Alaska Department of Fish and Game
Division of Wildlife Conservation

Federal Aid in Wildlife Restoration
Management Report
Survey-Inventory Activities
1 July 1996 - 30 June 1998

DEER

Mary V Hicks, Editor

Grants W-24-5 and W-27-1
Study 2.0
December 1999

STATE OF ALASKA
Tony Knowles, Governor

DEPARTMENT OF FISH AND GAME
Frank Rue, Commissioner

DIVISION OF WILDLIFE CONSERVATION
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CONTENTS

LOCATION

GAME MANAGEMENT UNIT: Unit 1A (5,300 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 densities 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 about 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 overall carrying capacity of 50 to 60% by the end of the logging rotation in 2054. Long-term implications of habitat loss include the inability to provide for subsistence needs and the loss of deer hunting opportunities.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

The management objective for deer in Unit 1A is to maintain populations in excess of 45 deer per mi^2 of winter range. Mean pellet group densities of 1.4 pellet groups per plot have been determined to be equivalent to 45 deer per mi^2 (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 6 watersheds (or value comparison units—VCUs) during 1997 and 8 during 1998. 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.

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 the harvest ticket holders. Our results are expanded to cover all harvest ticket holders.

The Division of Subsistence has historically conducted personal interview household surveys to estimate harvest rates, and some of their results conflict with our estimates. Subsistence has done 3 Subsistence Resource Personal Interview Household Surveys of rural communities in the last 12 years.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

The highest 1997 deer pellet densities in Unit 1A were on East Gravina Island. East Gravina data indicate the population remained relatively stable between 1996 and 1997 and declined slightly during 1998. The 1997 mean pellet group count was the second highest recorded for East Gravina. The lowest counts were at Whitman Lake and Helm Bay. Helm Bay deer estimates have continued to decline since the high in 1988. George Inlet data indicate populations in that area remained stable between 1994 and 1996 then declined by 47% between 1996 and 1998 (Table 1). Overall, we believe deer densities in Unit 1A increased slightly during 1996, declined during 1997, and remained stable during 1998.

Deer densities vary within and between VCUs in Unit 1A and some of them declined considerably between 1996 and 1998. Cleveland Peninsula pellet counts in 1997 were low, while counts closer to Ketchikan were higher. Average pellet groups per plot were similar at 0.9, 0.9, and 0.8 during 1996, 1997, and 1998, respectively. The management objective of 45 deer/mi^2 was met in only 1 of 5 sampled VCUs during 1996, 1 of 6 during 1997, and none of 8 sampled VCUs during 1998. Mild winter weather and lack of snow during those years may have led to underestimated numbers because deer were more widely distributed and wintered at higher elevations (>1500 ft, the upper limit of the pellet transects). New deer transects were established during 1996 at Duke Island that showed low pellet densities (mean 0.05 pellets/plot).

Unlike the high densities of up to 3.9 pellet-groups per plot observed in Unit 4 (Kirchhoff 1996), Unit 1A densities represent low to moderate deer population levels. The disparity between these unit densities is probably 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 lower than normal success during the report period. This was reflected in the record low kill of 9100 deer during 1996 and 10,626 deer during 1997. The harvest during 1996 was the lowest reported for Southeast since

1982. Numbers of hunters decreased slightly in Unit 1A during 1997 (Table 2) and coincide with a decline in hunter numbers throughout Southeast. The total number of hunter-days afield was also 16% below the long-term average for Southeast Alaska.

Deer harvests in Unit 1A decreased by 20% during the 1996 and 1997 seasons (Table 2). The number of days required to bag a deer was slightly higher than the previous 10-season mean. The average number of deer taken per hunter in Unit 1A remained constant (Table 2). South Revilla Island continued to receive the greatest hunting pressure and accounted for the highest deer harvests in the unit during both years (1996–97). Gravina Island produced its second highest harvest during the same period (Table 3). Hunter effort remained stable throughout most of the unit but was low compared to the 10-year average.

Hunting of antlerless deer was allowed before 1978 but has since been limited to only buck (or antlered) deer with bag limits ranging from 3 to 4. Despite the fact that Unit 1A has maintained an antlered-only hunt, several does are reported killed each season. A total of 69 does were reported during 1996, and another 6 were reported in the 1997 harvest. 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) reported actual hunter kills may 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 the total deer killed during the past 2 years (Table 6). Sitka black-tailed deer rut during November, and consequently bucks spend more time in November moving during the day, making them more visible and vulnerable to hunters. This may account for the high number of bucks killed during November.

Transport Methods. The majority of Unit 1A hunters continue to use boats to access hunting areas (Table 6). Boat access accounted for 72% of the deer killed during 96–97. Airplanes account for very little of the reported hunter transportation to the field.

Other Mortality

Vehicle/deer collision estimates have remained low (5–10 deer/year), and collisions are not significant sources of deer mortality. Unreported and illegal harvest is estimated at 50% of reported harvest in Unit 1A. Based on staff observations and responses to trapper questionnaires, wolf populations are abundant in Unit 1A (Table 7). Wolves and black bears eat several thousand deer each year. Person et al. (1996) estimated an average of 26 deer killed per wolf per year in Unit 2.

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 years of heavy snowfall. U.S. Forest Service and Alaska Department of Fish and Game (ADF&G) habitat models predict that the forest's capacity to support deer in average winters will decline by nearly half by the year 2054. This loss will be greater in deep snow years. By 2054 we expect few areas will meet

projected hunter demand within roaded and logged portions of Unit 1A (U. S. Forest Service 1989).

CONCLUSIONS AND RECOMMENDATIONS

Based on pellet-group data, our objective of maintaining 45 deer/mi^2 in winter habitat was achieved in only 1 of the VCUs sampled in Unit 1A during 1997 and none in 1998. Estimated 1998 densities ranged from 14 deer/mi^2 in Helm Bay to 43 deer/mi^2 on Gravina Island. South Revilla and Gravina islands continue to produce most of Unit 1A deer. Easy access from the population center of Ketchikan continues to make these areas popular hunting destinations.

For the second year in a row, weather during deer hunting season was characterized by a lack of snow at low elevations. That allowed deer to remain dispersed, at high elevations, and harder for hunters to find. Besides helping many deer evade hunters, the snow-free early winter probably resulted in higher than usual overwinter survival in some areas. The lack of snow affected pellet survey counts and probably distorted population trend estimates. Pellet-group data should be viewed as a relative estimate of population trends and not as an actual measure of deer abundance.

The Subsistence deer hunter survey results have consistently been high, sometimes 3 times greater, compared to DWC estimates. The major differences between DWC and Subsistence survey results were that the Subsistence 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 is probably somewhere between the two estimates. Subsistence and DWC have agreed to work together on ways to link future harvest surveys to discover why the results are so different. Subsistence Resource Specialists will be conducting household surveys in southern Southeast in 1999.

Wolf abundance remained relatively high in recent years, and predation continues to influence deer populations. Based on staff observations and responses to trapper questionnaires, wolves are abundant in Unit 1A. Hunters have similarly reported more wolf sign on the Cleveland Peninsula than anytime in the past decade.

As noted in the past (Wood 1990, Larsen 1993, Larsen 1995), we are aware of illegal deer hunting in southern Southeast. The illegal harvest in Unit 1A is estimated to be high, but little data exist to quantify the actual 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. Without the kill date, there is no way to validate these data.

Efforts should be made to inform the public about effects of logging on deer populations, so that 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 implications of habitat loss include the inability to provide for subsistence needs and loss of deer hunting opportunities (Wood 1990, Larsen 1993).

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Table 1 Unit 1A deer pellet-group survey results, 1981–1997

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

Table 1 Continued

Year	VCU	Mean pellet groups/plot[a]	Number of plots	95% CI
1989	748	1.41	169	1.08–1.75
1990	748	1.03	240	0.82–1.25
1991	748	1.49	168	1.15–1.84
1992	748	0.65	195	0.49–0.81
1994	748	0.95	309	0.79–1.11
1996	748	0.98	305	0.76–1.19
1998	748	0.52	314	0.40–0.65
1981	752-Whitman Lake	0.18	45	0.02–0.33
1987	752	0.16	187	0.09–0.23
1990	752	0.45	193	0.32–0.59
1992	752	0.20	189	0.12–0.28
1997	752	0.81	181	0.63–0.98
1998	752	0.47	209	0.33–0.61
1985	758-Carroll Point	0.66	118	0.46–0.86
1986	758	0.75	118	0.56–0.95
1988	758	1.15	85	0.82–1.49
1992	758	0.28	87	0.14–0.41
1994	758	0.70	125	0.49–0.90
1998	758	0.51	125	0.38–0.64
1985	759-Moth Bay	0.59	140	0.42–0.74
1986	759	0.98	156	0.79–1.17
1988	759	0.72	78	0.46–0.97
1992	759	0.48	136	0.30–0.66
1994	759	0.95	136	0.71–1.17
1998	759	0.68	176	0.53–0.82
1985	760-Lucky Cove	1.16	335	1.00–1.33
1986	760	1.16	258	0.95–1.32
1988	760	1.02	65	0.69–1.34
1991	760	1.39	271	1.07–1.70

Table 1 Continued

Year	VCU	Mean pellet groups/plot[a]	Number of plots	95% CI
1981	764-Blank Inlet	1.24	108	0.89–1.59
1981	765-Dall Head	0.52	69	0.31–0.74
1996	765	1.07	295	0.90–1.24
1998	765	0.84	2.87	0.67–1.01
1996	767-Duke Island	0.05	294	0.02–0.09
1985	769-Alava Bay	0.52	311	0.39–0.65
1986	769	0.85	326	0.68–1.01
1991	769	1.64	143	1.22–2.05
1994	769	0.79	326	0.64–0.94
1996	769	0.93	324	0.77–1.09
1998	769	0.66	335	0.52–0.79
1985	772-Wasp Cove	0.41	271	0.31–0.51
1986	772	0.50	300	0.38–0.62
1989	772	0.58	145	0.39–0.77
1991	772	0.13	207	0.07–0.18
1991	821-Winstanley Island	0.27	49	0.11–0.42
1981	999-East Gravina	1.06	226	0.89–1.22
1984	999 (all transects)	0.86	1,087	0.78–0.94
1985	999	1.23	1,172	1.13–1.32
1986	999	1.40	1,267	1.30–1.50
1984	999-East Gravina	0.88	376	0.73–1.03
1985	999 (trans. 1-3)	1.44	224	1.20–1.67
1986	999	1.62	346	1.43–1.81
1987	999	1.63	334	1.41–1.84
1988	999	2.07	278	1.79–2.35
1989	999	1.13	182	0.86–1.41
1990	999	1.40	279	1.12–1.68
1991	999	1.12	154	0.80–1.43

Table 1 Continued

Year	VCU	Mean pellet Groups/plot[a]	Number of Plots	95% CI
1992	999	1.22	302	1.05–1.38
1994	999	1.52	331	1.37–1.79
1996	999	1.47	338	1.28–1.67
1997	999	1.71	274	1.47–1.95
1998	999	1.34	3.07	1.12–1.56

Table 2 Unit 1A deer harvest data, 1984–1997

Year	Nr of hunters	Nr of successful hunters	Percent successful	Total hunter days	Average hunter days	Total deer[a]	Average deer per hunter	Average hunter days per deer
1984	1,060	440	42	5,280	5.5	620	0.6	9.3
1985	1,108	412	37	5,683	5.1	779	0.7	7.3
1986	1,107	529	48	7,100	6.4	859	0.8	8.3
1987	946	376	40	6,379	6.7	611	0.6	10.4
1988	958	413	43	4,930	5.1	686	0.7	7.2
1989	982	335	34	4,348	5.1	592	0.6	7.3
1990	1,009	443	44	5,127	5.1	723	0.7	7.1
1991	734	259	35	3,094	4.2	347	0.5	8.9
1992	751	294	39	4,519	6.0	686	0.9	6.6
1993	996	344	34	4,465	4.5	515	0.5	8.7
1994	1,067	516	48	5,514	5.2	912	0.8	6.0
1995	1,118	493	44	5,080	4.5	914	0.8	5.5
1996[b]	---	344	---	---	---	539	---	---
1997	875	333	38	4,208	2.6	528	0.6	8.0

[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, 1990–1997

Major harvest area	Year	Number of hunters, expanded	Number of successful hunters, expanded	Percent successful	Total hunter days, expanded	Average days per hunter	Average deer per hunter	Total deer killed
1-Gravina Island	1990	221	72	33	614	2.8	0.5	101
	1991	198	46	23	624	3.2	0.2	46
	1992	179	64	35	801	4.5	0.9	160
	1993	266	52	19	553	2.1	0.3	87
	1994	246	80	32	578	2.4	0.5	115
	1995	404	164	40	1,413	3.5	0.8	328
	1996	---	83	---	---	---	---	135
	1997	373	95	24	971	2.6	0.4	131
2-Annette Island	1990	16	13	78	39	2.4	1.1	18
	1991	6	0	0	11	2.0	0.0	0
	1192	16	16	100	179	10.9	5.5	91
	1993	22	11	52	112	5.1	0.6	14
	1994	15	0	0	49	3.1	0.0	0
	1995	16	13	80	84	5.2	1.2	19
	1996	---	---	---	---	---	---	---
	1997	15	9	60	15	1.0	0.6	9
3-Duke Island	1990	9	2	20	18	2.0	0.2	2
	1991	33	8	26	70	2.2	0.6	20
	1992	22	3	12	58	2.6	0.1	3
	1993	15	0	0	15	1.0	0.0	0
	1994	3	0	0	7	2.0	0.0	0
	1995	19	0	0	49	2.5	0.0	0
	1996	---	---	---	---	---	---	---
	1997	12	6	50	18	1.5	0.5	6

Table 3 Continued

Major harvest area	Year	Number of hunters, expanded	Number of successful hunters, expanded	Percent successful	Total hunter days, expanded	Average days per hunter	Average deer per hunter	Total deer killed
4–South Revilla	1990	594	180	30	2,610	4.4	0.4	259
	1991	416	124	30	1,134	2.7	0.4	147
	1992	341	61	18	1,376	4.0	0.3	102
	1993	463	135	29	1,883	4.1	0.4	188
	1994	600	212	35	2,696	4.5	0.6	389
	1995	572	168	29	1,925	3.4	0.4	218
	1996	---	165	---	---	---	---	229
	1997	456	170	37	1873	4.1	0.6	252
5–North Revilla	1990	242	82	34	801	3.3	0.4	103
	1991	204	55	27	748	3.7	0.4	76
	1992	275	55	20	846	3.1	0.3	80
	1993	345	80	23	1,033	3.0	0.3	97
	1994	347	136	39	1,049	3.0	0.6	192
	1995	334	137	41	918	2.7	0.6	192
	1996	---	62	---	---	---	---	85
	1997	159	42	26	445	2.8	0.4	56
6–Cleveland Peninsula	1990	245	122	50	981	4.0	1.0	236
	1991	158	42	26	458	2.9	0.4	59
	1992	280	126	45	1,159	4.1	0.9	241
	1993	262	74	28	705	2.7	0.4	109
	1994	307	155	51	1,044	3.4	0.7	208
	1995	200	70	35	549	2.7	0.6	114
	1996	---	---	---	---	---	---	96
	1997	186	52	328	512	2.8	0.4	69

