Deer
Management Report
of survey-inventory activities
1 July 1998–30 June 2000

Mary V. Hicks, Editor
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ADF&G

Please note that population and harvest data in this report are estimates and may be refined at a later date.

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If used in part, the reference would include the author's name, unit number, and page numbers. Authors' names can be found at the end of each unit narrative.

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LOCATION

GAME MANAGEMENT UNIT: 1A (5300 mi^2)

GEOGRAPHIC DESCRIPTION: Unit 1 south of Lemesurier Point, including all drainages into Behm Canal and excluding all drainages into Ernest Sound

BACKGROUND

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

Weather conditions and population levels influence deer harvests. Unit 1A harvests ranged from 350 to 915 deer during the past 12 seasons, with hunting seasons generally extending from August through November or December. Limited hunting of antlerless deer was allowed before 1978, but now only bucks are legal. As clearcut logging continues to reduce old-growth habitat in portions of Unit 1A, deer populations are expected to decline. Population models indicate declines in carrying capacity of 50–60% 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 GOALS

In fall 2000 the Board of Game took action to establish a Unit 1A population goal of 15,000 deer and a harvest goal of 700 deer, based on high consumptive use of the deer population in the subunit.

MANAGEMENT OBJECTIVES

- Maintain populations in excess of 45 deer per mi^2 of winter range, as determined by mean densities of 1.4 pellet groups per plot (Kirchhoff 1990).

METHODS

We collected population information from spring pellet-group surveys and to a lesser degree from hunters' anecdotal reports. 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 season.

We surveyed deer pellet-group transects in 4 watersheds (or value comparison units–VCUs) during 1999 and 4 during spring 2000. Methods for conducting the surveys are described by Kirchhoff and Pitcher (1988). We conducted beach mortality transects along previously established routes in the spring to measure overwinter mortality.

The Department of Wildlife Conservation (DWC) has mailed hunter surveys annually since 1980, with the exception of 1981. DWC mails harvest questionnaires to 33% of all Region I deer

harvest ticket holders, and results are expanded to estimate hunting results of all harvest ticket holders. We also estimate the number of hunters reporting as state proxy hunters or federal-designated hunters from the surveys.

The Division of Subsistence (DS) has historically conducted personal interview household surveys to estimate deer harvests, and some of their results conflict with our estimates. DS has done 4 Subsistence Resource Personal Interview Household Surveys of rural communities in the last 13 years.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

The highest 1998 deer-pellet densities in Unit 1A were on East Gravina Island and the lowest counts were at Whitman Lake and Helm Bay. Helm Bay deer population trends have continued to decline since the 1988 high. George Inlet data indicate populations remained stable between 1994 and 1996 and declined by 47% between 1996 and 1998 (Table 1). Deer pellet densities in Unit 1A declined sharply during spring 1999, with record lows in Port Stewart and Spacious Bay. The average pellet-group count of 0.09 per plot in Spacious Bay during 1999 was one of the lowest ever recorded in the unit. This low count translates into an estimated 3 deer/mi^2. Overall, we believe deer densities in Unit 1A declined during both 1998 and 1999.

Deer densities vary within and between VCUs in Unit 1A, and some of them declined considerably during 1999 and have more recently rebounded. Pellet-group counts on the Cleveland Peninsula have declined during the past 2 years, yet counts on Gravina were higher but remain slightly below the long-term average. Average counts of pellet groups per plot across the subunit were 0.5 and 0.7 during 1999 and 2000, respectively. The management objective of 45 deer/mi^2 has not been met in 8 VCUs sampled during the past 2 years; deer density estimates between 17 and 23 deer/mi^2 are indicated during this report period.

Unlike the high densities of 3.9 pellet groups per plot observed in Unit 4 (Kirchhoff 1996), Unit 1A densities represent low to moderate deer population levels. We believe the disparity between these densities is partly due to the presence of wolves in Unit 1A and their absence from Unit 4.

MORTALITY

Harvest

Season and Bag Limit	Resident and Nonresident Hunters	
Unit 1A	Aug 1–Dec 31	4 bucks

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

Hunter Harvest. Deer hunters throughout Southeast Alaska reported good success during 1998 but killed fewer deer during the 1999 season. The 1998 Unit 1A harvest was near the long-term average, but in 1999 dropped to only half that level. The overall hunter success rate for Unit 1A was only 25%, considerably below the regional average of 59%. During the 1999 season, Unit

1A had the highest average number of days/deer (12.7) for all of Southeast. The harvest estimate of 287 deer, a 25% success rate, and an average of 0.4 deer per hunter in 1999 were the lowest recorded for the unit since 1984 (Table 2).

The 1999 Gravina Island harvest was only 20% of the 1998 kill. The number of hunters on Gravina declined by 46%, from 360 in 1998 to 194 in 1999, and the reported hunter success rate was only 13%, far lower than elsewhere in Region 1. Hunters on Gravina spent 16 days afield for every deer taken. A dispersed deer population early in the 1999 season and poor weather during the November rut, making boat travel risky, contributed to the low deer harvest (Paul 1998, 1999).

Deer hunters on the Cleveland Peninsula saw a slight recovery from a 4-year trend of declining harvest, going from 23 deer in 1998 to 59 deer in 1999, but the 1999 total was still only 39% of the long-term average of 150. The number of hunters using the area was also lower during this report period (Paul 1998, 1999).

Despite the fact that Unit 1A has maintained an antlered-only hunt, several does are reported killed each season. A total of 11 does were reported during 1998, and another 13 in 1999 (Paul 1998, 1999). This probably represents only a portion of the illegal doe harvest. Although the degree of illegal harvests in Unit 1A is unknown, Wood (1990) thought it was considerable. Flynn and Suring (1989) estimated that actual hunter kills might be 38% greater than total estimated harvests from hunter reports because of crippling loss.

Harvest Chronology. Most of Unit 1A deer harvests occur during August and November, accounting for 30% and 35%, respectfully, of deer killed during the past 2 years (Table 6). Sitka black-tailed deer rut during November, and consequently spend more time moving in November during daylight hours, compared to other months, making them more visible and vulnerable to hunters. Bucks respond to a deer call more during the rut; consequently, hunters concentrate their efforts during this same period.

Transport Methods. The majority of Unit 1A hunters continue to use boats to access hunting areas. Boat (74%) and highway (14%) access accounted for most harvested deer during 1998–99 (Table 6). Airplanes account for less than 5% of the reported hunter transportation to the field (Paul 1999).

Other Mortality

Vehicle/deer collision estimates have remained low (5–10 deer/year), and collisions are not a significant source of deer mortality. Unreported and illegal harvest is estimated at 50% of the reported harvest in Unit 1A. Based on staff observations and responses to trapper questionnaires, wolf populations are abundant in Unit 1A (Table 7). We estimate that wolves and black bears eat several thousand deer each year. Person et al. (1996) estimated that 26 deer are killed per wolf per year in Unit 2. At present there are no accurate estimates of black bear predation on deer in Southeast.

Black-tailed deer populations fluctuate due to extreme weather patterns throughout Alaska (Kirchhoff 1990). Previously established deer mortality transects provide a relative measure of overwinter deer mortality. Winter mortality beach transects were visited during spring 1999 and 2000 to search the beach fringe for deer carcasses. When a carcass was located, we examined it to determine cause of death and to estimate body condition at time of death. We classified deer

by breaking a long bone to assess marrow condition; if we found the lower jaw, we determined age by tooth wear. The winter of 1998/99 was the worst in 30 years, and patches of snow persisted to late spring 1999. In some Cleveland Peninsula areas, biologists found knee-deep snow between 200 and 600-ft elevation during 1999 spring pellet counts. Similarly, areas on Revilla Island had as much as 2–3 feet of snow near the beach during late March 1999. Several starved deer were found along the shoreline, and we assume deer starvation was widespread during winter. Winter 1999/00 was much milder and only a few dead deer were observed along the beaches. We believe fewer deer died from malnutrition during winter 2000.

The number of hunters reporting as state proxy hunters or federal-designated hunters was lower in 1999 than in 1998. We estimate 9 federal-designated hunters from Ketchikan took 23 deer with a 100% success rate in 1998. Seven federal-designated hunters registered but did not report harvesting deer in 1999 (Paul 1998, 1999). Similarly, there were fewer state proxy hunters in 1999 than in 1998. A total of 28 hunters registered in 1998 to hunt under the state proxy program and harvested 33 deer for a 66.7% success rate. A total of 17 hunters registered in 1999 as state proxy hunters and reported taking 31 deer, a 100% success rate.

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, critical to deer during winters of heavy snowfall. U.S. Forest Service and DWC habitat models predict that the forest's capacity to support deer in average winters will decline by nearly half by 2054. This loss will be greater in years with deep snow. By 2054 we expect that few areas will meet projected hunter demand within roaded and logged portions of Unit 1A (USFS 1989).

CONCLUSIONS AND RECOMMENDATIONS

Based on pellet-group data, our objective of maintaining 45 deer/mi^2 in winter habitat was not achieved in any of the VCUs sampled in Unit 1A during 1999 or 2000. Estimated 1999 densities ranged from 3 deer/mi^2 at Spacious Bay to 25 deer/mi^2 in Port Stewart. Estimated 2000 densities ranged from 4 deer/mi^2 on Duke Island to 40 deer/mi^2 at Port Stewart. Pellet-group data should be viewed as an indicator of population trends and not as an actual measure of deer abundance.

South Revilla and Gravina islands continue to produce most of the Unit 1A deer harvest. Easy access from the population center of Ketchikan continues to make these areas popular hunting destinations.

Although the winter of 1998/99 was one of the most severe in nearly 3 decades, weather did not affect hunting patterns or success during the fall 1998. Until late December, weather during the deer hunting season was mild with relatively less snowfall at low elevations across much of Southeast. However, weather turned severe in January 1999 with winter snowfall 120–200% above normal in most areas of the region. The snow accumulation and long-lasting effects varied dramatically, even in adjacent drainages in some instances. Besides lowering deer hunter success rates, the snow-free early winter of 1999 probably resulted in higher than usual overwinter survival in most areas. The winter of 1999/00 was much milder, and overwinter mortality was low, providing the deer population a chance for recovery.

Beach transects during the spring provide a relative measure of overwinter mortality and also provide a measure of spring range condition and snow persistence. Winter mortality was low during 98/99 and much more dramatic during winter and spring 99/00. The winter of 2000/01 has been much milder and may go on record as being the mildest winter in 20 years.

The Division of Subsistence deer hunter survey results have consistently been high, sometimes 3 times greater than DWC estimates. The major differences between surveys are that the DS survey estimates more hunters in communities and a higher hunter success rate. The DWC survey estimates a slightly higher number of deer taken per successful hunter. The actual harvest probably lies somewhere between the 2 estimates. DS and DWC have agreed to work together on ways to link future surveys to discover why the results are so different. DS Resource Specialists conducted household surveys in some communities around southern Southeast in 1999, and those results will soon be available.

Wolf abundance remained relatively high in recent years, and predation continues to influence deer populations. Based on responses to trapper questionnaires and staff observations, wolves are abundant in Unit 1A.

As noted in the past (Wood 1990, Larsen 1993, 1995), we are aware of illegal deer hunting in southern Southeast. The illegal harvest in Unit 1A is believed to be high, but little data exist to quantify the numbers killed. Although the taking of female deer is illegal in 1A, several hunters voluntarily noted the harvest of does on the DWC mail questionnaire.

Effort should be made to inform the public about effects of logging on deer populations to alert the public to the tradeoffs between timber harvest and wildlife. We anticipate that winter habitat loss through logging will reduce deer carrying capacity for many decades. Long-term implications of habitat loss include the inability to provide for subsistence needs and the loss of deer hunting opportunities (Wood 1990, Larsen 1993). Changes this past year with the Roadless Initiative passed by Congress will protect some prime deer habitat from future logging activities (USDA 2000).

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Table 1 Unit 1A deer pellet-group survey results, regulatory years 1981–1982 through 1999–2000

Area	Regulatory year	Mean pellet groups/plot[a]	Number of plots	95% CI
Smugglers Cove (VCU 715)	1981–1982	0.48	147	0.30–0.66
Helm Bay (VCU 716)	1981–1982	0.16	704	0.12–0.19
	1984–1985	0.54	302	0.44–0.65
	1985–1986	0.85	181	0.65–1.05
	1988–1989	1.67	247	1.38–1.95
	1991–1992	1.63	240	1.35–1.92
	1992–1993	1.25	169	0.96–1.53
	1993–1994	1.37	286	1.16–1.59
	1995–1996	1.31	284	1.09–1.52
	1997–1998	0.79	265	0.65–0.99
	1998–1999	0.44	232	0.34-0.55
Port Stewart (VCU 719)	1993–1994	1.22	289	1.03–1.42
	1995–1996	1.61	278	1.35–1.87
	1997–1998	1.29	289	1.08–1.50
Spacious Bay (VCU 722)	1993–1994	0.54	300	0.43–0.64
	1995–1996	0.45	283	0.35–0.54
	1997–1998	0.43	276	0.33–0.53
Margaret (VCU 738)	1985–1986	0.57	515	0.47–0.66
	1986–1987	0.84	251	0.69–1.00
	1988–1989	1.32	110	0.97–1.67
	1989–1990	0.62	129	0.44–0.84
	1990–1991	0.56	274	0.44–0.68
	1991–1992	0.76	272	0.58–0.94
	1993–1994	0.31	281	0.23–0.39
	1995–1996	0.70	304	0.56–0.84
	1997–1998	0.56	297	0.43–0.68
	1999–2000	0.47	264	0.98–1.45
George Inlet (VCU 748)	1981–1982	0.21	110	0.09–0.33
	1984–1985	0.27	344	0.19–0.35
	1985–1986	0.52	313	0.39–0.65

Table 1 Continued

Area	Regulatory year	Mean pellet groups/plot[a]	Number of plots	95% CI
	1989–1990	1.41	169	1.08–1.75
	1990–1991	1.03	240	0.82–1.25
	1991–1992	1.49	168	1.15–1.84
	1992–1993	0.65	195	0.49–0.81
	1994–1995	0.95	309	0.79–1.11
	1996–1997	0.98	305	0.76–1.19
	1998–1999	0.52	314	0.40–0.65
	1999–2000	0.51	270	0.38–0.64
Whitman Lake	1981–1982	0.18	45	0.02–0.33
(VCU 752)	1987–1988	0.16	187	0.09–0.23
	1990–1991	0.45	193	0.32–0.59
	1992–1993	0.20	189	0.12–0.28
	1997–1998	0.81	181	0.63–0.98
	1998–1999	0.47	209	0.33–0.61
Carroll Point	1985–1986	0.66	118	0.46–0.86
(VCU 758)	1986–1987	0.75	118	0.56–0.95
	1988–1989	1.15	85	0.82–1.49
	1992–1993	0.28	87	0.14–0.41
	1994–1995	0.70	125	0.49–0.90
	1998–1999	0.51	125	0.38–0.64
Moth Bay	1985–1986	0.59	140	0.42–0.74
(VCU 759)	1986–1987	0.98	156	0.79–1.17
	1988–1989	0.72	78	0.46–0.97
	1992–1993	0.48	136	0.30–0.66
	1994–1995	0.95	136	0.71–1.17
	1998–1999	0.68	176	0.53–0.82
Lucky Cove	1985–1986	1.16	335	1.00–1.33
(VCU 760)	1986–1987	1.16	258	0.95–1.32
	1988–1989	1.02	65	0.69–1.34
	1991–1992	1.39	271	1.07–1.70

Table 1 Continued

Area	Regulatory year	Mean pellet groups/plot[a]	Number of plots	95% CI
Blank Inlet (VCU 764)	1981–1982	1.24	108	0.89–1.59
Dall Head (VCU 765)	1981–1982	0.52	69	0.31–0.74
	1996–1997	1.07	295	0.90–1.24
	1998–1999	0.84	287	0.67–1.01
	1999–2000	0.94	285	0.77–1.14
Duke Island (VCU 767)	1996–1997	0.05	294	0.02–0.09
	1999–2000	0.12	281	0.08–0.18
Alva Bay (VCU 769)	1985–1986	0.52	311	0.39–0.65
	1986–1986	0.85	326	0.68–1.01
	1991–1992	1.64	143	1.22–2.05
	1994–1995	0.79	326	0.64–0.94
	1996–1997	0.93	324	0.77–1.09
	1998–1999	0.66	335	0.52–0.79
	1999–2000	0.73	339	0.56–0.93
Wasp Cove (VCU 772)	1985–1986	0.41	271	0.31–0.51
	1986–1987	0.50	300	0.38–0.62
	1989–1990	0.58	145	0.39–0.77
	1991–1992	0.13	207	0.07–0.18
Winstanley Island (VCU 821)	1991–1992	0.27	49	0.11–0.42
East Gravina (all transects) (VCU 999)	1981–1982	1.06	226	0.89–1.22
	1984–1985	0.86	1,087	0.78–0.94
	1985–1986	1.23	1,172	1.13–1.32
	1986–1987	1.40	1,267	1.30–1.50
East Gravina (trans. 1–3) (VCU 999)	1984–1985	0.88	376	0.73–1.03
	1985–1986	1.44	224	1.20–1.67
	1986–1987	1.62	346	1.43–1.81
	1987–1988	1.63	334	1.41–1.84
	1988–1989	2.07	278	1.79–2.35
	1989–1990	1.13	182	0.86–1.41

Table 1 Continued

Area	Regulatory year	Mean pellet groups/plot[a]	Number of plots	95% CI
	1990–1991	1.40	279	1.12–1.68
	1991–1992	1.12	154	0.80–1.43
	1992–1993	1.22	302	1.05–1.38
	1994–1995	1.52	331	1.37–1.79
	1996–1997	1.47	338	1.28–1.67
	1997–1998	1.71	274	1.47–1.95
	1998–1999	1.34	307	1.12–1.56
	1999–2000	1.24	267	1.06–1.42

[a]Density 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

Table 2 Unit 1A deer harvest data, regulatory years 1984–1985 through 1999–2000

Regulatory year	Nr hunters	Nr successful hunters	Percent successful	Hunter days	Average hunter days	Deer[a]	Average deer per hunter	Average hunter days per deer
1984–1985	1060	440	42	5280	5.5	620	0.6	9.3
1985–1986	1108	412	37	5683	5.1	779	0.7	7.3
1986–1987	1107	529	48	7100	6.4	859	0.8	8.3
1987–1988	946	376	40	6379	6.7	611	0.6	10.4
1988–1989	958	413	43	4930	5.1	686	0.7	7.2
1989–1990	982	335	34	4348	5.1	592	0.6	7.3
1990–1991	1009	443	44	5127	5.1	723	0.7	7.1
1991–1992	734	259	35	3094	4.2	347	0.5	8.9
1992–1993	751	294	39	4519	6.0	686	0.9	6.6
1993–1994	996	344	34	4465	4.5	515	0.5	8.7
1994–1995	1067	516	48	5514	5.2	912	0.8	6.0
1995–1996	1118	493	44	5080	4.5	914	0.8	5.5
1996–1997[b]	---	344	---	---	---	539	---	---
1997–1998	875	333	38	4208	2.6	528	0.6	8.0
1998–1999	922	338	37	3482	3.8	556	0.6	6.3
1999–2000	747	189	25	3644	4.9	287	0.4	12.7
$\bar{x}$	944	366	38	4705	5.0	611	1.0	

[a]Includes does which were reported killed.

[b] Some harvest data not available for 1996.

