Alaska Department of Fish and Game
Division of Wildlife Conservation
Federal Aid in Wildlife Restoration
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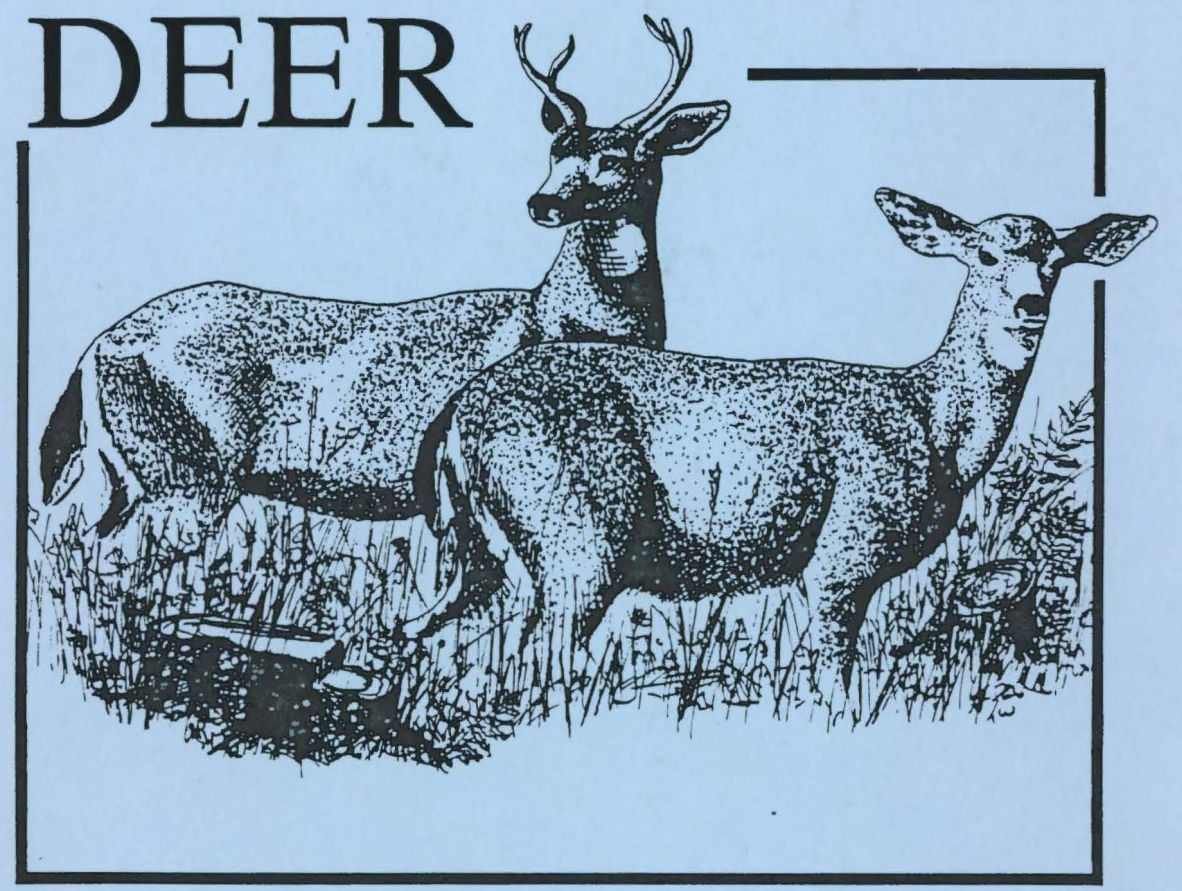
DEER



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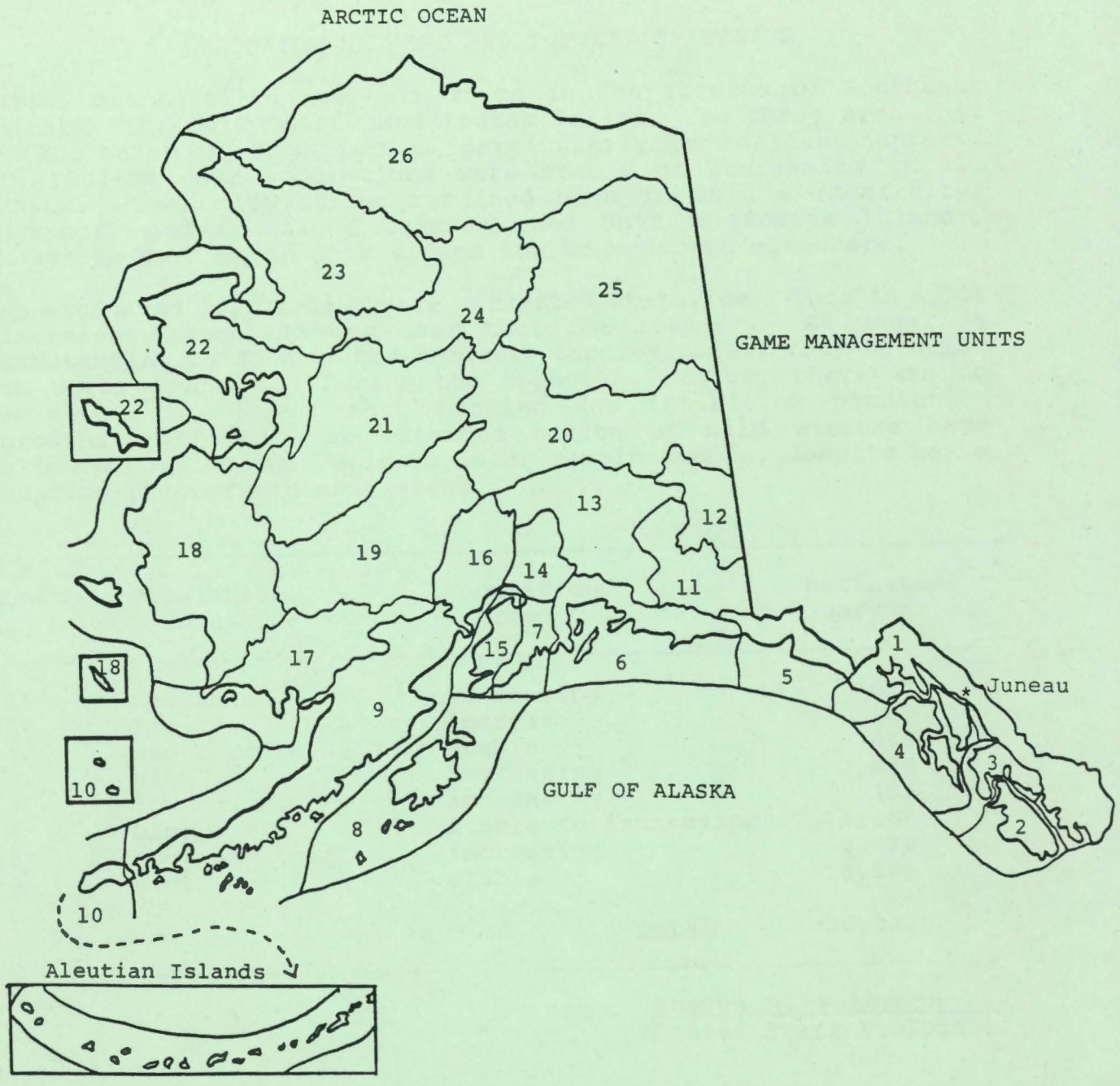
CONTENTS


ARCTIC OCEAN
GAME MANAGEMENT UNITS
26
23
24
25
22
22
21
20
13
12
18
19
16
14
11
7
1
17
15
6
5
18
Juneau
9
4
3
10
GULF OF ALASKA
8
2
10
Aleutian Islands

STATEWIDE HARVEST AND POPULATION STATUS

Sitka black-tailed deer are found in the forests of Southeast Alaska, the Gulf Coast, and Kodiak Island. In these areas, it is the major big game species, particularly for resident hunters. In 1987-88 deer populations were stable or increasing in all units. Deer populations remained high in Unit 4 (Admiralty, Baranof, and Chichagof Islands) and Unit 8 (Kodiak Island), moderate to high in Unit 6, and low to moderate elsewhere.