Table 3 Continued

Major harvest area	Year	Number of hunters, expanded	Number of successful hunters, expanded	Percent successful	Total hunter days, expanded	Average days per hunter	Average deer per hunter	Total deer killed
7–North Mainland	1990	10	2	20	58	5.8	0.4	4
	1991	11	0	0	33	3.0	0.0	0
	1992	25	8	33	75	3.0	0.3	8
	1993	38	19	49	164	4.3	0.5	19
	1994	19	1	5	84	4.5	0.1	1
	1995	28	7	26	56	2.0	0.3	7
	1996	---	---	---	---	---	---	---
	1997	15	0	0	153	10.2	0	0
8–South Mainland	1990	3	0	0	7	2.5	0.0	0
	1991	9	0	0	15	1.8	0.0	0
	1992	8	0	0	25	3.0	0.0	0
	1993	-	-	-	--	---	---	-
	1994	3	3	100	7	2.0	2.0	7
	1995	38	21	56	86	2.3	0.9	35
	1996	---	6	---	---	---	---	11
	1997	6	6	100	23	3.8	1.0	6

Table 4 Unit 1A reported and estimated deer harvest/mortality, 1984–1997

	Reported Harvest			Unreported & Illegal	Estimated	Estimated Number
Year	Male	Female	Total	Harvest[a]	Total Harvest	of Road Kills
1984	620	0	620	310	930	1 - 5
1985	779	0	779	390	1,169	1 - 5
1986	859	0	859	430	1,289	1 - 5
1987	611	0	611	306	917	1 - 5
1988	686	0	686	343	1,029	1 - 5
1989	587	5	592	296	888	1 - 5
1990	642	81	723	361	1,084	1 - 5
1991	331	61	347	173	520	1 - 5
1992	661	25	686	343	1,029	1 - 5
1993	515	0	515	257	772	1 - 5
1994	877	35	912	456	1,368	1 - 5
1995	853	61	914	457	1,371	1 - 5
1996	533	6	539	270	809	1 - 5
1997	459	69	528	264	792	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, 1988–1997

	Successful				Unsuccessful			
Year	Local resident[a]	Nonlocal resident	Nonresident	Total	Local resident[a]	Nonlocal resident	Nonresident	Total
1988	392	21	0	413	508	37	0	545
1989	310	25	0	335	607	40	0	647
1990	429	14	0	443	527	38	2	567
1991	259	0	0	259	418	53	4	475
1992	292	2	0	294	440	10	8	458
1993	336	3	6	345	619	21	11	651
1994	509	5	2	516	513	27	11	551
1995	464	23	6	493	601	12	12	625
1996	344	---	---	344	---	---	---	---
1997	319	0	14	333	512	16	14	542

[a]Local residents refer to Alaskans living within the boundaries of Unit 1A.

Table 6 Unit 1A deer harvest chronology and method of transportation used by all hunters, 1988–1997

	Month of kill							Method of transportation[a]					
Year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Unk.	Airplane	Boat	Foot	Highway Vehicle[b]	Other	Unk.
1988	165	80	172	197	52	0	20	63	1,456	458	518	7	107
1989	97	68	165	221	35	5	4	93	1,394	411	465	25	0
1990	92	85	171	325	50	0	0	105	1,366	514	515	0	14
1991	121	0	65	140	21	0	0	40	972	329	367	0	15
1992	118	33	213	283	30	0	9	35	1,042	377	304	8	0
1993	126	32	88	239	30	0	0	171	1,139	553	602	32	18
1994	171	33	273	315	97	21	2	117	1,436	405	638	50	18
1995	206	145	179	268	116	0	0	56	1,570	501	581	64	7
1996	187	28	91	170	11	0	51	---	---	---	---	---	---
1997	105	87	104	179	23	0	29	34	641	59	122	20	0

[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, 1981–1997

Regulatory Year	Pellet group data[b]	Harvest data: Total harvest	Harvest data: Deer kill/ hunter day	Harvest data: Hunter success (%)	Wolf abundance	Weather index[c]
1981/82	---	---	----	--	--	6.3
1982/83	---	---	----	--	--	1.3
1983/84	0.6	---	----	--	--	1.3
1984/85	0.7	620	0.10	42	--	4.7
1985/86	1.0	779	0.14	37	--	2.0
1986/87	1.1	859	0.12	48	--	2.7
1987/88	1.6	611	0.09	40	--	1.7
1988/89	1.0	686	0.14	43	--	4.7
1989/90	0.9	587	0.13	34	--	1.3
1990/91	1.1	723	0.14	44	--	2.3
1991/92[d]	0.8	347	0.11	35	86	0.3
1992/93	0.9	686	0.15	39	65	3.0
1993/94	1.0	515	0.11	34	57	1.7
1994/95	1.0	912	0.16	48	93	4.7
1995/96	1.1	914	0.18	44	80	2.7
1996/97	0.9	807	---	---	83	---
1997/98	0.7	792	0.13	38	80	---

[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 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: Unit 1B (3,000 mi^2)

GEOGRAPHIC DESCRIPTION: The Southeast Alaska mainland from Cape Fanshaw to Lemesurier Point

BACKGROUND

Sitka black-tailed deer are in low densities on the Unit 1B mainland. Deer populations in these areas have historically fluctuated with high and low population extremes. Severe winter weather has caused most declines, and predation by wolves and bears and illegal hunting has extended the length of the declines. Clearcut logging has reduced winter carrying capacity.

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

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

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

METHODS

Harvest data for Unit 1B was estimated from a regional questionnaire mailed to a random sample of 33% of all deer harvest ticket holders. Relative winter deer densities were measured with spring pellet-group transects in selected areas.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Pellet-group surveys in Unit 1B are currently inadequate to determine deer population trends (Table 1). The 1996 count of 1.53 pellet groups/plot indicates a moderately high deer density in the Muddy River survey area. The 1998 Horns Cliff count of .59 pellet groups/plot indicates a low deer density. The low count in pellet groups was partly due to the lack of snow during the mild winter of 1997–98, which probably caused many deer to remain above 1500 feet, the cutoff elevation for our pellet-count surveys.

MORTALITY

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 low in 1996 with only 56 deer harvested (Table 2). In 1997 the harvest almost doubled with 105 harvested deer.

Hunter Residency and Success. No nonresidents reported hunting deer in Unit 1B during the reporting period (Table 3). Deer populations are greater and seasons and bag limits more liberal in other nearby units, attracting nonlocal hunters to areas other than Unit 1B. During the 1995 and 1997 seasons, the success rate was 33 and 48%, respectively (the success rate is not available for 1996).

Harvest Chronology. Table 5 shows the harvest percentage by month. Most deer harvest takes place during October and to a lesser degree November in most years. During the report period October provided the highest percent of harvest.

Transport Methods. Most hunters traveled by boat to their hunting areas (Table 4). Logging roads provide some 4-wheeler and highway vehicle access.

CONCLUSIONS AND RECOMMENDATIONS

Deer populations in Unit 1B 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, 1991–98

VCU	Name	Pellet-Groups Year	Plots	Mean	95% CI
489	Muddy River	1996	348	1.53	1.26–1.80
490	Horns Cliff	1998	250	.59	0.47–0.74
524	Frosty Bay	1991	266	.70	0.55–0.86

Table 2 Unit 1B deer harvest, 1990–98

Regulatory Year	Estimated legal harvest						Estimated illegal harvest					Total[a]
	M	(%)	F	(%)	Unk.	Total	M	(%)	F	(%)	Unk.	
1990	148	(100)				148						148
1991	50	(100)				50						50
1992	142	(100)				142			6	(100)		148
1993	164	(100)				164			21	(100)		185
1994	184	(100)				184						184
1995	75	(100)				75						75
1996	56	(100)				56						56
1997	105	(100)				105						105

[a] Data from mail questionnaire survey.

Table 3 Unit 1B deer hunter residency and success, 1990–98

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

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

Table 4 Unit 1B deer hunter effort percent by transport method, 1988–98[a]

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

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

Table 5 Unit 1B deer harvest chronology percent by month, 1990–98

Regulatory Year	Harvest periods						Total[a] deer
	August	September	October	November	December	Unk.	
1990	18	10	15	53	3	0	148
1991	10	0	47	22	22	0	51
1992	39	0	5	27	30	0	148
1993	14	17	22	47	0	0	185
1994	14	0	14	59	13	0	183
1995	6	0	66	28	0	0	75
1996	0	10	38	25	27	0	56
1997	4	17	41	18	13	7	105

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

LOCATION

GAME MANAGEMENT UNIT: 1C (7,600 mi^2)

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

BACKGROUND

Deer have inhabited northern Southeast Alaska since their emigration from southern refugia following the Pleistocene epoch (Klein, 1965). Deep winter snow on the mainland portion of Unit 1C has kept the number of deer lower than that on adjacent islands. Severe winters in 1969 and 1971 increased winter mortality and reduced deer numbers (Olson, 1979). A 1963 population estimate suggested 200,000 deer were in Southeast Alaska at that time (Merriam, 1965). The regionwide harvest in the 1962 season was some 10,500 deer. Hunter surveys, still conducted today, were begun in 1970. 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 and rarely in mainland locations. Mild winters throughout the mid-1990s increased deer densities.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

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

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

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

METHODS

A total of 11,567 deer harvest tickets were issued for the 1996 regulatory year in Southeast Alaska and 11,537 for 1997. About one third of the harvest ticket holders were mailed hunter surveys in each of the 2 years within the period, and 58% responded to the survey. During this reporting period we changed the mail survey to boost hunter response rates, and as a result there were some changes in information collected. In 1996 only information on location of kills was gathered, while in 1997 we tried to gain more insight into hunter effort by asking about

unsuccessful hunts as well. 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 and Shelter islands and at Rhine Creek in regulatory year (RY) 1996 and on Douglas and Lincoln islands in RY 1997.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

No population estimates are available for deer in Unit 1C, and pellet group information is insufficient. During this report period, pellet densities along transects on the north end of Douglas Island climbed well above values found since sampling was first established in the early 1990s. Mean pellet densities of 1.43 and 1.55 groups/plot were recorded, compared to levels between 0.74 and 0.97 seen in earlier years. There has been an upward trend in pellet densities in this area since sampling was initiated, probably reflecting the deer population's response to the generally mild winters during this span of time.

At Inner Point on the southwest side of Douglas Island, pellet-group densities averaged 2.36 groups/plot in the spring of 1997, a record for the area since transect establishment in 1986. The following year pellet densities dropped to 0.84 groups/plot, the lowest ever recorded. These data continue to show wide disparity between the Inner Point and North Douglas transect groups. While this may defeat one of the original purposes for the North Douglas transects (i.e., a road-accessible substitute for the Inner Point group), it allows a better interpretation of what may be happening with the deer herd on the island.

In 1997 the Shelter Island transects showed an increase in deer pellet densities from that seen when previously surveyed 1995. Deer pellet densities on Shelter Island are now approaching levels documented in the mid-1980s, indicating the importance of winter weather in controlling deer numbers. In 1998 pellet densities on adjacent Lincoln Island were also near the management objective of 2.0 pellet groups/plot.

MORTALITY

Harvest

Season and Bag Limits.

	Resident and nonresident hunters	
Unit 1C	Aug 1–Dec 31	4 deer; antlerless
Douglas, Lincoln, Shelter, islands		deer may be taken Sullivan 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 period.

Hunter Harvest. Based on data gathered from the annual deer hunter survey, 353 deer were killed in Unit 1C in 1996 and 438 in 1997 (Table 2). Does made up 41% of the 1994 harvest and 22% in 1995.

Hunter Residency and Success. During the reporting period most successful (96% in 1996, 98% in 1997) and unsuccessful (92% in 1997, 1996 unavailable) hunters were residents of Unit 1C (Table 3). Nonlocal residents made up most of the remainder of hunters. In 1997, 9 nonresidents (none successful) made up .1% of all hunters.

In 1996 there was an average of 1.4 deer taken per successful hunter, and 1.9 deer taken per successful hunter in 1997. Other effort data are available only for 1997 and generally show an improvement from the previous reporting period, such as a rise in both the number of deer per hunter day and the total number of deer taken. Although the harvest was down from levels seen through the 80s and early 90s, it rebounded some from the low level experienced in 1995.

Transport Methods. Hunters most commonly use highway access and foot access to Douglas Island; these methods are the most important means of transport in the unit. Boats provide access to Shelter, Lincoln, and other islands and are the second most important. Use of boats to more remote areas apparently leads to higher success because 50% of 1996 successful hunters used this form of access. In 1997, 61% of all Unit 1C deer hunters reported using boat or foot access, while 37% reported only using boats. Again, boat-borne hunters were somewhat more successful than were other hunters, with 41% success.

CONCLUSIONS AND RECOMMENDATIONS

Pellet counts within Unit 1C indicate growing deer densities, with some transects showing higher counts than ever before. Transects at Shelter Island and Inner Point met the management objective of 2.0 pellet groups/plot.

Unit 1C deer habitats have experienced a series of light snow winters, leading up to and through this reporting period. Paradoxically, while this has helped deer numbers increase, it also has had the effect of impeding hunter success to some extent. With little snow accumulation restricting them, deer use higher elevations than in more severe conditions, effectively lowering the density of deer. As pellet-group densities have increased over the period, we have heard from many hunters that deer are hard to find. Although this is true compared to deep snow conditions when deer are restricted to beach areas, harvest statistics from this period show that the amount of effort per deer by successful hunters is similar to past years.

The greatest anomaly in the data collected during this period is the depressed density of deer pellet groups found at Inner Point at the end of the report period, when the counts from the nearby North Douglas transects were at an all-time high. We believe this is because many deer on this southwest-facing slope spent the winter above the highest extent of the pellet transects, which end at 1500 feet. This is probably the result of an extremely easy winter, but may have also been influenced by selective logging which took place along transects during the late summer and early fall of 1997. Helicopter and logging activity and/or slash may have influenced deer to remain higher on the slope than usual. We found an abundance of browse and no winter-killed carcasses, so there is little reason to suspect that transect results indicate a deer decline.

While the deer harvest in Unit 1C during this period did not equal the numbers taken in the mid-80s/early 90s, it did rebound from the low seen in 1995. Although some hunters did report difficulty finding deer, virtually all agreed that animals are plentiful. Few complaints have been received about Unit 1C deer hunting conditions. This is possibly because many of the hunters using this area still regard it as a secondary deer hunting area to be used when weather or time do not allow them to access Unit 4.