Table 3 Unit 1A deer harvests from major harvest areas, regulatory years 1990–1991 through 1999–2000

Major harvest area	Regulatory year	Nr hunters expanded	Nr successful hunters expanded	Percent successful	Hunter days expanded	Average days per hunter	Average deer per hunter	Deer killed
1-Gravina Island	1990–1991	221	72	33	614	2.8	0.5	101
	1991–1992	198	46	23	624	3.2	0.2	46
	1992–1993	179	64	35	801	4.5	0.9	160
	1993–1994	266	52	19	553	2.1	0.3	87
	1994–1995	246	80	32	578	2.4	0.5	115
	1995–1996	404	164	40	1413	3.5	0.8	328
	1996–1997	---	83	---	---	---	---	135
	1997–1998	373	95	24	971	2.6	0.4	131
	1998–1999	361	110	30	859	2.4	0.5	183
	1999–2000	194	25	13	574	3.0	0.2	35
2-Annette Island	1990–1991	16	13	78	39	2.4	1.1	18
	1991–1992	6	0	0	11	2.0	0.0	0
	1992–1993	16	16	100	179	10.9	5.5	91
	1993–1994	22	11	52	112	5.1	0.6	14
	1994–1995	15	0	0	49	3.1	0.0	0
	1995–1996	16	13	80	84	5.2	1.2	19
	1996–1997	---	---	---	---	---	---	---
	1997–1998	15	9	60	15	1.0	0.6	9
	1998–1999	12	0	0	29	2.4	0.0	0
	1999–2000	13	6	46	58	4.5	1.5	19

Table 3 Continued

Major harvest area	Regulatory year	Nr hunters expanded	Nr successful hunters expanded	Percent successful	Hunter days expanded	Average days per hunter	Average deer per hunter	Deer killed
3-Duke Island	1990–1991	9	2	20	18	2.0	0.2	2
	1991–1992	33	8	26	70	2.2	0.6	20
	1992–1993	22	3	12	58	2.6	0.1	3
	1993–1994	15	0	0	15	1.0	0.0	0
	1994–1995	3	0	0	7	2.0	0.0	0
	1995–1996	19	0	0	49	2.5	0.0	0
	1996–1997	---	---	---	---	---	---	---
	1997–1998	12	6	50	18	1.5	0.5	6
	1998–1999	---	---	---	---	---	---	---
	1999–2000	---	---	---	---	---	---	---
4–South Revilla	1990–1991	594	180	30	2610	4.4	0.4	259
	1991–1992	416	124	30	1134	2.7	0.4	147
	1992–1993	341	61	18	1376	4.0	0.3	102
	1993–1994	463	135	29	1883	4.1	0.4	188
	1994–1995	600	212	35	2696	4.5	0.6	389
	1995–1996	572	168	29	1925	3.4	0.4	218
	1996–1997	---	165	---	---	---	---	229
	1997–1998	456	170	37	1873	4.1	0.6	252
	1998–1999	461	157	34	1356	2.9	0.5	222
	1999–2000	458	86	19	1871	4.1	0.3	119

Table 3 Continued

Major harvest area	Regulatory year	Nr hunters expanded	Nr successful hunters expanded	Percent successful	Hunter days expanded	Average days per hunter	Average deer per hunter	Deer killed
5–North Revilla	1990–1991	242	82	34	801	3.3	0.4	103
	1991–1992	204	55	27	748	3.7	0.4	76
	1992–1993	275	55	20	846	3.1	0.3	80
	1993–1994	345	80	23	1033	3.0	0.3	97
	1994–1995	347	136	39	1049	3.0	0.6	192
	1995–1996	334	137	41	918	2.7	0.6	192
	1996–1997	---	62	---	---	---	---	85
	1997–1998	159	42	26	445	2.8	0.4	56
	1998–1999	175	51	29	509	2.9	0.3	61
	1999–2000	88	29	33	282	3.2	0.5	44
6–Cleveland Peninsula	1990–1991	245	122	50	981	4.0	1.0	236
	1991–1992	158	42	26	458	2.9	0.4	59
	1992–1993	280	126	45	1159	4.1	0.9	241
	1993–1994	262	74	28	705	2.7	0.4	109
	1994–1995	307	155	51	1044	3.4	0.7	208
	1995–1996	200	70	35	549	2.7	0.6	114
	1996–1997	---	---	---	---	---	---	96
	1997–1998	186	52	28	512	2.8	0.4	69
	1998–1999	158	23	15	525	3.3	0.1	23
	1999–2000	146	32	22	645	4.4	0.3	49

Table 3 Continued

Major harvest area	Regulatory Year	Nr hunters expanded	Nr successful hunters expanded	Percent successful	Hunter days expanded	Average days per hunter	Average deer per hunter	Deer killed
7–North Mainland	1990–1991	10	2	20	58	5.8	0.4	4
	1991–1992	11	0	0	33	3.0	0.0	0
	1992–1993	25	8	33	75	3.0	0.3	8
	1993–1994	38	19	49	164	4.3	0.5	19
	1994–1995	19	1	5	84	4.5	0.1	1
	1995–1996	28	7	26	56	2.0	0.3	7
	1996–1997	---	---	---	---	---	---	---
	1997–1998	15	0	0	153	10.2	0	0
	1998–1999	9	0	0	42	4.7	0	0
	1999–2000	14	0	0	43	3.1	0	0
8–South Mainland	1990–1991	3	0	0	7	2.5	0.0	0
	1991–1992	9	0	0	15	1.8	0.0	0
	1992–1993	8	0	0	25	3.0	0.0	0
	1993–1994	---	---	---	---	---	---	-
	1994–1995	3	3	100	7	2.0	2.0	7
	1995–1996	38	21	56	86	2.3	0.9	35
	1996–1997	---	6	---	---	---	---	11
	1997–1998	6	6	100	23	3.8	1.0	6
	1998–1999	24	14	58	33	1.4	0.8	18
	1999–2000	10	0	0	10	1.0	0.0	0

Table 4 Unit 1A reported and estimated deer harvest/mortality, regulatory years 1984–1985 through 1999–2000

Regulatory	Reported harvest			Unreported & illegal	Estimated	Estimated Nr
year	Male	Female	Total	harvest[a]	total harvest	road kills
1984–1985	620	0	620	310	930	1–5
1985–1986	779	0	779	390	1169	1–5
1986–1987	859	0	859	430	1289	1–5
1987–1988[b]	611	0	611	306	917	1–5
1988–1989	686	0	686	343	1029	1–5
1989–1990	587	5	592	296	888	1–5
1990–1991	642	81	723	361	1084	1–5
1991–1992	331	61	347	173	520	1–5
1992–1993	661	25	686	343	1029	1–5
1993–1994	515	0	515	257	772	1–5
1994–1995	877	35	912	456	1368	1–5
1995–1996[b]	853	61	914	457	1371	1–5
1996–1997	533	6	539	270	809	1–5
1997–1998	459	69	528	264	792	1–5
1998–1999	545	11	556	278	834	1–5
1999–2000	275	13	288	144	432	1–5
$\bar{x}$	616	23	635	317	952	1–5

[a]Unreported and illegal harvest is estimated at 50% of reported harvest.
[b]Antlerless seasons: State season in 1987, Federal season in 1995.

Table 5 Unit 1A deer hunter residency and success, regulatory years 1988–1989 through 1999–2000

Regulatory year	Successful				Unsuccessful			
	Local resident[a]	Nonlocal resident	Nonresident	Total	Local resident[a]	Nonlocal resident	Nonresident	Total
1988–1989	392	21	0	413	508	37	0	545
1989–1990	310	25	0	335	607	40	0	647
1990–1991	429	14	0	443	527	38	2	567
1991–1992	259	0	0	259	418	53	4	475
1992–1993	292	2	0	294	440	10	8	458
1993–1994	336	3	6	345	619	21	11	651
1994–1995	509	5	2	516	513	27	11	551
1995–1996	464	23	6	493	601	12	12	625
1996–1997	344	---	---	344	---	---	---	---
1997–1998	319	0	14	333	512	16	14	542
1998–1999	323	15	0	338	575	5	4	584
1999–2000	161	29	0	190	517	10	0	527
$\bar{x}$	345	12	3	359	531	24	6	

[a]Local residents includes Alaskans living within Unit 1A boundaries.

Table 6 Unit 1A deer harvest chronology and method of transportation used by all hunters, regulatory years 1988–1989 through 1999–2000

Regulatory Year	Month of kill							Method of transportation[a]					
	Aug	Sept	Oct	Nov	Dec	Jan	Unk	Airplane	Boat	Foot	Highway vehicle[b]	Other	Unk
1988–1989	165	80	172	197	52	0	20	63	1456	458	518	7	107
1989–1990	97	68	165	221	35	5	4	93	1394	411	465	25	0
1990–1991	92	85	171	325	50	0	0	105	1366	514	515	0	14
1991–1992	121	0	65	140	21	0	0	40	972	329	367	0	15
1992–1993	118	33	213	283	30	0	9	35	1042	377	304	8	0
1993–1994	126	32	88	239	30	0	0	171	1139	553	602	32	18
1994–1995	171	33	273	315	97	21	2	117	1436	405	638	50	18
1995–1996	206	145	179	268	116	0	0	56	1570	501	581	64	7
1996–1997	187	28	91	170	11	0	51	---	---	---	---	---	---
1997–1998	105	87	104	179	23	0	29	34	641	59	122	20	0
1998–1999	136	80	113	110	54	16	5	42	667	42	171	---	---
1999–2000	62	17	65	97	24	0	22	54	481	45	168		
$\bar{x}$	132	57	142	212	45	--	12	74	1106	336	405	23	20

[a]Numbers of successful and unsuccessful hunter trips.
[b]Includes cars, trucks, and off-road vehicles (3- and 4-wheelers).

Table 7 Unit 1A deer pellet group and harvest data, predator abundance(I_A)[a], and weather severity indices, regulatory years 1981–1982 through 1999–2000

Regulatory year	Pellet-group data[b]	Harvest data			Wolf abundance	Weather index[c]
		Total harvest	Deer kill/ hunter day	Hunter success (percent)		
1981–1982	---	---	---	---	---	6.3
1982–1983	---	---	---	---	---	1.3
1983–1984	0.6	---	---	---	---	1.3
1984–1985	0.7	620	0.10	42	---	4.7
1985–1986	1.0	779	0.14	37	---	2.0
1986–1987	1.1	859	0.12	48	---	2.7
1987–1988	1.6	611	0.09	40	---	1.7
1988–1989	1.0	686	0.14	43	---	4.7
1989–1990	0.9	587	0.13	34	---	1.3
1990–1991	1.1	723	0.14	44	---	2.3
1991–1992[d]	0.8	347	0.11	35	86	0.3
1992–1993	0.9	686	0.15	39	65	3.0
1993–1994	1.0	515	0.11	34	57	1.7
1994–1995	1.0	912	0.16	48	93	4.7
1995–1996	1.1	914	0.18	44	80	2.7
1996–1997	0.9	807	---	---	83	---
1997–1998	0.7	792	0.13	38	80	---
1998–1999	0.5	556	0.16	37	81	---
1999–2000	0.7	287	0.08	25	82	---
$\bar{x}$	0.94	668	0.13	39	79	2.7

[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 to 1996 Unit 1A trapper questionnaires.

[b] Mean 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.

LOCATION

GAME MANAGEMENT UNIT: 1B (3000 mi^2)

GEOGRAPHIC DESCRIPTION: SE Alaska mainland from Cape Fanshaw to Lemesurier Point

BACKGROUND

Sitka black-tailed deer inhabit the Unit 1B mainland in low densities. Deer numbers have fluctuated over time with high and low population extremes. Severe winter weather has caused most declines, and illegal hunting and predation by wolves and bears have extended the length of the declines. Clear-cut logging has reduced deer carrying capacity in some areas.

The most recent significant population declines occurred in the late 1960s and early 1970s, leading to restrictive regulations and bag limits in 1973. Unit 1B remained open, with a 1 deer (antlered) limit from 1973 to 1980 and a 2 deer (antlered) limit from 1981 to the present.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

Population objectives for Unit 1B deer are to maintain healthy, productive populations, sufficiently abundant and resilient to harsh winters, to ensure good hunting opportunities and success. The population objective for deer in Unit 1B is from 6400 to 10,200 deer.

MANAGEMENT OBJECTIVES

- Increase deer populations on winter range (<1500 foot elevation) to 32 deer/mi^2 (1.0 pellet group/20 m^2 plot).
- Monitor deer densities using pellet-group surveys.
- Monitor deer harvest using mailed questionnaires.

METHODS

We estimated Unit 1B harvest data from a regional questionnaire, mailed to a random sample of 33% of deer harvest ticket holders. Relative winter deer densities are periodically measured with spring pellet-group transects in selected areas.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Unit 1B pellet-group surveys are currently inadequate to determine deer population trends (Table 1). The 1996 count of 1.53 pellet groups/plot indicated a moderately high deer density in the Muddy River survey area. The 1998 Horns Cliff count of .59 pellet groups/plot indicated a low deer density. The low Horns Cliff count was partly due to less snow during the winter of 1997/98, which probably caused many deer to remain above 1500 feet, the cutoff elevation for pellet-group surveys. No pellet-group surveys were conducted in Unit 1B during this report period.

MORTALITY

Harvest

Season and Bag Limit	Resident and Nonresident Hunters	
Unit 1B	Aug 1–Dec 31	2 antlered deer

Board of Game Actions and Emergency Orders. During this period the Board of Game took no action, and no emergency orders were issued.

Hunter Harvest. Hunter harvest was relatively low in 1998 with only 72 deer harvested (Table 2). In 1999 the harvest was slightly higher with 85 deer harvested, which is equivalent to the long-term average. For the first time, the North Arm of the Stikine River had the highest harvest in the unit with 30 deer, and another 20 were reported taken from the Thomas Bay area. Anecdotal evidence suggests that the deer population in the Thomas Bay area has increased.

Hunter Residency and Success. Few nonresidents reported hunting deer in Unit 1B during the report period, and none was successful (Table 3). Deer populations are greater and seasons and bag limits more liberal in other nearby units, attracting nonlocal hunters. The total number of hunters increased from 152 in 1997 to 186 in 1998, and then decreased to 160 in 1999. The success rate declined from 48% in 1997 to 30% and 32% in 1998 and 1999, respectively.

Harvest Chronology. Table 5 shows the harvest percentage by month. Generally most deer harvest takes place during October and November. During the report period, November and October, respectively, provided the highest percent of harvest.

Transport Methods. Most hunters traveled by boat to their hunting areas (Table 4). A small percentage of hunters reported using airplanes or highway vehicles to access hunt areas. Logging roads provide some 4-wheeler and highway vehicle access.

CONCLUSIONS AND RECOMMENDATIONS

Unit 1B deer populations seem stable 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.

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Table 1 Unit 1B deer population trends as indicated by pellet-group surveys, regulatory years 1991–1992, 1996–1997, 1998–1999

Area	Regulatory year	Mean pellet groups/plot	Number of plots	95% CI
Frosty Bay (VCU 524)	1991–1992	.70	266	0.55–0.86
Muddy River (VCU 489)	1996–1997	1.53	348	1.26–1.80
Horn Cliffs (VCU 490)	1998–1999	.60	250	0.47–0.74

Table 2 Unit 1B deer harvest, 1990–2000

Regulatory year	Estimated legal harvest						Estimated illegal harvest					Total[a]
	M	(%)	F	(%)	Unk.	Total	M	(%)	F	(%)	Unk.	
1990–1991	148	(100)				148						148
1991–1992	50	(100)				50						50
1992–1993	142	(100)				142			6	(100)		148
1993–1994	164	(100)				164			21	(100)		185
1994–1995	184	(100)				184						184
1995–1996	75	(100)				75						75
1996–1997	56	(100)				56						56
1997–1998	105	(100)				105						105
1998–1999	72	(100)				72						72
1999–2000	73	(100)				73			12	(100)		85

[a] Data from mail questionnaire.

Table 3 Unit 1B deer hunter residency and success, 1990–2000

	Successful					Unsuccessful					
Regulatory year	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Total hunters
1990–1991	89	14	0	103	(52)	80	14	3	97	(48)	200
1991–1992	37	8	0	45	(43)	40	17	2	59	(57)	104
1992–1993	123	10	0	133	(54)	94	18	0	112	(46)	245
1993–1994	80	27	0	107	(56)	53	26	6	85	(44)	192
1994–1995	107	18	0	125	(48)	100	35	2	137	(52)	262
1995–1996	40	16	0	56	(33)	81	32	0	113	(67)	169
1996–1997	46	6	0	52	NA	NA	NA	NA	NA	NA	NA
1997–1998	61	12	0	73	(48)	68	11	0	79	(52)	152
1998–1999	51	5	0	56	(30)	112	14	4	130	(70)	186
1999–2000	38	14	0	52	(32)	65	29	14	108	(68)	160

[a] Residents of Units 1B, 3, Meyers Chuck, Point Baker, and Port Protection.

Table 4 Unit 1B deer hunter effort, percent by transport method, 1990–2000[a]

Regulatory year	Percent of effort							Number of trips
	Airplane	Boat	3- or 4-wheeler	Foot	ORV	Highway vehicle	Other	
1990–1991		85	15	1				307
1991–1992		86	14					148
1992–1993		87	3	6	2	3		422
1993–1994	10	74		8		8		244
1994–1995	5	91	2			2		345
1995–1996	3	89	2	3	2			226
1996–1997		100						NA
1997–1998	4	86	7			3		NA
1998–1999		91	4			5		NA
1999–2000	3	94				3		NA

[a] The hunter survey reports transport as total number of hunting trips by method.

Table 5 Unit 1B deer harvest chronology by month and percent, 1990–2000

Regulatory year	Harvest periods							
	Aug	Sep	Oct	Nov	Dec	March	Unk	Deer[a]
1990–1991	18	10	15	53	3	0	0	148
1991–1992	10	0	47	22	22	0	0	51
1992–1993	39	0	5	27	30	0	0	148
1993–1994	14	17	22	47	0	0	0	185
1994–1995	14	0	14	59	13	0	0	183
1995–1996	6	0	66	28	0	0	0	75
1996–1997	0	10	38	25	27	0	0	56
1997–1998	4	17	41	18	13	0	7	105
1998–1999	15	9	24	24	7	7	14	72
1999–2000	5	9	0	27	14	0	45	85

[a] May not equal harvest table due to rounding or incomplete reporting.

LOCATION

GAME MANAGEMENT UNIT: 1C (7600 mi^2)

GEOGRAPHIC DESCRIPTION: 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 has kept the number of deer lower than that on adjacent islands. Severe winters in 1969 and 1971 increased mortality and reduced deer numbers (Olson 1979). A 1963 population estimate suggested 200,000 deer were in Southeast Alaska at that time (Merriam 1965). The regionwide harvest in the 1962 season was 10,500 deer. Hunter surveys, still conducted today, were begun in 1970. These surveys have grown from phone surveys of a few deer hunters to a mail-out survey of a random list of hunters beginning in 1980. Pellet-group counts (Kirchhoff and Pitcher 1988) were begun in Unit 1C in 1984 and have been conducted on Douglas, Harbor, Lincoln, and Shelter islands on a near annual basis, but rarely in mainland locations. Deer densities were relatively high throughout the early to mid 1990s but declined substantially in 1998–99 due to the effects of a very severe winter. Since then, however, the deer population has rebounded because of 2 consecutive mild winters.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

As established by the Alaska Board of Game during their fall 2000 meeting in response to the intensive management of game law [AS 16.05.255 (i) (4)], the management goal is to manage the Unit 1C deer population to achieve and maintain a population of 6200 deer while maintaining an annual harvest of 456 deer.

MANAGEMENT OBJECTIVES

- 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.
- Monitor the deer harvest.
- Participate in annual deer-pellet surveys.

METHODS

A total of 11,281 deer harvest tickets were issued for the 1998 regulatory year (RY = 1 July–30 June) in Southeast Alaska and 11,770 for RY 1999. We mailed nearly one third of the harvest ticket holders a survey each year, and 60% responded. The survey was designed to collect

information on hunter effort, location of hunts, timing of hunts, number of days hunted, mode of transportation, and the number of deer harvested. Survey results for hunter effort, success, and kill location were expanded to estimate results for all harvest ticket holders. We conducted pellet-group surveys on Douglas, Shelter, and Sullivan Islands in RY 1998 and on Douglas Island in RY 1999.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

No population estimates are available for Unit 1C deer, but we monitor general population trends using deer pellet data. Pellet-group densities along transects on the north end of Douglas Island declined from 1.43 and 1.55 groups/plot during the previous report period to 1.03 and 0.88 groups/plot during spring 1999 and 2000, respectively. This decline reflects the severe winter of 1998–99 that resulted in winter mortality (2 carcasses were discovered while conducting pellet counts) on Douglas Island. At Inner Point on the southwest side of Douglas Island, pellet-group densities averaged 1.06 and 1.09 groups/plot during the spring of 1999 and 2000, respectively. These relatively low pellet-group densities are also probably due to the effects of the severe winter of 1998–99. Although these counts are higher than the 1997 count of 0.84 groups/plot, they are considerably lower than the 1996 count of 2.36 groups/plot. We believe the low 1997 count was due to many deer wintering above the highest pellet transect because of a winter with low snowfall. It may also have been influenced by selective logging along these transects during late summer and early fall of 1997.