An estimated 36,222 deer were harvested statewide. This is a 30% increase in the harvest over that for 1986-87. As usual, a substantial portion of the harvest (approximately 78%) occurred in Units 4 and 8. During the reporting period, there was no evidence to suggest that hunting was inhibiting population growth. Instead, the extended series of mild winters have allowed populations to increase or remain stable, despite heavy hunting pressure in some areas.

Unit	Population level	Population trend	Estimated harvest
1A	variable	increasing	611
1B	low	increase	65
1C	moderate to high	stable	496
2	high	increasing	3,886
3	low	increasing	135
4	high	stable to increasing	14,400
6	moderate to high	increasing	2,828
8	high	stable	13,801
		Total	36,222

Steven R. Peterson
Senior Staff Biologist

STUDY AREA

GAME MANAGEMENT UNITS: 1A and 2 (8400 mi^2)

GEOGRAPHICAL DESCRIPTION: Ketchikan area, including mainland areas draining into Behm and Portland Canals and Prince of Wales Island and adjacent islands south of Sumner Strait and west of Kashevarof Passage.

BACKGROUND

Southeast Alaska is at the northern edge of the range for deer, and populations are subject to great fluctuations because of winter weather and predators. The most recent population low, which followed very severe winters in 1968-69 and 1971-72, carried through until the early 1980's, when noticeable population increases began. Currently, deer numbers are high in much of the area, except for the rugged mainland areas generally east of Behm Canal. Deer are increasing steadily in all suitable habitat in Subunit 1A and Unit 2.

Typical Southeast deer habitat is uneven-aged old-growth forest of spruce, hemlock, and cedar from an elevation of zero to about 2,000 feet and alpine/subalpine habitat from 2,000 to about 3,000 feet. Winter range is the most important limiting factor, and low-volume old-growth forest is preferred during years of little snow pack, while the high-volume stands are critical for survival during severe winters.

Harvests fluctuate widely because they follow population changes. Harvests in Subunit 1A have ranged from 340 to 850 deer over the past 7 years (i.e., 1982-88), while in Unit 2 the low and high harvests over the same period were 615 and 3,880 deer, respectively. Seasons have generally been long (i.e., 1 August to November or December), and bag limits have been typically 3 or 4 bucks; either-sex seasons have been authorized when populations were very high.

Habitat changes in the form of clearcut logging are rapidly reducing the old-growth forest to even-aged, closed-canopy stands of limited value to deer. Early successional stages (i.e., aged 3 to 20 years) are useable habitat during mild winters, while closed-canopy stands (i.e., aged 20 to 100 years) are not considered deer habitat for either summer or winter. During years of moderate to heavy snowfall, use of cut-over areas and low-volume timber ceases and the deer are confined to the higher-volume stands of old-growth. Current population models suggest declines in overall carrying capacity of 50% to 60% by the end of the logging

rotation in the year 2054. In some areas following severe winters, declines may substantially exceed even 60% because of extensive loss of critical winter habitat.

POPULATION OBJECTIVES

To maintain deer populations in excess of 75 deer/ mi^2 of winter range, as measured by mean pellet density of 1.4 pellet groups per plot.

METHODS

Harvest assessment is based on a mail questionnaire to a random sample of people who picked up deer harvest tickets. In 1987, 50% and 100% of the harvest ticket holders in large and small communities, respectively, were sampled. Hunter check stations have been used when specific data were required. Discussion with hunters throughout the season has also supplied useful data on many aspects of the deer population, harvest, and public opinion. Summer alpine surveys are not conducted annually; rather, they are opportunistic, depending upon budgets, weather, and the need to reinforce estimates of population levels.

Following severe winters, natural mortality surveys are conducted along standardized routes to assess losses. These routes have not been surveyed for many years because of mild winters and low natural mortality. During early spring, relative deer densities and population trends are measured with standardized pellet group transects in areas where deer populations winter.

RESULTS AND DISCUSSION

Population Status and Trend

Deer populations are on the rise throughout Subunit 1A and Unit 2, but densities vary within these units. Highest densities occur in Unit 2 and the lower Cleveland Peninsula portion of Subunit 1A. Populations are low on the mainland and the northeastern edge of Revilla Island, while the remainder of Revilla Island appears to have a moderate deer density. Because populations are probably high in Unit 2 and the Cleveland Peninsula, a moderately severe winter would cause significant mortality. Table 1 presents pellet group data since 1981 showing population trends and pellet group densities.

Mortality

Season and Bag Limit:

The open season for subsistence, resident, and nonresident hunters in Subunit 1A and Unit 2 is 1 August to 30 November. The bag limit is 3 antlered deer. The bag limit for Unit 2 is 2 deer; however, only 1 antlerless deer may be taken only from 10 to 31 of October.

Human-induced Mortality:

In 1987 the deer harvest was calculated from a mail survey of harvest ticket vendors. Sample rates were 100% for communities under 200 people and 50% for communities over 200 population. Returns were expanded to cover all harvest ticket holders. The expanded harvest figures for the past 5 years are shown in Table 2 for Subunit 1A and Unit 2. The reason for the apparent drop in harvest for Subunit 1A is unknown; all indications point to an increasing deer population. Nearly all of the decline was attributable to the large drop in the harvest from Gravina Island. As expected, the harvest in Unit 2 continued to increase rapidly. The short antlerless season there was met with much public opposition, even though the harvest was small. Table 3 presents hunter data by major harvest area for both areas in 1987.

The unreported harvests (Table 2) has been estimated, serving only to show there is a significant illegal harvest. The level is much higher in Unit 2, because of its extensive road system, lack of enforcement personnel, and the many widely scattered subsistence-oriented settlements.

Hunter Residency and Success. Table 4 indicates that deer hunters in Subunit 1A and Unit 2 are mostly local residents (residing in Units 1-5). In Subunit 1A, all hunters were local residents, while in Unit 2, 3% of the hunters were nonlocal residents or nonresidents.

Harvest Chronology. Current hunter surveys do not provide usable data on harvest chronology. Typically, however, there appear to be peaks in the harvest: one in August to early September and a larger one in November during the rut. In addition, any significant snowfall during the season brings out many hunters. October is generally the time of lowest hunter participation.

Transport Methods. The current deer hunter survey also does not provide data on means of transportation; however, the extensive logging-road system over much of Unit 2 is heavily used by deer hunters. Boats are the primary mode used in Subunit 1A. A small amount of the early season alpine hunting occurs from aircraft landing on higher elevation lakes.

Natural Mortality:

The winter of 1987-88 was mild, and natural mortality was probably very low. Healthy black bear and wolf populations exist throughout Subunit 1A and Unit 2, but while predation undoubtedly slows the growth of the deer population, it has not stopped it.

Habitat Assessment and Enhancement

As a result of logging, major changes in the old-growth forest habitat are occurring. The most serious impacts occur in the higher-volume timber at low elevations. These stands are critical

during years of heavy snowfall. By the end of the rotation (year 2054), U.S. Forest Service and ADF&G habitat models predict that the capacity of the forest to support deer in an average winter will decline by nearly half. This loss will be greater during years of deep snow and somewhat less during years of low snow. By the year 2054, there will be no areas within the roaded and logged portions of Subunit 1A and Unit 2 where projected hunter demand for deer will be met.

Various habitat manipulative measures have been conducted by the USFS for silvicultural purposes as well as to improve cut-over areas as winter deer habitat. None of these efforts have been shown to have any significant value for deer.