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Table 1 Unit 1C deer population trends as indicated by pellet group surveys, 1986–1997

Site	Regulatory Year	Mean pellet groups/plot	Number of plots	95 % CI
Kensington (VCU 20)	1994	0.00	180	--
Portland Island (VCU 27)	1987	0.99	381	0.87–1.12
North Douglas (VCU 35)	1991	0.8	300	0.65–0.96
	1993	0.74	324	0.62–0.87
	1994	0.91	315	0.74–1.09
	1995	0.86	306	0.70–1.02
	1996	0.97	323	0.81–1.12
	1997	1.43	323	1.24–1.62
	1998	1.55	321	1.32–1.77
Inner Point (VCU 36)	1986	1.97	235	1.68–2.25
	1987	1.76	262	1.53–2.00
	1988	1.21	200	1.02–1.39
	1989	1.30	258	1.08–1.53
	1992	2.05	204	1.75–2.36
	1995	1.41	254	1.21–1.60
	1996	1.68	240	1.45–1.91
	1997	2.36	252	2.08–2.64
	1998	0.84	280	0.69–0.98
Rhine Creek (VCU 38)	1997	0.31	108	
Harbor Island (VCU 65)	1987	1.28	200	1.00–1.56
Couverden (VCU 117)	1993	0.35	350	0.27–0.44
Shelter Island (VCU 124)	1987	2.91	288	2.57–3.24
	1988	3.16	130	2.62–3.70
	1989	1.42	300	1.23–1.62
	1990	1.60	300	1.37–1.82
	1993	2.00	250	1.73–2.26
	1995	1.38	297	1.20–1.56
	1997	2.51	312	2.23–2.78
Lincoln Island (VCU 124)	1998	1.57	207	1.27–1.77
Sullivan Island (VCU 94)	1990	1.40	250	1.17–1.62

Table 2 Unit 1C annual deer harvest, 1986–97

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

Data from expanded results of hunter surveys.

Table 3 Unit 1C hunter residency and success, 1986–1997

	Successful				Unsuccessful			
Reg. Year	Local Res.	Nonlocal Res.	Nonres.	Total	Local Res.	Nonlocal Res.	Nonres.	Total
1986	256	8	0	264	655	67	4	726
1987	316	14	0	330	611	42	2	655
1988	232	20	0	252	639	45	6	690
1989	247	26	0	273	624	43	0	667
1990	291	32	2	324	564	56	3	623
1991	209	21	0	230	551	42	4	597
1992	321	15	6	343	550	63	5	618
1993	295	8	0	302	549	50	2	601
1994	359	4	2	365	574	67	11	652
1995	210	0	0	210	670	92	18	780
1996	247	10	0	257	NA*	NA	NA	NA
1997	231	4	0	235	583	43	9	635

* Data for unsuccessful hunters unavailable due to changes in survey.

Table 4 Unit 1C statistics for successful hunters, 1986–1997

Regulatory Year	Nr. deer/ hunter	Nr. deer/ hunter day	Nr. hunter days/deer	Nr. days/ hunter
1986	2.4	0.5	6.7	3.3
1987	1.5	0.5	3.4	3.6
1988	1.8	0.6	2.6	2.5
1989	1.8	0.5	3.2	3.4
1990	0.5	0.2	6.5	3.4
1991	0.5	0.1	7.2	3.6
1992	0.5	0.2	2.8	3.3
1993	0.6	0.2	3.1	3.3
1994	1.8	0.5	2.0	3.5
1995	1.5	0.2	4.3	6.3
1996	1.4	NA*	NA	NA
1997	1.9	0.6	1.6	3.0

* Data unavailable due to changes in survey.

LOCATION

GAME MANAGEMENT UNIT: Unit 2 (3,600 mi^2)

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

BACKGROUND

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

Weather conditions and population levels influence deer harvests. Unit 2 harvests ranged from 1265 to 3886 deer during the past 12 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 1995–96, 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. In fall 1996 the Board of Game changed Unit 2 harvest regulations from 4 antlered deer to 4 bucks.

As clear-cut 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 implications of habitat loss include the inability to provide for subsistence needs and the loss of deer hunting opportunities.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain populations in excess of 45 deer per mi^2 of winter range

Mean pellet group densities of 1.4 pellet groups per plot have been determined to be equivalent to 45 deer per mi^2 (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 has historically conducted personal interview household surveys to estimate harvest rates, and some of the results conflict with our estimates. Subsistence has completed 3 subsistence household surveys of rural communities in the last 12 years.

Because of concern for deer populations by some residents, a concerted effort was made to sample as many value comparison units (VCUs) as possible on Prince of Wales Island during 1997. Over 4300 plots were surveyed, more than in any other year. We surveyed deer pellet-group transects in 17 watersheds (or VCUs), during April 1997 and another 13 during 1998. Methods for conducting the surveys are described by Kirchhoff and Pitcher (1988). No beach mortality transects or aerial surveys were completed during this reporting period.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Unit 2 deer densities vary within and between VCUs. Unit 2 deer pellet-group densities were generally lower than the 10-year mean, but well within the historical average for the last 14 years. For all transects in Unit 2, the average pellet groups per plot count during 1996 was 1.3, during 1997 the average count was 0.9, and in 1998 it was 0.8. The highest 1997 deer pellet densities in Unit 2 were at Little Ratz and Twelvemile, but the 1996 and 1998 high counts were at Warm Chuck. Warm Chuck has been at moderate levels with a slight increase of 5% between 1997 and 1998. Those estimates declined by 44% from 1995 to 1998. Sarkar is also declining and was down 52% between 1997 to 1998 (Table 1).

Most other transects showed stable and declining trends from historical levels. The lack of snow during the past several years may have contributed to an underestimate of actual deer numbers because deer were probably more widely distributed and at higher elevations than normal. 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. No regulatory changes were made to state seasons or bag limits during this period.

Hunter Harvest. Hunters in all areas in Southeast Alaska exhibited lower than normal success. This was reflected in the low Southeast harvests of 9100 deer during 1996 and 10,626 deer during 1997. Overall, 1996 was the lowest reported harvest for Southeast since 1982 and 4000 less than the average for the past 15 years. With snow-free conditions in many road-accessible areas on Prince of Wales Island (POW), hunters were able to spend more days hunting on more of the road system than usual, but with less success because deer were more dispersed.

The 1996 and 1997 Unit 2 seasons were below the 10-year average (Table 7). The 1997 hunter success declined 24% from 1996 levels, but was similar to the 12-year average (Table 2). The average number of deer killed per hunter day declined considerably during 1997, compared to the

10-year average. The average number of deer taken per hunter remained constant. Hunter effort increased and remained stable throughout most of the unit during the past 2 seasons. Central Prince of Wales Island continued to attract the most hunters and had the highest harvests in the unit during 1994 and 1995, but has since declined. The 1997 harvest in Central Prince of Wales was down over 60% from the past 6-year average, while harvests reached 6-year highs on Heceta and Outer Island during the same period (Table 3). Success rates varied throughout the unit, with the highest success coming from Heceta and the Outer Island harvest areas, although the overall hunting pressure and number of hunters was low at both these sites. Snowfall during the past several years has been below average, and as a consequence deer were more dispersed and required more hunting effort to locate them. Historically, heavy snowfall anytime during the hunting season tends to be followed by increased hunter effort.

Because of the extensive and growing road system, many settlements, and insufficient law enforcement personnel, Unit 2 probably has one of the highest illegal or unreported harvests in the region. Although the degree of illegal harvest in Unit 2 is unknown, Wood (1990) thought it considerable (Table 7), perhaps as high as 100% of the total hunter harvest. Additionally, Flynn and Suring (1989) reported that actual hunter kill may 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. For example, during the 1997 season 80 nonresident hunters had a 47% success rate, which only accounted for 2% of the reported Unit 2 deer harvest (Table 5). Nonlocal residents accounted for 41% of the Unit 2 deer harvest during 1994 and 1995. Central POW had the greatest decline in harvest between 1996 and 1997. Coffman Cove hunters, however, reported 36% more deer taken during the 1997 season than during 1996. Hunters from POW communities spent much less time afield in 1997 than in 1996. Collectively during 1997, hunters from the larger communities on the island reported 10,000 fewer hunter days than in 1996. Prince of Wales Island deer hunters reported an average of 2–3 weeks hunting in 1996; they reported hunting only for a week or less in 1997.

Harvest Chronology. Most of the Unit 2 deer harvests are during August, October, and November (Table 6). During 1996 to 1998 most Unit 2 harvests were during August (35%) and November (30%). An additional 18% of the harvest occurs during October (Table 6). Because Sitka black-tailed deer rut and breed during November, bucks move about considerably during the day, making them more visible and vulnerable to hunters. This contributes to the higher harvests during November.

Transport Methods. The majority of successful Unit 2 hunters (80%) use the extensive road system to access hunting areas. Boat use accounts for 13% and aircraft 3% for access, respectively. In 1997 hunters using airplanes to access hunting areas spent 11 days/deer, hunters using highway vehicles reported 6.3 days/deer, and hunters with boats reported 4.2 days/deer (Table 6).

Other Mortality

Based on staff observations and responses to 1995/96, 1996/97 and 97/98 trapper questionnaires, Unit 2 wolf populations are believed to be at lower densities than those on the nearby mainland (Table 7). During 1997, 79 wolves were harvested from Unit 2, which is down 40% from the

1996 harvest of 132. Fall 1996 Board of Game actions shortened Unit 2's hunting season by 5 months, the trapping season by 2 months, and implemented a harvest quota of 90 wolves. Wolf numbers in Unit 2 may have declined slightly during 1996 then remained stable during 1997/98. Person et al. (1996) reported an average of 26 deer killed per wolf per year in Unit 2.

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

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

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, 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 substantially 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).

CONCLUSIONS AND RECOMMENDATIONS

A concerted effort was made to count as many VCUs as possible during 1997. Based on pellet-group data, our objective of maintaining 45 deer/mi^2 in winter habitat was achieved in only 3 of the Unit 2 VCUs sampled during 1997 and none in 1998. During 1998 densities ranged from 9 deer/mi^2 at Sarkar to 41 deer/mi^2 at Warm Chuck. For the entire island the average number of pellet groups per plot was down slightly from 1996 levels, but well within the historical range for the last 14 years. These results indicate that although deer may be scarce in specific locales on the island, the island deer population is stable. Target objectives for Unit 2 are to increase populations of deer 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.

Reported hunter harvests remain relatively high throughout much of the unit, and mild weather during the past several years enabled deer numbers in most parts of the unit to remain stable.

Wolf abundance remained relatively high in recent years, and predation continues to influence deer populations. Wolf abundance in Unit 2 was estimated at the highest since 1991. Harvest of wolves is down 40% from the 1996 levels. During Fall 1996 Board of Game actions shortened Unit 2's hunting season by 5 months, the trapping season by 2 months, and implemented a harvest quota of 90 wolves. Wolf population estimates for Unit 2 indicate that numbers may have declined slightly during 1996 and remained stable during 1997 and 1998.

We believe the ongoing federal antlerless season in Unit 2 is contrary to appropriate wildlife management principles and may negatively influence future deer population levels in the unit. As noted in the past (Wood 1990, Larsen 1993, Larsen 1995), we are aware of illegal hunting in southern Southeast, particularly in Unit 2.

Subsistence survey results have consistently been high compared to Division of Wildlife Conservation (DWC) estimates, with some discrepancies as high as 300%. The major differences between DWC and Subsistence survey results were that Subsistence estimates more hunters in communities and a higher hunter success rate, while the DWC survey estimates a slightly higher number of deer taken per successful hunter. The actual harvest is probably somewhere in between the two estimates. Subsistence and DWC have agreed to attempt to link future harvest surveys to discover why the results are so different. Subsistence staff plan POW surveys in summer 1999.

Unit 2 has consistently shown a very low survey response rate, although response has improved since the 1985 levels. Low response from villages such as Hydaburg and Klawock are still unsatisfactorily low. The low response rates from these Unit 2 rural communities reduce our confidence in the ability of the survey to accurately describe actual deer hunting effort and success or to estimate deer abundance.

It is unclear whether the 1997 harvest data are the result of a widely dispersed deer population that eluded hunters or if the data reflect some decline in the deer population. A population decline could be due to a number of factors, including habitat loss, predation, or overhunting. ADF&G will be closely monitoring the 1998 and 1999 Prince of Wales Island deer harvests to see if the downward trend continues (Paul and Straugh 1997).

We should inform the public of logging effects on deer populations, so that people are aware of the tradeoffs between timber harvest and wildlife. We anticipate winter habitat loss through logging will reduce carrying capacity of deer for many decades. Long-term implications of habitat loss are (1) the inability to provide for subsistence needs and (2) the loss of hunting opportunities for deer hunters in Unit 2 (Wood 1990, Larsen 1993).