In the spring 1999 the Shelter Island transects had a mean of 1.63 pellet groups/plot compared to 2.51 pellet groups/plot during the previous survey (spring of 1997). As in other parts of the unit, this decrease may be due to the severe winter of 1998–99. We did not conduct deer pellet surveys on adjacent Lincoln Island during this report period.

We conducted deer pellet surveys on Sullivan Island in the northernmost part of Unit 1C during spring 1999. Due to persisting snow cover, we were able to survey only those areas just above sea level and were unable to get a sample size large enough for a reliable estimate of the deer pellet groups/plot. However, general observations of deer droppings, tracks, and browsing indicated deer densities were fairly low.

MORTALITY

Harvest

Season and Bag Limit	Resident and Nonresident Hunters	
Unit 1C Douglas, Lincoln, Shelter, Sullivan islands	Aug 1–Dec 31	4 deer; antlerless deer may be taken only from Sep 15–Dec 31
Unit 1C Remainder	Aug 1–Dec 31	2 antlered deer

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

Hunter Harvest. Based on data gathered from the annual deer hunter survey, hunters killed 384 deer in 1998 and 339 in 1999 (Table 2). Of this harvest an estimated 77% and 75% of the harvest came from Douglas Island in 1998 and 1999, respectively. Does composed 29% of the 1998 harvest and 41% in 1999. The high doe harvest in 1999 was probably due to hunters' seeing fewer bucks because of the high 1998–99 winter kill.

Hunter Residency and Success. During the report period most hunters (94% in 1998, 91% in 1999) were Unit 1C residents, while nonlocal residents composed the majority of the remaining hunters. Nonresidents made up only 1% of 1998 hunters and did not account for any hunters in 1999 (Table 3). The hunter success rate ranged from 24% in 1998 to 26% in 1999. The harvest during this report period was relatively low, with the 1999 harvest of 339 deer being the second lowest in 15 years. An average of 1.7 and 1.5 deer were taken per successful hunter in 1998 and 1999, respectively. Hunters expended an average of 8.8 days of hunting per deer in 1998 and 6.8 days per deer in 1999. The average deer per hunter was .4 each year. The higher deer per successful hunter in 1998 is probably due to heavy snowfall during the last 2 weeks of the season that increased hunter effort and success. In general, the greater the snowfall, the greater the concentration of deer at lower elevations. Under such conditions hunters can locate and harvest deer much more easily. In 1999, snow levels never reached 1998 levels, and in 1999 fewer hunters went afield (2295) than in 1998 (3384).

Transport Methods. As in the past, most hunters used highway vehicles or boats to access hunting areas, with foot access being the third most popular method. During this report period 56% of hunters used highway vehicles for access, 33% used boats, and 10% used foot access. There were also a few hunters who were dropped off by aircraft. Hunters most commonly used highway vehicle and foot access while hunting the east and north sides of Douglas Island; boats were used for hunting on west Douglas Island, Shelter, Lincoln, Sullivan, and other islands in the unit. In 1998 hunters using foot access had a success rate of 35%, compared to hunters using boats (23%) or highway vehicles (22%). In 1999, hunters using boats to access more remote areas apparently reaped dividends, as 37% were successful compared to the 23% success for those who used highway vehicles and 16% success for those using foot access. The inconsistency in hunter success by access type between 1998 and 1999 is puzzling. Further analysis of the data received from hunter surveys might shed light on this inconsistency.

CONCLUSIONS AND RECOMMENDATIONS

Pellet counts in Unit 1C indicate low deer densities relative to the last 10 years. Transects at Shelter Island and Inner Point did not meet the management objective of 2.0 pellet groups/plot.

Unit 1C deer habitats experienced a series of light snow winters, leading up to and through the previous reporting period. In winter 1998/99 however, snow began accumulating at sea level in late December and continued to fall into late March, when the snowpack was the second deepest ever recorded in the Juneau area. Because of this accumulation, much of the deer habitat along pellet-transect routes remained snow-covered into May, preventing us from surveying all of the standard routes. The effects of the severe winter were evident in lower pellet counts and in deer

mortalities that we discovered while traversing transects. Due to the deep snow at higher elevations, deer were limited to the beach fringe in many areas for much of the winter. It is likely that deer that subsequently perished during the late winter months deposited some of the pellet groups counted.

In contrast to the severe winter of 1998–99, the winter of 1999–00 was mild, allowing deer to remain scattered throughout their habitat. Winter survival was probably high, and we expect the deer population to rebound soon to levels seen in the mid-1990s if this mild weather pattern continues. Paradoxically, while the mild winter of 1999–00 helped deer numbers increase, it also impeded hunter success. With little snow accumulation in late fall and early winter, deer use higher elevations, effectively lowering the density of deer and making it more difficult for hunters to locate them.

While the deer harvest was relatively low in the unit during this report period, few hunters complained about a lack of deer. This is possibly because many hunters using this area still regard it as a secondary deer hunting area to be used when weather and time do not allow them to hunt Unit 4.

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Table 1 Unit 1C deer population trends as indicated by pellet group surveys, 1986–1987 through 1999–2000

Area	Regulatory year	Mean pellet groups/plot	Number of plots	95 % CI
Kensington (VCU 20)	1993–1994	0.00	180	---
Portland Island (VCU 27)	1986–1987	0.99	381	0.87–1.12
North Douglas (VCU 35)	1990–1991	0.8	300	0.65–0.96
	1992–1993	0.74	324	0.62–0.87
	1993–1994	0.91	315	0.74–1.09
	1994–1995	0.86	306	0.70–1.02
	1995–1996	0.97	323	0.81–1.12
	1996–1997	1.43	323	1.24–1.62
	1997–1998	1.55	321	1.32–1.77
	1998–1999	1.03	273	0.86–1.19
	1999–2000	0.88	282	0.71–1.04
Inner Point (VCU 36)	1985–1986	1.97	235	1.68–2.25
	1986–1987	1.76	262	1.53–2.00
	1987–1988	1.21	200	1.02–1.39
	1988–1989	1.30	258	1.08–1.53
	1991–1992	2.05	204	1.75–2.36
	1994–1995	1.41	254	1.21–1.60
	1995–1996	1.68	240	1.45–1.91
	1996–1997	2.36	252	2.08–2.64
	1997–1998	0.84	280	0.69–0.98
	1998–1999	1.06	239	0.87–1.25
	1999–2000	1.09	280	0.90–1.28
Rhine Creek (VCU 38)	1996–1997	0.31	108	---
Harbor Island (VCU 65)	1986–1987	1.28	200	1.00–1.56
Couverden (VCU 117)	1992–1993	0.35	350	0.27–0.44
Shelter Island (VCU 124)	1986–1987	2.91	288	2.57–3.24
	1987–1988	3.16	130	2.62–3.70
	1988–1989	1.42	300	1.23–1.62
	1989–1990	1.60	300	1.37–1.82
	1992–1993	2.00	250	1.73–2.26
	1994–1995	1.38	297	1.20–1.56
	1996–1997	2.51	312	2.23–2.78
	1998–1999	1.63	290	1.42–1.85

Table 1 Continued

Lincoln Island (VCU 124)	1997–1998	1.57	207	1.27–1.77
Sullivan Island (VCU 94)	1989–1990	1.40	250	1.17–1.62
	1998–1999	0.64	66	0.35–0.93

Table 2 Unit 1C annual deer harvest[1], 1985–1986 through 1999–2000

Regulatory year	Males	Females	Estimated Total
1985–1986	296	138	434
1986–1987	347	149	496
1987–1988	325	118	443
1988–1989	271	218	489
1989–1990	330	169	499
1990–1991	245	172	417
1991–1992	358	153	511
1992–1993	302	277	579
1993–1994	427	232	659
1994–1995	210	101	311
1995–1996	209	143	353
1996–1997	342	96	438
1998–1999	273	111	384
1999–2000	201	139	339

[1.]Data from expanded results of hunter surveys.

Table 3 Unit 1C deer hunter residency and success, regulatory years 1986–1987 through 1999–2000

Regulatory year	Successful						Unsuccessful						Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Unk	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Unk	Total	(%)	
1986–1987	256	8	0	0	264	(27)	655	67	4	0	726	(73)	990
1987–1988	316	14	0	0	330	(34)	611	42	2	0	655	(66)	985
1988–1989	232	20	0	0	252	(27)	639	45	6	0	690	(73)	942
1989–1990	247	26	0	0	273	(29)	624	43	0	0	667	(71)	940
1990–1991	291	32	2	0	324	(34)	564	56	3	0	623	(66)	947
1991–1992	209	21	0	0	230	(28)	551	42	4	0	597	(72)	827
1992–1993	321	15	6	0	343	(36)	550	63	5	0	618	(64)	961
1993–1994	295	8	0	0	302	(33)	549	50	2	0	601	(67)	903
1994–1995	359	4	2	0	365	(36)	574	67	11	0	652	(64)	1017
1995–1996	210	0	0	0	210	(21)	670	92	18	0	780	(79)	990
1996–1997	247	10	0	0	257	NA[b]	NA	NA	NA	NA	NA	NA	NA
1997–1998	231	4	0	0	235	(27)	583	43	9	0	635	(73)	870
1998–1999	217	5	0	0	223	(24)	672	42	8	0	722	(76)	945
1999–2000	206	27	0	0	233	(27)	575	49	0	0	624	(73)	857

[a] Local means the hunter is a resident of Unit 1C.

[b.] Data for unsuccessful hunters unavailable due to changes in survey.

Table 4 Unit 1C hunter effort and success (by number), 1990–1991 through 1999–2000

Regulatory year	hunters	days hunted	deer killed	deer/hunter	days/deer
1990–1991	948	3262	499	.5	6.5
1991–1992	827	2993	417	.5	7.2
1992–1993	959	3202	511	.5	6.3
1993–1994	904	2950	579	.6	5.1
1994–1995	1017	4151	659	.6	6.3
1995–1996	990	3968	311	.3	12.8
1996–1997	257	NA*	NA	NA	NA
1997–1998	861	3645	438	.5	8.3
1998–1999	946	3384	384	.4	8.8
1999–2000	856	2295	339	.4	6.8

* Data unavailable due to changes in survey.

LOCATION

GAME MANAGEMENT UNIT: Unit 2 (3600 mi^2)

GEOGRAPHIC DESCRIPTION: Prince of Wales Island and adjacent islands south of Sumner Strait and west of Kashevarof Passage and Clarence Strait

BACKGROUND

Sitka black-tailed deer are throughout Unit 2. Deer populations tend to fluctuate seasonally, primarily in response to severe winter weather, habitat loss, and wolf and black bear predation. Currently deer numbers are at moderate levels throughout most of southern Southeast Alaska.

Weather conditions and population levels influence deer harvests. Unit 2 harvests ranged from 1880 to 3886 deer the past 16 seasons. Hunting seasons have generally extended from August through November or December, and limited hunting of antlerless deer was allowed before 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, despite state opposition, a 2 1/2-month antlerless season was implemented in Unit 2 for rural-qualified residents under federal regulations. The federal doe season is presently in effect allowing qualified rural hunters to harvest 1 doe as part of their 4 deer bag limit. In fall 1996 the Board of Game (board) changed Unit 2 harvest regulations from 4 antlered deer to 4 bucks.

More clearcut logging has occurred in Unit 2 than in most other deer habitats in Southeast Alaska and its effects on deer habitat are varied and enduring. Counting both national forest and private lands, ADF&G biologists estimate that 470 mi^2 of forested habitat has been cut during the past 50 years in Unit 2. The result of that timber harvest has been the removal of a large portion of important deer habitat, especially critical winter habitats. Habitat changes continue from additional logging and from the second growth in many 20–30-year-old clearcuts when they reach the exclusion stage. At this point, the canopy closes and the important understory plants disappear. Associated with logging is road building, and roads are steadily impinging on deer habitat; Unit 2 has the highest density of roads of anywhere else in Southeast—over 2200 miles of drivable road surface. As clearcut logging continues to reduce old-growth habitat in portions of Unit 2, deer populations are expected to decline. Population models indicate declines in carrying capacity of 50 to 60% by the end of the logging rotation in 2054. Long-term consequences of habitat loss include the inability to provide for subsistence needs and the loss of deer hunting opportunities.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

Action taken by the Board of Game in fall 2000 established a Unit 2 population goal of 71,000 deer and a harvest goal of 2700 deer. This action is based on the Unit 2 population being identified by the board as important for satisfying high levels of human consumptive use.

MANAGEMENT OBJECTIVES

- Maintain populations in excess of 45 deer per mi^2 of winter range, as determined by mean pellet group densities of 1.4 pellet groups per plot (Kirchhoff 1990).

METHODS

We collected population information from anecdotal reports provided by hunters and from 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 mailed harvest questionnaires to 33% of all harvest ticket holders. Our results are expanded to cover all harvest ticket holders.

The Division of Subsistence (DS) has historically conducted personal interview household surveys to estimate deer harvest rates, and some of the results conflict with our estimates. DS has completed 4 such surveys in the last 14 years. The latest household survey was done during summer 2000 and results should be available soon.

We surveyed deer pellet-group transects in 6 watersheds (or VCUs) during April 1999 and another 4 during spring 2000. Methods for conducting the surveys are described by Kirchhoff and Pitcher (1988). No beach mortality transects or aerial surveys were completed during this report period.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Unit 2 deer densities vary within and between VCUs. Unit 2 deer pellet-group counts were generally higher than the 10-year mean and well within the historical average for the last 14 years. The Snakey Lakes and Thorne Lake VCUs were similar to the highest count ever recorded in those areas. For all pellet transects in Unit 2, the average number of pellet groups per plot in 1999 and 2000 was 0.85 and 1.29, respectively. The highest 1999 deer-pellet densities in Unit 2 were at Tuxekan and Thorne Lake; the high counts in 2000 were at Thorne Lake and Snakey Lakes (Table 1).

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 deer densities is probably due to the presence of wolves in Unit 2 and their absence from Unit 4.

MORTALITY

Harvest

Season and Bag Limit	Resident and Nonresident Hunters	
Unit 2	Aug 1–Dec 31	4 bucks

Board of Game Actions and Emergency Orders. Fall 1996 board actions shortened the Unit 2 wolf hunting season by 5 months, the wolf trapping season by 2 months, and implemented a

harvest quota of 90 wolves. It is unknown if these changes will have any noticeable effect on deer numbers. No regulatory changes were made to the state deer seasons or bag limits during this period.

Hunter Harvest. Harvest on Prince of Wales Island (POW) during the past 2 seasons was estimated at 2492 and 2550 deer, respectively. Although the average deer per hunter in Unit 2 is comparable to that in Unit 4, POW hunters spend 5 days afield for each deer taken compared to just over 2 days per deer in Unit 4. The 1998/99 snowfall was substantial, but effects on deer numbers, based on the following year's harvest, were varied, primarily affecting the deer population along the northwest side of POW. The number of hunters (1943) during fall 1999 remained about the same in Unit 2 as in the previous year (1958). Success rate during 1999 remained stable at 63%, and hunters spent an average of 7 days in the field, 2 more days than in 1998.

Unit 2 probably has one of the highest illegal or unreported harvests in the region. This is because of the extensive, and increasing, road system and lack of law enforcement personnel. Although the degree of illegal harvest is unknown, Wood (1990) thought it considerable (Table 7), perhaps even as high as the legal harvest. Because of the extensive and growing POW road system, many communities, and insufficient law enforcement personnel, Additionally, Flynn and Suring (1989) reported that actual hunter kill can be 38% greater than total estimated harvests from hunter reports because of crippling loss.

Hunter Residency and Success. Nonresident hunters have never taken a high number of deer from Unit 2, and interest by nonresident hunters fluctuates yearly. Only 8 nonresident hunters were successful during 1998, a 17% success rate. During the 1999 season 126 nonresident hunters took 63 deer, a 40% success rate and the most deer ever harvested by nonresidents; this accounted for only 2% of the reported Unit 2 deer harvest (Table 5). Nonlocal residents harvested an average of 47% of the harvest during 1998 and 1999. The Ketchikan hunters' share of the POW harvest in those 2 seasons remained similar at 28% and 23%, respectively. Reported harvest in the Craig/Klawock/Thorne Bay areas of Central POW increased significantly during 1998 and 1999. The number of does harvested under the federal regulations increased from 82 in 1998 to 198 in 1999 with more hunters participating. We have no measure of the reliability of these figures and the actual doe harvest may be much higher.

Harvest Chronology. Most Unit 2 deer are harvested during August, October, and November. During 1998, August accounted for most of the deer harvest (35%), although the 1999 harvest was higher in November (28%) than in the other popular months (Table 6).

Transport Methods. Similar to the long-term average, over 70% of successful Unit 2 hunters used the extensive road system to access hunting areas during the past 2 years. Boat use accounted for 16% of the access and aircraft 3%. Hunters using boats and airplanes to reach hunting areas spent fewer hunting days per deer (4.5 days/deer) than hunters using highway vehicles (5.6 days/deer). Hunters using 3- or 4-wheelers spent the least amount of time (1.3 days) per harvested deer (Table 6).

Other Mortality

Based on staff observations and responses to 1998–99 and 99–00 trapper questionnaires, we believe that wolf populations are common in Unit 2 but at lower densities than those populations on the nearby mainland (Table 7). During 1998, 54 wolves were sealed in Unit 2. During 1999, 91 wolves were harvested from Unit 2, and the season was closed by emergency order in February, one month short of the regular season.

Deer are extremely vulnerable to harsh winter weather, and the extent of winter mortality depends on the severity of the season. Based on past winter conditions, and despite the heavy snow cover in many areas, we believe there was a good overwinter survival of deer.

Vehicle collision estimates have remained low (10–25 deer/year) and are not a significant source of mortality. However, unreported and illegal kill is estimated at 100% of Unit 2 reported harvest.

HABITAT

Assessment

Logging continues to cause major changes in old-growth habitat. The most serious effects are in higher volume stands at low elevations, which are critical to deer during years of heavy snowfall. U.S. Forest Service and ADF&G habitat models predict the forest's capacity to support deer in average winter conditions will decline by nearly half by the end of the logging rotation in 2054. Because of extensive loss of critical winter habitat, in some areas declines may exceed 60% following severe winters. By 2054 we expect few areas will meet projected hunter demand within road-accessible areas and logged portions of Unit 2 (U.S. Forest Service 1989). Changes this past year with the Roadless Initiative, passed by Congress, will protect some prime deer habitat from future logging activities (USDA 2000).

Because of habitat changes currently taking place in Unit 2, we need, more than ever, information on deer herd status to serve as a baseline to assess long-term changes. An attempt to gather deer condition data from hunters was only marginally successful during the 1998 season and resulted in a small sample of measurements. During that effort we established several voluntary hunter checkstations along key access points to intercept hunters returning from the field. We will continue to gather this data in cooperation with U.S. Forest Service staff during fall 2001. News releases will be circulated before the hunting season describing our concerns and justification for checkstations. We intend to use incentives to increase hunter cooperation, allowing us to measure and weigh hunters' deer. If successful, we will continue the program annually. The data collection will target the two high harvest periods of August and November.

CONCLUSIONS AND RECOMMENDATIONS

Based on pellet-group data, our objective of maintaining 45 deer/mi^2 in winter habitat was not achieved in any of the 5 VCUs sampled during 1999, and only 1 in spring 2000. However, all VCUs counted during 2000 were generally higher than the 10-year average. Although the harvest was lower in 1999, the number of hunters in the field was similar to that of 1998. The total number of hunter days and the average days/deer were much higher in 1999 than in 1998, while the average deer per hunter was similar the past 2 years. The success during the past 2 seasons

(64%) is lower than during the 1997 season (80%) but similar to the 10-year average (Table 2). The higher effort and lower number of deer harvested in 1999 may reflect the severe winter weather in Unit 2 during the prior winter.

Wolf abundance remained moderate to relatively high in recent years, and predation continues to influence deer populations in Unit 2. Using radiocollared deer in different habitat types and in different road densities, current predator/prey research in Unit 2 will provide new information about deer survival.

We believe the ongoing federal antlerless season in Unit 2 is contrary to appropriate wildlife management principles and may negatively influence future deer populations in the unit. We recognize that in other parts of Southeast Alaska, especially Unit 4, long-established doe seasons have proven effective and appropriate. Compared to Unit 2, these areas have significant differences in hunter access and ecological systems. Unit 2 hunters take does along easily accessible roaded areas, and in the future this could affect local populations. For example, harvesting 300 does along the road system may not be critical to the well-being of the unitwide population, but such a harvest could substantially affect the deer population in those local areas. The areas most affected by this local reduction in deer are also the same areas where local residents traditionally hunt bucks. However, doe permits are increasing in popularity, and the reported Unit 2 harvest increased by a factor of 2½ from 1998 to 1999. We have no measure of the reliability of these figures; actual doe harvest may be much higher.