Game Board Actions and Emergency Orders

From 1978 to 1986 the open season and bag limit remained unchanged; i.e., 1 August-30 November and 3 antlered deer, respectively. In response to increasing deer numbers in 1987, particularly in Unit 2, the harvest of antlerless deer was permitted between 10 and 31 October. Considerable opposition to this season developed. The season was dropped at the spring 1988 meeting of the Board of Game; however, the bag limit was raised to 4 antlered deer, and the season was extended through December.

CONCLUSION AND RECOMMENDATIONS

The objective of 75 deer/ mi^2 of winter habitat is probably being met in most areas of Unit 2 and in some parts of Subunit 1A. With continued mild winters deer populations in all suitable habitat should surpass the objective within a few years. The loss of winter habitat through logging will reduce the capacity of the land to produce deer for hundreds of years. Efforts to inform the public of the impacts of logging on deer should continue so that they are aware of the trade offs between timber harvest and wildlife populations. The long-range implications of this habitat loss will be the inability to provide for subsistence needs and the loss of hunting opportunities for deer hunters in Subunit 1A and Unit 2.

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Wildlife Biologist III

SUBMITTED BY:

David M. Johnson
Regional Management Coordinator

Table 1. Deer population trends in Subunit 1A and Unit 2, as indicated by pellet group surveys, 1981-1988.

Year	Mean pellet[a] groups/plot	Number of plots	95% C.I.
Prince of Wales and adjacent islands			
	VCU 528 Calder		
1988	2.14	252	1.79-2.50
	VCU 532 Red Bay		
1987	0.32	177	0.18-0.47
	VCU 539 Exchange Cove		
1988	1.40	266	1.15-1.65
	VCU 554 Sarkar		
1988	1.29	298	1.06-1.51
	VCU 561 Warm Chuck		
1984	1.02	326	1.02-1.38
1985	1.60	295	1.36-1.84
	VCU 578 Snakey Lakes		
1986	0.62	279	0.51-0.73
1988	1.05	300	0.85-1.26
	VCU 581 Luck Lake		
1986	1.74	178	1.41-2.07
1988	2.11	300	1.80-2.42
	VCU 587 Tuxekan		
1988	1.07	300	0.85-1.29
	VCU 621 12 Mile		
1985	0.31	196	0.19-0.43
1986	0.64	300	0.48-0.81
1987	0.65	370	0.49-0.81
1988	0.62	302	0.46-0.78
	VCU 635 Port Refugio		
1985	2.69	317	2.27-3.12
1986	2.52	324	2.09-2.96
1987	1.76	369	1.46-2.07
1988	1.15	270	0.90-1.40
	VCU 679 Kitkun		
1988	0.32	240	0.21-0.43

- Continued -

Table 1. Continued

Year	Mean pellet[a] groups/plot	Number of plots	95% C.I.
	VCU 685 Nutkwa		
1988	0.10	234	0.02-0.17
Cleveland Peninsula			
	VCU 715 Smugglers		
1981	0.48	147	0.30-0.66
	VCU 716 Helm Bay		
1981	0.16	704	0.12-0.19
1984	0.54	302	0.44-0.65
1985	0.85	181	0.65-1.05
1988	1.67	247	1.38-1.95
Revillagigedo Island			
	VCU 738 Margaret		
1985	0.57	515	0.47-0.66
1986	0.84	251	0.69-1.00
1988	1.32	110	0.97-1.67
	VCU 748 George Inlet		
1981	0.21	110	0.09-0.33
1984	0.27	344	0.19-0.35
1985	0.52	313	0.39-0.65
	VCU 752 Whitman Lake		
1981	0.18	45	0.02-0.33
1987	0.16	187	0.09-0.23
	VCU 758 Carroll Point		
1985	0.66	118	0.46-0.86
1986	0.75	118	0.56-0.95
1988	1.15	85	0.82-1.49
	VCU 759 Moth Bay		
1985	0.59	140	0 42-0.74
1986	0.98	156	0.79-1.17
1988	0.72	78	0.46-0.97
	VCU 760 Lucky Cove		
1985	1.16	335	1.00-1.33
1986	1.16	258	0.95-1.32
1988	1.02	65	0.69-1.34

Table 1. Continued

Year	Mean pellet[a] groups/plot	Number of plots	95% C.I.
	VCU 769 Alava Bay		
1985	0.52	311	0.39-0.65
1986	0.85	326	0.68-1.01
	VCU 772 Wasp Cove		
1985	0.41	271	0.31-0.51
1986	0.50	300	0.38-0.62
Gravina Island			
	VCU 764 Blank Inlet		
1981	1.24	108	0.89-1.59
	VCU 765 Dall Head		
1981	0.52	69	0.31-0.74
	VCU 999 E. Gravina - all transects		
1981	1.06	226	0.89-1.22
1984	0.86	1,087	0.78-0.94
1985	1.23	1,172	1.13-1.32
1986	1.40	1,267	1.30-1.50
	VCU E. Gravina - Trans 1,2,3		
1984	0.88	376	0.73-1.03
1985	1.44	224	1.20-1.67
1986	1.62	346	1.43-1.81
1987	1.63	334	1.41-1.84
1988	2.07	278	1.79-2.35

[a] Density classes based on Mean Pellet Groups/Plot:

Less than 0.5 = extremely low
0.51-1.0 = low
1.01-2.0 = moderate
2.01-3.0 = high
Over 3.0 = extremely high

Table 2. Annual harvest and accidental death in Subunit 1A and Unit 2, 1983-1987.

Year	Hunter harvest: Reported M	Reported F	Reported Total	Unreported estimate[a]	Total	Accidental[b]
Unit 1A						
1983	440	0	440	220	660	1 to 5
1984	620	0	620	310	930	1 to 5
1985	779	0	779	390	1169	1 to 5
1986	859	0	859	430	1289	1 to 5
1987	611	0	611	306	917	1 to 5
Unit 2						
1983	1740	0	1740	1740	3480	unk
1984	1880	0	1880	1880	3760	unk
1985	3151	0	3151	3151	6302	unk
1986	2805	0	2805	2805	5610	unk
1987	3616	270	3886	3886	7772	20

[a] Unreported and illegal harvests are estimated at 50% of reported harvest in Subunit 1A and 100% of reported harvest in Unit 2.
[b] Estimated number of road kills.

Table 3. Deer hunter survey for Subunit 1A and Unit 2, 1987.

Game mgmt unit	Major harvest area	Number of hunters	Number success	Percent success	Total hunter days	Average days per hunter	Total bucks killed	Total does killed	Total deer killed
1A	1-Gravina Island	237	47	20	665	2.8	71	0	71
1A	2-Annette Island	32	18	56	190	5.9	18	0	18
1A	3-Duke Island	18	0	0	36	2.0	0	0	0
1A	4-South Revilla	464	136	29	2898	6.2	195	0	195
1A	5-North Revilla	272	66	24	1270	4.7	73	0	73
1A	6-Cleveland Peninsula	317	150	47	1113	3.5	225	0	225
1A	7-North Mainland	21	7	33	62	3.0	13	0	13
1A	8-South Mainland	22	12	55	146	6.6	18	0	18
2	9-Outer Islands	72	42	58	134	1.9	50	8	58
2	10-Hecata Island	91	67	74	311	3.4	94	0	94
2	11-SW Prince of Wales	106	51	48	235	2.2	96	0	96
2	12-SE Prince of Wales	286	127	44	1565	5.5	198	18	216
2	13-Central POW	1032	656	64	5592	5.4	1187	88	1275
2	14-North Central POW	1000	652	65	5757	5.8	1145	106	1251
2	15-N. Prince of Wales	797	539	68	4114	5.2	847	50	897

Table 4. Hunter residency and success in Subunit 1A and Unit 2, 1983-1987.