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Table 1 Unit 2 deer pellet-group survey results, 1984–1997

Year	VCU[a]	Mean pellet groups/plot[b]	Number of plots	95% CI
1988	528–Calder	2.14	252	1.78–2.49
1997	528	1.17	272	0.97–1.39
1987	532–Red Bay	0.32	177	0.18–0.47
1994	532	0.94	256	0.74–1.14
1996	532	1.19	281	0.97–1.41
1997	532	1.07	248	0.89–1.25
1998	532	0.73	283	0.59–0.88
1988	539–Exchange Cove	1.40	266	1.15–1.64
1992	539	1.10	125	0.83–1.38
1997	539	1.25	303	1.04–1.46
1989	549–Sarheen	1.73	310	1.44–2.01
1996	549	1.00	334	0.83–1.16
1997	549	1.00	330	0.85–1.14
1998	549	0.42	355	0.33–0.51
1988	554–Sarkar	1.28	298	1.06–1.50
1992	554	0.53	245	0.41–0.66
1994	554	0.92	292	0.77–1.07
1997	554	0.61	263	0.48–0.74
1998	554	0.29	312	0.21–0.37
1984	561–Warm Chuck	1.02	326	1.02–1.38
1985	561	1.60	295	1.36–1.84
1989	561	2.21	302	1.91–2.50
1991	561	2.05	291	1.73–2.37
1996	561	1.39	276	1.17–1.61
1997	561	1.21	247	1.01–1.41
1998	561	1.29	246	1.08–1.51
1991	569–Baker	0.08	256	0.04–0.12
1992	575–Thorne Lake	1.20	334	1.03–1.37
1994	575	0.76	293	0.62–0.91
1995	575	1.27	299	1.09–1.45
1997	575	0.84	303	0.66–0.96
1998	575	0.87	316	0.71–1.03

Table 1 Continued

Year	VCU[a]	Mean pellet groups/plot[b]	Number of plots	95% CI
1986	578–Snakey Lakes	0.62	279	0.51–0.73
1988	578	1.05	300	0.85–1.26
1989	578	1.56	200	1.26–1.86
1993	578	0.77	356	0.61–1.32
1997	578	1.39	310	1.17–1.60
1998	578	0.71	225	0.55–0.87
1986	581–Luck Lake	1.74	178	1.41–2.07
1988	581	2.11	300	1.80–2.42
1993	581	1.10	175	0.87–1.32
1992	584–Little Ratz	0.94	272	0.76–1.13
1997	584	1.93	255	1.64–2.21
1998	584	0.78	282	0.64–0.91
1988	587–Tuxekan	1.07	300	0.84–1.28
1997	587	1.04	314	0.87–1.22
1998	587	0.48	353	0.37–0.58
1985	621–Twelvemile	0.31	196	019–0.43
1986	621	0.64	300	0.48–0.81
1987	621	0.65	370	0.49–0.81
1988	621	0.62	302	0.46–0.77
1989	621	0.78	235	0.59–0.98
1990	621	1.18	176	0.84–1.52
1991	621	1.84	231	1.48–2.21
1992	621	0.43	250	0.32–0.55
1993	621	0.84	258	0.63–1.05
1994	621	0.93	324	0.76–1.09
1997	621	1.45	202	1.10–1.79
1998	621	0.83	280	0.63–1.02
1995	625–Trocadero	1.74	235	1.41–2.06
1997	625	1.18	235	0.97–1.38
1998	625	0.97	267	0.78–1.16
1997	628–Pt. Amargua	1.04	255	0.83–1.24
1998	628	0.93	325	0.78–1.08

Table 1 Continued

Year	VCU[a]	Mean pellet groups/plot[b]	Number of plots	95% CI
1985	635–Port Refugio	2.69	317	2.27–3.12
1986	635	2.52	324	2.09–2.96
1987	635	1.76	369	1.46–2.07
1988	635	1.15	270	0.90–1.40
1989	635	0.80	507	0.68–0.93
1990	635	1.25	232	1.03–1.48
1991	635	1.13	367	0.95–1.32
1992	635	0.76	255	0.57–0.95
1993	635	1.35	213	0.98–1.71
1994	635	1.85	280	1.51–2.19
1997	635	0.82	276	0.65–1.08
1998	635	0.78	315	0.61–0.96
1988	679–Kitkun	0.32	240	0.20–1.07
1989	679	0.89	273	0.71–1.07
1995	679	0.40	264	0.28–0.52
1997	679	0.31	261	0.19–0.44
1988	685–Nutkwa	0.09	234	0.02–0.16

[a]Value comparison unit

Table 2 Unit 2 deer harvest data, 1984–1997

Regulatory Year	Nr. of hunters	Nr. of successful hunters	Percent successful	Total hunter days	Average hunter days	Total deer[a]	Average deer per hunter	Average hunter days per deer
1984	1,910	1,210	63	13,070	6.8	1,880	1.0	6.9
1985	2,025	1,373	68	14,182	7.0	3,151	1.6	4.5
1986	2,233	1,538	69	17,505	7.8	2,805	1.3	6.2
1987	2,481	1,845	74	17,709	7.1	3,886	1.6	4.5
1988	2,124	1,415	67	10,668	5.0	2,849	1.3	3.7
1989	2,132	1,397	65	12,315	5.7	2,806	1.3	4.4
1990	2,149	1,445	67	13,566	6.3	3,093	1.4	4.4
1991	1,664	1,142	69	11,985	7.2	2,466	1.5	4.9
1992	2,046	1,416	69	12,337	6.0	3,097	1.5	4.0
1993	1,986	1,394	70	11,860	6.0	2,807	1.4	4.2
1994	2,019	1,412	70	12,140	6.0	2,825	1.4	4.3
1995	2,143	1,496	70	12,887	6.0	3,277	1.5	3.9
1996	---	1,889	---	---	---	2,512	---	
1997	1,779	1,430	80	11,342	4.8	1,883	1.1	6.0

[a]Includes does which were reported killed.

Table 3 Unit 2 deer harvests from major harvest areas, 1990–1997

Major harvest area	Reg year	Number of hunters, expanded	Number of 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	62	41	65	100	1.6	0.8	47
	1991	42	30	72	89	2.1	1.2	50
	1992	107	77	72	246	2.3	1.0	107
	1993	55	22	41	203	3.7	0.7	36
	1994	146	124	84	260	1.8	1.4	198
	1995	56	41	73	245	4.4	1.8	102
	1996	---	14	---	---	---	---	14
	1997	45	27	60	127	2.8	0.5	6
10–Heceta Island	1990	52	52	100	117	1.6	0.8	47
	1991	122	86	71	350	2.1	1.2	50
	1992	164	117	71	501	2.3	1.0	107
	1993	140	113	80	354	3.7	0.7	36
	1994	86	72	83	194	2.2	1.5	125
	1995	64	50	78	340	5.3	1.5	95
	1996	---	22	---	---	---	---	27
	1997	60	40	78	154	2.6	0.9	55
11–SW POW Island	1990	119	72	60	875	7.3	1.4	166
	1991	59	33	56	529	8.9	1.1	67
	1992	174	98	56	743	4.3	1.1	189
	1993	127	82	65	441	3.5	1.3	170
	1994	141	80	57	504	3.6	0.8	117
	1995	192	92	48	1,061	5.5	0.9	166
	1996	---	38	---	---	---	---	52
	1997	65	27	26	182	2.8	0.9	60

Table 3 Continued

Major harvest area	Reg year	Number of hunters, expanded	Number of 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	264	128	48	847	3.2	0.9	234
	1991	244	121	49	904	3.7	0.7	174
	1992	270	150	56	952	3.5	0.9	247
	1993	336	102	30	1,072	3.2	0.5	153
	1994	260	106	41	824	3.2	0.5	140
	1995	279	121	43	919	3.3	0.7	206
	1996	---	135	---	---	---	---	207
	1997	218	74	36	967	4.4	0.6	130
13–Central POW Island	1990	1,100	626	57	6,201	5.6	1.2	1,271
	1991	849	580	68	5,093	6.0	1.3	1,129
	1992	1,032	645	62	4,901	4.7	1.1	1,183
	1993	1,005	657	65	5,248	5.2	1.2	1,187
	1994	973	622	64	5,560	5.7	1.2	1,143
	1995	1,092	763	70	5,341	4.9	1.3	1,423
	1996	---	554	---	---	---	---	912
	1997	723	336	41	3988	5.5	0.8	585
14–North Central POW Island	1990	664	343	52	2,924	4.5	0.9	568
	1991	553	275	50	3,003	5.4	0.8	448
	1992	639	375	59	2,647	4.1	1.0	662
	1993	710	418	59	3,076	4.3	10.	690
	1994	570	349	61	3,001	5.3	1.1	654
	1995	659	342	52	2,501	3.8	1.0	646
	1996	---	351	---	---	---	---	577
	1997	580	332	54	2895	5.0	1.0	601

Table 3 Continued

Major harvest area	Reg year	Number of hunters, expanded	Number of successful hunters, expanded	Percent successful	Total hunter days, expanded	Average days per hunter	Average deer per hunter	Total nr. deer killed
15–North POW Island	1990	538	382	71	2,463	4.6	1.3	725
	1991	411	233	57	2,16	4.9	1.1	468
	1992	477	297	62	2,347	4.9	1.0	470
	1993	382	245	64	1,466	3.8	1.0	364
	1994	420	298	71	1,797	4.3	1.1	448
	1995	560	351	63	2,480	4.4	1.1	640
	1996	---	303	---	---	---	---	500
	1997	414	231	63	1787	4.3	0.8	347

Table 4 Unit 2 reported and estimated deer harvest/mortality,1984–1997

Regulatory	Reported harvest			Unreported & illegal	Estimated	Estimated nr.
Year	Male	Female	Total	harvest[a]	Total harvest	of road kills
1984	1880	0	1880	1880	3760	unknown
1985	3151	0	3151	3151	6302	unknown
1986	2805	0	2805	2805	5610	unknown
1987	3616	270[b]	3886	3886	7772	20
1988	2846	3	2849	2849	5698	30
1989	2806	0	2806	2806	5612	25
1990	2952	141	3093	3093	6186	25
1991	2343	123	2466	2466	4932	25
1992	3036	61	3097	3097	6194	25
1993	2746	61	2807	2807	5614	25
1994	2762	62	2825	2825	5650	25–30
1995	2957	320[b]	3277	3277	6554	25–30
1996	2378	134	2512	2512	5024	25–30
1997	1174	91	1265	1265	2530	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, 96,97.

Table 5 Unit 2 Hunter residency and success, 1988–1997

Regulatory year	Successful				Unsuccessful			
	Local resident[a]	Nonlocal resident	Nonresident	Total	Local resident[a]	Nonlocal resident	Nonresident	Total
1988	748	638	29	1,415	242	430	38	710
1989	713	675	9	1,397	272	425	38	735
1990	825	583	36	1,444	323	351	30	704
1991	632	487	23	1,142	224	276	22	522
1992	829	572	17	1,418	299	291	38	628
1993	800	582	13	1,395	260	294	37	591
1994	773	608	31	1,412	231	321	54	606
1995	893	573	30	1,496	226	385	37	648
1996	1,291	574	34	1,899	---	---	---	---
1997	929	492	9	1,430	717	517	71	1,305

[a]Local residents refer to Alaskans living within the boundaries of Unit 2.

Table 6 Unit 2 deer harvest chronology and method of transportation used by hunters, 1988–1997

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	895	447	506	888	72	7	34	173	990	547	2,875	18	55
1989	729	377	469	1,061	152	12	6	203	815	1,042	3,276	52	16
1990	1,013	470	559	903	135	11	2	207	776	1,023	3,522	28	0
1991	816	272	470	793	109	5	1	36	771	617	2,924	34	9
1992	1,256	422	635	696	52	8	28	106	865	1,113	3,467	54	0
1993	1,124	421	368	774	74	24	22	292	753	1,082	2,723	280	0
1994	911	344	578	916	68	0	8	170	1,049	800	2,507	68	19
1995	1,253	433	553	904	124	0	10	143	666	877	3,792	145	11
1996	518	163	165	331	77	6	--	--	--	--	--	--	--
1997	316	142	163	223	33	--	--	91	269	29	1,388	0	0

[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, 1981–1997.

Regulatory year	Pellet group data[b]	Harvest Data				Weather index[c]
		Total harvest	Deer kill/ hunter day	Hunter success (%)	Wolf abundance	
1981/82	---	----	----	--	--	6.3
1982/83	---	----	----	--	--	1.3
1983/84	1.0	----	----	--	--	1.3
1984/85	1.8	1880	0.14	63	--	4.7
1985/86	1.4	3151	0.22	68	--	2.0
1986/87	1.0	2805	0.16	69	--	2.7
1987/88	1.2	3886	0.22	74	--	1.7
1988/89	1.3	2849	0.27	66	--	4.7
1989/90	1.2	2806	0.23	65	--	1.3
1990/91	1.3	3093	0.23	67	--	2.3
1991/92[d]	0.8	2466	0.20	69	59	0.3
1992/93	1.0	3097	0.25	69	60	3.0
1993/94	1.1	2807	0.24	70	25[e]	1.7
1994/95	1.1	2825	0.23	70	37	4.7
1995/96	1.2	3277	0.25	70	37	2.7
1996/97	0.9	2512	---	---	37	---
1997/98	0.8	1265	0.17	70	70	---

[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 (3,000^2)

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

BACKGROUND

Sitka black-tailed deer inhabit most of the islands in Unit 3. Deer populations on these islands have historically fluctuated with high and low extremes; clear-cut logging has reduced winter carrying capacity. 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 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 in the 1993 hunt, the only part of Unit 3 closed to deer hunting was the area within the Petersburg and Kupreanof city limits.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

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

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

METHODS

Unit 3 deer harvest was estimated from a regional questionnaire mailed to a random sample of 33% of all deer harvest ticket holders. Relative winter deer densities were measured 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 in Unit 3 varied from a slight decrease to increasing (Table 1). Some of the decrease in pellet groups was due to the lack of snow during the mild winter of 1997–98. Many deer probably spent less time than average below the 1500-ft elevation, the cutoff for spring pellet-count surveys. Pellet-group counts at Castle River and Portage Bay in the spring of 1998 were .36 and .37 pellet groups/plot, respectively, similar to counts in recent years. The East Duncan site produced a count of 1.04 groups/plot, up from .78 and down from 1.12 in 1992 and 1990, respectively. Woewodski (S. Mitkof) counts decreased to 1.56 and 1.10 pellet-groups/plot in 1997 and 1998 from an all time high of 2.25 in 1996. The 1997 Blind Slough and Dry counts were 1.61 (up from 1.28 and 1.04 in 1993 and 1992) and 1.26 (down from 1.44 in 1993 but up from the 1981 estimate of .92) pellet groups/plot, respectively. Snow Passage on Zarembo Island had .98 pellet groups/plot, up from .57 in 1994. Field observations by state and Forest Service biologists suggest a high deer population along the Zarembo road system. Most does observed in the fall had twins. The Onslow pellet-group count of .73 groups/plot was similar to previous years. The Coronation count of .44 pellet groups/plot was down substantially from the 1989 count of 1.63.

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	One 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 of Game actions occurred, and no emergency orders were issued during the report period.

Hunter Harvest. Unit 3 deer hunter effort and harvest changed little before 1991 (Table 2). Hunter survey data for 1991–1997 include Mitkof Island, which is primarily responsible for the large increase in both hunter numbers and kill. The unitwide 1996 harvest of 577 deer was a 33% decrease from the record 1995 harvest of 866 deer. In 1997 the harvest increased to 780 deer, over half of which (407 deer) came from Zarembo Island.

Hunter Residency and Success. Few nonresidents hunt deer in Unit 3 (Table 3) and most hunters are local residents. Deer populations are greater and seasons and bag limits more liberal in other nearby units, attracting most nonlocal hunters to areas other than Unit 3.

Harvest Chronology. Table 5 shows the Unit 3 deer harvest percentage by month. Most deer harvest takes place during August, October, and November. Some Unit 3 hunters reported taking deer in December and January during the closed season. The increase of Unit 3 kills during October in 1991–1997 coincides with the Mitkof Island registration permit hunt.

Transport Methods. Most hunters traveled by boat to their hunting areas. The increase in the use of highway vehicles and decrease in boat use in 1991–1997 in Unit 3 reflects effort on Mitkof Island (Table 4).