We should inform the public of the effects of logging on deer populations, so the public is aware of tradeoffs between timber harvest and wildlife. We anticipate winter habitat loss through logging will reduce carrying capacity of deer for many decades. Long-term consequences of habitat loss include the inability to provide for subsistence needs and the loss of hunting opportunities for deer hunters (Wood 1990, Larsen 1993).

We will apply new effort to establish baseline deer herd condition data for Unit 2 deer in fall 2001. These data will complement ongoing predator/prey research and help us measure long-term variation in deer condition in response to habitat changes. Ongoing road improvement projects, paving large sections of POW, and the arrival of new high-speed ferries will increase hunter access and affect deer populations. New and improved access, coupled with the declining deer carrying capacity, requires that we monitor populations more closely in Unit 2 in the near future.

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Table 1 Unit 2 deer pellet-group survey results, regulatory years 1984–1985 through 1999–2000

	Regulatory year	Mean pellet groups/plot[b]	Number of plots	95% CI
Protection	1997–998	1.15	332	0.99–1.30
(VCU 527)	1998–1999	0.59	281	0.47–0.71
	1999–2000	0.56	325	0.43–0.69
Calder	1988–1989	2.14	252	1.78–2.49
(VCU 528)	1997–1998	1.17	272	0.97–1.39
	1999–2000	0.48	165	0.31–0.62
Red Bay	1987–1988	0.32	177	0.18–0.47
(VCU 532)	1994–1995	0.94	256	0.74–1.14
	1996–1997	1.19	281	0.97–1.41
	1997–1998	1.07	248	0.89–1.25
	1998–1999	0.73	283	0.59–0.88
Exchange Cove	1988–1989	1.40	266	1.15–1.64
(VCU 539)	1992–1993	1.10	125	0.83–1.38
	1997–1998	1.25	303	1.04–1.46
Sarheen	1989–1990	1.73	310	1.44–2.01
(VCU 549)	1996–1997	1.00	334	0.83–1.16
	1997–1998	1.00	330	0.85–1.14
	1998–1999	0.42	355	0.33–0.51
	1999–2000	0.64	284	0.51–0.78
	2000–2001	0.98	293	0.78–1.17
Sarkar	1988–1989	1.28	298	1.06–1.50
(VCU 554)	1992–1993	0.53	245	0.41–0.66
	1994–1995	0.92	292	0.77–1.07
	1997–1998	0.61	263	0.48–0.74
	1998–1999	0.29	312	0.21–0.37
	1999–2000	0.74	281	0.60–0.88
Warm Chuck	1984–1985	1.02	326	1.02–1.38
(VCU 561)	1985–1986	1.60	295	1.36–1.84
	1989–1990	2.21	302	1.91–2.50
	1991–1992	2.05	291	1.73–2.37

Table 1 Continued

Area[a]	Regulatory Year	Mean pellet groups/plot[b]	Number of plots	95% CI
	1996–1997	1.39	276	1.17–1.61
	1997–1998	1.21	247	1.01–1.41
	1998–1999	1.29	246	1.08–1.51
	1999–2000	0.99	288	0.81–1.16
Baker (VCU 569)	1991–1992	0.08	256	0.04–0.12
Thorne Lake (VCU 575)	1992–1993	1.20	334	1.03–1.37
	1994–1995	0.76	293	0.62–0.91
	1995–1996	1.27	299	1.09–1.45
	1997–1998	0.84	303	0.66–0.96
	1998–1999	0.87	316	0.71–1.03
	1999–2000	1.02	231	0.83–1.21
	2000–2001	1.28	311	1.06–1.50
Snakey Lakes (VCU 578)	1986–1987	0.62	279	0.51–0.73
	1988–1989	1.05	300	0.85–1.26
	1989–1990	1.56	200	1.26–1.86
	1993–1994	0.77	356	0.61–1.32
	1997–1998	1.39	310	1.17–1.60
	1998–1999	0.71	225	0.55–0.87
	1999–2000	0.86	250	0.67–1.05
	2000–2001	1.55	263	1.24–1.86
Luck Lake (VCU 581)	1986–1987	1.74	178	1.41–2.07
	1988–1989	2.11	300	1.80–2.42
	1993–1994	1.10	175	0.87–1.32
Little Ratz (VCU 584)	1992–1993	0.94	272	0.76–1.13
	1997–1998	1.93	255	1.64–2.21
	1998–1999	0.78	282	0.64–0.91
	1999–2000	1.38	304	1.18–1.59
Tuxekan (VCU 587)	1988–1987	1.07	300	0.84–1.28
	1997–1998	1.04	314	0.87–1.22
	1998–1999	0.48	353	0.37–0.58

Table 1 Continued

Area[a]	Regulatory year	Mean pellet groups/plot[b]	Number of plots	95% CI
	1999–2000	1.26	328	1.03–1.49
Twelvemile	1985–1986	0.31	196	019–0.43
(VCU 621)	1986–1987	0.64	300	0.48–0.81
	1987–1988	0.65	370	0.49–0.81
	1988–1989	0.62	302	0.46–0.77
	1989–1990	0.78	235	0.59–0.98
	1990–1991	1.18	176	0.84–1.52
	1991–1992	1.84	231	1.48–2.21
	1992–1993	0.43	250	0.32–0.55
	1993–1994	0.84	258	0.63–1.05
	1994–1995	0.93	324	0.76–1.09
	1997–1998	1.45	202	1.10–1.79
	1998–1999	0.83	280	0.63–1.02
Trocadero	1995–1996	1.74	235	1.41–2.06
(VCU 625)	1997–1998	1.18	235	0.97–1.38
	1998–1999	0.97	267	0.78–1.16
Pt. Amargua	1997–1998	1.04	255	0.83–1.24
(VCU 628)	1998–1999	0.93	325	0.78–1.08
Port Refugio	1985–1984	2.69	317	2.27–3.12
(VCU 635)	1986–1987	2.52	324	2.09–2.96
	1987–1988	1.76	369	1.46–2.07
	1988–1989	1.15	270	0.90–1.40
	1989–1990	0.80	507	0.68–0.93
	1990–1991	1.25	232	1.03–1.48
	1991–1992	1.13	367	0.95–1.32
	1992–1993	0.76	255	0.57–0.95
	1993–1994	1.35	213	0.98–1.71
	1994–1995	1.85	280	1.51–2.19
	1997–1998	0.82	276	0.65–1.08
	1998–1999	0.78	315	0.61–0.96
	1999–2000	0.94	272	0.75–1.13
Kitkun	1988–1989	0.32	240	0.20–1.07
(VCU 679)	1989–1990	0.89	273	0.71–1.07

Table 1 Continued

Area[a]	Regulatory year	Mean pellet groups/plot[b]	Number of plots	95% CI
	1995–1996	0.40	264	0.28–0.52
	1997–1998	0.31	261	0.19–0.44
Nutkwa (VCU 685)	1988–1989	0.09	234	0.02–0.16

[a]Value comparison unit

Table 2 Unit 2 deer harvest data, regulatory years 1984–1985 through 1999–2000

Regulatory year	Nr hunters	Nr successful hunters	Percent successful	Total hunter days	Average hunter days	Total deer[a]	Average deer per hunter	Average hunter days per deer
1984–1985	1910	1210	63	13,070	6.8	1880	1.0	6.9
1985–1986	2025	1373	68	14,182	7.0	3151	1.6	4.5
1986–1987	2233	1538	69	17,505	7.8	2805	1.3	6.2
1987–1988	2481	1845	74	17,709	7.1	3886	1.6	4.5
1988–1989	2124	1415	67	10,668	5.0	2849	1.3	3.7
1989–1990	2132	1397	65	12,315	5.7	2806	1.3	4.4
1990–1991	2149	1445	67	13,566	6.3	3093	1.4	4.4
1991–1992	1664	1142	69	11,985	7.2	2466	1.5	4.9
1992–1993	2046	1416	69	12,337	6.0	3097	1.5	4.0
1993–1994	1986	1394	70	11,860	6.0	2807	1.4	4.2
1994–1995	2019	1412	70	12,140	6.0	2825	1.4	4.3
1995–1996	2143	1496	70	12,887	6.0	3277	1.5	3.9
1996–1997	---	1889	---	---	---	2512	---	
1997–1998	1779	965	54	11,342	4.8	1883	1.1	6.0
1998–1999	1958	1268	65	10,447	5.3	2492	1.3	4.2
1999–2000	1943	1224	63	12,600	6.5	2550	1.3	4.9
Average	2053	1402	67	13,197	6.0	2774	1.0	5.0

[a]Includes does which were reported killed.

Table 3 Unit 2 deer harvests from major harvest areas, regulatory years 1990–1991 through 1999–2000

Major harvest area	Regulatory year	Nr hunters, expanded	Nr successful hunters, expanded	Percent successful	Total hunter days, expanded	Average days per hunter	Average deer per hunter	Total nr deer killed
9–Outer Islands	1990–1991	62	41	65	100	1.6	0.8	47
	1991–1992	42	30	72	89	2.1	1.2	50
	1992–1993	107	77	72	246	2.3	1.0	107
	1993–1994	55	22	41	203	3.7	0.7	36
	1994–1995	146	124	84	260	1.8	1.4	198
	1995–1996	56	41	73	245	4.4	1.8	102
	1996–1997	---	14	---	---	---	---	14
	1997–1998	45	27	60	127	2.8	0.5	6
	1998–1999	22	17	77	48	2.2	0.9	21
	1999–2000	22	11	50	82	3.7	1.2	27
10–Heceta Island	1990–1991	52	52	100	117	1.6	0.8	47
	1991–1992	122	86	71	350	2.1	1.2	50
	1992–1993	164	117	71	501	2.3	1.0	107
	1993–1994	140	113	80	354	3.7	0.7	36
	1994–1995	86	72	83	194	2.2	1.5	125
	1995–1996	64	50	78	340	5.3	1.5	95
	1996–1997	---	22	---	---	---	---	27
	1997–1998	60	40	78	154	2.6	0.9	55
	1998–1999	85	71	84	153	1.8	1.6	132
	1999–2000	52	42	81	291	5.6	1.4	73

Table 3 Continued

Major harvest area	Regulatory year	Nr hunters, expanded	Nr successful hunters, expanded	Percent successful	Total hunter days, expanded	Average days per hunter	Average deer per hunter	Total nr deer killed
12–SE POW Island	1990–1991	264	128	48	847	3.2	0.9	234
	1991–1992	244	121	49	904	3.7	0.7	174
	1992–1993	270	150	56	952	3.5	0.9	247
	1993–1994	336	102	30	1072	3.2	0.5	153
	1994–1995	260	106	41	824	3.2	0.5	140
	1995–1996	279	121	43	919	3.3	0.7	206
	1996–1997	---	135	---	---	---	---	207
	1997–1998	218	74	36	967	4.4	0.6	130
	1998–1999	218	113	52	631	2.9	0.7	156
	1999–2000	183	61	33	464	2.5	0.7	120
13–Central POW Island	1990–1991	1100	626	57	6201	5.6	1.2	1271
	1991–1992	849	580	68	5093	6.0	1.3	1129
	1992–1993	1032	645	62	4901	4.7	1.1	1183
	1993–1994	1005	657	65	5248	5.2	1.2	1187
	1994–1995	973	622	64	5560	5.7	1.2	1143
	1995–1996	1092	763	70	5341	4.9	1.3	1423
	1996–1997	---	554	---	---	---	---	912
	1997–1998	723	336	41	3988	5.5	0.8	585
	1998–1999	871	513	59	3574	4.1	1.0	847
	1999–2000	939	562	60	6053	6.4	1.1	1059

Table 3 Continued

Major harvest area	Regulatory year	Nr hunters, expanded	Nr successful hunters, expanded	Percent successful	Total hunter days, expanded	Average days per hunter	Average deer per hunter	Total nr Deer killed
14–North Central	1990–1991	664	343	52	2924	4.5	0.9	568
POW Island	1991–1992	553	275	50	3003	5.4	0.8	448
	1992–1993	639	375	59	2647	4.1	1.0	662
	1993–1994	710	418	59	3076	4.3	10.	690
	1994–1995	570	349	61	3001	5.3	1.1	654
	1995–1996	659	342	52	2501	3.8	1.0	646
	1996–1997	---	351	---	---	---	---	577
	1997–1998	580	332	54	2895	5.0	1.0	601
	1998–1999	658	385	59	2973	4.5	0.9	584
	1999–2000	708	389	55	3353	4.7	0.9	603
15–North POW Island	1990–1991	538	382	71	2463	4.6	1.3	725
	1991–1992	411	233	57	2016	4.9	1.1	468
	1992–1993	477	297	62	2347	4.9	1.0	470
	1993–1994	382	245	64	1466	3.8	1.0	364
	1994–1995	420	298	71	1797	4.3	1.1	448
	1995–1996	560	351	63	2480	4.4	1.1	640
	1996–1997	---	303	---	---	---	---	500
	1997–1998	414	231	63	1787	4.3	0.8	347
	1998–1999	658	385	59	2973	4.5	0.9	584
	1999–2000	701	389	55	3353	4.8	0.9	603

Table 4 Unit 2 reported and estimated deer harvest/mortality, regulatory years 1984–1985 through 1999–2000

Regulatory year	Reported harvest			Unreported & illegal harvest[a]	Estimated total harvest	Estimated nr road kills
	Male	Female	Total			
1984–1985	1880	0	1880	1880	3760	unknown
1985–1986	3151	0	3151	3151	6302	unknown
1986–1987	2805	0	2805	2805	5610	unknown
1987–1988	3616	270[b]	3886	3886	7772	20
1988–1989	2846	3	2849	2849	5698	30
1989–1990	2806	0	2806	2806	5612	25
1990–1991	2952	141	3093	3093	6186	25
1991–1992	2343	123	2466	2466	4932	25
1992–1993	3036	61	3097	3097	6194	25
1993–1994	2746	61	2807	2807	5614	25
1994–1995	2762	62	2825	2825	5650	25–30
1995–1996	2957	320[b]	3277	3277	6554	25–30
1996–1997	2378	134	2512	2512	5024	25–30
1997–1998	1724	159	1883	1883	3766	25–30
1998–1999	2404	88	2492	2492	4984	25–30
1999–2000	2352	198	2550	2550	5100	25–30
Average	2672	101	2774	2774	5547	25–30

[a]Unreported and illegal harvest is estimated at 100% of reported harvest.
[b]Antlerless seasons: State season in 1987, Federal season in 1995–1999.

Table 5 Unit 2 Hunter residency and success, regulatory years 1988–1989 through 1999–2000

Regulatory year	Successful				Unsuccessful			
	Local resident[a]	Nonlocal resident	Nonresident	Total	Local resident[a]	Nonlocal resident	Nonresident	Total
1988–1989	748	638	29	1415	242	430	38	710
1989–1990	713	675	9	1397	272	425	38	735
1990–1991	825	583	36	1444	323	351	30	704
1991–1995	632	487	23	1142	224	276	22	522
1992–1993	829	572	17	1418	299	291	38	628
1993–1994	800	582	13	1395	260	294	37	591
1994–1995	773	608	31	1412	231	321	54	606
1995–1996	893	573	30	1496	226	385	37	648
1996–1997	726	599	34	1359	---	---	---	---
1997–1998	569	388	9	966	304	433	71	808
1998–1999	760	501	8	1269	185	385	39	609
1999–2000	502	672	50	1224	279	365	76	720
Average	731	573	24	1328	259	360	44	662

[a]Local residents include Alaskans living within Unit 2 boundaries.

Table 6 Unit 2 deer harvest chronology and method of transportation used by hunters, regulatory years 1988–1989 through 1999–2000

Regulatory year	Month of kill							Method of transportation[a]					
	Aug	Sept	Oct	Nov	Dec	Jan	Unk	Airplane	Boat	Foot	Highway vehicle[b]	Other	Unk
1988–1987	895	447	506	888	72	7	34	173	990	547	2875	18	55
1989–1988	729	377	469	1,061	152	12	6	203	815	1042	3276	52	16
1990–1989	1013	470	559	903	135	11	2	207	776	1023	3522	28	0
1991–1990	816	272	470	793	109	5	1	36	771	617	2924	34	9
1992–1991	1256	422	635	696	52	8	28	106	865	1113	3467	54	0
1993–1992	1124	421	368	774	74	24	22	292	753	1082	2723	280	0
1994–1995	911	344	578	916	68	0	8	170	1049	800	2507	68	19
1995–1996	1253	433	553	904	124	0	10	143	666	877	3792	145	11
1996–1997	518	163	165	331	77	6	---	---	---	---	---	---	---
1997–1998	316	142	163	223	33	---	---	91	269	29	1388	0	0
1998–1999	865	356	483	606	68	0	114	79	336	54	1476	5	9
1999–2000	561	437	573	717	117	0	7	59	273	28	1569	4	10
Average	855	357	460	734	90	7	23	142	688	656	2684	63	12

[a]Numbers of successful and unsuccessful hunter trips.
[b]Includes cars, trucks, and off-road vehicles (3 and 4-wheelers).

Table 7 Unit 2 deer pellet group and harvest data, predator abundance(I_A)[a], and weather severity indices, regulatory years 1981–1982 through 1999–2000

Regulatory year	Pellet-group data[b]	Harvest data			Wolf abundance	Weather index[c]
		Total harvest	Deer kill/ hunter day	Hunter success (percent0		
1981–1982	---	---	---	---	---	6.3
1982–1983	---	---	---	---	---	1.3
1983–1984	1.0	---	---	---	---	1.3
1984–1985	1.8	1880	0.14	63	---	4.7
1985–1986	1.4	3151	0.22	68	---	2.0
1986–1987	1.0	2805	0.16	69	---	2.7
1987–1988	1.2	3886	0.22	74	---	1.7
1988–1989	1.3	2849	0.27	66	---	4.7
1989–1990	1.2	2806	0.23	65	---	1.3
1990–1991	1.3	3093	0.23	67	---	2.3
1991–1992[d]	0.8	2466	0.20	69	59	0.3
1992–1993	1.0	3097	0.25	69	60	3.0
1993–1994	1.1	2807	0.24	70	25[e]	1.7
1994–1995	1.1	2825	0.23	70	37	4.7
1995–1996	1.2	3277	0.25	70	37	2.7
1996–1997	0.9	2512	---	---	37	---
1997–1998	0.8	1265	0.17	70	70	---
1998–1999	0.9	2492	0.24	65	68	---
1999–2000	1.3	2550	0.19	63	72	---
Average	1.1	2735	0.22	68	55	---

[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 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.

LOCATION

GAME MANAGEMENT UNIT: 3 (3000^2)

GEOGRAPHIC DESCRIPTION: Islands of the Petersburg, Kake, and Wrangell area

BACKGROUND

Sitka black-tailed deer inhabit most of Unit 3 islands. Deer populations on these islands have historically fluctuated with high and low extremes; clear-cut logging has reduced winter carrying capacity in some areas. Severe winter weather causes most declines, and predation by wolves and bears and illegal hunting has extended the length of the declines.

The most recent significant population decline was in the late 1960s and early 1970s, which led to restrictive regulations and bag limits in 1973. 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 (board) increased this limit to 2 antlered deer in 1988. 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 with the 1993 hunt, the only part of Unit 3 closed to deer hunting was the area within Petersburg and Kupreanof city limits. The fall 2000 Board of Game meeting abolished that prohibition.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

As established by the Alaska Board of Game during their fall 2000 meeting in response to the intensive management of game law [AS 16.05.255 (i)(4)], the management goal is to manage the Unit 1B deer population to achieve and maintain a population of 15,000 deer while maintaining an annual harvest of 900 deer.

MANAGEMENT OBJECTIVES

- Increase deer populations on winter range (<1500 ft elevation) to 32 deer/mi^2, measured by a mean pellet density of 1.0 pellet group/20 m^2 plot.
- Monitor deer densities using pellet-group surveys.
- Monitor deer harvest using mailed questionnaires.