Year	Successful				Unsuccessful			
	Local res.	Nonlocal res.[a]	Non-res.	Total	Local res.	Nonlocal res.[a]	Non-res.	Total
Subunit 1A								
1983	Data	Unavailable						
1984	"	"						
1985	"	"						
1986	"	"						
1987	377	0	0	377	570	0	0	570
Unit 2								
1983	Data	Unavailable						
1984	"	"						
1985	"	"						
1986	"	"						
1987	1800	13	32	1845	629	3	4	636

[a] Local resident = residents of southeast Alaska

STUDY AREA

Game Management Units: 1B and 3 (7,200 mi^2)

Geographical Description: Southeast Mainland from Cape Fanshaw to Lemesurier Point and islands of the Petersburg, Kake, and Wrangell area.

BACKGROUND

Sitka black-tailed deer are found on most of the islands in Unit 3 and in suitable habitat in the mainland area of Subunit 1B. In the past, deer populations in these areas have periodically reached peaks and then crashed. The magnitude of these fluctuations has normally been greater on the islands (Unit 3) than on the mainland (Subunit 1B). The declines can be attributed to several factors, but the most prominent one is severe winters. Additional factors include wolf and bear predation, excessive or illegal hunting, and reduction or elimination of wintering areas caused by clearcut logging.

The most recent population decline occurred in the late 1960's and early 1970's, resulting in restrictive regulations and bag limits beginning in 1973. Deer hunting in Subunit 1B has remained open; the bag limits for 1973 to 1980 and 1981 to 1988 have been 1 and 2 antlered deer, respectively. Unit 3, however, was closed in 1975, and the area north of Sumner Strait remains closed. A limit of 1 antlered deer was reinstated for the area south of Sumner Strait in 1980, and the Alaska Board of Game recently increased the limit to 2 antlered deer effective for the 1988 season.

POPULATION OBJECTIVES

To increase populations to moderate levels (50 deer/mi^2) as measured by a mean pellet density of 1 pellet group per plot.

METHODS

Harvest of deer was estimated by means of hunter harvest questionnaires sent to a random sample of hunters who obtained 1987 harvest tickets. Pellet group transect surveys in selected areas of Unit 3 were used to estimate indices of deer density in winter habitat in selected areas of Unit 3. Communications, usually verbal, with hunters and others also provided useful information about deer population trends.

RESULTS AND DISCUSSION

Population Status and Trend

The deer populations on Mitkof, Kupreanof, and Kuiu Islands have continued to increase. Based on pellet group counts and comments from the public, it appeared that the Mitkof population was substantially higher than those on Kupreanof or Kuiu Islands. Even

on the latter 2 islands, however, there were signs of an increasing deer population. In Unit 3 south of Sumner Strait, populations appeared to be stable or, in some cases, declining. No determination of deer population status in Subunit 1B was made during the reporting period.

Population Size:

Pellet group survey data (Table 1) from Kuiu and Conclusion Islands are insufficient to conclusively indicate trends; however, the 1988 count at Bay of Pillars was significantly higher than the 1984 count at nearby Security Bay. Although deer numbers on Kuiu Island are still low, sightings of deer are becoming more common, even in areas where no deer have been seen for the past several years. Also, a researcher working on the west side of Kuiu Island reported high densities of deer on one of the larger islands in Tebenkof Bay.

The 1987 count on Conclusion Island indicated a relatively high density of deer. No counts were conducted in 1988; however, information from a local Fish and Game Advisory Committee suggested that the deer population on Conclusion Island was in a sharp decline as of the fall of 1987.

On Kupreanof Island the significant increase in pellet groups in the Castle River area from 1984 to 1987 indicated growth of the deer population. Likewise, many comments from the public and from Fish and Wildlife Protection and U.S. Forest Service personnel also suggested increases in deer on Kupreanof Island. However, the relatively low pellet group count from the Point Barrie area in 1988 indicates that large differences in population density probably exist on Kupreanof Island. The survey data from the Level Islands (adjacent to Kupreanof Island) from 1981 to 1986 indicated high-to-medium densities of deer, with a downward trend (1986) on Little Level Island. The only resident of Big Level Island reported a substantial decrease in the number of deer sightings during the winter of 1987-88.

Although not a significant difference, the apparent decrease in the pellet group count from the southern Mitkof Island area suggested a leveling off or a decline in the deer population. That does not agree, however, with numerous comments from the public and other information, all of which consistently suggest continued growth of the Mitkof Island deer populations. Nonsynchronous increases and decreases in deer numbers on different parts of Mitkof Island are a possibility, but limitations of the present data make a positive determination impossible. It may become necessary to conduct additional pellet group counts in areas other than the Woewodski Island count area to better understand deer population trends on Mitkof Island.

No surveys were conducted on Woronkofski Island in 1988. The 1985 and 1987 surveys suggested a medium-to-high population of deer. The 1988 survey results from Etolin Island were similar to the previous

4 years. The deer population has apparently stabilized and does not show any signs of increasing to the level stated in our population objective (i.e., 1 pellet group/plot). Although no survey results or other quantifiable data are available, public comments suggest that the wolf population is relatively high on Etolin Island. A substantial proportion of mortality to transplanted elk on Etolin Island in 1987 was attributed to wolf predation.

Deer density apparently decreased on Coronation Island from 1985 to 1988. This supposition was supported by the discovery of more than 40 carcasses of winter-killed deer there during a research project conducted in the summer of 1988 (S. Lewis, pers. commun.); additional findings and implications will be forthcoming.

Mortality

Season and Bag Limit:

The open season for subsistence, resident, and nonresident hunters in Subunit 1B and that portion of Unit 3 south of Sumner Strait and Decision Passage, including the Vank Island group and Level and Conclusion Islands, is 1 August to 30 November. The bag limits for Subunit 1B and Unit 3 are 2 and 1 antlered deer, respectively. There is no open season for the remainder of Unit 3.

Human-induced Mortality:

The harvest and percentage of successful hunters in both Subunit 1B and Unit 3 decreased in 1987 from those of the previous year. (Table 2). This represented a distinct contrast to the trend of the past 4 years. Inclement weather may have been partially responsible for the decrease in harvest. The decreased number of hunter days per deer killed in Subunit 1B may have resulted from hunters' unwillingness to remain in the field if not immediately successful. The hunter days per deer killed did not change substantially for Unit 3, even though the success rate of hunters sharply decreased.

It is unclear whether the 1988 statistics failed to reflect a change in the status of deer populations or other factors were primarily responsible for reduced hunter success. A lower-than-usual response rate by hunters to the 1987 deer hunter questionnaire may have biased the estimated harvest. Illegal and unreported harvest were assumed to be less than 10% of the estimated harvest.

Hunter Residency and Success. The harvest records indicate that nonresidents were unsuccessful during the deer hunting seasons in Subunit 1B and Unit 3 (Table 3). Nonlocal residents accounted for 43% of the harvest in Subunit 1B in 1987, a much larger percentage than those of the previous 2 years. The nonlocal resident deer harvest in Unit 3 decreased from 13% in 1985 to zero in 1987. Primarily local residents harvested deer in Subunit 1B

and Unit 3. Deer are more numerous and seasons and bag limits more liberal in other units in Southeast Alaska; therefore, there is relatively little incentive for residents of those areas to hunt in Subunit 1B and Unit 3.

Game Board Actions and Emergency Orders

No regulatory changes for Subunit 1B were made during the past 5 years. In Unit 3 a hunting season was opened on Coronation Island in 1985. Pellet group surveys in 1983 and 1985 on Coronation indicated a deer population healthy enough to sustain hunting. Coronation Island had been closed to hunting previously because of a deer-wolf research project. In 1987 a minor regulatory change was made that simplified the wording of the description of the portion of Unit 3 that was open to hunting; it made no substantive change to the season or bag limit.