Other Mortality

The Forest Service monitored 32 radiocollared deer on Mitkof Island during 1997/98. Seven radiocollared deer died; 1was killed by a car, 3 by wolf predation, 1 by legal hunter harvest, 1 by poaching, and 1 from unknown causes. Twenty additional deer were fitted with radio collars on Mitkof Island in the spring of 1998, bringing the total number of collared deer to 45.

CONCLUSIONS AND RECOMMENDATIONS

Deer populations in Unit 3 are stable and increasing with localized variations. Slight decreases in the 1998 pellet counts were probably due to deer spending more time at altitudes 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. All of Unit 3 can remain open for deer hunting, except for the existing closures within the Petersburg and Kupreanof city limits.

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Table 1 Unit 3 deer population trends as indicated by pellet group surveys 1981–98

VCU	Name	Pellet-Groups Year	Plots	Mean	95% CI
400	Security Bay	1984	360	0.02	0.01–0.04
		1989	304	0.25	0.16–0.34
		1995	268	0.22	0.15–0.29
403	Pillar Bay	1988	337	0.16	0.10–0.22
408	Malmesbury	1990	206	0.11	0.05–0.18
417	Conclusion	1987	207	2.66	2.32–3.01
		1989	200	0.95	0.72–1.18
		1991	200	0.71	0.53–0.88
		1996	191	1.45	1.19–1.70
427	Big John Bay	1994	300	0.38	0.29–0.48
431	Point Barrie	1988	357	0.23	0.17–0.29
		1993	375	0.77	0.64–0.90
434a	Big Level	1981	399	1.54	1.45–1.63
		1983	336	1.56	
		1986	382	1.66	1.41–1.90
		1989	227	1.07	
		1991	456	2.16	1.90–2.41
434b	Little Level	1981	114	2.48	2.02–2.94
		1983	136	2.34	
		1986	122	1.39	1.07–1.70
		1989	137	1.52	
		1991	132	3.59	3.07–4.11
435	Castle River	1984	312	0.19	0.12–0.26
		1987	305	0.51	0.37–0.65
		1989	312	0.40	0.25–0.56
		1994	310	0.32	0.20–0.40
		1998	281	0.36	0.28–0.44
437	East Duncan Canal	1990	227	1.12	0.92–1.32
		1992	213	0.78	0.63–0.94
		1998	153	1.04	0.77–1.30
442	Portage Bay	1993	282	0.43	0.30–0.56

Table 1 Continued

VCU	Name	Pellet-Groups Year	Plots	Mean	95% CI
		1995	277	0.43	0.63–0.94
		1998	285	0.39	0.29–0.49
448	Woewodski	1984	295	.088	0.69–1.08
	(S. Mitkof)	1985	209	1.00	0.82–1.19
		1987	195	1.65	1.85–2.61
		1988	433	1.33	1.16–1.51
		1989	417	1.35	1.24–1.73
		1990	355	1.46	1.28–1.64
		1991	316	1.80	1.52–2.07
		1992	248	0.79	0.62–0.97
		1993	230	1.06	0.85–1.27
		1994	152	1.13	0.82–1.46
		1995	157	1.38	1.08–1.67
		1996	243	2.25	1.95–2.55
		1997	282	1.56	1.27–1.84
		1998	282	1.10	0.91–1.29
448a	Woewodski Island	1991	461	1.86	1.66–2.05
		1994	510	1.30	1.15–1.46
449	Frederick	1981	945	0.08	0.06–0.11
	(N. Mitkof)	1990	180	0.55	0.36–0.74
		1992	227	0.54	0.42–0.65
452	Blind Slough	1992	114	1.04	0.77–1.30
	(Central Mitkof)	1993	265	1.28	1.04–1.51
		1997	245	1.61	1.34–1.88
454	Dry	1981	91	0.92	0.56–1.28
		1993	210	1.44	1.17–1.72
		1997	188	1.26	0.88–1.39
455	Vank Island Group	1981			
	a) Sokolof		900	1.73	1.61–1.85
	b) Rynda		281	0.25	0.18–0.32
	c) Greys		284	0.25	0.18–0.32
458	Snow Passage	1994	345	0.57	0.45–0.70
		1997	315	0.98	0.80–1.16
461	Woronkofski (All Transects)	1985	646	1.63	1.45–1.81

Table 1 Continued

461	Woronkofski (Trans. 10, 11, 12)	1985	218	2.01	1.62–2.39
		1987	201	2.23	1.85–2.61
		1989	223	2.52	2.18–2.85
		1991	203	1.59	1.32–1.85
		1993	225	0.22	0.13–0.31
		1994	224	0.26	0.18–0.34
467	Mosman	1993	304	0.07	0.03–0.11
473	Onslow	1984	321	0.37	0.28–0.46
		1985	334	0.59	0.48–0.70
		1986	347	0.72	0.59–0.84
		1987	336	0.42	0.31–0.55
		1988	329	0.44	0.32–0.55
		1991	322	0.66	0.51–0.80
		1993	341	0.68	0.55–0.82
		1994	340	0.88	0.74–1.02
		1997	346	0.73	0.59–0.86
480	Fools	1994	193	0.54	0.38–0.70
564	Coronation	1983	696	1.20	1.04–1.36
		1985	228	2.34	
		1988	408	1.41	1.17–1.66
		1989	293	1.63	1.28–1.98
		1997	289	0.44	0.34–0.55

Table 2 Unit 3 deer harvest, 1990–98

Regulatory Year	Estimated legal harvest						Estimated illegal harvest	Total[a]
	M	(%)	F	(%)	Unk.	Total		
1990	228	(100)			0	228	22	250
1991	381	(100)			0	381	30	411
1992	581	(100)			0	581	57	638
1993	619	(100)			0	619	51	670
1994	690	(100)			0	690	0	690
1995	844	(100)			0	844	22	866
1996	588	(100)			0	588	15	603
1997	773	(100)			0	773	7	780

[a] Data from mail questionnaire survey.

Table 3 Unit 3 deer hunter residency and success, 1990–98

	Successful					Unsuccessful					
Regulatory Year	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Total[b] hunters
1990	131	43	0	174	(51)	145	18	2	165	(49)	339
1991	278	22	0	300	(49)	282	19	5	306	(51)	606
1992	428	45	0	473	(48)	468	46	0	514	(52)	987
1993	422	51	2	475	(45)	492	72	5	569	(55)	1,044
1994	457	33	4	494	(44)	488	101	3	592	(55)	1,086
1995	569	28	6	603	(58)	386	47	0	433	(42)	1,036
1996	379	33	6	418	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1997	511	33	0	544	(49)	512	43	9	564	(51)	1,108

[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, 1990–98[a]

Regulatory Year	Percent of effort							Number of trips
	Airplane	Boat	3- or 4-wheeler	Foot	ORV	Highway vehicle	Other	
1990	4	60	0	14	0	21	1	708
1991	1	41	1	12	3	43	0	1227
1992	1	32	4	11	1	50	1	1861
1993	2	44	2	10	4	36	2	1835
1994	1	33	4	13	2	46	1	2204
1995	1	42	5	13	4	34	1	2140
1996	1	50	13	2	0	34	0	NA
1997	1	55	13	0	0	31	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, 1990–98

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

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

LOCATION

GAME MANAGEMENT UNIT: 4 (5,820 mi^2)

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

BACKGROUND

Game Management Unit 4 (Unit 4) provides the majority of the deer hunting opportunity in Southeast Alaska (Faro 1997). During 1997–98, Unit 4 accounted for 41% of the region's hunter effort and 59% of the deer harvest (Paul and Straugh 1998).

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). In recent history 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 winter of 1994/95, many fawns died, but since that time winters have been relatively mild with high survival of all age classes.

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 may 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 land in Unit 4. The Federal Subsistence Board promulgated regulations that apply only on federal lands and give federally qualified subsistence hunters more liberal season dates and bag limits. While the two sets of regulations were initially quite similar, they now continue to diverge.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

None has been established.

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. The technique has been used to collect population trend data since 1981. Kirchhoff and Pitcher (1988) have described the methods in detail.

Winter mortality surveys (beach transects) on some previously established trend areas were conducted 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 1997, 1998). We asked hunters to supply information on hunting effort, kills, months hunted, and kill locations on an area-specific basis.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Pellet-group surveys indicate Unit 4 Sitka black-tailed deer populations increased in most areas during this report period (Table 1). Deer populations appear to have recovered from the winter losses incurred during the late 1980s and early 1990s. During this report period deer were probably at habitat carrying capacity in many areas in the unit.

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

Pellet-group surveys (Table 1) generally reflect an increasing deer population. Most areas are probably at or near carrying capacity. Except in areas in proximity to population centers and protected waters providing good access, this trend is supported by observations by department staff and the public. Evaluation of the deer population status for management purposes should continue to be based on a variety of indicators, including pellet-group surveys, hunter contacts, field observations, harvest questionnaires, and mortality transects.

Population Size

Deer pellet-group surveys conducted during spring 1997 and 1998 indicated an increase in 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 in

February or March. Snowfall that concentrates deer in restricted habitats may result in high-pellet densities in sample units in such areas. In years with little snow accumulation, wintering deer may be scattered over a wide area or at elevations above transect boundaries.

Population Composition

The sex composition of the legal kill (Table 2) was estimated from deer harvest questionnaires (Paul and Straugh 1997, 1998). Extrapolations of hunter reports indicated a 1996–97 take of 3655 bucks (74%, Table 2). Hunters took an estimated 4279 (68%) bucks during 1997–98. There remains a strong tendency for hunters to select against killing females and fawns, although the September 15–December 31 either-sex season (the federal season goes 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 from September 15–December 31.
Remainder of Unit 4	Aug 1–Dec 31	4 deer; however, antlerless deer may be taken only from September 15–December 31.

Board of Game Actions and Emergency Orders. None.

Hunter Harvest. Extrapolations of responses from the hunter harvest indicated there were 2095 and 2337 successful deer hunters in Unit 4 during the 1996–97 and 1997–98 seasons, respectively (Table 3).

In 1996–97 hunters reported killing 4990 deer. In 1997–98 the reported kill was 6261 deer. Crippling loss, unreported kills, and illegal kills are difficult to accurately determine, but are estimated at >25% of the reported harvest (Table 2). Based on these estimates, the total hunter-related deer mortality was in excess of 6200 in 1996–97 and in excess of 7800 during the 1997–98 season. The harvest is slightly lower than what was thought to have occurred during the previous reporting period (Faro 1997).

Hunter Residency and Success. During 1996–97 a total of 1011 successful hunters residing in Unit 4 harvested an estimated 2764 deer (2.7 deer/successful hunter). During the 1997–98 season, 1184 successful Unit 4 residents took 3913 deer (3.3 deer/successful hunter, Table 3). Nonresident hunters in Unit 4 made up only 0.8% and 0.6% of the successful hunters during 1996–97 and 1997–98, respectively. Alaska residents from other than Unit 4 made up most of the hunters (51% and 49% in 1996–97 and 1997–98, respectively). During the 1997/98 season, 33% of nonresidents, 70% of Unit 4 residents, and 61% of nonlocal Alaska residents were successful at taking at least 1 deer.

Harvest Chronology. Most hunters continue to be in the field during November, resulting in the greatest single-month harvest. During the 1996/97 season, 38% of the harvest occurred in November, and 36% during 1997/98 (Table 4). December generally provides the next highest deer harvest from Unit 4. The federal season in January generally results in about 5% of the reported annual harvest.

Transport Methods. Deer hunter transportation type remains almost identical with past years (Table 5). During 1996–97 boats were used in 72% of the hunting trips, 12% of the hunters used airplanes, 2% walked from their respective residences, 11% used highway vehicles, and 1% used an off-road vehicle (3- or 4-wheeler). During 1997–98, boats were used in 74% of the trips, airplanes were used 6% of the time, and highway vehicles 15%. Transport methods have changed little since the 1988/89 season when data were first collected.

Other Mortality

Starvation mortality due to severe winters has had little effect on Unit 4 deer during this reporting period. Data were collected on low-elevation mortality transects during springs of both years, indicating that winter mortality was negligible.

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 1996–97 was 2.4 deer per successful hunter, but in 1997–98 that figure rose to 2.7 deer per successful hunter. Bucks composed 74% of the reported harvest during 1996–97, but during 1997–98, 68% of the reported harvest were bucks.

Harvest questionnaire data indicated an estimated deer harvest of 4990 in Unit 4 during 1996–97 and 6261 during 1997–98 (Paul and Straugh 1997, 1998).

Weather during the deer hunting season influences the amount of effort put forth by hunters (Faro 1997), thus influencing 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, illegal take and wounding losses are currently estimated at 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 two regulatory entities in standardizing deer hunting regulations.

ACKNOWLEDGEMENTS

Many people were involved in data collections. Many thanks to all those who participated, including K. Bovee, B. Dinneford, N. Duclos, L. Johnson, M. Kirchhoff, R. Miller, B. Minn, C. Parsley, A. Schmidt, L. Schmidt, L. Shipley, and T. Suminski.

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Table 1 Unit 4 deer population trends as indicated by pellet group surveys, 1985–1998

Area	Regulatory year	Mean pellet groups/plot	Number of plots
128 – Hawk Inlet	1985/86	1.92	286
	1986/87	2.54	278
	1988/89	1.82	334
	1989/90	2.19	250
	1991/92	1.61	319
	1995/96	1.26	325
171– Hood Bay	1986/87	2.31	358
	1988/89	1.77	366
	1989/90	1.85	375
	1991/92	1.91	360
	1993/94	1.64	371
182 – Pybus Bay	1985/86	2.00	235
	1986/87	2.03	242
	1988/89	2.00	156
	1989/90	1.72	221
	1991/92	1.13	236
	1994/95	1.48	205
	1997/98	1.37	256
185 – Pleasant Island	1990/91	1.38	311
	1991/92	1.34	210
	1992/93	1.77	305
	1993/94	1.26	345
189 – Port Althorp	1987/88	1.80	195
	1990/91	1.92	223
	1991/92	1.36	261
	1992/93	1.39	248
	1993/94	1.31	253
	1994/95	2.12	98
	1997/98	1.48	281
190 – Idaho Inlet	1987/88	1.34	258
	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
202 – Port Frederick	1987/88	1.87	242
	1995/96	1.02	226
209- Suntaheen Creek	1987/88	1.22	272
	1991/92	1.13	271
	1992/93	0.73	265
	1993/94	1.05	272
	1995/96	0.98	276
218 – Pavlov River	1987/88	1.78	325
	1991/92	1.56	341
	1995/96	1.50	249
223 – Upper Tenakee	1987/88	1.47	253
	1991/92	0.59	265
	1992/93	0.47	249
	1993/94	0.61	319
	1995/96	0.56	263
231 – Saltery Bay	1987/88	2.02	256
	1991/92	0.97	256
	1992/93	0.76	227
	1993/94	0.97	193
	1995/96	1.90	152
235 – Kadashan	1987/88	2.67	221
	1991/92	1.63	282
	1992/93	1.12	385
	1993/94	1.39	294
	1995/96	2.36	204
236 – Corner Bay	1980/81	0.35	60
	1991/92	2.27	206
	1992/93	1.72	50
	1993/94	1.69	198

Table 1 Continued

Area	Regulatory year	Mean pellet groups/plot	Number of plots
247 – Finger Mountain	1986/87	3.11	236
	1988/89	2.99	305
	1989/90	3.36	225
	1990/91	3.93	150
	1991/92	2.85	207
	1992/93	3.03	179
	1993/94	2.29	275
	1995/96	2.62	221
254 – Soapstone	1987/88	1.92	274
	1990/91	2.05	270
	1992/93	1.88	243
	1993/94	1.34	310
	1994/95	1.48	283
300 – Nakwasina	1986/87	2.31	195
	1988/89	2.32	244
	1989/90	2.99	255
	1990/91	3.98	175
	1991/92	1.64	223
	1992/93	3.15	188
	1993/94	1.46	230
	1994/95	1.75	216
	1995/96	2.82	210
	1996/97	2.79	200
	1997/98	2.99	217
305 – Sea Lion Cove	1986/87	3.31	226
	1988/89	1.75	303
	1989/90	2.03	227
	1990/91	1.63	219
	1991/92	1.30	239
	1992/93	1.70	198
	1993/94	1.29	221
	1994/95	1.30	210
	1995/96	1.63	225
	1997/98	1.71	241
308 – South Kruzof	1992/93	1.62	345
	1993/94	1.71	370

Table 2 Unit 4 deer harvest, 1993/94–1997/98

Regulatory year	Estimated legal harvest[a] M	(%)	F	%	Unk	Total	Estimated illegal harvest[b]	Total
1993/94	6000	(71)	2500	(29)		8500	850	9400
1994/95	7400	(68)	3500	(32)		10,900	2000	12,900
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

[a]From mail questionnaire survey.