METHODS

We estimated Unit 3 deer harvest from a regional questionnaire mailed randomly to 33% of deer harvest ticket holders. We measured winter deer densities with spring pellet-group transects in selected areas.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Deer population trends as indicated by pellet-group surveys varied from decreased to slightly increased (Table 1). Snow cover in the Petersburg area was well below normal during the winter of 1998/99 and well above average during the winter of 1999/00. Some of the decrease in pellet-group counts, particularly during spring 1999 surveys, may have been due to the lack of snow during 1998/99. We believe many deer spent less time than average below 1500 ft elevation, the cutoff for spring pellet-count surveys. Because snow conditions in winter 1999/00 were more similar to the long-term average, pellet-count surveys in spring 2000 probably provided more reliable assessments of deer densities.

Pellet-group counts at Big Level Island in spring 1999 were 2.00 pellet groups/plot, down slightly from an all-time high of 2.16 in 1991. The Little Level Island site produced a mean of 2.84 pellet groups/plot in 1999, down substantially from the all time high of 3.59 in 1991. Sokolof counts were .92 pellet groups/plot in 1999, down from 1.73 in 1981. Rynda counts were .27 pellet groups/plot in 1999, nearly unchanged from .25 in 1981. The Woewodski (South Mitkof) counts increased slightly from 1.10 pellet groups/plot in 1998 to 1.36 in 1999, and then decreased to 1.27 pellet groups/plot in 2000. The Woewodski counts remain down from an all time high of 2.25 in 1996. Woronkofski had .11 pellet groups/plot in 1999, down from .26 in 1994 and continuing a decreasing trend from the all-time high of 2.52 in 1989. Security Bay had .10 pellet groups/plot in 2000, down slightly from 0.22 in 1995. Pillar Bay had .18 pellet groups/plot in 2000, similar to 0.16 in 1988. Malmesbury had .06 pellet groups/plot in 2000, down slightly from 0.11 in 1990. Pellet-group counts on Kuiu Island remain some of the lowest in Southeast, despite vast amounts of suitable habitat. We believe predation by black bears and wolves, not hunting, are responsible for low deer numbers on Kuiu Island. Such speculation is feasible when hunter harvest is only 20 deer a year. Despite good deer habitat, fawn survival is probably low amid the highest black bear densities in Southeast Alaska.

MORTALITY

Harvest

Season and Bag Limit	Resident and Nonresident Hunters	
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

Board of Game Actions and Emergency Orders. No board actions occurred and no emergency orders were issued during the report period. At the fall 2000 board meeting, 2 proposals were adopted affecting Unit 3 deer hunting. One established population and harvest objectives for deer in Unit 3, and the other abolished a regulation prohibiting deer hunting within the Petersburg and Kupreanof city limits. These changes go into effect July 2001.

Hunter Harvest. Deer hunter effort and harvest changed little before 1991 (Table 2). Hunter survey data for 1991–1999 includes Mitkof Island, which is primarily responsible for the large increase in both hunter numbers and kill. The unitwide 1998 harvest of 1119 deer represented a 29% increase from the record 1995 harvest of 866 deer. In 1999 the harvest decreased to 932 deer, 368 (39%) of which came from Zarembo Island.

Hunter Residency and Success. Few nonresidents hunt deer in Unit 3 (Table 3) and most hunters are local residents. Nonresidents comprised just 1% of all Unit 3 deer hunters in 1998 and 1999. Deer populations are greater and seasons and bag limits more liberal in other nearby units, attracting most nonlocal hunters to those areas.

Harvest Chronology. Table 5 shows the Unit 3 deer harvest percentage by month. Most deer harvest takes place during October, November, and August. Some hunters reported taking deer in December, January, February, and April during the closed season. The relatively high number of October kills from 1991–1999 coincides with the Mitkof Island registration permit hunt.

Transport Methods. From 1995–1997 most hunters used boats to access their hunting areas. During 1998–1999 most deer hunters, 50% and 53% respectively, used highway vehicles to access hunting areas. The increase in the use of highway vehicles and decrease in boat use in 1991–1997 reflect effort on Mitkof Island (Table 4).

Other Mortality

Between 1997 and 1998 the Forest Service radiocollared 51 deer (14 bucks and 37 does) on Mitkof Island. Of the total, 16 (31%) were still alive in December 2000, 32 (63%) were confirmed mortalities, and the status of 3 (6%) were unknown. Of the 32 documented mortalities, 14 (44%) died by wolf predation, 9 (28%) by legal hunters, 2 (6%) by vehicles, 2 (6%) by poachers, 2 (6%) by starvation or natural causes, and 3 (9%) by unknown causes.

CONCLUSIONS AND RECOMMENDATIONS

Unit 3 deer populations are stable and increasing with localized variations. Slight decreases in spring 1999 pellet counts were probably due to deer spending more time at elevations above survey areas because of low snow levels. 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, and all Unit 3 can remain open for deer hunting.

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Table 1 Unit 3 deer population trends as indicated by pellet-group surveys, 1981–2000

Area	Regulatory year	Mean pellet groups/plot	Number of plots	95% CI
Security Bay	1984–1985	.02	360	0.01–0.04
(VCU 400)	1989–1990	.25	304	0.16–0.34
	1995–1996	.22	268	0.15–0.29
	2000–2001	.09	201	0.05–0.14
Pillar Bay	1988–1989	.16	337	0.10–0.22
(VCU 403)	2000–2001	.18	264	0.13–0.23
Malmesbury	1990–1991	.11	206	0.05–0.18
(VCU 408)	2000–2001	.06	254	0.03–0.09
Conclusion	1987–1988	2.66	207	2.32–3.01
(VCU 417)	1989–1990	.95	200	0.72–1.18
	1991–1992	.71	200	0.53–0.88
	1996–1997	1.45	191	1.19–1.70
Big John Bay (VCU 427)	1994–1995	.38	300	0.29–0.48
431–Point Barrie	1988–1989	.23	357	0.17–0.29
(VCU)	1993–1994	.77	375	0.64–0.90
Big Level	1981–1982	1.54	399	1.45–1.63
(VCU 434a)	1983–1984	1.56	336	
	1986–1987	1.66	382	1.41–1.90
	1989–1990	1.07	227	
	1991–1992	2.16	456	1.90–2.41
Little Level	1981–1982	2.48	114	2.02–2.94
(VCU 434b)	1983–1984	2.34	136	
	1986–1987	1.39	122	1.07–1.70
	1989–1990	1.52	137	
	1991–1992	3.59	132	3.07–4.11
Castle River	1984–1985	.19	312	0.12–0.26
(VCU 435)	1987–1988	.51	305	0.37–0.65
	1989–1990	.40	312	0.25–0.56
	1994–1995	.32	310	0.20–0.40
	1998–1999	.36	281	0.28–0.44
East Duncan Canal	1990–1991	1.12	227	0.92–1.32
(VCU 437)	1992–1993	.78	213	0.63–0.94
	1998–1999	1.04	153	0.77–1.30

Table 1 Continued

Area	Regulatory year	Mean pellet groups/plot	Nr plots	95% CI
Portage Bay	1993–1994	.43	282	0.30–0.56
(VCU 442)	1995–1996	.43	277	0.63–0.94
	1998–1999	.39	285	0.29–0.49
Woewodski (S. Mitkof)	1984–1985	.088	295	0.69–1.08
(VCU 448)	1985–1986	1.00	209	0.82–1.19
	1987–1988	1.65	195	1.85–2.61
	1988–1989	1.33	433	1.16–1.51
	1989–1990	1.35	417	1.24–1.73
	1990–1991	1.46	355	1.28–1.64
	1991–1992	1.80	316	1.52–2.07
	1992–1993	0.79	248	0.62–0.97
	1993–1994	1.06	230	0.85–1.27
	1994–1995	1.13	152	0.82–1.46
	1995–1996	1.38	157	1.08–1.67
	1996–1997	2.25	243	1.95–2.55
	1997–1998	1.56	282	1.27–1.84
	1998–1999	1.10	282	0.91–1.29
	1999–2000	1.36	196	1.11–1.60
	2000–2001	1.27	226	1.05–1.50
4Woewodski Island	1991–1992	1.86	461	1.66–2.05
(VCU 448a)	1994–1995	1.30	510	1.15–1.46
Frederick (N. Mitkof)	1981–1982	.08	945	0.06–0.11
(VCU 449)	1990–1991	.55	180	0.36–0.74
	1992–1993	.54	227	0.42–0.65
Blind Slough	1992–1993	1.04	114	0.77–1.30
(Central Mitkof)	1993–1994	1.28	265	1.04–1.51
(VCU 452)	1997–1998	1.61	245	1.34–1.88
Dry	1981–1982	.92	91	0.56–1.28
(VCU 454)	1993–1994	1.44	210	1.17–1.72
	1997–1998	1.26	188	0.88–1.39
Vank Island Group	1981–1982			
(VCU 455)				
a) Sokolof		1.73	900	1.61–1.85
b) Rynda		.25	281	0.18–0.32
c) Greys		.25	284	0.18–0.32
Snow Passage	1994–1995	.57	345	0.45–0.70
(VCU 458)	1997–1998	.98	315	0.80–1.16

Table 1 Continued

Area	Regulatory year	Mean pellet groups/plot	Nr plots	95% CI
Woronkofski (VCU 461) (All Transects) (Trans. 10, 11, 12)	1985–1986	1.63	646	1.45–1.81
	1985–1986	2.01	218	1.62–2.39
	1987–1988	2.23	201	1.85–2.61
	1989–1990	2.52	223	2.18–2.85
	1991–1992	1.59	203	1.32–1.85
	1993–1994	.22	225	0.13–0.31
	1994–1995	.26	224	0.18–0.34
Mosman (VCU 467)	1993–1994	.07	304	0.03–0.11
Onslow (VCU 473)	1984–1985	.37	321	0.28–0.46
	1985–1986	.59	334	0.48–0.70
	1986–1987	.72	347	0.59–0.84
	1987–1988	.42	336	0.31–0.55
	1988–1989	.44	329	0.32–0.55
	1991–1992	.66	322	0.51–0.80
	1993–1994	.68	341	0.55–0.82
	1994–1995	.88	340	0.74–1.02
	1997–1998	.73	346	0.59–0.86
Fools (VCU 480)	1994–1995	.54	193	0.38–0.70
Coronation (VCU 564)	1983–1984	1.20	696	1.04–1.36
	1985–1986	2.34	228	N/A
	1988–1989	1.41	408	1.17–1.66
	1989–1990	1.63	293	1.28–1.98
	1997–1998	.44	289	0.34–0.55

Table 2 Unit 3 deer harvest, 1990–2000

Regulatory year	Estimated legal harvest						Estimated illegal harvest	Total[a]
	M	(%)	F	(%)	Unk.	Total		
1990–1991	228	(100)			0	228	22	250
1991–1992	381	(100)			0	381	30	411
1992–1993	581	(100)			0	581	57	638
1993–1994	619	(100)			0	619	51	670
1994–1995	690	(100)			0	690	0	690
1995–1996	844	(100)			0	844	22	866
1996–1997	588	(100)			0	588	15	603
1997–1998	773	(100)			0	773	7	780
1998–1999	1005	(100)			0	1005	114	1119
1999–2000	862	(100)			0	862	70	932

[a] Data from mail questionnaire survey.

Table 3 Unit 3 deer hunter residency and success, 1990–2000

	Successful					Unsuccessful					
Regulatory year	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Total[b] hunters
1990–1991	131	43	0	174	(51)	145	18	2	165	(49)	339
1991–1992	278	22	0	300	(49)	282	19	5	306	(51)	606
1992–1993	428	45	0	473	(48)	468	46	0	514	(52)	987
1993–1994	422	51	2	475	(45)	492	72	5	569	(55)	1044
1994–1995	457	33	4	494	(44)	488	101	3	592	(55)	1086
1995–1996	569	28	6	603	(58)	386	47	0	433	(42)	1036
1996–1997	379	33	6	418	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1997–1998	511	33	0	544	(49)	512	43	9	564	(51)	1108
1998–1999	612	48	17	677	(59)	419	32	17	468	(41)	1145
1999–2000	500	68	5	573	(48)	563	56	9	628	(52)	1201

[a] Residents of Units 1B, 3, Meyers Chuck, Point Baker, and Port Protection.
[b] Data from registration permit report and hunter survey included.

Table 4 Unit 3 deer hunter effort percent by transport method, 1990–2000[a]

Regulatory year	Percent of effort							Number of trips
	Airplane	Boat	3- or 4-wheeler	Foot	ORV	Highway vehicle	Other	
1990–1991	4	60	0	14	0	21	1	708
1991–1992	1	41	1	12	3	43	0	1227
1992–1993	1	32	4	11	1	50	1	1861
1993–1994	2	44	2	10	4	36	2	1835
1994–1995	1	33	4	13	2	46	1	2204
1995–1996	1	42	5	13	4	34	1	2140
1996–1997	1	50	13	2	0	34	0	NA
1997–1998	1	55	13	0	0	31	0	NA
1998–1999	1	53	6	1	0	39	0	NA
1999–2000	1	35	13	1	0	50	0	NA

[a] The hunter mail survey reports transport as total number of hunting trips by method.

Table 5 Unit 3 deer harvest chronology percent by month, 1990–2000

Regulatory year	Harvest periods									Total[a] nr. deer
	August	September	October	November	December	January	February	April	Unk.	
1990–1991	36	10	24	25	4	0	0	0	0	250
1991–1992	15	11	53	21	0	0	0	0	0	410
1992–1993	9	11	63	16	0	0	0	0	0	639
1993–1994	21	6	45	24	1	2	0	0	0	671
1994–1995	16	4	47	31	1	1	0	0	0	691
1995–1996	29	7	41	23	0	0	0	0	0	866
1996–1997	14	7	43	21	1	0	0	0	14	588
1997–1998	20	10	35	26	0	1	0	0	8	780
1998–1999	13	7	41	31	1	1	1	1	4	1118
1999–2000	15	9	36	33	1	0	1	0	5	932

[a] May not equal harvest table due to rounding or incomplete reporting.

LOCATION

GAME MANAGEMENT UNIT: 4 (5820 mi^2)

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

BACKGROUND

Game Management Unit 4 (Unit 4) continues to provide most of the deer hunting opportunity in Southeast Alaska. During 1999–00, Unit 4 accounted for 40% of the region's hunter effort and 61% of the deer harvest (Paul and Straugh 2000).

Significant changes in deer density are normal in Unit 4. Periodic declines are attributable to severe winter weather, most importantly deep snow (Olson 1979). Deer populations were low in the late 1940s following years of heavy winter mortality. By 1956 deer increased to exceed carrying capacity (Klein and Olson 1960). More recently, severe winters appear to be on a 10-year cycle, with intervening mild winters. Most winters in Unit 4 were mild from the mid-1970s through 1987–88, with high survival of fawns and adult deer. However, during the winters of 1988–89 through 1990–91, persistent snow caused significant deer mortality. During the winters of 1994–95 and 1998–99, many fawns died, but these appear to be relatively minor setbacks. Winters of 1999–00 and 2000–01 were mild, with apparent recovery of deer populations.

Deer densities are expected to decline in the future due to habitat alteration caused by commercial logging. Kirchhoff (1994) pointed out that following clear-cut logging, browse availability declines as forest regrowth progresses. He also noted that snow accumulation in clear-cut areas during severe winters precludes use by deer, resulting in high starvation mortality. Farmer and Kirchhoff (1998) reiterated that differences in habitat use and mortality can be attributed to forage abundance and availability (Wallmo and Schoen 1980), nutritional quality (Hanley et al. 1989), snow (Kirchhoff and Schoen 1987), and predation risk (Kirchhoff 1994).

Since 1990 both state and federal subsistence hunting regulations have been in effect. The Alaska Board of Game adopted state regulations that apply on all lands in Unit 4. While the 2 sets of regulations were initially quite similar, they now continue to diverge regarding bag limits, method, and season length. The Federal Subsistence Board promulgated regulations that apply only on federal lands, giving federally qualified subsistence hunters more liberal bag limits and season dates. State bag limits are 3–4 deer; the federal bag limit for deer is 6. Federal law allows shooting deer from a boat, yet state law does not. Season lengths vary, with the state season closing December 31 and the federal closure a month later on January 31. Different regulations for separate groups of hunters using the same resource confuse hunters, make enforcement difficult, and may lessen the credibility of management agencies.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

As established by the Alaska Board of Game during their fall 2000 meeting in response to the intensive management of game law [AS 16.05.255 (i)(4)], the management goal is to manage the Unit 4 deer population to achieve and maintain a population of 125,000 deer while maintaining an annual harvest of 7800 deer.

MANAGEMENT OBJECTIVES

- Maintain a population capable of sustaining a mean reported harvest of at least 1.5 deer per hunter
- Maintain a population capable of providing a minimum reported success rate of 1 deer killed per 4 days hunting effort
- 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. We have used this technique to collect population trend data since 1981. Kirchhoff and Pitcher (1988) have described the methods in detail. We conducted winter mortality surveys (beach transects) on some previously established trend areas during spring.

We mailed a harvest questionnaire to a sample of hunters with deer harvest tickets to assess hunter effort and success (Paul and Straugh 1999, 2000). We asked hunters to supply area-specific information on hunting effort, months hunted, number of kills, and kill locations.

During winter 1998–99, we developed and field-tested methods to document physiologically stressed deer, a condition caused by severe winters. During periods of heavy snowfall, deer become concentrated on beaches, and a 40-mile boat route was established to examine the physical condition of these deer. We viewed deer through binoculars at ranges of 25–200 meters and assigned each individual to one of 7 condition classifications. We documented changes in deer condition through late winter.

Although we conducted no formal investigations regarding parasites in deer, we did inspect several animals during the course of this reporting period and noted lungworm (*Dictyocaulus viviparus*) and ectoparasite occurrences.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Pellet-group surveys indicate Unit 4 Sitka black-tailed deer populations probably declined in spring 1999 due to deep and long-lasting snows. Declines were probably greater in eastern parts of the unit (notably Admiralty Island). Although pellet-group

surveys still indicated lower deer populations during spring 2000 in most areas (Table 1), this reflects the fact that deer were not restricted to typical winter range during the preceding winter.

Habitat quality and winter severity vary significantly throughout the unit because of local climate factors, topography, and the extent of logging activities. Eastern portions of the unit generally experience greater snow depths and sustain higher winter mortality. Areas logged before 1970 are entering a stage of natural reforestation and cannot support deer long term. Because of the extent of clear-cut logging, future deer carrying capacity will be lower than prelogging levels. Many popular deer hunting areas will not sustain current harvests.

Pellet-group surveys (Table 1) generally reflect a decreasing deer population. However, these data probably reflect only the declines noted during the winter of 1998/99. Winter 1999/00 was mild and deer remained scattered at higher elevations; thus, pellet surveys reflected relatively lower densities of pellet groups in most areas.

This is also true of the spring pellet surveys in 1999 and 2000, which indicated a slight decrease in deer numbers (Table 1). This technique alone may not fully reflect deer populations in late winter because deer that deposited pellets during December or January may have died by February or March. Snowfall that concentrates deer in restricted habitats may cause high pellet densities in such areas. Yet in years with little snow accumulation (such as 1998–99 and 1999–00), wintering deer may be scattered over wide areas or at elevations above transect boundaries. For management we should continue to base our evaluation of the deer population status on a variety of indicators, including hunter contacts, field observations, harvest questionnaires, mortality transects, and pellet-group surveys.

Population Composition

We estimated sex composition of the legal kill (Table 2) from deer harvest questionnaires (Paul and Straugh 1999, 2000). Extrapolations of hunter reports indicated a 1998–99 estimated take of 3400 bucks (72%, Table 2). Hunters took an estimated 4800 (71%) bucks during 1999–00. There remains a strong tendency for hunters to select bucks, even though the September 15–December 31 either-sex season (federal season extends through January) has been in effect for many years.

Distribution and Movements

No information.

MORTALITY

Harvest

Season and Bag Limit	Resident and Nonresident 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; however, antlerless deer may be taken only during Sep 15–Dec 31
Remainder of Unit 4	Aug 1–Dec 31	4 deer; however, antlerless deer may be taken only during Sep 15–Dec 31

Board of Game Actions and Emergency Orders. At their November 2000 meeting, the board established population and harvest goals for Unit 4 deer in response to requirements of the intensive management of game law.

Hunter Harvest. Extrapolations of responses from the hunter harvest indicated there were 2629 and 2518 successful deer hunters in Unit 4 during the 1998–99 and 1999–00 seasons, respectively (Table 3). These numbers indicate relatively stable hunter effort, continuing a 10-year trend.