CONCLUSIONS AND RECOMMENDATIONS

The population objective, as stated, may not reflect the flexibility needed for the deer management program in Subunit 1B and Unit 3. For instance, the present objective could imply that if pellet group counts fall below 1.00/plot, hunting should be stopped or restricted in order to facilitate a population recovery. This is not easily reconciled with the Etolin Island situation, in which pellet group data have been well below 1.00 for 5 years while the season and bag limit have been the same as those islands having a much higher pellet group density. I suggest the following objectives be adopted:

1. In areas presently closed to hunting, maintain closures to promote deer population growth to a level that results in pellet group counts of 1.00/plot or higher.

2. In areas presently open to hunting and in which pellet group counts are below 1.00/plot, maintain present seasons as long as future pellet group counts and other information do not indicate a downward trend and as long as public support continues.

3. In areas presently open to hunting and in which pellet group counts are above and remain above 1.00/plot, maintain present seasons and bag limits or promote more liberal seasons and bag limits if pellet group data and other information indicate an increasing number of deer.

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Table 1. Deer pellet group survey data for Unit 3, 1981-88.

Year	Mean pellet groups/plot	Number of plots	95% C.I.
		Kuiu Island	
Security(VCU 400)			
1984	0.02	360	0.01-0.04
Bay of Pillars(VCU 403)			
1988	0.17	337	0.10-0.23
Conclusion Island(VCU 417)			
1987	2.66	207	2.32-3.01
		Kupreanof Island	
Point Barrie(VCU 431)			
1988	0.24	357	0.17-0.30
Little Level Island(VCU 435)			
1981	2.48	114	2.02-2.94
1983	2.34	136	---------
1986	1.39	122	1.07-1.70
Big Level Island(VCU 435)			
1981	1.54	399	1.45-1.63
1983	1.56	336	---------
1986	1.66	382	1.42-1.90
Castle(VCU 435)			
1984	0.19	312	0.12-0.26
1987	0.51	305	0.37-0.65
		Mitkof Island	
Woewodski Island(VCU 448 (includes south end of Mitkof Island)			
1984	0.89	295	0.69-1.08
1985	0.72	209	0.58-0.85
1987	1.65	195	1.36-1.94
1988	1.34	433	1.16-1.52

- Continued -

Table 1. Continued.

Year	Mean pellet groups/plot	Number of plots	95% C.I.
Frederick(VCU 449)			
1981	0.08	945	0.06-0.11
		Dry Island(VCU 454)	
1981	0.92	91	0.56-1.28
		Woronkofski Island(VCU 461)	
All transects			
1985	1.63	646	1.45-1.81
Transects 10, 11, and 12 only			
1985	2.01	218	1.62-2.39
1987	2.23	201	1.85-2.61
		Etolin Island(VCU 473)	
1984	0.37	321	0.28-0.46
1985	0.59	334	0.48-0.70
1986	0.62	347	0.37-1.75
1987	0.42	336	0.31-0.52
1988	0.44	305	0.33-0.56
		Coronation Island(VCU 564)	
1983	1.20	696	1.04-1.36
1985	2.34	228	---------
1988	1.42	408	1.17-1.67

Table 2. Estimated deer harvest, hunter success rate, and hunter effort in Subunit 1B and Unit 3, 1983-87.

Year	Harvest	Successful hunters(%)	Hunter days per deer	Estimated harvest + assumed illegal & unreported harvests
			Subunit 1B	
1983	21	23	11.0	23
1984	5	7	3.2	5
1985	39	42	6.7	43
1986	69	58	5.8	76
1987	65	32	4.4	72
			Unit 3	
1983	83	26	16.1	91
1984	130	33	2.2	143
1985	166	39	5.3	183
1986	201	48	3.4	221
1987	135	31	3.7	141

[a] Assumed to be no more than 10% of the estimated harvest.

Table 3. Hunter residency and success in Subunit 1B and Unit 3, 1983-87.

	Successful				Unsuccessful			
	Local res.[a]	Nonlocal res.	Non-res.	Total	Local res.[a]	Nonlocal res.	Non-res.	Total
Subunit 1B								
1983	NA[b]	NA	NA	21	NA	NA	NA	NA
1984	NA	NA	NA	5	NA	NA	NA	NA
1985	40	7	0	47	NA	NA	NA	NA
1986	69	0	0	69	NA	NA	NA	NA
1987	34	26	0	60	78	10	5	93
Unit 3								
1983	NA	NA	NA	83	NA	NA	NA	NA
1984	NA	NA	NA	130	NA	NA	NA	NA
1985	152	22	0	174	NA	NA	NA	NA
1986	197	5	0	202	NA	NA	NA	NA
1987	128	0	0	128	254	20	0	274

[a] Residents of Subunit 1B, and Unit 3, Meyers Chuck, and Point Baker.
[b] Not available; missing records.

STUDY AREA

GAME MANAGEMENT UNIT: 1C (6,500 mi²)

GEOGRAPHICAL DESCRIPTION: Southeast mainland from Cape Fanshaw to Eldred Rock

BACKGROUND

Deer have inhabited northern Southeast Alaska since their emigration from southern refugia following the Pleistocene epoch (Klein 1965). Deeper winter snow on the mainland portion of Subunit 1C has probably caused the number of deer to be less than that on adjacent islands. Severe winters in 1969 and 1971 increased winter mortality and reduced deer numbers in Subunit 1C as well as in the rest of Southeast Alaska.

Hunter harvest surveys were begun in 1970 and have continued with some changes in procedure to the present. Deer pellet group counts, which were initiated in Subunit 1C in 1984, have been conducted on Douglas, Harbor, Lincoln, and Shelter Islands as well as Holkham Bay on the mainland in Subunit 1C.

POPULATION OBJECTIVES

To maintain current population densities on Douglas, Lincoln, and Shelter Islands, as measured by a mean pellet density of 2.0 pellet groups per plot.

METHODS

Harvest parameters were measured using a mail questionnaire. A stratified random sample of hunters who received 1987 deer harvest tickets were sent surveys. Hunter effort, success, and location of harvest were measured from these responses, and the results were expanded to encompass all harvest ticket holders. Trend was estimated for the Shelter Island deer population using pellet group transects. The other established trend areas at Inner Point and Lincoln Island were not sampled during the reporting period.

RESULTS AND DISCUSSION

Population Status and Trend

No estimates of the actual population size are available for Subunit 1C; however, based on pellet group counts for Shelter Island (Table 1), deer densities have been relatively high since at least 1985 and are now above the management goal of 2.0 pellet groups per plot. A similar trend is believed to exist on Douglas and Lincoln islands. Mainland trends are probably similar, but with lower densities.

Mortality

Season and Bag Limit:

The open season for subsistence, resident, and nonresident hunters in Subunit 1C is 1 August to 31 December. The bag limit is 4 deer; however, antlerless deer may be taken only from 15 September to 31 December.

Human-induced Mortality:

Based on data gathered from the annual deer hunter survey, 496 deer were taken in Subunit 1C in 1987 (Table 2). This is slightly above the 5-year average of 470 deer. Bucks composed 70% of the harvest, the highest in the 5-year period.

Hunter Residency and Success:

During the 1987-88 season, an average of 1.5 deer/hunter and 0.5 deer/hunter-day were harvested, 3.4 hunter-days/deer were expended, and 3.6 days/hunter were spent in the field (Table 3). The number of deer harvested per hunter was higher in 1986 (i.e., 2.4); however, the 1987 figure (i.e., 1.5) is higher than the 5-year mean (i.e., 1.3). Hunters enjoyed a relatively high success rate for the 2nd consecutive year in 1987; i.e., 1 deer harvested/2 days hunted.

The most successful (96%) and unsuccessful (93%) hunters were residents of Subunit 1C (Table 4). The few nonresident hunters that were sampled were unsuccessful. Only 1% of the hunters in Subunit 1C resided outside of Southeast Alaska.

Transport Methods:

Deer hunters typically use highway vehicles and boats for gaining access to hunting areas in Subunit 1C, but data are not available to indicate relative frequency of use.