[b]Includes crippling loss estimate.

Table 3 Unit 4 deer hunter residency and success, 1993/94–1997/9

Regulatory year	Successful				Unsuccessful				Total nr hunters
	Local resident	Nonlocal resident	Nonresident	Total	Local resident	Nonlocal resident	Nonresident	Total	
1993/94	1,590	1,476	17	3,083	349	564	33	946	4,029
1994/95	1,839	1,800	35	3,674	325	360	20	705	4,379
1995/96	1,361	1,249	30	2,640	471	777	6	1,254	3,894
1996/97	1,037	1,041	17	2,095	NA	NA	NA	NA	NA
1997/98	1,215	1,108	14	2,337	513	732	28	1,273	3,610

Table 4 Unit 4 deer harvest chronology, 1993/94–1997/98

Regulatory year	Harvest periods												Total harvest
	August	(%)	September	(%)	October	(%)	November	(%)	December	(%)	January	(%)	Other	
1993/94	684	(8)	672	(8)	1,561	(18)	3,110	(36)	1,744	(20)	623	(7)	130	8,524
1994/95	621	(6)	565	(5)	1,266	(12)	4,969	(46)	3,238	(30)	138	(1)	39	10,836
1995/96	451	(6)	575	(8)	940	(13)	3,108	(42)	1,874	(25)	449	(6)	31	7,428
1996/97	294	(6)	453	(10)	717	(16)	1,883	(41)	1,100	(24)	148	(3)	396	4,991
1997/98	327	(5)	564	(9)	1,196	(20)	2,246	(37)	1,337	(22)	358	(6)	234	6,262

Unit 5 Unit 4 deer hunting trips percent by transport method, 1993/94–1997/98

Regulatory year	Percent of harvest						Number of hunters
	Airplane	Foot	Boat	ORV	Highway vehicle	Unknown	
1993/94	7	11	66	1	12	3	4,029
1994/95	8	11	68	1	11	1	4,379
1995/96	7	12	70	2	8	1	3,894
1996/97	12	2	72	1	11	1	NA
1997/98	9	3	68	6	14	0	3,610

LOCATION

GAME MANAGEMENT UNIT: 5 (5,800 mi^2)

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

BACKGROUND

Deer were introduced to the islands of Yakutat Bay in 1934, when 7 does and 5 bucks were released there (Burris and McKnight, 1973). These animals established a small population that is found on islands and the mainland along the east side of Yakutat Bay. Habitat and predators limited deer densities, and the population has supported small harvests over the years. Many of the deer were 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 deer season within Unit 5 was closed in July 1980. By the end of the 1980s, deer had recovered to some degree, and public requests for an open season were heard. In an effort to provide an opportunity for legal deer hunting, the Board of Game instituted a limited deer hunt within Unit 5A in 1991. Since then, small numbers of deer have been taken in most years, with some reported illegal harvest.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

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

METHODS

A total of 11,567 deer harvest tickets were issued for the 1996 regulatory year in Southeast Alaska and 11,537 for 1997. About one-third of the harvest ticket holders had hunter surveys mailed to them in each of the 2 years within the period, and 58% of those responded to the survey. During this reporting period the mail survey underwent changes to boost hunter response rates, and as a result there were some changes in information collected. In 1996 only information on location of kills was gathered, but in 1997 we tried to gain more insight into hunter effort by asking about unsuccessful hunts as well. Survey results for hunter effort, success, and kill location were expanded to estimate results for all harvest ticket holders. Since 1986 pellet-group surveys have been conducted on several islands and on the mainland near Yakutat as a way to gauge deer population trends. Crews from the US Forest Service usually perform this work. In regulatory year (RY) 1996, transects were walked on Knight Island and on the Yakutat Bay islands. No transects were completed in this area in RY 1997.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Deer populations remain low in the Yakutat area. Habitat condition and heavy snow accumulations on the mainland prevent numbers from climbing significantly, although some islands in Yakutat Bay will continue to support deer. Reports from local hunters, fishers, and others indicate that wolves have had significant effects upon deer, at least in some places. The 1997 counts indicated some small degree of recovery from the virtual absence of deer sign on Knight Island the previous year.

MORTALITY

Harvest

Season and Bag Limits.

	Resident and nonresident hunters
Unit 5A	Nov 1–Nov 30 1 antlered deer.
Unit 5B	No Open Season.

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

Hunter Harvest. Expanded deer harvest survey results indicate that no hunters were successful in 1996, while 5 hunters were successful in taking 1 deer each in 1997. The 1997 estimated total effort was 97 hunter days by 29 hunters. 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. Also there are known instances of illegal harvest, resulting in an undocumented harvest of unknown size.

Hunter Residency and Success. Since this deer hunt was resumed in 1991, virtually all hunters within Unit 5A have been local residents. However, in 1997 this was not true; 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 the limited habitat in the Yakutat 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 to the north in Unit 6 and to the south in Units 1–4.

Transport Methods. According to the survey results, 83% of deer hunters used boats. Most deer locally inhabit islands in Yakutat Bay. Other deer hunters in the unit reported using 4-wheelers to access deer hunting areas.

CONCLUSIONS AND RECOMMENDATIONS

The deer hunt within Unit 5A remains an opportunity for Yakutat residents to legally harvest small numbers of deer. Habitat conditions, predation, and snow depths will prevent the deer population from growing significantly, and these conditions have apparently caused declines in some parts of the limited local range. Deer pellet transect data should continue to be collected as

a way to monitor deer population trends. Local trapping pressure on wolves has increased and may have reduced some deer predation. The provision in both state and federal law for deer to be taken for ceremonial purposes may result in additional pressure on this introduced deer population. Closure of the state hunt should be considered as a management option if pellet transects and harvest data continue to show declines.

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Table 1 Unit 5A deer population trends as indicated by pellet group surveys, 1986–1997

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

Table 2 Unit 5A annual deer harvest, 1991–1997

Regulatory Year	Males	Females	Estimated Total
1991	2	0	2
1992	0	0	0
1993	3	0	3
1994	5	0	5
1995	7	0	7
1996	0	0	0
1997	0	5	5

Data from expanded results of hunter surveys.

Table 3 Unit 5A hunter residency and success, 1991–1997

Reg. year	Successful				Unsuccessful			
	Local residents	Nonlocal residents	Non-residents	Total	Local residents	Nonlocal residents	Non-residents	Total
1991	2	0	0	2	34	0	0	34
1992	0	0	0	0	15	0	0	15
1993	3	0	0	3	19	0	0	19
1994	5	0	0	5	15	4	0	19
1995	7	0	0	7	15	0	0	15
1996	0	0	0	0	NA[a]	NA	NA	NA
1997	0	5	0	5	19	0	5	24

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

Table 4 Unit 5A statistics for successful hunters, 1991–1997

Regulatory Year	Nr. deer/ hunter	Nr. deer/ hunter day	Hunter days/deer	Nr. days/ hunter
1991	1.0	0.4	4.8	4.8
1992	----	----	----	----
1993	----	----	----	----
1994	1.0	0.3	3.0	3.0
1995	1.0	0.4	2.3	2.3
1996	----	----	----	----
1997	1.0	0.3	3.2	3.2

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 by releasing 24 deer on Hawkins and Hinchinbrook Islands in Prince William Sound (PWS) between 1916 and 1923 (Burris and McKnight 1973). This was the first big game transplant in the state and was one of the most successful. Deer quickly occupied vacant habitat on most islands and adjacent mainland in PWS. The population apparently peaked at a high level 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 all subunits of Unit 6. The highest densities are on Hawkins, Hinchinbrook, and Montague Islands (Big Islands) in PWS. Lower densities are on smaller islands and mainland areas surrounding PWS; densities decrease rapidly as distance from PWS increases.

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. Weather data from Hinchinbrook Island indicate the climate (Shishido 1986) is milder than on the surrounding mainland because of a strong maritime influence. 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 of 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 both 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, currently under construction, will increase the number of hunters in western PWS and Montague Island.

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 around 3000 in 1987. Harvests probably 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 about 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, Yoe and Peek 1992, Kirchhoff and Schoen 1987 and 1988). Private landowners have clear-cut large areas on Montague Island, Port Fidalgo, and eastern PWS. However, the *Exxon Valdez* Oil Spill (EVOS) Trustee Council recently acquired (by fee simple title, and conservation and timber easements) about 75,000 acres of land in eastern PWS that 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 (Figure 1). Three transects consisting of continuous 3.3- X 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 100 plots were examined. The number of plots varied, depending upon the distance from the beach to the alpine and upon persistence of snow at the time of the survey. Minimum number of plots within a location was 200. Mean numbers of pellet groups per plot (MPGP) were calculated for each location. Within each location, means were first tested for a time-series correlation or other covariate structure using a repeated measures analysis (Earl Becker, pers. commun.). 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, pers. commun.).

Although invaluable as an indicator of population trend, spring pellet group density has an inherent lag time: deer that die in late winter have deposited pellets that may be counted, thereby biasing the index upward (Kirchhoff and Pitcher 1988). Nowlin (in prep.) developed an annual index of snow depth and duration (SI) from snow measurements taken daily at Port San Juan in PWS to qualitatively predict winter mortality of deer. I used this method to calculate a snow index for 1996/97 and 1997/98.

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 total harvest data into geographic areas that included Hinchinbrook Island, Montague Island, western PWS, and northern and eastern PWS (Figure 1).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Deer density on the Big Islands in PWS was moderate or high, based upon standards set by Kirchhoff and Pitcher (1988) for Southeast Alaska. They 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. One of 6 locations had pellet-group densities in the high range with 2 others nearly so during 1997/98 (Table 1). Among geographic harvest areas, the highest MPGPs were on Hinchinbrook Island (1.77–2.53), followed by Hawkins Island (1.90–1.94) and Montague Island (1.36–1.51) in spring of 1998. Overall pellet-group density on the Big Islands was 1.84 MPGP (Table 1).

Population Trend

Deer numbers increased during this reporting period (Table 1). Overall MPGP increased by about 38% from 1994/95 to 1997/98. All 6 locations showed an increase in deer density from 1995/96 to 1997/98. Pellet-group data and incidental observations indicated that the population declined after the very severe winter of 1990/91 and changed little over the next 2 years when the winters were more severe than average (Figure 2). Recovery probably began with the very mild winter of 1993/94 and has continued because of relatively average winters during this reporting period (Figure 2).

MORTALITY

Harvest

Season and Bag Limit. The open season for resident and nonresident hunters was 1 August to 31 December. The bag limit was 4 deer; however, antlerless deer could be taken beginning November 1 during 1996 and October 1 in 1997.

Board of Game Actions and Emergency Orders. The Board of Game changed the any-deer season from 1Nov–31Dec, to 1Oct–31Dec, effective 1997/98. No emergency orders were issued.

Hunter Harvest. Total estimated deer harvest in Unit 6 during 1996/97 and 1997/98 was 2080 and 2675, respectively (Table 2), an increase of about 30% from 1995/96. This was the highest harvest in 10 years, except for unusual harvest conditions in 1994/95 when early, heavy snows forced deer onto beaches before the season closed. As during past years, most harvest came from Montague Island. The harvest in Western PWS exceeded that of Hinchinbrook Island during both years, a pattern that has not occurred for 10 years when deer numbers were similarly high. Northern and eastern PWS had the lowest harvests. The reported legal harvest consisted of 66 and 71% males during 1996/97 and 1997/98, respectively. These proportions were similar to past years.

Hunter Residency and Success. Approximately 1223 and 1485 individuals hunted deer in Unit 6 during 1996/97 and 1997/98, respectively (Table 3). Hunter success during each year was 63% and 66%, respectively. Total numbers of hunters was higher in 1997/98 compared to previous years.

Most successful hunters during this reporting period were local residents of Unit 6 (68% in 1996/97 and 76% in 1997/98). Nonlocal residents reported success rates of 59% in 1996/97 and 60% in 1997/98. These proportions were similar to previous years.

Harvest Chronology. Hunters took the most deer during November in 1996/97 (37%) and in 1995/96 (33%) (Table 4). Deer were easiest to hunt during November because the bag limit was any deer and the rut was in progress. The proportion of deer taken in October increased during 1997/98, probably because the any-deer season changed from November 1 to October 1.

Transport Methods. Boats were the most important transportation method used (72% in 1996/97 and 74% in 1997/98) (Table 5). Airplanes were second; and 3- and 4-wheelers, highway vehicles, and walking were of minor importance. This was also the case in previous years.

HABITAT

Snow Depth and Duration

The SI indicated average snow depth and duration for 1996/97 (SI = 5) and slightly below average for 1997/98 (SI = 4) (Figure 2). Deer mortality was probably average for this reporting period, which allowed the population to continue an increase that began during the very mild winter of 1993/94 (SI = 2). Nowlin (in prep.) demonstrated that the SI followed deer population trends. Higher SI's resulted during years that the population decreased and low SI's were marked by years of population recovery and growth. This reporting period had low to normal SI's and an increasing deer population.