In 1998–99 hunters reported killing 4700 deer. In 1999–00 the reported kill was 6800 deer. Crippling loss, unreported kills, and illegal kills are difficult to accurately determine, but we estimate they are 25% of the reported harvest (Table 2). Based on these estimates, hunter-related deer mortality was 5900 deer in 1998–99 and 8500 during the 1999–00 season. This harvest is comparable with the previous reporting period (Whitman 2000).

Hunter Residency and Success. During 1998–99 a total of 1296 successful hunters residing in Unit 4 harvested an estimated 4621 deer (3.6 deer/successful hunter). During the 1999–00 season, 1238 successful Unit 4 residents took 3942 deer (3.2 deer/successful hunter, Table 3). Nonresident Unit 4 hunters made up only 1.1% and 3.4% of the hunters during 1998–99 and 1999–00, respectively. Most hunters (54% and 52% in 1998–99 and 1999–00, respectively) were Alaska residents from outside Unit 4. During the 1999–00 season, 76% of Unit 4 residents, 65% of nonlocal Alaska residents, and 52% of nonresidents successfully harvested at least 1 deer.

Harvest Chronology. Most hunters continue to be in the field during November, effecting the greatest single-month harvest. During the 1998–99 season, November accounted for 34% of the harvest and 40% during 1999–00 (Table 4). December generally provides the next highest deer harvest from Unit 4. The federal season in January generally results in about 6% of the reported annual harvest.

Transport Methods. Hunter transportation modes remained almost identical with past years (Table 5). During 1998–99, hunters used boats in 72% of deer hunting trips, airplanes and highway vehicles in 11% (each), and walking and 3- or 4-wheelers 3% (each). During 1999–00, hunters used boats in 69% of the trips, highway vehicles in 13%,

and airplanes in 12%. Transport methods have changed little since the 1988–89 season when data were first collected.

Other Mortality

Unlike the previous report period, starvation mortality due to severe winters affected Unit 4 deer this period. Data were collected on low-elevation mortality transects during both springs and indicated winter mortality was relatively high in spring 1999 but negligible in spring 2000. Although largely speculative, I believe that winter mortality during 1998–99 may have caused at least a 20% decline in the deer population on Admiralty Island, with Baranof and Chichagof mortality about half that.

During March 1999, we completed 3 boat surveys along a 40-mile stretch of beach north of Sitka in an effort to quantify physical condition of wintering deer. During those surveys, we classified 172 deer according to the following scale:

0 Dead. Observation should be accompanied by necropsy report/notes.

1 Animal may be unwilling or unable to stand. Ribs visible through coat.

2 "Humped" appearance. May be "shaky" in hind limbs when walking. Animal may be somewhat lethargic. Often hesitant to leave beach. Hips noticeably angular at illium. Hair often showing disarray or missing patches. Some posterior ribs may be visible.

3 Hair usually patchy. Some angled appearance of hips when viewed from the side. When viewed from rump, backbone visible.

4 Rounded hips, sleek coat. May have "breeding patches" of missing/scuffed hair. Very alert.

5 Fat. Classification usually reserved for late summer and early fall.

U Unclassified. Generally used when an animal is too far away to be accurately classified or has left the beach fringe before being classified.

Results of the 3 surveys indicate an apparent decline in mean condition of observed deer. On 5 March 1999 we surveyed deer from Otstoia Island (Hoonah Sound) to St. John the Baptist Bay. Wind and other environmental conditions kept large numbers of deer off the beaches, but we were able to classify 25 deer with a mean rating of 3.9 (includes both adults and fawns). On 18 March an area from Piper Island in Fish Bay south through Neva and Olga straits (including St. John the Baptist Bay) was surveyed under ideal weather conditions, and 124 deer showed a mean condition rating of 3.5 (indicating a 10% decline over a 2-week period). The third survey, on 26 March, resulted in classification of 23 deer with a mean condition index of 3.5.

This survey provides an objective way to assess relative condition of wintering deer, and it appears to hold promise as a method of monitoring and documenting declines during severe winters.

Parasites

Incidental observations of deer lungs reveal that lungworm (*Dictyocaulus viviparus*) does occur in Unit 4 deer, but is infrequently fatal. We examined 8 sets of deer lungs (5 females, 3 males) in spring 1999. Three of those (37.5%) had adult lungworms, and all infestations were relatively light. Incidental examinations of 14 additional deer indicates that incidence of lungworms in fawns is high. As a deer matures, incidence of adult worms appears to decline, but most deer show scarring in lung tissue from previous infestations that they have overcome. Secondary problems associated with fluid in the lungs (lungworm-pneumonia complex) were not evident. Although presence of roundworms (Metastrongylidae) does not necessarily affect deer, nutritionally stressed individuals may be compromised further. I suspect that although *D. viviparus* is ubiquitous within the deer population, they only are a problem when deer become nutritionally stressed in conjunction with severe winter weather.

Nasal bots (*Cephenemyia jellisoni*) have been documented in deer during this reporting period, but their incidence is relatively low. In over 30 deer examined incidentally, only 3 were hosting bots in the nasopharyngeal pouch. In 28 deer examined at the time of death, one was host to a single tick (I suspect *Dermacentor* sp.). Unfortunately, that tick was not collected, so positive identification is still a mystery. Sucking lice (*Tricholipeurus lipeuroides*) are common ectoparasites as well.

HABITAT

Assessment

No data were collected.

Enhancement

No habitat enhancement projects were conducted.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

None.

CONCLUSIONS AND RECOMMENDATIONS

All management objectives were met during both seasons. The average kill during 1998–99 was 2.8 deer per successful hunter, and in 1999–00 that figure declined slightly to 2.4 deer per successful hunter. Bucks composed 72% of the reported harvest during both the 1998–99 and 1999–00 regulatory years. Harvest questionnaire data indicated an estimated deer harvest of 4700 in Unit 4 during 1998–99 and 6800 during 1999–00 (Paul and Straugh 1999, 2000).

Weather during the deer hunting season influences hunter effort (Faro 1997) and consequently the harvest. When early snow is sufficient to push deer from higher elevations to beaches, hunters are generally more successful. Shooting from boats under federal subsistence hunting regulations causes high crippling rates and loss of deer. Therefore, we estimate that illegal take and wounding losses are 25% above the legal kill. Although deer densities are high throughout most areas, they remain below carrying

capacity in easily accessible areas because of high hunter harvest. Predation mortality is probably negligible in most of the unit, although brown bears prey on deer in some areas.

A major management concern continues to be the diverging hunting regulations promulgated by the Federal Subsistence Board and the State Board of Game. Different regulations for separate groups of hunters using the same resource make enforcement difficult, confuse hunters, and lessen the credibility of management agencies. In addition, conflicting regulations may make management of the resource more difficult in the future. Wherever possible, the division should assist the 2 regulatory entities in standardizing deer hunting regulations.

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Table 1 Unit 4 deer population trends as indicated by pellet-group surveys, 1985–1999

Area	Regulatory year	Mean pellet groups/plot	Number of plots
Hawk Inlet	1985–86	1.92	286
(VCU 128)	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
	1998–99	1.25	176
Hood Bay	1986–87	2.31	358
(VCU 171)	1988–89	1.77	366
	1989–90	1.85	375
	1991–92	1.91	360
	1993–94	1.64	371
	1999–00	1.04	349
Pybus Bay	1985–86	2.00	235
(VCU 182)	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
	1997–98	1.37	256
Pleasant Island	1990–91	1.38	311
(VCU 185)	1991–92	1.34	210
	1992–93	1.77	305
	1993–94	1.26	345
	1998–99	1.82	223
Port Althorp	1987–88	1.80	195
(VCU 189)	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
	1997–98	1.48	281
Idaho Inlet	1987–88	1.34	258
(VCU 190)	1991–92	0.94	219
	1992–93	0.56	305
	1993–94	0.71	294
	1997–98	1.11	273

Table 1 Continued

Area	Regulatory year	Mean pellet groups/plot	Number of plots
Port Frederick	1987–88	1.87	242
(VCU 202)	1995–96	1.02	226
Suntaheen Creek	1987–88	1.22	272
(VCU 209)	1991–92	1.13	271
	1992–93	0.73	265
	1993–94	1.05	272
	1995–96	0.98	276
	1998–99	1.02	112
Pavlov River	1987–88	1.78	325
(VCU 218)	1991–92	1.56	341
	1995–96	1.50	249
	1998–99	2.24	213
Upper Tenakee	1987–88	1.47	253
(VCU 223)	1991–92	0.59	265
	1992–93	0.47	249
	1993–94	0.61	319
	1995–96	0.56	263
Saltery Bay	1987–88	2.02	256
(VCU 231)	1991–92	0.97	256
	1992–93	0.76	227
	1993–94	0.97	193
	1995–96	1.90	152
Kadashan	1987–88	2.67	221
(VCU 235)	1991–92	1.63	282
	1992–93	1.12	385
	1993–94	1.39	294
	1995–96	2.36	204
Corner Bay	1980–81	0.35	60
(VCU 236)	1991–92	2.27	206
	1992–93	1.72	50
	1993–94	1.69	198

Table 1 Continued

Area	Regulatory year	Mean pellet groups/plot	Number of plots
Finger Mountain (VCU 247)	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
	1995–96	2.62	221
	1998–99	3.04	169
	1999–00	2.87	217
Soapstone (VCU 254)	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
Nakwasina (VCU 300)	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
	1996–97	2.79	200
	1997–98	2.99	217
	1998–99	3.20	146
	1999–00	2.64	181
Sea Lion Cove (VCU 305)	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
	1997–98	1.71	241
	1999–00	1.42	201

Table 1 Continued

Area	Regulatory year	Mean pellet groups/plot	Number of plots
South Kruzof (VCU 308)	1992–93	1.62	345
	1993–94	1.71	370
	1998–99	1.38	365
Cape Ommaney (VCU 339)	1999–00	1.26	270
Whale Bay (VCU 344)	1999–00	1.40	260
West Crawfish (VCU 348)	1999–00	1.34	211

Table 2 Unit 4 deer harvest, 1995/96–1999/00

	Estimated legal harvest[a]						Estimated illegal	
Regulatory year	M	(%)	F	%	Unk	Total	harvest[b]	Total
1995–96	5300	(72)	2100	(28)		7400	1200	8600
1996–97	3700	(74)	1300	(26)		5000	1250	6250
1997–98	4300	(68)	2000	(32)		6300	1580	7880
1998–99	3400	(72)	1300	(28)		4700	1200	5900
1999–00	4800	(71)	2000	(29)		6800	1700	8500

[a]From mail questionnaire.

[b]Includes crippling loss estimate.

Table 3 Unit 4 deer hunter residency and success, 1995/96–1999/00

Regulatory year	Successful				Unsuccessful				Total nr hunters
	Local resident	Nonlocal resident	Nonresident	Total	Local resident	Nonlocal resident	Nonresident	Total	
1995–96	1361	1249	30	2640	471	777	6	1254	3894
1996–97	1037	1041	17	2095	NA	NA	NA	NA	NA
1997–98	1215	1108	14	2337	513	732	28	1273	3610
1998–99	1296	1308	25	2629	301	616	13	930	3559
1999–00	1238	1217	63	2518	387	654	59	1100	3618

Table 4 Unit 4 deer harvest chronology by month, 1995/96–1999/00

Regulatory year	Harvest periods												Total harvest
	August	(%)	September	(%)	October	(%)	November	(%)	December	(%)	January[1]	(%)	Other	
1995–96	451	(6)	575	(8)	940	(13)	3108	(42)	1874	(25)	449	(6)	31	7428
1996–97	294	(6)	453	(10)	717	(16)	1883	(41)	1100	(24)	148	(3)	396	4991
1997–98	327	(5)	564	(9)	1196	(20)	2246	(37)	1337	(22)	358	(6)	234	6262
1998–99	433	(6)	808	(11)	1501	(20)	2605	(34)	1304	(17)	568	(7)	376	7595
1999–00	270	(4)	383	(6)	867	(13)	2731	(40)	1711	(25)	374	(6)	425	6761

[1] January season is closed by state regulation. Qualified local residents are allowed to hunt National Forest lands under federal regulations.

Table 5 Unit 4 deer harvest, percent by transport method, 1995/96–1999/00

	Percent of harvest						Number
Regulatory year	Airplane	Foot	Boat	ORV	Highway vehicle	Unknown	of hunters
1995–96	7	12	70	2	8	1	3894
1996–97	12	2	72	1	11	1	NA
1997–98	9	3	68	6	14	0	3610
1998–99	11	3	72	3	11	0	3559
1999–00	12	3	69	3	13	0	3618

LOCATION

GAME MANAGEMENT UNIT: 5 (5800 mi^2)

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

BACKGROUND

Deer were introduced to the islands of Yakutat Bay in 1934 with the release of 7 does and 5 bucks (Burris and McKnight 1973). These animals established a small population that persists today on islands and the mainland along the east side of Yakutat Bay. Heavy snowfall and predators limit deer densities, but the population has supported small harvests over the years. Many of the deer are taken during the course of hunts for other species. The potential for this deer herd is very limited.

Due to deer declines in the 1970s and a virtual cessation of harvest, the Unit 5 deer season was closed in July 1980. By the end of the 1980s, deer had recovered to some degree, and the Board of Game acted on public requests for an open season. In 1991 the board instituted a limited deer hunt in Unit 5A. Since then, small numbers of deer have been taken in most years, with some reported illegal harvest.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain a population capable of sustaining a 1-month season and a bag limit of 1 buck.

METHODS

A total of 11,281 deer harvest tickets were issued for the 1998 regulatory year (RY) for all of Southeast Alaska and 11,770 for RY 1999. About one third of the harvest ticket holders were mailed a hunter survey in each of the 2 years within the report period, and 60% responded. In Unit 5A, 14 of 22 hunters who received surveys responded in 1998, and 7 of 11 responded in 1999. The survey was designed to collect information on hunter effort, location and timing of hunts, number of days hunted, transportation used, and the number of deer harvested. Survey results for hunter effort, success, and kill location were expanded to estimate results for all harvest ticket holders. To gauge deer population trends, US Forest Service crews have conducted pellet group surveys since 1986 on several islands and on the mainland near Yakutat. No pellet transects were completed during this report period.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Deer populations remain low in the Yakutat area. Limited habitat and heavy snow accumulations on the mainland prevent deer from increasing significantly, but some Yakutat Bay islands

continue to support deer. Reports from local hunters, fishermen, and others indicate that wolves have preyed significantly on deer.

MORTALITY

Harvest

Season and Bag Limit	Resident and Nonresident Hunters
Unit 5A	Nov 1–Nov 301 antlered deer
Unit 5B	No Open Season

Board of Game Actions and Emergency Orders. The board made no changes to deer hunting regulations during the report period, and no emergency orders were issued.

Hunter Harvest. Based on data gathered from the annual deer hunter survey, 5 male deer were killed in 1998, and 5 were also harvested in 1999 (Table 2). Hunter effort varied considerably during the 2 years, with 29 hunters expending 92 days of effort in 1998 and 20 hunters spending only 30 days afield in 1999. These figures are a statistical expansion of harvest reported from our survey, and significant error is possible in a hunt with such low effort and harvest.

Illegal Harvest. Anecdotal information collected from both Alaska Department of Fish and Game and US Forest Service employees stationed in Yakutat suggests the illegal harvest of deer may exceed the legal harvest. From skiffs, hunters take deer illegally by spotlighting deer on beaches.

Hunter Residency and Success. Since this hunt resumed in 1991, virtually all Unit 5A hunters have been local residents. This held true in 1998, although in 1999 all 5 successful hunters were reported to be nonlocal residents. This is probably an artifact of expanding a very small sample size to arrive at a harvest estimate. Since limited habitat in the area supports low densities of deer, it is unlikely that nonlocal hunters would choose to pursue deer within this unit when better hunting opportunities are available to the north in Unit 6 and to the south in Units 1–4.

Transport Methods. As in the past, most hunters used boats to access hunting areas. In 1998, 19 of 29 hunters used boats for access, while 5 used ATVs and 5 others used highway vehicles. Interestingly, all 5 successful hunters reportedly used ATVs for access. This is probably inaccurate reporting because the islands are heavily timbered and transportation to the islands is by boat. In 1999 all hunters used boats for access.

CONCLUSIONS AND RECOMMENDATIONS

The Unit 5A deer hunt provides Yakutat residents a yearly opportunity to legally harvest a small number of deer. Habitat conditions, predation, and deep snow will probably prevent this deer population from ever growing significantly. However, local trapping may have reduced some wolf predation on deer. The importance of deer to the community of Yakutat seems to be a distant 3rd to moose and mountain goats. Most deer are taken incidentally on the beach. Pellet transect data should continue to be collected to monitor deer population trends. The small harvest probably has little effect on the population because much of this mortality is probably

compensatory to wolf predation or winterkill. Closure of the state hunt should be considered as a management option if pellet transects and harvest data indicate a need for such action.

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Table 1 Unit 5A deer population trends as indicated by pellet-group surveys, 1991–1992 through 1997–1998

Area	Regulatory year	Mean pellet groups/plot	Number of plots	95 % CI
Knight Island (VCU 361)	1991–1992	0.81	100	0.61–1.01
	1992–1993	0.95	100	0.74–1.16
	1994–1995	0.44	90	0.25–0.64
	1996–1997	0.00	153	0.00–0.00
	1997–1998	0.03	192	0.01–0.05
Humpback (VCU 363)	1991–1992	0.01	118	0.00–0.03
Yakutat Islands (VCU 368)	1991–1992	0.32	415	0.24–0.39
	1992–1993	0.48	243	0.37–0.58
	1993–1994	1.07	106	0.81–1.32
	1994–1995	0.66	251	0.52–0.80
	1996–1997	0.59	379	0.48–0.69
	1997–1998	0.59	344	0.48–0.70
Ankau (VCU 369)	1991–1992	0.03	116	0.00–0.05

Table 2 Unit 5A annual deer harvest[1], 1991–1999 through 1999–2000

Regulatory year	Males	Females	Estimated Total
1991–1992	2	0	2
1992–1993	0	0	0
1993–1994	3	0	3
1994–1995	5	0	5
1995–1996	7	0	7
1996–1997	0	0	0
1997–1998	0	5	5
1998–1999	5	0	5
1999–2000	5	0	5

[1] Data from expanded results of hunter surveys.

Table 3 Unit 5A hunter effort and success, 1991–1999 through 1999–2000

Regulatory year	Number of hunters	Number of days hunted	Number of deer killed	Number of deer/hunter	Number of days/deer
1991–1992	36	123	2	.1	61.5
1992–1993	15	61	0	0	0
1993–1994	22	149	3	.1	49.7
1994–1995	24	89	5	.2	17.8
1995–1996	22	61	7	.3	8.7
1996–1997	N/A	N/A	N/A	N/A	NA
1997–1998	29	97	5	.2	18.2
1998–1999	29	92	5	.2	19.0
1999–2000	20	30	5	.3	6.0

LOCATION

GAME MANAGEMENT UNIT: 6 (10,140 mi^2)

GEOGRAPHIC DESCRIPTION: Prince William Sound and North Gulf Coast

BACKGROUND

The Cordova Chamber of Commerce introduced Sitka black-tailed deer to Unit 6 between 1916 and 1923 (Burris and McKnight 1973). At least 24 deer were released on Hawkins and Hinchinbrook Islands in Prince William Sound (PWS). This was the first big game translocation in the state and was one of the most successful. Deer quickly occupied vacant habitat on most islands and adjacent mainland in PWS. The population apparently peaked in 1945, resulting in habitat damage and long-term reduction in carrying capacity (Robards 1952). High winter mortality occurred in the late 1940s, mid 1950s, late 1960s, and early 1970s (Reynolds 1979). Deer currently occupy most of Unit 6. The highest densities are on the big islands, Hawkins, Hinchinbrook, and Montague in PWS. Lower densities occur on smaller islands and mainland areas surrounding PWS.

Black-tailed 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. The climate is milder on the big islands compared to the surrounding mainland because of strong maritime influence (Shishido 1986). Snow-shading canopies of old-growth forest provide accessible forage and shelter during winter (Shishido 1986, Reynolds 1979). Primary winter forage includes *Cornus canadensis*, *Rubus pedatus*, and *Coptus* spp. until deeper snows necessitate a change from forbes to *Vaccinium ovalifolium*. Predation is minimal because there are few wolves and coyotes off the mainland. 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). A series of mild winters allows deer to increase and disperse to less favorable habitat only to decline during severe winters from starvation. Hunting can be a limiting factor in local areas when deep snow concentrates deer on beaches during open season; however, this is a relatively rare occurrence (Reynolds 1979). Harvest may become a more significant factor in the future if numbers of hunters increase. The road to Whittier will increase the number of hunters in western PWS and Montague Island. However, weather will continue to constrain hunter access.