CONCLUSIONS AND RECOMMENDATIONS

No changes in seasons or bag limits are recommended.

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Table 1. Deer population trends in Subunit 1C as indicated by pellet group surveys, 1984-1987.

Year	Mean pellet groups/plot	Number of plots	95% CI
	Portland Island (VCU 27)		
1987	0.99	381	0.28-1.12
	Douglas Island Inner Point (VCU 36)		
1985	1.30	239	1.10-1.51
1986	1.97	235	1.68-2.25
1987	1.76	262	1.53-2.00
	Tracy Arm Harbor Island (VCU 65)		
1987	1.28	200	1.00-1.56
	Shelter Island (VCU 124)		
1984	1.52	300	1.34-1.70
1985	2.52	296	2.24-2.81
1986	3.24	292	2.91-3.57
1987	2.91	288	2.57-3.24

Table 2. Annual harvest[a] in Subunit 1C, 1983-1987.

Year	M	F	Total
1983	276	221	497
1984	265	130	395
1985	329	197	526
1986	296	138	434
1987	347	149	496

[a] Based on expanded results from hunter survey.

Table 3. Average statistics for successful hunters in Subunit 1C, 1983-1987.

Year	No. deer/ hunter	No. deer/ hunter day	No. hunter days/deer	No. days/ hunter
1983	0.6	0.1	10.9	3.6
1984	0.4	0.2	3.4	3.8
1985	1.7	0.2	1.7	3.6
1986	2.4	0.5	6.7	3.3
1987	1.5	0.5	3.4	3.6

Table 4. Hunter residency and success in Subunit 1C, 1983-1987.

	Successful				Unsuccessful			
Year	Local Res.	Nonlocal Res.	Nonres.	Total	Local Res.	Nonlocal Res.	Nonres.	Total
1983	--	--	--	165	--	--	--	704
1984	--	--	--	390	--	--	--	560
1985	--	--	--	268	--	--	--	723
1986	256	8	0	264	655	67	4	726
1987	316	14	0	330	611	42	2	655

STUDY AREA

GAME MANAGEMENT UNIT: 4 (5,700 mi²)

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

BACKGROUND

Based on deer pellet group transects and hunter harvest, the highest deer populations in Southeast Alaska currently occur in Unit 4. Historical deer population peaks and declines have been reported for Southeast Alaska (Merriam 1970, Olson 1979). Deer population declines in Unit 4 have been attributed to severe winter weather and associated deep-snow conditions.

Weather conditions in Southeast Alaska have been exceptionally mild since the early 1970's (Juday 1984). Mild winters and few effective predators have permitted excellent overwintering survival of deer in Unit 4.

Other units (i.e., Units 1, 2, and 3) in Southeast have experienced wolf predation as a contributing factor to population depression (Merriam 1966, Smith et al. 1986), but wolves do not inhabit Unit 4. Brown bears are numerous in the unit, and deer predation by brown bears is occasionally noted.

POPULATION OBJECTIVES

To maintain a population density capable of sustaining an average hunter kill of at least 1.5 deer.

To maintain a population capable of providing the harvest with a hunting effort of no more than 4 days per deer.

To maintain the male deer component of the harvest at a minimum of 60%.

METHODS

Deer fecal pellet group counts were conducted on Admiralty, Baranof, Chichagof, and Yakobi Islands in the spring of 1988 (Table 1). Each 20-m² survey plot was positioned along a predetermined compass course. Pellet group transects were placed in "value comparison units" (VCU's) previously delineated by the U.S. Forest Service (USFS). We utilized VCU's to facilitate response to USFS information requests.

A survey questionnaire was mailed to a sample of deer harvest ticket holders to obtain deer hunter effort and success (Thomas 1988). Hunters were asked to indicate hunting locations by harvest area (Figs. 1-3).

RESULTS AND DISCUSSION

Population Status and Trend

On Chichagof Island, 9 pellet group transects ranged from a low of 0.97 pellet groups/plot in Lisianski Inlet to a high of 2.67 pellet groups/plot in the Kadashan River area. Transects in the Lake Florence area on Admiralty Island yielded 1.5 pellet groups/plot. On Baranof Island, transects at Port Alexander had an average of 1.75 pellet groups/plot. Yakobi Island showed an average of 1.93 pellet groups per plot. Historical pellet group data for each VCU sampled since 1981 are given in Table 1 (Kirchhoff and Pitcher 1988).

Population Composition:

The composition of the harvest was estimated from information obtained from the deer harvest survey (Thomas 1988). Male deer accounted for 72% of the reported harvest.

Mortality

Season and Bag Limit:

The open season for subsistence hunters in Unit 4 is 1 August to 31 January. The open season for residents and nonresidents is 1 August to 7 January. The bag limit for all hunters is 6 deer; however, antlerless deer may only be taken from 15 September to 31 January.

Rural residents of Unit 4 and residents of Kake, Gustavus, Haines, Petersburg, Point Baker, Klukwan, Port Protection, and Wrangell are designated by the Board of Game as subsistence deer hunters for Unit 4. The season for all other hunters ends on 7 January.

Human-induced Mortality:

A survey questionnaire was mailed to a sample of deer harvest ticket holders to obtain harvest information for Unit 4 (Thomas 1988); extrapolation of responses indicated that over 5,400 hunters harvested more than 14,000 deer in 1987-88 (Table 2). Hunters reported a take of 10,300 bucks and 4,100 antlerless deer in Unit 4. Although crippling losses, unreported harvests, and illegal harvests are probably less than 10%, they are calculated at 10% (Table 2). The percentage of accidental deaths is not a significant management factor. The total mortality in Unit 4 is estimated at 15,700 deer.

The harvest in Unit 4 is directly related to deer population levels and has increased steadily in this decade (Fig. 4). The northeast portion of Chichagof Island from Port Frederick to Tenakee Inlet has been roaded in this decade, providing over one-third of the deer taken on Chichagof Island during the reporting period. (Fig. 5).

Hunter and Residency Success. Increased deer populations and the longer season helped increase the hunter success ratio; 88% of the hunters who resided in Unit 4 killed at least 1 deer, while 72% of the Alaskans living outside the unit were successful. This was an improvement over 1986-87, when 72% of the local residents and 58% of the nonlocal residents were successful (Table 3). The average harvest per resident was 3 deer, with an expenditure of 3 days per deer. Successful unit residents averaged 4 deer each.

Harvest Chronology. Overall, the winter of 1987 in the Sitka area was extremely mild, characterized by very little snow; therefore, hunting conditions did not markedly improve over the course of the season. September and January had the lowest harvest rates. The chronology of the deer harvest by month follows: August, 9.0%; September, 7.6%; October, 17.6%; November, 37.5%; December, 20.7%; and January, 7.6% (Table 4). This was the first unit-wide season that extended into January.

Transport Methods. The use of motorized land vehicles along the road system on the Hoonah "peninsula" helped to increase the deer harvest in that area during the 1987-88 season. The 6-deer bag limit, a convenient Alaska Marine Highway schedule, and the extensive logging-road system attracted many hunters from the Juneau area. Much concern about potential overharvesting of deer was expressed by residents of Hoonah and Tenakee Springs.

The harvest questionnaire results indicated an estimated harvest of 1,533 bucks and 583 does in Hunt Areas 3523, 3524, 3625, and 3626, which include the Hoonah "peninsula" and Port Frederick (Figure 3). The Hoonah "peninsula" makes up about 5% of the area of Unit 4; however, it accounted for 15% of the deer harvest in Unit 4.

Several proposals were made to the Board of Game by residents who wanted to reduce the deer harvest by those hunting from motorized land vehicles. Wildlife Conservation Division staff met with representatives from the Fish and Game Advisory Committees of Hoonah and Tenakee Springs and the Board of Game to develop a proposal to restrict the deer harvest along the Hoonah road system. Hunter questionnaires indicate that 67% of those hunting in the area in 1987 were not residents of Hoonah. Juneau residents accounted for 45% of the deer taken, while logging-camp residents accounted for 12% of the harvest; Hoonah residents took 29%.