Logging

Logging by private landowners occurred in Patton Bay on Montague Island from 1993 to 1997. Clear-cutting was completed on approximately 3000 acres of high volume old-growth stands. A haul road was constructed around the south end of the island to move logs from Patton Bay to a log transfer site in MacLeod Harbor. This habitat had provided critical winter forage and snow shelter on one of the highest density wintering areas in PWS. Loss of this habitat will negatively affect deer during the next severe winters.

CONCLUSIONS AND RECOMMENDATIONS

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

The deer population continued to increase as a result of near average to mild winters over the past 5 years. It could sustain additional harvest. ADF&G supports a proposal by the local advisory committee to increase the bag limit from 4 to 5 deer beginning in 1999–2000; the Board of Game adopted this proposal.

Pellet-group surveys, SI's, and hunter questionnaires have provided tools to effectively monitor and manage deer in Unit 6. We should continue pellet-group surveys and refine the SI. MPGP is probably a good index to population trend. Our assumption that pellets do not persist for more than 1 year is being tested by Nowlin (in prep.). The SI appears to be a good indicator of winter mortality and population status. Attempts to improve it and verify relationships with other data should continue.

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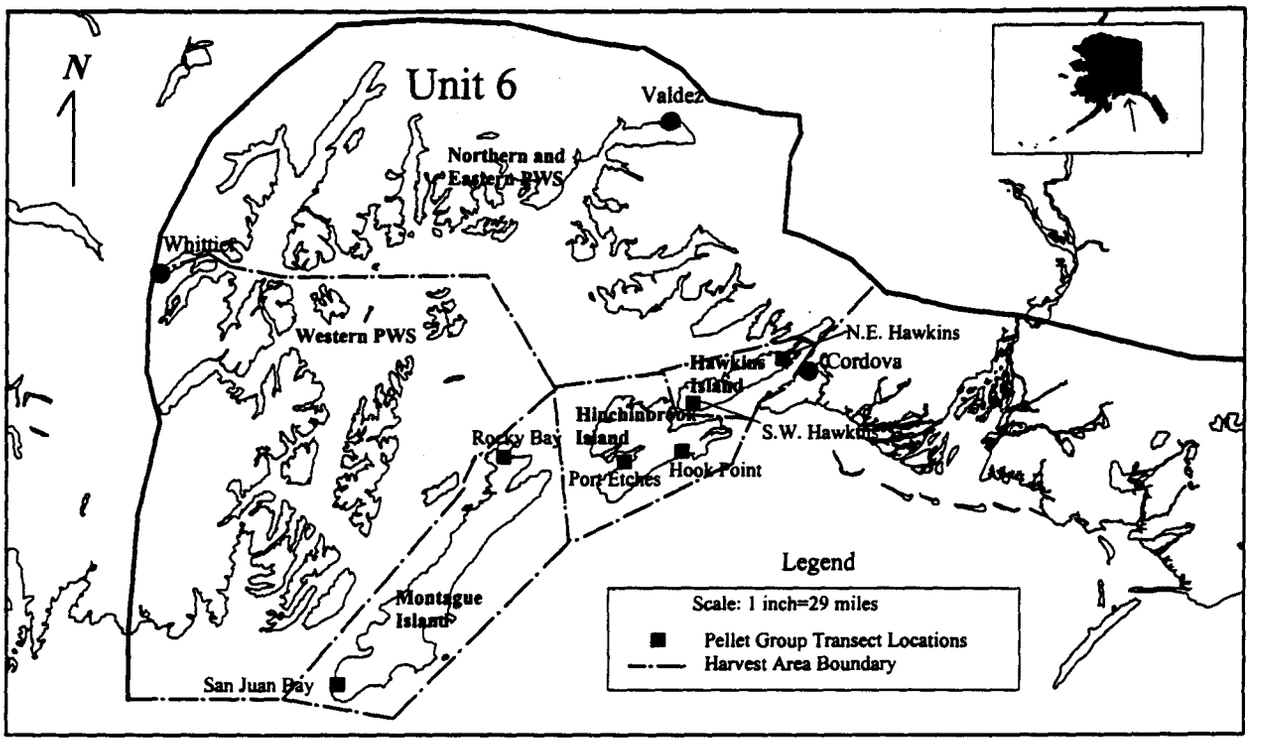

Figure 1. Unit 6 deer pellet-group transect locations and harvest area boundaries.

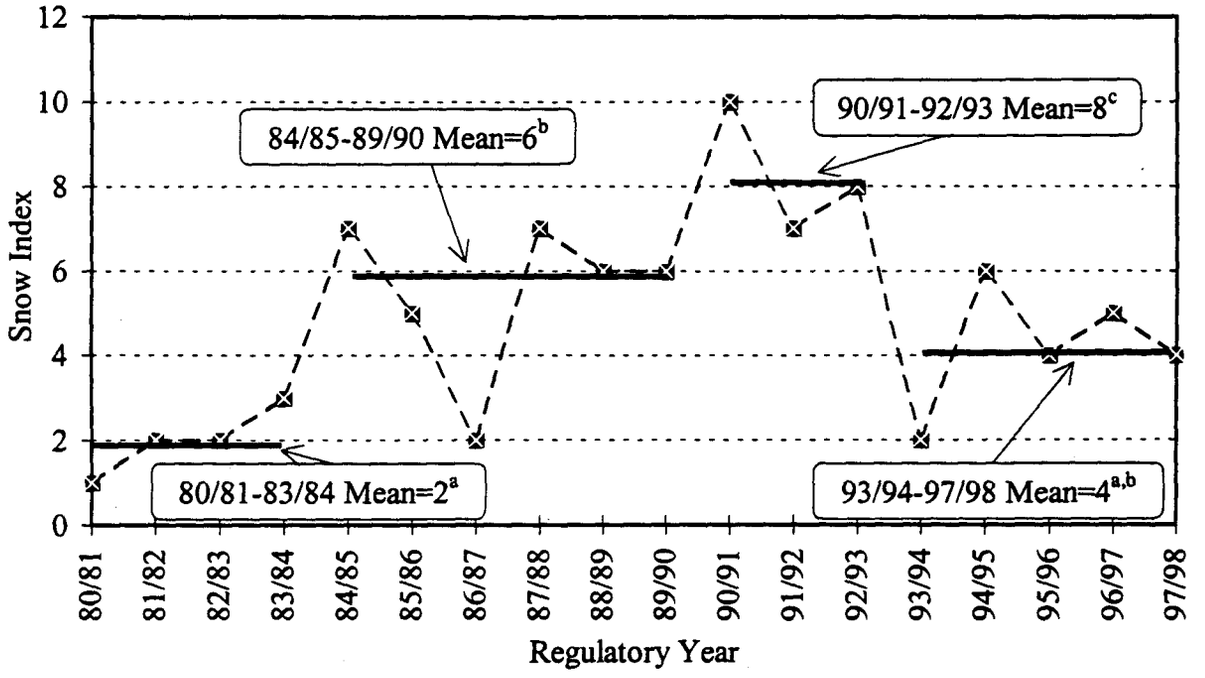

Figure 2. Port San Juan snow depth and duration index, 1980–97. Snow index of 5 represents a normal year, based on long term averages ($^{a-c}$ Means with different letters are significantly different ($p<0.05$, $F = 9.15$).

Table 1 Unit 6 deer population trends as indicated by pellet group surveys 1988-1997. Surveys from 1995 - 1997 were analyzed using a mixed, repeated measures technique

AREA	Specific location/UCU	Regulatory year	Mean Pellets/Plot	S.E.	Sig. diff	Number of plots
Hawkins Island	N.E. Hawkins	1993/94	1.16			225
	2001	1994/95	1.16	0.30	a	214
		1995/96	1.84	0.54	a, b	243
		1996/97	1.55	0.38	b	240
		1997/98	1.90	0.37	b	238
	S.W. Hawkins	1990/91	1.07			169
	2003	1994/95	0.79	0.15	a	200
		1995/96	1.05	0.40	a	222
		1996/97	1.87	0.31	b, c	223
		1997/98	1.94	0.44	c	224
Hinchinbrook Island	Hook Point	1992/93	1.30			237
	1905	1994/95	1.30	0.57	a	244
		1995/96	1.46	0.57	a, b	234
		1996/97	1.98	0.57	c	233
		1997/98	2.53	0.57	d	239
	Port Etches	1993/94	1.26			225
	1903	1994/95	1.44	0.34	a	228
		1995/96	1.68	0.34	a	235
		1996/97	1.96	0.34	a	235
		1997/98	1.77	0.34	a	235
Montague Island	Rocky Bay	1993/94	0.97			194
	1803	1994/95	1.06	0.27	a, c	240
		1995/96	1.27	0.24	b	233
		1996/97	0.92	0.12	a	219
		1997/98	1.51	0.19	b, c	218
	San Juan Bay	1991/92	0.64			214
	1810	1994/95	1.00	0.35	a	233
		1995/96	1.29	0.42	a	237
		1996/97	1.17	0.39	a	234
		1997/98	1.36	0.46	a	237
All Areas		1994/95	1.14	0.16	a	1359
		1995/96	1.50	0.16	b	1404
		1996/97	1.56	0.16	c	1384
		1997/98	1.84	0.16	b	1388

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

Table 2 Unit 6 deer harvest, 1993–97

Area	Regulatory year	Estimated legal harvest M	(%)	F	(%)	Total	Estimated illegal harvest	Total
Hawkins Island	1993/94	185	(61)	120	(39)	305	20	325
	1994/95	317	(62)	194	(38)	511	40	551
	1995/96	208	(71)	84	(29)	292	20	312
	1996/97	246	(69)	110	(31)	356	30	386
	1997/98	291	(70)	123	(30)	414	30	444
Hinchinbrook Island	1993/94	242	(65)	129	(35)	371	20	391
	1994/95	423	(57)	321	(43)	744	30	774
	1995/96	236	(66)	124	(34)	360	30	390
	1996/97	262	(65)	140	(35)	402	30	432
	1997/98	289	(67)	140	(33)	429	30	459
Montague Island	1993/94	236	(65)	125	(35)	361	30	391
	1994/95	545	(66)	279	(34)	824	30	854
	1995/96	538	(71)	220	(29)	758	60	818
	1996/97	482	(68)	226	(32)	708	60	768
	1997/98	727	(73)	263	(27)	990	60	1050
Western PWS	1993/94	149	(81)	36	(19)	185	20	205
	1994/95	305	(70)	130	(30)	435	30	465
	1995/96	216	(81)	52	(19)	268	20	288
	1996/97	237	(59)	167	(41)	404	30	434
	1997/98	356	(67)	178	(33)	534	30	564

Table 2 Continued

Area	Regulatory year	Estimated legal harvest M	(%)	F	(%)	Total	Estimated illegal harvest	Total
Northern and Eastern PWS	1993/94	26	(63)	15	(37)	41	20	61
	1994/95	89	(65)	47	(35)	136	20	156
	1995/96	32	(80)	8	(20)	40	3	43
	1996/97	37	(80)	9	(20)	46	4	50
	1997/98	99	(74)	34	(26)	133	10	143
Unit 6 - Unknown	1993/94	5	(100)	0	(0)	5	0	5
	1994/95	32	(86)	5	(14)	37	0	37
	1995/96	4	(50)	4	(50)	8	0	8
	1996/97	5	(50)	5	(50)	10	0	10
	1997/98	25	(100)	0	(0)	25	0	25
Unit 6 - Total	1993/94	843	(66)	425	(34)	1268	110	1378
	1994/95	1711	(64)	976	(36)	2687	150	2837
	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

Table 3 Unit 6 deer hunter residency and success, 1993–97

Regulatory year	Successful					Unsuccessful					Total hunters
	Local resident[a]	Nonlocal resident	Non-resident	Total	(%)	Local resident	Nonlocal resident	Non-resident	Total	(%)	
1993/94	233	325	4	572	(57)	177	256	0	433	(43)	1005
1994/95	483	441	12	936	(68)	170	250	29	449	(32)	1385
1995/96	280	404	10	694	(56)	240	300	0	540	(44)	1234
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

[a] Resident of Unit 6

Table 4 Unit 6 deer harvest chronology percent by time period, 1993–97

Regulatory year	Harvest periods					*n*
	August	September	October	November	December	
1993/94	6	5	15	50	23	363
1994/95	6	4	16	49	26	563
1995/96	8	6	8	56	20	431
1996/97	7	8	16	37	33	430
1997/98	7	8	25	33	27	593

Table 5 Unit 6 deer harvest percent by transport method, 1993–97

Regulatory year	Percent of harvest						*n*
	Airplane	Boat	3- and 4-wheeler	Highway vehicle	Foot	Unknown	
1993/94	26	69	1	2	3	0	314
1994/95	25	68	1	1	4	0	304
1995/96	26	72	0	1	4	0	305
1996/97	24	72	1	2	8	0	266
1997/98	22	74	0	2	5	0	337

Table 6 Unit 6 early winter deer pellet group persistence by cover type, 1995–96

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

LOCATION

GAME MANAGEMENT UNIT: 8 (5,097 mi^2)

GEOGRAPHIC DESCRIPTION: Kodiak and Adjacent Islands

BACKGROUND

The Sitka black-tailed deer population in Unit 8 originated from 4 transplants, totaling 25 deer, made to Long Island and Kodiak Island between 1924 and 1934 (Burris and McKnight 1973). By the early 1940s deer occupied northeastern Kodiak Island, and the first hunt was in 1953. The deer population continued to expand into unoccupied 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 reached peak numbers, exceeding 100,000 animals (Smith 1989). Winter severity increased beginning in the 1987/88 winter causing a declining population trend through 1992. An increasing trend in the population from 1993 to 1996 correlated with less severe winters. The population seemed stable from 1996 to 1997.

Annual hunter harvest surveys have been used to assess trends in the deer population since 1989. We assessed winter mortality by searching for and examining deer carcasses in selected coastal wintering areas. Aerial surveys were done to assess winter conditions and physical appearance of deer. In 1990 the U.S. Fish and Wildlife Service (USFWS) began using various aerial and ground surveys to monitor deer population trends on the Kodiak National Wildlife Refuge (NWR). Refuge staff have also experimented with browse transects, Forward Looking Infrared Radar (FLIR), and range exclosures to investigate deer population trends.