Legal deer hunting began in 1935. It was monitored from 1960 through 1979 by harvest reports and hunter contacts. Beginning in 1980, 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 3000 in 1987. Harvests increased at an average annual rate of 14% between 1980 and 1984 (Griese and Miller 1986). The average estimated harvest during 1990–1995 was 2140, ranging from 1400 to 2800 deer.

Clearcut logging of old-growth forest on private land in PWS is the most important deer management concern in Unit 6. Research and annual pellet-group surveys have repeatedly

demonstrated the importance of these timber stands for overwinter survival of deer in coastal ecosystems in PWS (Shishido 1986) and in southeastern Alaska (Kirchhoff 1983 and 1992, Schoen et al. 1985, Schoen 1978, Kirchhoff and Schoen 1987 and 1988). Private landowners have clear-cut large areas on Montague Island, Port Fidalgo, and eastern PWS. The *Exxon Valdez* Oil Spill (EVOS) Trustee Council recently acquired (by fee simple title and conservation and timber easements) about 205,000 acres of land in eastern PWS. This acquisition will conserve important habitat for deer in areas formerly scheduled for logging.

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

ADF&G and the U.S. Forest Service cooperated to monitor population trend in PWS. We conducted annual pellet-group surveys (Kirchhoff and Pitcher 1988) during late May and early June at 6 locations (Fig 1). Three transects consisting of continuous 3.3- × 65.6-ft plots run uphill from the beach fringe at each sampling location. Most transects terminated at alpine habitat. Those not reaching the alpine terminated after we had examined 100 plots. The number of plots varied, depending upon the distance from the beach to the alpine and upon persistence of snow during the survey. Minimum number of plots within a location was 200. We calculated mean numbers of pellet groups per plot (MPGP) for each location. Within each location, we first tested means for a time-series correlation or other covariate structure, using a repeated measures analysis (Earl Becker, personal communication). Once a significant year effect was detected at a location, Fisher's Protected LSD test was used to determine (at $P<0.10$) which years were different from one another (Earl Becker, personal communication). Kirchhoff and Pitcher (1988) suggested that MPGPs of 0.50 to 0.99, 1.00 to 1.99, and 2.00 to 2.99 were low, moderate, and high densities, respectively, for Southeast Alaska.

Although invaluable as an indicator of population trend, spring pellet-group density has an inherent lag time, particularly during winters with heavy snow. Deer that die in late winter have deposited pellets that may be counted, thereby biasing the index upward (Kirchhoff and Pitcher 1988). I used an annual snow index (Nowlin 1997) to predict whether pellet-group density reflected current population density, or a lag existed because of late-season mortality that would appear in the spring survey of the following year.

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

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Deer density in PWS was low to moderate during the reporting period (Table 1). We were unable to conduct pellet-group surveys at Port Etches and San Juan Bay during 1998–99 because of lingering snow down to sea level.

Population Trend

Deer numbers decreased during this reporting period. Record-high MPGPs and harvest during 1998 indicated the population was at a high density after 5 years of relatively mild winters (Fig 2). I observed heavily browsed winter habitat in about one third of areas visited. The population declined during the severe winter of 1998–99, with declining MPGPs lagging into 1999–00 (Table 1). MPGP decreased by 54% from 1997–98 to 1999–00 (Table 1). The greatest and least declines in MPGPs occurred at Hook Point (-70%) and Port Etches (-34%), respectively; both of which are on Hinchinbrook Island.

MORTALITY

Harvest

Season and Bag Limit. The open season for resident and nonresident hunters was 1 August to 31 December. The bag limit was 5 deer; however, antlerless deer could be taken beginning 1 October.

Board of Game Actions and Emergency Orders. The Board of Game changed the bag limit from 4 deer to 5 beginning in 1999–00. No emergency orders were issued.

Hunter Harvest. Total estimated deer harvest in Unit 6 during 1998–99 and 1999–90 was 3075 and 2390, respectively (Table 2). The record harvest during 1998–99 was a result of high deer density and good hunting conditions. As during past years, most harvest came from Montague Island. Northern and eastern PWS had the lowest harvests. The reported legal harvest consisted of 69% and 53% males during 1998–99 and 1999–00, respectively. The low proportion of males killed during 1999–00 resulted from disproportionately high mortality of males the previous winter.

Hunter Residency and Success. Approximately 1740 and 1410 individuals hunted deer in Unit 6 during 1998–99 and 1999–00, respectively (Table 3). Hunter success during each year was 67% and 61%, respectively. Total numbers of hunters was higher in 1998–99 compared to previous years.

Nonlocal residents represented 54% and 58% of successful hunters during this reporting period. Local residents on average killed 1.9 deer per hunter compared to 1.6 deer per hunter for nonlocal residents. These proportions were similar to those in previous years.

Harvest Chronology. Hunters killed most deer during November (Table 4). Deer were easiest to hunt during November because the bag limit was any deer, the rut was in progress, and deer were present at lower elevation because of snowfall.

Transport Methods. Similar to previous years, hunters primarily used boats and airplanes, respectively; 3- and 4-wheelers, highway vehicles, and walking were not significant modes (Table 5).

HABITAT

Snow Depth and Duration

The snow index (SI) indicated higher than average snow depth and duration for 1998–99 (SI = 8) and above average for 1999–00 (SI = 6) (Fig 2). Deer mortality was high during the 1998–99 and probably average during the following winter. However, the lag in declining MPGP from the severe winter carried into spring of 1999 (Table 1). Nowlin (1997) demonstrated that the SI followed deer population trends. Higher SIs resulted during years when the population decreased and low SIs were marked by years of population recovery and growth. This reporting period had higher than normal SIs and a decreasing deer population.

CONCLUSIONS AND RECOMMENDATIONS

We achieved our objectives to maintain a deer population capable of sustaining an annual harvest of 1500 deer with a minimum hunter success rate of 50%. During the reporting period, hunters harvested 69% males the first year but only 53% the following year. Harvest of male deer should return to normal as the population recovers from the severe winter of 1998–99. The deer population decreased because of high winter mortality.

Pellet-group surveys, snow indices, and hunter questionnaires provide tools to effectively monitor and manage deer in Unit 6. MPGP has been a reliable index to population trend. We should continue pellet-group surveys and add 2 locations in western PWS to the annual survey. We should add 1 near-beach mortality transect to each survey area to determine if this method reflects population MPGP and SI and if starvation mortality can be delineated from other sources of mortality such as wounding loss. The SI appears to be a good indicator of winter mortality and population status.

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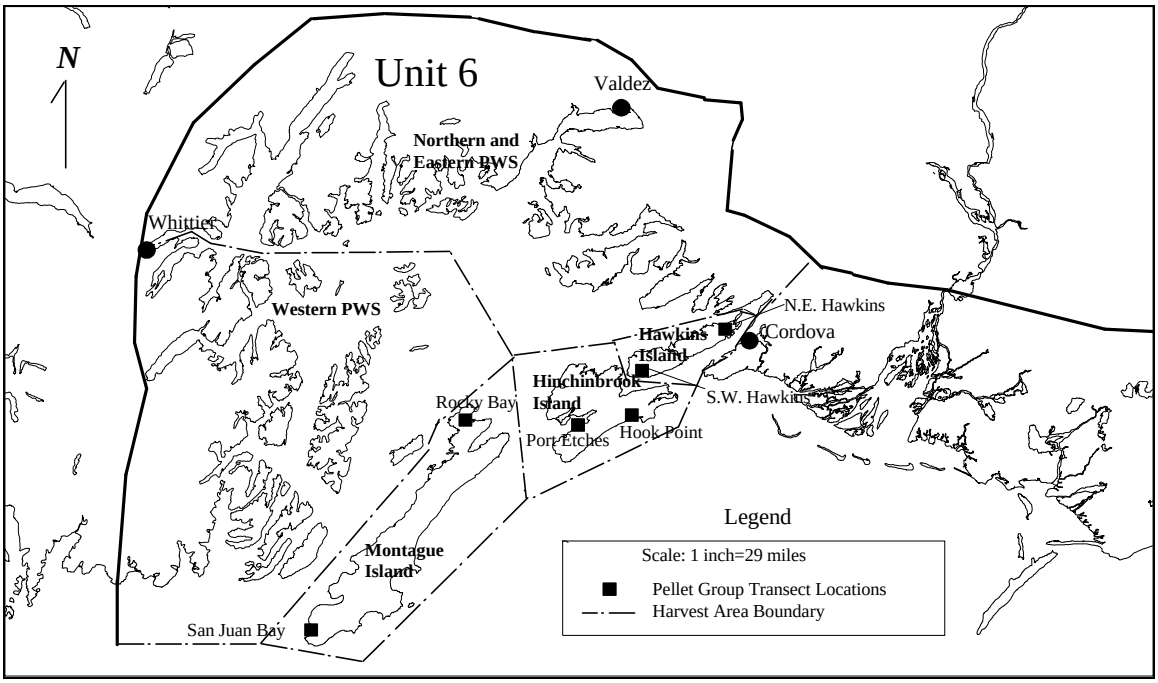

Figure 1 Unit 6 deer pellet-group transect locations and harvest area boundaries

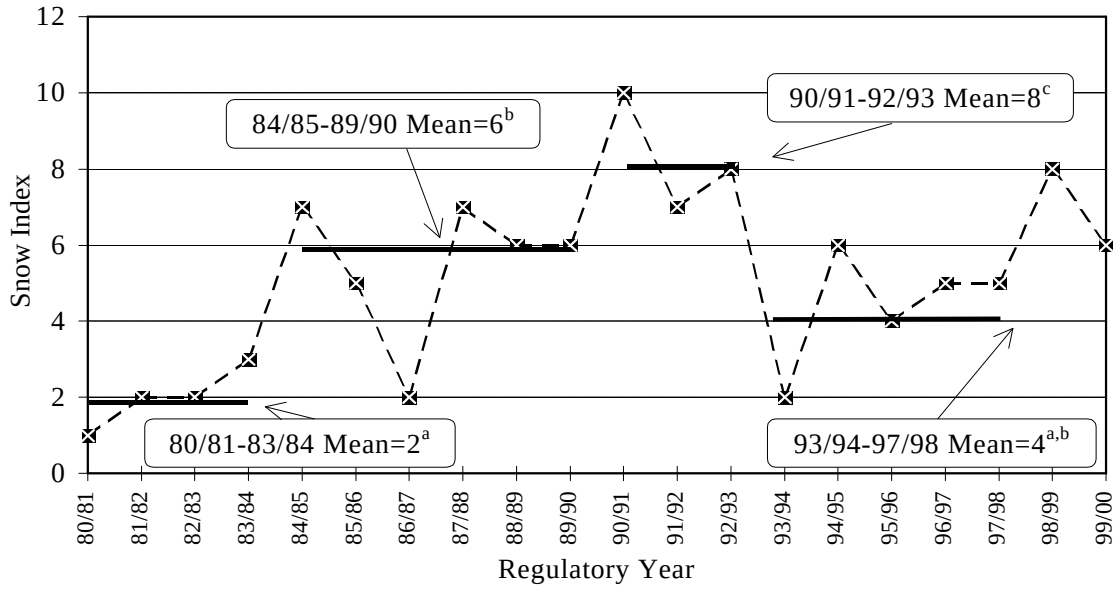

Figure 2 Port San Juan snow depth and duration index, 1980–99. Snow index of 5 represents a normal year, based on long-term averages ($^{a-c}$ Means with different letters are significantly different ($p<0.05$, $F = 9.15$).

Table 1 Unit 6 deer population trends as indicated by spring pellet-group surveys 1995–2000. We analyzed survey data using a repeated measures technique.

AREA	Specific location/UCU	Regulatory year	Mean Pellets/Plot	S.E.	Sig. diff	Number of plots
Hawkins Island	N.E. Hawkins	1995–96	1.84	0.54	a	243
	2001	1996–97	1.55	0.38	a	240
		1997–98	1.90	0.37	a	238
		1998–99	1.11	0.36	b	237
		1999–00	0.89	0.36	b	225
	S.W. Hawkins	1995–96	1.05	0.40	a	222
	2003	1996–97	1.87	0.31	b, c	223
		1997–98	1.94	0.44	c	224
		1998–99	1.42	0.33	d	209
		1999–00	0.85	0.33	a	208
Hinchinbrook Island	Hook Point	1995–96	1.46	0.57	a	234
	1905	1996–97	1.98	0.57	b	233
		1997–98	2.53	0.57	c	239
		1998–99	1.22	0.41	a, b	211
		1999–00	0.77	0.41	b	214
	Port Etches	1995–96	1.68	0.34	a	235
	1903	1996–97	1.96	0.34	a	235
		1997–98	1.77	0.34	a	235
		1998–99	not surveyed			
		1999–00	1.16	0.29	b	235
Montague Island	Rocky Bay	1995–96	1.27	0.24	a, d	*233*
	1803	1996–97	0.92	0.12	b	219
		1997–98	1.51	0.19	c, d	218
		1998–99	1.02	0.17	a, b	218
		1999–00	0.62	0.17	b	218
	San Juan Bay	1995–96	1.29	0.42	a	237
	1810	1996–97	1.17	0.39	a	234
		1997–98	1.36	0.46	a	237
		1998–99	not surveyed			
		1999–00	0.75	0.38	b	237
All Areas		1995–96	1.50	0.16	a, c	1404
		1996–97	1.56	0.16	a	1384
		1997–98	1.84	0.16	b	1388
		1998–99	1.23	0.10	c	875
		1999–00	0.85	0.09	d	1337

[a-d] Means with different letters within specific locations are significantly different (P<0.1).

Table 2 Unit 6 deer harvest, 1995–00

Area	Regulatory year	Estimated legal harvest M	(%)	F	(%)	Total	Estimated illegal harvest	Total
Hawkins Island	1995–96	208	(71)	84	(29)	292	20	312
	1996–97	246	(69)	110	(31)	356	30	386
	1997–98	291	(70)	123	(30)	414	30	444
	1998–99	337	(62)	147	(38)	384	30	414
	1999–00	253	(54)	214	(46)	467	30	497
Hinchinbrook Island	1995–96	236	(66)	124	(34)	360	30	390
	1996–97	262	(65)	140	(35)	402	30	432
	1997–98	289	(67)	140	(33)	429	30	459
	1998–99	507	(70)	221	(30)	728	30	758
	1999–00	205	(55)	166	(45)	371	30	401
Montague Island	1995–96	538	(71)	220	(29)	758	60	818
	1996–97	482	(68)	226	(32)	708	60	768
	1997–98	727	(73)	263	(27)	990	60	1050
	1998–99	830	(73)	307	(27)	1137	60	1197
	1999–00	439	(50)	444	(50)	883	60	943
Western PWS	1995–96	216	(81)	52	(19)	268	20	288
	1996–97	237	(59)	167	(41)	404	30	434
	1997–98	356	(67)	178	(33)	534	30	564
	1998–99	336	(66)	175	(34)	511	30	541
	1999–00	241	(58)	176	(42)	417	30	447

Table 2 Continued

Area	Regulatory year	Estimated legal harvest M	(%)	F	(%)	Total	Estimated illegal harvest	Total
Northern and	1995–96	32	(80)	8	(20)	40	3	43
Eastern PWS	1996–97	37	(80)	9	(20)	46	4	50
	1997–98	99	(74)	34	(26)	133	10	143
	1998–99	39	(55)	32	(45)	71	10	81
	1999–00	48	(62)	29	(38)	77	10	87
Unit 6 - Unknown	1995–96	4	(50)	4	(50)	8	0	8
	1996–97	5	(50)	5	(50)	10	0	10
	1997–98	25	(100)	0	(0)	25	0	25
	1998–99	61	(73)	23	(27)	84	0	84
	1999–00	11	(65)	6	(35)	17	0	17
Unit 6 - Total	1995–96	1234	(71)	492	(29)	1726	133	1859
	1996–97	1269	(66)	657	(34)	1926	154	2080
	1997–98	1788	(71)	737	(29)	2525	150	2675
	1998–99	2010	(69)	905	(31)	2915	160	3075
	1999–00	1197	(53)	1035	(46)	2232	160	2392

Table 3 Unit 6 deer hunter residency and success, 1995–00

Regulatory year	Successful					Unsuccessful					Total hunters
	Local resident[a]	Nonlocal resident	Non resident	Total	(%)	Local resident	Nonlocal resident	Non resident	Total	(%)	
1995–96	280	404	10	694	(56)	240	300	0	540	(44)	1234
1996–97	397	364	9	770	(63)	184	255	14	453	(37)	1223
1997–98	485	496	5	986	(66)	152	326	22	500	(34)	1485
1998–99	492	631	44	1167	(67)	159	387	29	575	(33)	1742
1999–00	345	495	18	858	(61)	340	340	43	551	(39)	1409

[a] Resident of Unit 6

Table 4 Unit 6 deer harvest chronology percent by month, 1995–00

Regulatory year	Harvest periods					
	August	September	October	November	December	*n*
1995–96	8	6	8	56	20	431
1996–97	7	8	16	37	33	430
1997–98	7	8	25	33	27	593
1998–99	5	8	28	32	27	625
1999–00	7	3	21	42	27	558

Table 5 Unit 6 deer harvest percent by transport method, 1995–00

Regulatory year	Percent of harvest						*n*
	Airplane	Boat	3- and 4-wheeler	Highway vehicle	Foot	Unknown	
1995–96	26	72	0	1	4	0	305
1996–97	24	72	1	2	8	0	266
1997–98	22	74	0	2	5	0	337
1998–99	28	67	0	0	3	1	371
1999–00	29	64	0	0	5	1	361

LOCATION

GAME MANAGEMENT UNIT: 8 (5097 mi^2)

GEOGRAPHIC DESCRIPTION: Kodiak and Adjacent Islands

BACKGROUND

The Sitka black-tailed deer population in Unit 8 originated from 4 translocations, totaling 25 deer, to Long Island and Kodiak Island between 1924 and 1934 (Burris and McKnight 1973). By the early 1940s deer occupied northeastern Kodiak Island and Long Island, and the first hunt was in 1953. The deer population continued to expand into unoccupied habitats, and by the late 1960s deer had dispersed 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 peaked, 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 from 1993 to 1996 correlated with less severe winters. Winter severity increased in 1997, and during winter 1998–99 the Unit 8 deer population experienced its greatest decline in history.

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 (FWS) began using various aerial and ground surveys to monitor deer population trends on the Kodiak National Wildlife Refuge (NWR). Refuge staff have also experimented with browse transects, Forward Looking Infrared Radar (FLIR), and range exclosures to investigate deer population trends.

During the past 2 decades, Unit 8 had liberal seasons and bag limits. 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 to 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 stayed 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 1 October to 30 November 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 NWR under federal subsistence regulations. Along the Kodiak road system and near the village of Port Lions, hunters were restricted to 1 deer, with doe harvests further restricted to a single week of the season.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVE

- Maintain a deer population that will sustain an annual harvest of 8000 deer.

METHODS

In Unit 8 we used varied sources to gather information on deer. We have no objective methods of ascertaining deer numbers or densities, but annual questionnaires provide reliable harvest data. We mailed questionnaires to hunters 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 returned questionnaires. Field interviews and posthunt interviews provided preliminary harvest data. The FWS interviewed hunters annually in the Kodiak NWR during October through December boat-based enforcement patrols. ADF&G and Kodiak NWR staff conducted winter aerial surveys in several locations on the refuge to assess techniques for monitoring population trends. A few outfitters and transporters submitted voluntary summaries of hunting activities.

To assign a measurable population objective for the unit, we adopted the methods used by department biologists in Southeast Alaska and tailored them to local conditions. We assumed the deer population could sustain total annual mortality (from hunting, predation, and starvation) of 33% of the preseason population. By estimating annual mortality, we back-calculated the theoretical minimum number of deer needed to sustain that mortality. This number became our minimum population "objective."

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

To compute annual mortality, we recognized 4 principle components: reported kill, unreported kill, loss due to starvation, and loss due to predation. Because we have only empirical data on reported kill, we made some simplifying assumptions to estimate other components. Below I list these assumptions:

1) Unreported kill averages 25% of reported kill. Hunting loss is equal to reported plus unreported kill.