Game Board Actions and Emergency Orders

At its spring 1988 meeting, the Board of Game adopted a regulation for that portion of Chichagof Island east of Port Frederick and north of Tenakee Inlet (Hoonah "peninsula") that restricts the sport and nonresident bag limit to 3 deer for the 1988-89 season. The bag limit for hunters eligible for subsistence deer hunting in

Unit 4 remained at 6 deer. The Board standardized the 1988-89 season closure to 31 January to include both subsistence and regular seasons.

In the remainder of Unit 4, the Board of Game adopted a 6-deer bag limit regulation for subsistence, resident, and nonresident hunters and extended the season to 31 January for the 1988-89 season. The action was proposed by Game Division to increase the harvest of deer during a period of high populations.

CONCLUSIONS AND RECOMMENDATIONS

The population objectives for Unit 4 are to maintain a population density capable of sustaining an average harvest of at least 1.5 deer/hunter with a hunting effort of no more than 4 days/deer and to maintain the male deer component of the harvest at a minimum of 60%. All 3 objectives were achieved during 1987. The average harvest was 2.4 deer/hunter; hunting effort was 2.8 days/deer. The male deer component of the harvest was 72%. The number of hunters increased by 4%, while the number of deer harvested increased 39% over the 1986-87 harvest.

Extrapolation of reports from deer hunters in Unit 4 indicated an estimated harvest of 14,430 deer during the 1987-88 season (Thomas 1988). Seventy-four percent of the hunters were successful. The winter was mild, and the 6-month season allowed hunters to select for optimum weather conditions. Spring pellet group count results indicate that the deer population continues to be high, compared with other sampled areas in Southeast Alaska (Kirchoff and Pitcher 1988). Some areas near communities have low deer populations, but individual seasons and bag limits for these small areas are not recommended. Should restrictive measures be required to reduce the harvest, I recommend shortening the season by eliminating January and a portion of December.

The destruction of deer habitat in Unit 4 is of major concern. Clear-cutting of old-growth forests in Southeast has been identified by deer researchers and interdisciplinary advisory groups as detrimental to deer welfare (Schoen et al. 1981, Sigman 1985, Kirchhoff 1987, Smith et al. 1983). It is advisable to provide information to the USFS to try to influence timber unit layout to avoid cutting in prime deer habitat. Road access associated with timber harvest is causing deer and hunter management problems in areas where communities are linked to the Alaska Marine Highway system. ADF&G should work with the USFS to jointly develop a road closure and hunter access management plan for problem areas such as the Hoonah "peninsula." In the event of deep snow conditions during the winter of 1988-89, deer mortality transects should be reinstated.

Acknowledgements

Linda Bergdoll-Schmidt prepared the tables and edited the report prior to submission to the regional office. Mike Thomas provided

additional information on chronology from the hunter survey questionnaires, and Mark Kirchhoff and his crew spent long hours in Unit 4 conducting surveys. Captain Charles McLeod often piloted the RV Polaris after dark to insure that the pellet group survey team would be in the right location the next day. His effort and skills are much appreciated.

LITERATURE CITED

Juday, G. P. 1984. Temperature trends in the Alaska climate record: Problems, update, and prospects. In Proceedings conference on the potential effects of carbon-dioxide induced climatic change in Alaska, April 1982. Fairbanks. 16pp.

Kirchhoff, M. D., and J. W. Schoen. 1987. Forest cover and snow: Implications for deer habitat in southeast Alaska. J. Wildl. Manage. 51(1):28-33.

Kirchhoff, M. D., and K. W. Pitcher. 1988. Deer pellet-group surveys in southeast Alaska 1981-1987. Alaska Dep. Fish and Game. Final Rep. Proj. W-22-6. Job 2.9. July 1988. Juneau. 113pp.

Merriam, H. R. 1966. Relationships between deer and wolves on Coronation Island, southeast Alaska. Presentation at N.W. Sect. of The Wildl. Soc. La Grande, OR.

Merriam, H. R. 1970. Deer fluctuations in Alaska. Presentation at N.W. Sect. of The Wildl. Soc. Spokane, WA. Mimeo. 5pp.

Olson, S. T. 1979. The life and times of the black-tailed deer in southeast Alaska. Pages 160-168 in O. C. Wallmo and J. W. Schoen, eds. Sitka black-tailed deer. USDA For. Serv., Alaska Region. Ser. No. R10-48. Juneau.

Schoen, J. W., M. D. Kirchhoff, and O. C. Wallmo. 1981. Seasonal distribution and habitat use by Sitka black-tailed deer in southeastern Alaska. Vol. II. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-21-1. Job 2-6-R. Juneau. 59pp.

Sigman, M. J. (ed.) 1985. Impacts of clearcut logging on the fish and wildlife resources of southeast Alaska. Alaska Dep. Fish and Game, Habitat Division, Juneau. 95pp.

Smith, C. A., E. L. Young, C. R. Land, and K. P. Bovee. 1986. Effects of predation on black-tailed deer population growth. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-4. Job 14.13. Juneau. 24pp.

Smith, C., K. Kohrt, B. Baker, J. Sturgeon, M. Barton, and R. Harris. 1983. Deer and timber management in southeast

Alaska - issues and recommendations. Tech. Comm. Rep. by: The Wildl. Soc., Soc. Am. Foresters, State of Alaska, USDA For. Serv., Sealaska Corp. 44pp.

Thomas, M. 1988. 1987 deer hunter survey. Alaska Dep. Fish and Game. Region I. Game Division. Juneau. 167pp.

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Table 1. Deer population trends in Unit 4 as indicated by pellet group surveys, 1981-1988.

Name	Year	Mean pellet groups/plot	Number of VCU[a] plots	95% C.I.
		Admiralty Island		
VCU 125				
Barlow Cove	1982	1.07	2,567	1.01-1.12
	1984	1.69	347	1.46-1.92
	1985	1.55	347	1.35-1.76
VCU 127				
W Admiralty	1982	1.65	1,054	1.53-1.77
VCU 128				
Hawk Inlet	1982	1.21	1,605	0.99-1.42
	1984	1.42	339	1.22-1.63
	1985	1.69	270	1.43-1.95
	1986	1.92	286	1.64-2.19
	1987	2.54	278	2.19-2.89
VCU 140				
Dorn Island	1984	1.27	230	1.02-1.53
VCU 148				
Lake Kathleen	1987	2.13	207	1.76-2.49
VCU 150				
Lake Florence	1988	1.49	294	1.28-1.70
VCU 162				
Thayer Lake	1987	2.81	313	2.49-3.12
VCU 171				
Hood Bay	1987	2.31	358	1.99-2.63
VCU 182				
Pybus Bay	1981	1.34	390	1.16-1.52
	1984	1.02	300	0.86-1.18
	1985	1.86	269	1.60-2.12
	1986	2.00	235	1.70-2.29
	1987	2.03	242	1.69-2.37
		Chichagof & Yakokbi Islands		
VCU 189				
Port Althorp	1988	1.80	195	1.48-2.14
VCU 190				
Idaho Inlet	1988	1.35	250	1.09-1.60
VCU 202				

-continued-

Table 1. Continued.