There were liberal seasons and bag limits during the past 2 decades. Seasons ranged from 153 to 184 days, and bag limits ranged from 4 to 7 deer of either sex. The bag limit was increased from 3 to 4 deer in 1970/71, with a 1 August 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 was in effect through the 1990/91 regulatory year. The bag limit was reduced to 4 deer, and a limit of 1 antlerless deer was imposed from October 1 to November 30 in part of northeastern Kodiak Island and the Afognak Island group for the 1991/92 season. The bag limit remained at 5 deer for Unit 8 residents hunting the Kodiak NWR under federal subsistence regulations.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVE

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

METHODS

Questionnaires were mailed to hunters annually beginning with the 1989/90 season to assess trends in hunting effort and harvest. The questionnaires were sent to a random sample of deer harvest ticket holders, and harvest estimates were derived from returned questionnaires. Field interviews and posthunt interviews provided preliminary harvest data. The USFWS interviewed hunters annually in the Kodiak NWR during October through December boat-based enforcement patrols. A few outfitters and transporters submitted voluntary summaries of hunting activities.

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

ADF&G and Kodiak NWR staff conducted winter aerial surveys in several locations on the refuge to assess techniques for monitoring population trends.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

The deer population appeared to be stable during this reporting period. Following a decline that began with the 1987/88 winter, deer numbers rebounded from 1992 to 1995. We have no direct methods of estimating the deer population size in the unit, so trends are assessed by harvest reports, winter mortality surveys, and subjective reports. These data indicated that by 1992 the population in the northern part of Kodiak Island had declined to about 50% of the abundance compared to the mid-1980s. Deer numbers in those areas continued to be relatively low during this reporting period. The population recovery has been most pronounced in southern Kodiak Island, which typically has less persistent snow cover. The deer population was estimated at 100,000 in the mid-1980s. The current population is probably less than 80,000 deer.

Population Composition

The percentage of males in the harvest has remained near 80% since the 1993/94 season (Table 1). Hunters reported that larger bucks were scarce in 1992/93 and 1993/94 (Smith 1995), more common in 1994/95 through 1996/97, and again hard to find in 1997/98.

Distribution and Movements

Deer are throughout Unit 8 except in the more remote Semedi, Barren, and Chirikof island groups. Within the past 10 to 15 years, deer colonized Tugidak Island, about 20 miles south of Kodiak Island. Tugidak is a Critical Habitat Area, important to ground-nesting birds and harbor seals. 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 to 31 October.

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. Current regulations have been in effect since the 1991/92 season. In 1997 the Alaska Board of Game authorized a primitive weapons hunt for the Kodiak road system. This additional season extends from 1 to 14 November for 1 buck and is open to hunters using muzzle-loaders and bows. Bow hunters must successfully complete an authorized education course before participating in the hunt.

Hunter Harvest. The estimated annual harvest decreased from 10,041 deer in 1994/95 to 7193 in 1995/96 (Table 1). Harvests rebounded in 1996/97 and 1997/98 to 8944 and 8709, respectfully. The estimated number of hunters afield exhibited a similar pattern, with an increase from 1995/96 (5000) to 1996/97 (5296) and a similar level in 1997/98 (5241) (Table 2).

Harvest was evenly distributed during this reporting period. Smith (1995) noted that harvest in southern Kodiak Island (hunt areas nr. 18–26) increased from 24% in 1989/90 to 40% and 42% for 1992/93 and 1993/94, respectively. In 1996/97 and 1997/98, 33% and 28% of the harvest, correspondingly, was from the southern Kodiak area. The population decline in the early part of the decade was more precipitous in the northern part of Unit 8, prompting hunters to concentrate more effort on southern Kodiak Island. As populations recovered, more hunters returned to northern areas. Harvest from the northern islands of Shuyak, Afognak, and Raspberry was lower

in 1997/98 (17%) than in any other year. The mean percentage of the harvest reported from those islands during the previous 5 years (1992/93–1996/97) was 21%.

Males composed 79% of the 1996/97 and 1997/98 harvests. In 1996/97 the mean number of deer/hunter afield was 2.1, and it declined slightly to 2.0 in 1997/98 (Table 3).

Hunter Residency and Success. The number of hunters afield in 1996/97 (5241) was comparable to the average (5112) of the previous 5 years (1992/93–1996/97) (Table 2). Unit 8 residents composed 39% of the hunters in 1997/98, down slightly from the 5-year average (42%). Non-local residents composed 49% of the hunters in 1997/98, mirroring the 5-year average (49%). Nonresidents composed 13% of the hunters in 1997/98, up from the 5-year average (10%).

Hunter success was 82% in 1997/98, an increase from the 5-year average (77%). This was the second highest success reported since surveys have been conducted (Table 3).

In 1997/98, 28% of the hunters reported taking 4 or more deer, a slightly lower percentage than the 5-year average (31%).

Harvest Chronology. November is consistently the peak month of harvest in Unit 8 (Table 5). In 1997/98, 43% of the deer were harvested in November, up slightly from the average (40%) of the previous 5 years (1992/93 to 1996/97).

Transport Methods. Boats and aircraft are the favored means of transportation for deer hunters in Unit 8. In 1997/98, 49% of the deer hunters used boats as their primary means of access, up from the average (43%) of the previous 5 years (1992/93 to 1996/97). 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.

Other Mortality

Mortality surveys in coastal winter ranges indicated that deer winter mortality was light in 1997/98 (Table 7). As in previous years, juvenile deer were the most severely impacted portion of the population.

Illegal deer harvest outside the hunting season was common, resulting in an estimated harvest of about 10 to 15% 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 occurs, predominantly in late winter, but is not a limiting factor.

HABITAT

Assessment

High deer densities in the late 1970s through the mid-1980s resulted in 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 plan to construct range exclosures in 1999.

Much of the Sitka spruce forest of central and eastern Afognak Island has been clear-cut logged beginning in 1975. Mature spruce has been converted to seral shrub-grass communities. Logging began in 1993 on private land in the Chiniak Peninsula of northeastern Kodiak Island. Studies in southeastern Alaska indicated that old-growth forest was critical in maintaining deer populations (Wallmo and Schoen 1980). Logging deer winter range on Afognak Island initially reduces carrying capacity; subsequent increased production of herbaceous and shrubby vegetation may benefit deer, depending on snow conditions. 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 enhances their survival in areas without coniferous forest.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Methodology for the deer hunter questionnaire survey should be reevaluated in the context of increasingly specific demands for harvest and hunting effort data related to federal regulatory authority for subsistence hunting. Conflicting results from harvest surveys used by the Division of Wildlife Conservation and Division of Subsistence cloud the validity of current methodology. Subsistence harvest on federal lands under the Federal Designated Hunter provision may not be measured accurately with the hunter questionnaire, and harvest under the state's proxy system could introduce additional error.

Improving precision in assessing deer population trends is desirable, but it is difficult and expensive. Hunter questionnaire surveys are the most economical, although indirect, method of monitoring deer population trends in Unit 8. Kodiak NWR staff initiated aerial and ground deer 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). Pellet-group counts are used in forested habitat of southeastern Alaska to monitor deer population trends (Kirchoff and Pitcher 1988). The Kodiak NWR staff established some pellet-group transects in the Olga Bay area in 1994, but results were inconclusive and the surveys were discontinued in 1996. Refuge staff have 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.

CONCLUSIONS AND RECOMMENDATIONS

The deer population in Unit 8 and the harvest pressure on that population appeared stable during this reporting period. The management objective of maintaining a population that produces a harvest of 8000 deer annually has been met in 7 of the last 10 years. Both hunter success and the proportion of males in the harvest were high, indicating that the deer population is healthy and productive. Winter severity was light to moderate in 1996/97 and 1997/98, and deer overwinter mortality reflected these conditions. Deer herds on the south end of Kodiak Island seem to have recovered from the steep population decline in the late 1980s, but deer numbers on northern Kodiak and the northern islands in the archipelago have not rebounded as successfully.

Although hunter success is high and more than 25% of the hunters typically fill their bag limits, there have been increasing complaints about the quality of deer harvested and the degree of competition in some areas. Hunters would like to see more large bucks, and some, particularly

nonresident guided hunters, are interested in portions of the unit being managed for trophy quality animals. There have also been increasing reports of male deer with little or no testicular development. These "steer deer' appear to be healthy, but they have atypical antlers and a somewhat larger body size. While neither of these issues directly affects our current management strategy, they deserve our attention and consideration.

Conflicts between state and federal regulation of deer hunting on the Kodiak NWR moderated during this reporting period as the controversial February season was eliminated, and weather conditions did not allow hunters to take large numbers of deer from the beaches in the late winter. The Designated Hunter regulation and the extension of the season into January are potentially detrimental to portions of the deer population, but this potential has not yet been realized.

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Table 1 Unit 8 deer harvest, 1987–97

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	---	8,106
1991/92	6569 (73)	2379 (27)		8948	---	8,948
1992/93	5144 (73)	1899 (27)		7043	---	7,043
1993/94	5124 (82)	1130 (18)		6254	---	6254
1994/95	8270 (80)	2130 (20)		10,401	---	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

[a] Harvest data extrapolated from the results of a mail questionnaire survey.
[b] Although illegal harvest has not been quantified, it is suspected to be about 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 to 97

	Successful				Unsuccessful				
Regulatory year	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	Total hunters
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

[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 through 1997 seasons[a]

Regulatory year	% Hunter success	% Successful hunters taking bag limit[b]	% Male	% Female	Estimated total harvest	Estimated nr. hunters	Mean nr. deer/hunter	Mean 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

[a] Harvest data are expanded from returned hunter questionnaires

[b] Bag limit 4 deer in 1980; 5 deer in 1983 to 1990; 5 deer on Kodiak NWR and 4 deer on non-federal lands in 1991 to 1998.

Table 4 Number and percent of hunters in Unit 8 that reported harvesting 1, 2, 3, 4, or 5 deer, 1993–97

	1993-94[a]		1994-95		1995-96		1996-97		1997-98	
	Hunters	%	Hunters	%	Hunters	%	Hunters	%	Hunters	%
1 deer	638	27	1116	29	948	33	1037	30	1137	32
2 deer	462	20	19	462	651	22	757	22	825	23
3 deer	491	21	700	18	469	16	605	18	593	17
4 deer	645	28	1106	28	726	25	871	25	857	24
5 + deer	107	5	249	7	110	4	186	6	131	4

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

Table 5 Unit 8 deer harvest chronology percent by period, 1980–97

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

Table 6 Unit 8 deer harvest percent by transport method, 1987–97

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

[a] No survey in 1988/89.

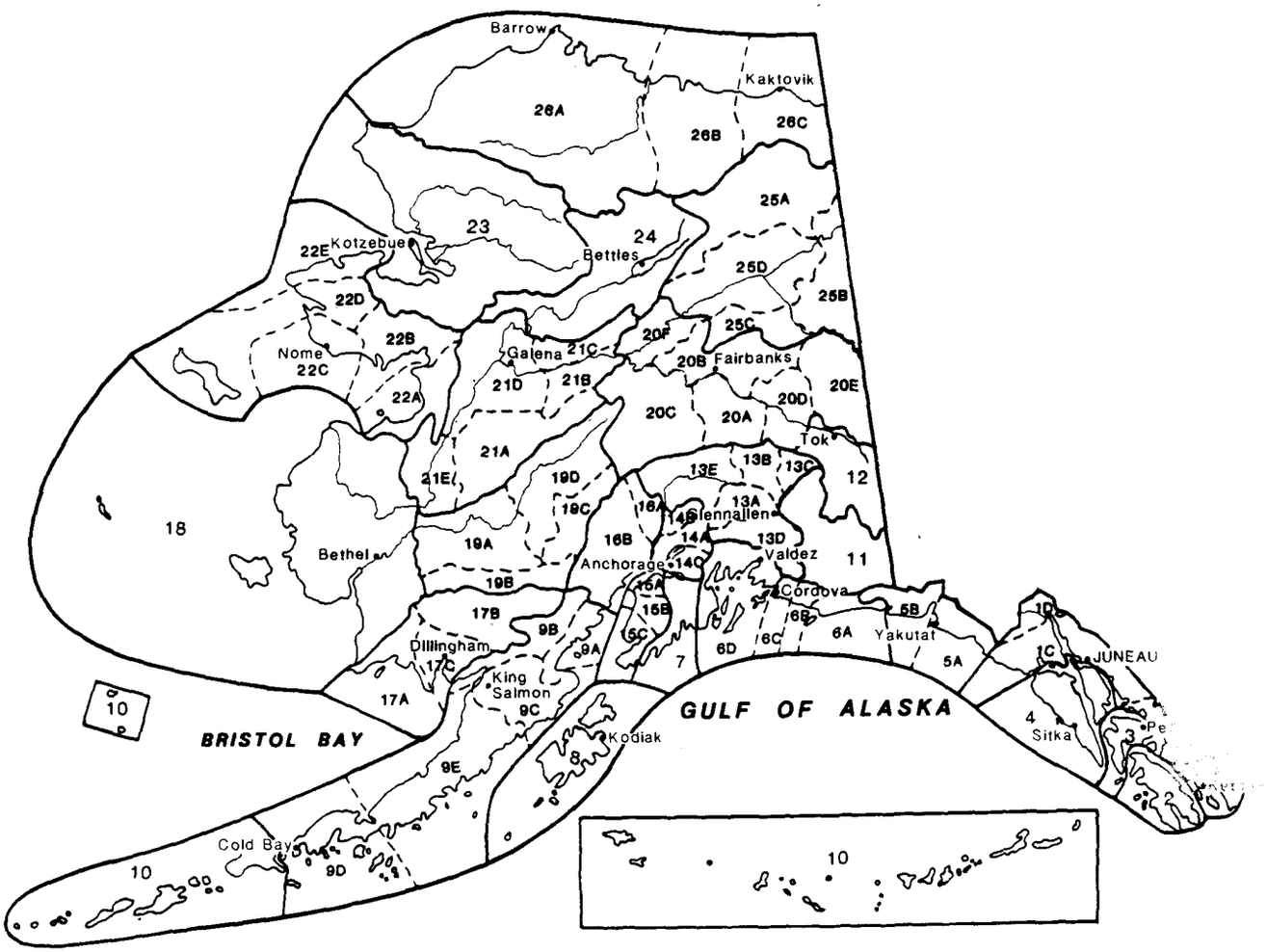
Table 7 Unit 8 sex and age composition of deer winterkill from beach mortality transects, 1988–1997

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

[a] includes fawns and yearlings.

[b] Data obtained from Kodiak NWR files (Stovall 1998)

Alaska's Game Management Units



The Federal Aid in Wildlife Restoration Program consists of funds from a 10% to 11% manufacturer's excise tax collected from the sales of handguns, sporting rifles, shotguns, ammunition, and archery equipment. The Federal Aid program allots funds back to states through a formula based on each state's geographic area and number of paid hunting license holders. Alaska receives a maximum 5% of revenues collected each year. The Alaska Department of Fish and Game uses federal aid funds to help restore, conserve, and manage wild birds and mammals to benefit the public. These funds are also used to educate hunters to develop the skills, knowledge, and attitudes for responsible hunting. Seventy-five percent of the funds for this report are from Federal Aid.

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