2) Predation loss equals 10% of the reported hunting kill.

3) Starvation loss is 150% greater than the reported hunting kill. For this assumption, we considered variability in winter severity over a 5-year period.

If total mortality is the sum of hunting loss, predation loss, and starvation loss, then the minimum population needed to sustain total mortality is equal to total mortality/0.33 (the maximum mortality sustainable). By using the average annual harvest over the 5 years before the decline, these calculations result in a minimum population "objective" of 73,530 deer.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

During past years, Unit 8 deer populations have experienced substantial winter mortality during 1968–1969, 1970–1971, and 1989–1990. There were also higher than usual winter mortalities occurring during the late 1970s and the early and late 1990s. After many of these occurrences, more conservative regulations were enacted and the populations quickly rebounded.

Winter 1998–1999 was one of the most severe on record. Snowfall was only slightly above normal, but persistent cold temperatures prevented snow from melting, retarded spring green-up, and increased thermal stress on the deer. The net result was one of the largest winter mortality events ever seen in Unit 8. Exact data are not available, but biologists with both the Department and Kodiak National Wildlife Refuge estimate that at least 50% of the deer succumbed to the harsh winter weather. These estimates were based on winter mortality transects, hunter reports, and personal observations. Mortality was observed throughout the archipelago, with the lightest reported on eastern Afognak and the outer Uyak Bay area on Kodiak Island.

The current population estimate for the unit is roughly 40,000 deer. By means of discussions with the Kodiak Fish and Game Advisory Committee, Kodiak National Wildlife Refuge staff, and department staff, we have concluded that the optimum population objective for the archipelago should be 70,000–75,000 deer (approximately 14–15 deer/mi^2).

Population Composition

The percentage of males in the harvest has remained at least 75% since the 1993–94 season (Table 1). In spite of a dramatic reduction in hunter success and in the number of deer harvested in 1999–2000, the percent males in the harvest remained high (75%). The proportion of males in the population, however, was undoubtedly reduced by the population decline in 1998–99.

Distribution and Movements

Deer inhabit all of Unit 8 except in the more remote Semedi, Barren, and Chirikof island groups. Within the past 15 years, deer colonized Tugidak Island, about 20 miles south of Kodiak Island. Tugidak is a Critical Habitat Area, important to harbor seals and ground-nesting birds. If deer proliferate on the island, it could result in detrimental impacts to the native flora and fauna.

Selinger (1995) documented movements between summer and winter ranges for 21 radiocollared female deer monitored in 1990 and 1991 near Spiridon Bay on western Kodiak Island. Distances between summer and winter ranges did not exceed 5 km (3 miles) for 14 deer, but 7 deer moved 22 km (13 miles). The mean date of movement between winter and summer ranges was 29 May, and 30 October was the mean date for movement between summer and winter ranges. Summer home ranges were larger than winter home ranges, averaging 454 ha (1.8 mi^2) and 107 ha (0.4 mi^2), respectively.

MORTALITY

Harvest

Season and Bag Limits. 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° 08'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 only be taken from 25 October to 31 October. A special weapons hunt (bows and muzzleloaders) for 1 antlered deer was open in this area from 1 November to 14 November. Hunters were required to successfully complete an authorized education course before participating in the hunt.

The open season for subsistence, resident, and nonresident hunters 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 southwesternmost arm of Ugak Bay was 1 August to 31 December. The bag limit was 4 deer; however, antlerless deer may 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 the state regulations except that residents of Unit 8 had a bag limit of 5 deer if hunting on the Kodiak NWR. In 1997 the Federal Subsistence Board extended the subsistence season on federal lands to include the entire month of January.

Board of Game Actions and Emergency Orders. At its March 1999 meeting, the board identified the Sitka black-tailed deer population on the Kodiak archipelago in Unit 8 as being important for providing high levels of human consumptive use under 5 AAC 92.106. Because of high winter mortality during 1998–1999, the Kodiak Fish and Game Advisory Committee submitted an emergency request to reduce the deer bag limit in Unit 8 during most of the December 1999 portion of the hunting season. On 2 December 1999, the board enacted an emergency regulation reducing the bag limit during 5–31 December 1999 from 4 deer of either sex to 2 antlered deer for Alaska residents and 1 antlered deer for nonresidents. This emergency regulation was applicable only in that portion of Unit 8 that previously had a 4-deer bag limit. The board's action did not affect the federal subsistence hunting regulations for Kodiak archipelago residents hunting on federal lands (5 deer of either sex through 31 January 2000). Although this action did not directly impact many subsistence users, some local residents are not able to participate in the federal subsistence hunt. Either they do not live close to federal public land or their traditional or preferred hunting areas are not located on federal lands.

The board and the department were unsure if this emergency action constituted a "significant" reduction in harvest opportunity from an identified big game prey population. Such a reduction would trigger provisions under AS 16.05.255 (f) for the board to consider whether intensive management actions are warranted to restore the abundance or productivity of a population. They felt it prudent, however, to identify the intensive management options available to potentially

enhance the deer population on the Kodiak archipelago. The department reported to the board on 14 January 2000 that no intensive management options were practical and that hunting season adjustments were the best method to aid the deer population.

Another action by the board in 1999 mandated that hunters using muzzleloaders during the special weapons hunt along the Kodiak road system successfully complete a department-sponsored muzzleloader clinic before going afield. This regulation mirrored the existing requirement for bow hunters engaged in the special hunt.

Hunter Harvest. Harvest in 1999–2000 was the lowest reported since we began conducting harvest surveys 20 years ago (Table 1). The total harvest (3728) was 57% lower than the average annual harvest for the previous 5 years (8602). The number of hunters afield was down from previous years (3251 versus the 5-year average of 4360), and hunter success declined 57% versus 78% (Table 2).

The population decline in the early part of the 1990s was more precipitous in the northern part of Unit 8, prompting hunters to concentrate more effort on southern Kodiak Island (Smith 1995). As populations recovered, more hunters returned to northern areas, and harvest was evenly distributed across the unit from 1996–97 to 1998–99. The population decline during winter 1998–99 again concentrated harvest in the southern areas (hunt areas 818–826). In 1999–2000 42% of the reported harvest was from these areas, compared to 32% during the previous 5 years. Harvest from the northern islands of Shuyak, Afognak, and Raspberry was 15% lower in 1999–2000 than in any previous year. The mean percentage of the harvest reported from those islands the previous 5 years (1994–95 through 1998–99) was 22%.

Males composed 76% of the 1998–99 and 1999–2000 harvests. In 1999–2000 the mean number of deer/hunter afield was 1.1, a decline from 1.7 in 1998–99 and from an average of 2.0 during the previous 5 years (1994–95 through 1998–99) (Table 3).

Hunter Residency and Success. The number of hunters afield in 1999–2000 (3251) was considerably below the average (4360) of the previous 5 years (1994–95 through 1999–2000) (Table 2). Unit 8 residents composed 37% of the hunters in 1999–2000, down slightly from the 5-year average (39%). Nonlocal residents composed 43% of the hunters in 1999–2000, a decline from the 5-year average of 49%. Nonresidents composed 20% of the hunters in 1999–2000, up greatly from the 5-year average of 12%.

Hunter success was 56% in 1999–2000, an dramatic decrease from the 5-year average (78%). This was the lowest success reported since surveys have been conducted (Table 3). In 1999–2000, 15% of the hunters reported taking 4 or more deer (Table 4), which was also far below the 5-year average of 28%.

Harvest Chronology. November is consistently the peak month of harvest in Unit 8 (Table 5). In 1999–2000, 42% of the deer were harvested in November, nearly identical to the average of 41% of the previous 5 years (1994–95 through 1998–99).

Transport Methods. Boats and aircraft are the favored means of transportation for deer hunters in Unit 8. In 1999–2000, 42% of the deer hunters used boats as their primary means of access, down from the average (45%) of the previous 5 years (1994–95 through 1998–99). In the past

decade, the preferred transport method has shifted from aircraft to boats (Table 6). Charter boats have become increasingly common throughout the archipelago, prompting conflicts with local hunters in some areas. Highway vehicles and 4-wheelers have also increased in popularity in areas off the Kodiak National Wildlife Refuge.

Other Mortality

From mortality surveys in coastal winter ranges, we documented the severe winter mortality during winter 1998–99 as over 3 times higher than during the previous 5 years (150.0 versus 47.8) (Table 7). Because of the timing of the surveys, and a delayed spring green-up that resulted in deer dying later than usual, actual mortality was probably much higher than reflected by our survey data. As in previous years, juvenile deer were the most severely affected portion of the population.

In Unit 8 sources of deer mortality are varied. Unreported deer harvest, including illegal kills outside the hunting season, was common, and we estimated an unreported harvest of 20–25% of the legal take. Free-roaming dogs are significant predators on deer near communities and isolated residences. There are also packs of feral dogs on the southwest portion of Kodiak Island. Deer/motor vehicle collisions kill an estimated 20 to 25 deer annually. Brown bear predation of deer, predominantly in late winter, is not a limiting factor.

HABITAT

Assessment

High deer densities in the late 1970s through the mid 1980s caused heavily browsed winter range. The population decline in the late 1980s reduced pressure on winter range, but we have not evaluated the level of recovery. Staff from Kodiak NWR established experimental range use transects within the refuge in 1997, and they constructed range exclosures in 1999. Preliminary data from these pilot studies of deer winter range in selected areas indicate that deer have heavily used several species of browse. During winters with heavy snowfall that force deer onto beaches and exposed capes, vegetation in those areas receives extensive use, especially red elderberry, highbush cranberry, blueberry, and willow. We have not determined long-term effects of heavy browsing on these species.

Much of the Sitka spruce forest of central and eastern Afognak Island has been clearcut-logged 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 Southeast Alaska indicated that old-growth forest was critical in maintaining deer populations (Wallmo and Schoen 1980). Logging winter range of deer on Afognak Island initially reduces carrying capacity; however, subsequent increased production of herbaceous and shrubby vegetation may benefit deer, depending on snow conditions. 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 that enhance their survival in areas without coniferous forest.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

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. Kodiak NWR staff initiated aerial and ground-counts in wintering areas in the refuge in 1992, concluding that aerial surveys required intensive effort to develop corrections for variations in sightability (Zwiefelhofer and Stovall 1992). We use pellet-group counts in forested habitat of Southeast Alaska to monitor deer population trends (Kirchoff and Pitcher 1988). The Kodiak NWR staff established pellet-group transects in the Olga Bay area in 1994, but results were inconclusive, and the surveys were discontinued in 1996. Refuge staff also experimented with FLIR equipment mounted on a U.S Coast Guard HH-60 helicopter to census deer on winter ranges on northwestern Kodiak Island.

Kodiak NWR sponsored a workshop in June 2000 to address continued concerns about the impact of introduced animals on native flora and fauna. Workshop participants concluded that a unitwide vegetative analysis was the highest research priority, followed closely by a comprehensive analysis of deer movements, feeding areas, and population dynamics. Refuge staff is committed to working with the department to follow through on these recommendations.

Hunters continued to report bucks with abnormal testicular development ("steer deer"), particularly from the south end of Kodiak. Hunter questionnaires indicated that about 3% of the bucks taken in 1999 were steer deer, with the highest prevalence on the Hepburn Peninsula (13%).

CONCLUSIONS AND RECOMMENDATIONS

Sitka black-tailed deer on the Kodiak archipelago are an introduced ungulate using an island habitat. There are no natural predators and the vegetation evolved in the absence of indigenous herbivores (except for seasonal use by brown bears). Consequently, the deer population is prone to dramatic population swings. Hunting is usually compensatory for annual winter mortality, which occurs when deer are forced onto beaches by snow and cold temperatures. This situation does not lend itself to active management practices to enhance deer populations. Regulatory responses such as liberalizing seasons as deer numbers increase and promulgating more conservative regulations when populations are in decline are the most effective ways to manage deer.

Although objective population data are nonexistent, Alaska Statute 16.05.255 dictates that population and harvest objectives are established for Unit 8 deer because of their importance as a source of human food. The department, in close cooperation with the Kodiak Fish and Game Advisory Committee, Kodiak NWR, commercial operators, and individual hunters, has attempted to satisfy this requirement with the best available data (details of this effort are presented in the *population size* section of this report). We recognize there is considerable room for improvement in the estimates used for these objectives, but by using an open and cooperative forum, we are confident these estimates can be used as an important tool for future management.

There has been a renewed sense of cooperation between the department and the staff of Kodiak NWR. We plan further research in deer biology and habitat and population dynamics. Together we hope to answer basic questions we have about these important ungulates. We have also noted

an improving relationship between the state and federal regulatory committees in Unit 8. Both entities passed regulations in 2001 to reduce deer harvests by sport and subsistence hunters to expedite recovery of the population. These efforts, coupled with mild winter conditions, will increase deer in Unit 8 and assist us in reaching our population objectives.

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Table 1 Unit 8 deer harvest, 1987–2000

Regulatory year	Estimated legal harvest[a] M (%)	F (%)	Unk.	Total	Estimated illegal harvest[b]	Total
1987–88	10,844 (80)	2702 (20)	245	13,791	---	13,791
1988–89[c]	---	---	---	---	---	---
1989–90	6923 (73)	2625 (27)	490	10,038	---	10,038
1990–91	5367 (67)	2739 (33)	---	8106	---	8106
1991–92	6569 (73)	2379 (27)	---	8948	---	8948
1992–93	5144 (73)	1899 (27)	---	7043	---	7043
1993–94	5124 (82)	1130 (18)	---	6254	---	6254
1994–95	8270 (80)	2130 (20)	---	10401	---	10,401
1995–96	5806 (81)	1387 (19)	---	7193	---	7193
1996–97	7041 (79)	1903 (21)	---	8944	---	8944
1997–98	6860 (79)	1849 (21)	---	8709	---	8709
1998–99	5879 (76)	1886 (24)	---	7765	---	7765
1999–00	2801 (75)	927 (25)	---	3728	---	3728

[a] Harvest data extrapolated from the results of a mail questionnaire survey.

[b] Although illegal harvest has not been quantified, it is probably 10% to 15% of the legal harvest.

[c] No survey was conducted in 1988–89.

Table 2 Unit 8 deer hunter residency and success, 1987–2000

Regulatory year	Successful				Unsuccessful				Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	
1987–88	1851	2410	290	4551 (76)	645	665	161	1471 (24)	6022
1988–89[b]	---	---	---	---	---	---	---	---	---
1989–90	1892	2080	383	4355 (67)	1,124	788	255	2167 (33)	6521
1990–91	1260	1627	185	3071 (74)	550	448	107	1105 (26)	4176
1991–92	1414	1702	262	3378 (76)	479	479	85	1043 (24)	4421
1992–93	1221	1345	207	2774 (67)	541	645	160	1345 (33)	4119
1993–94	935	1247	159	2341 (80)	256	286	63	605 (20)	2946
1994–95	1690	1917	287	3893 (83)	372	314	129	815 (17)	4708
1995–96	1164	1440	300	2904 (73)	480	440	160	1080 (27)	3984
1996–97	1428	1689	339	3456 (81)	348	368	122	838 (20)	4294
1997–98	1372	1749	422	3543 (82)	324	354	119	797 (19)	4340
1998–99	1062	1830	398	3290 (74)	370	548	267	1185 (26)	4475
1999–00	638	829	372	1839 (57)	567	571	274	1412 (43)	3251

[a] Includes residents of Unit 8.

[b] No survey was conducted in 1988–89.

Table 3 Unit 8 comparison of deer hunter questionnaire results for 1980–2000

Regulatory year	% Hunter success	hunters taking bag limit[b]	% Male	% Female	total harvest	Estimated nr. hunters	Mean nr. deer/hunter	nr. days hunted/deer
1980–81	73	37	74	26	5347	3440	1.6	3.8
1983–84	81	24	74	26	9897	4113	2.4	2.3
1984–85	81	23	74	26	8905	3948	2.3	2.6
1987–88	76	27	80	20	13,791	6022	2.3	2.3
1989–90	67	15	73	27	10,038	6521	1.5	2.5
1990–91	74	19	67	33	8106	4176	1.9	2.9
1991–92	76	31	73	27	8948	4421	2.0	2.7
1992–93	67	29	73	27	7043	4119	1.7	3.7
1993–94	80	33	82	18	6254	2946	2.1	2.4
1994–95	83	35	80	20	10,401	4708	2.2	2.4
1995–96	73	29	81	19	7193	3984	1.8	3.0
1996–97	81	31	79	21	8944	4294	2.1	2.8
1997–98	82	28	79	21	8709	4340	2.0	2.3
1998–99	73	0	76	24	7765	4475	1.7	3.2
1999–00	56	0	75	25	3728	3251	1.1	4.8

[a] Harvest data are expanded from returned hunter questionnaires.
[b] Bag limit 4 deer in 1980, 5 deer from 1983 to 1990, 5 deer on Kodiak NWR, and 4 deer on nonfederal lands from 1991 to 2000.

Table 4 Number and percent of hunters in Unit 8 that reported harvesting 1–5 deer, 1995–2000

	1995–96[a]		1996–97		1997–98		1998–99		1999–00	
	Hunters	%	Hunters	%	Hunters	%	Hunters	%	Hunters	%
1 deer	948	33	1037	30	1137	32	1100	24	890	48
2 deer	651	22	757	22	825	23	794	18	398	22
3 deer	469	16	605	18	593	17	601	13	280	15
4 deer	726	25	871	25	857	24	756	17	213	12
5 + deer	110	4	186	6	131	4	60	1	60	3

[a] Bag limit 5 deer on Federal lands within the Kodiak NWR; only residents of Unit 8 eligible.

Table 5 Unit 8 deer harvest chronology percent by month, 1980–2000

Regulatory year	Harvest periods (%)						
	August	September	October	November	December	January	*n*
1980–81	6	9	24	33	22	6	5347
1983–84	5	7	25	37	18	7	9897
1984–85	5	9	28	41	15	3	8905
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	8106
1991–92	5	5	20	40	30	0	8948
1992–93	4	5	26	39	26	0	7043
1993–94	5	7	31	39	19	0	6254
1994–95	4	5	29	36	24	0	10,401
1995–96	5	4	25	48	17	<1	7193
1996–97	4	6	25	39	26	0	8944
1997–98	4	3	23	43	28	0	8709
1998–99	5	5	20	40	30	<1	7765
1999–00	5	6	23	42	23	0	3728

Table 6 Unit 8 deer harvest percent by transport method, 1987–2000

Regulatory year	Percent of harvest									
	Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Other	Unknown	*n*
1987–88	34	--	39	5	--	--	16	2	3	2638
1988–89	--	--	--	--	--	--	--	--	--	---
1989–90	42	--	35	4	--	--	15	4	9	3156
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	10	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
1996–97	35	<1	47	7	0	1	10	12	0	915
1997–98	33	<1	49	6	<1	1	13	8	0	858
1998–99	19	3	43	9	0	2	15	10	2	7339[b]
1999–00	17	<1	42	8	0	1	15	15	2	5091[b]

[a] No survey in 1988–89.
[b] Starting in 1998, transportation data were collected by trips taken rather than by hunter.

Table 7 Unit 8 sex and age composition of deer winterkill from beach mortality transects, 1987–2000

Regulatory	Adult				Juvenile[a]				Unk. 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 (45)	7 (23)	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	0 (--)	0 (--)	0	0	0 (--)	0 (--)	1	1	0	0 (--)	0 (--)	1	1
1993–94	15 (88)	0 (--)	2	17	2 (17)	2 (17)	8	12	0	17 (89)	2 (11)	10	29
1994–95	5 (31)	1 (6)	10	16	7 (17)	8 (17)	27	42	2	12 (57)	9 (43)	39	60
1995–96	0 (--)	0 (--)	1	1	4 (12)	2 (6)	28	34	1	4 (67)	2 (33)	31	37
1996–97[b]	5 (45)	4 (36)	2	11	17 (25)	5 (7)	47	69	1	0 (--)	0 (--)	1	81
1997–98[b]	1 (33)	0 (--)	2	3	8 (29)	5 (18)	15	28	1	0 (--)	0 (--)	1	32
1998–99[b]	9 (6)	18 (12)	23	50	12 (8)	24 (16)	61	97	3	21 (14)	42 (28)	87	150
1999–00[b]	0 (--)	1 (10)	0	1	1 (10)	2 (20)	6	9	0	1 (10)	3 (30)	6	10

[a] Includes fawns and yearlings.

[b] Data obtained from Kodiak NWR files (Stovall 2001)