Name	Year	Mean pellet groups/plots	Number of VCU[a] plots	95% C.I.
Port Frederick VCU 209	1988	1.88	242	1.62-2.14
Whitestone Harbor VCU 211	1988	1.23	272	1.01-1.45
Point Augusta VCU 218	1983	1.78	757	1.62-2.01
Pavlov Harbor VCU 221	1988	1.78	324	1.51-2.06
NE Tenakee Inlet VCU 222	1981	0.86	193	0.64-1.08
N Tenakee Inlet VCU 223	1981	0.60	253	0.48-0.73
NW Tenakee Inlet VCU 231	1988	1.47	253	1.24-1.71
Saltery Bay VCU 234	1988	2.03	256	1.70-2.36
E Crab Bay VCU 235	1981	0.49	35	0.08-0.89
Kadashan River VCU 236	1981	0.54	96	0.32-0.76
	1988	2.67	221	2.19-3.16
Corner Bay VCU 246	1981	0.35	60	0.17-0.53
Broad Island VCU 247	1981	1.41	209	1.18-1.63
Finger Mountain	1983	1.17	2,145	1.11-1.24
	1984	1.83	302	1.57-2.09
	1985	3.23	279	2.79-3.67
	1986	2.88	277	2.57-3.19
	1987	3.11	236	2.71-3.52
VCU 249 Lisianski Inlet	1988	0.97	255	0.80-1.15
VCU 254 Yakobi Island	1988	1.93	275	1.68-2.18
VCU 275 Cobol/Slocum	1984	1.15	224	0.92-1.37
VCU 279 Rapids Point (W Peril Strait)	1983	0.77	2,734	0.73-0.81
VCU 281 Ushk Bay	1981	0.63	94	0.41-0.85

Table 1. Continued.

Name	Year	Mean pellet groups/plot	Number of VCU[a] plots	95% C.I.
		Baranof Island		
VCU 288				
Range Creek	1983	0.51	1,788	0.46-0.55
	1984	0.71	303	0.61-0.92
	1985	1.32	22	1.02-1.62
VCU 295				
Lake Eva	1987	1.81	172	1.46-2.15
VCU 296				
Portage Arm	1981	0.53	213	0.39-0.68
VCU 300				
Nakwasina				
(all transects)	1984	2.51	196	2.14-2.88
	1985	3.92	1,046	3.67-4.17
	1986	3.50	715	3.26-3.76
VCU 300				
Nakwasina				
(transects 2,3,8)	1984	2.51	138	2.10-2.93
	1985	3.65	218	3.13-4.17
	1986	3.38	205	2.91-3.84
	1987	2.31	195	1.90-2.72
VCU 305				
Sea Lion Cove	1984	1.36	320	1.15-1.58
	1985	2.57	292	2.23-2.91
	1986	2.87	235	2.44-3.29
	1987	3.31	226	2.82-3.80
VCU 339				
Port Alexander	1988	1.75	174	1.44-2.06

[a] Value comparison units.
[b] Commercial forest land (8,000 board feet per acre or more).

Table 2. Deer harvest data for Unit 4, 1983 through 1987-88.

Year	Males[a]	Females[a]	Estimated total[b]	Unreported harvest	Total harvest[c]
1983	6,200	2,200	8,400	840	9,200
1984	6,500	2,400	8,900	890	9,800
1985	7,000	3,400	10,400	1,040	11,400
1986-87	7,600	2,700	10,300	1,030	11,300
1987-88	10,300	4,100	14,400	1,440	15,700

[a] Rounded to nearest hundred.
[b] Estimate based on reported kill from Hunter Harvest Questionnaires (T. Paul, pers. comm.).
[c] Estimated 10% of reported harvest as crippling loss, unreported, and illegal take of deer of unknown sex.

Table 3. Hunter residency and success in Unit 4, 1986-87 and 1987-88 seasons.[a]

	Successful				Unsuccessful			
Year	Local res.	Nonlocal res.	Nonres.	Total	Local res.	Nonlocal res.	Nonres.	Total
1986-87	1,773	2,322	4	4,099	703	971	5	1,679
1987-88	1,934	2,369	23	4,326	551	982	77	1,610

[a] Adapted from Region I deer harvest report, 1986 and 1987.

Table 4. Harvest chronology in Unit 4, 1987-88.[a]

Aug	Sep	Oct	Nov	Dec	Jan
1,290 (9.0%)	1,089 (7.6%)	2,522 (17.6%)	5,374 (37.5%)	2,966 (20.7%)	1,089 (7.6%)

[a] Reported chronology percentages expanded to include unknown dates of harvest.

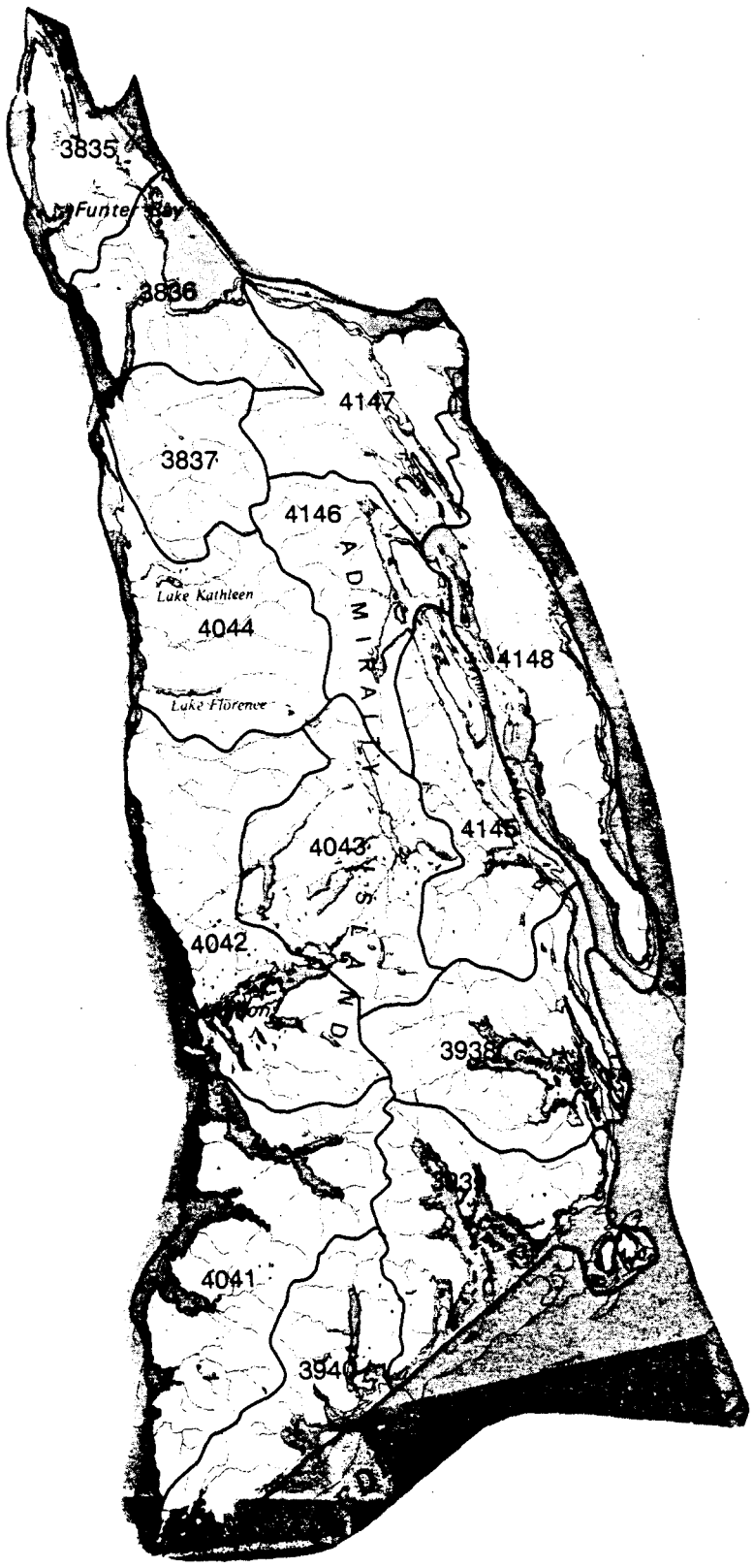

Fig. 1. Admiralty Island deer harvest areas.

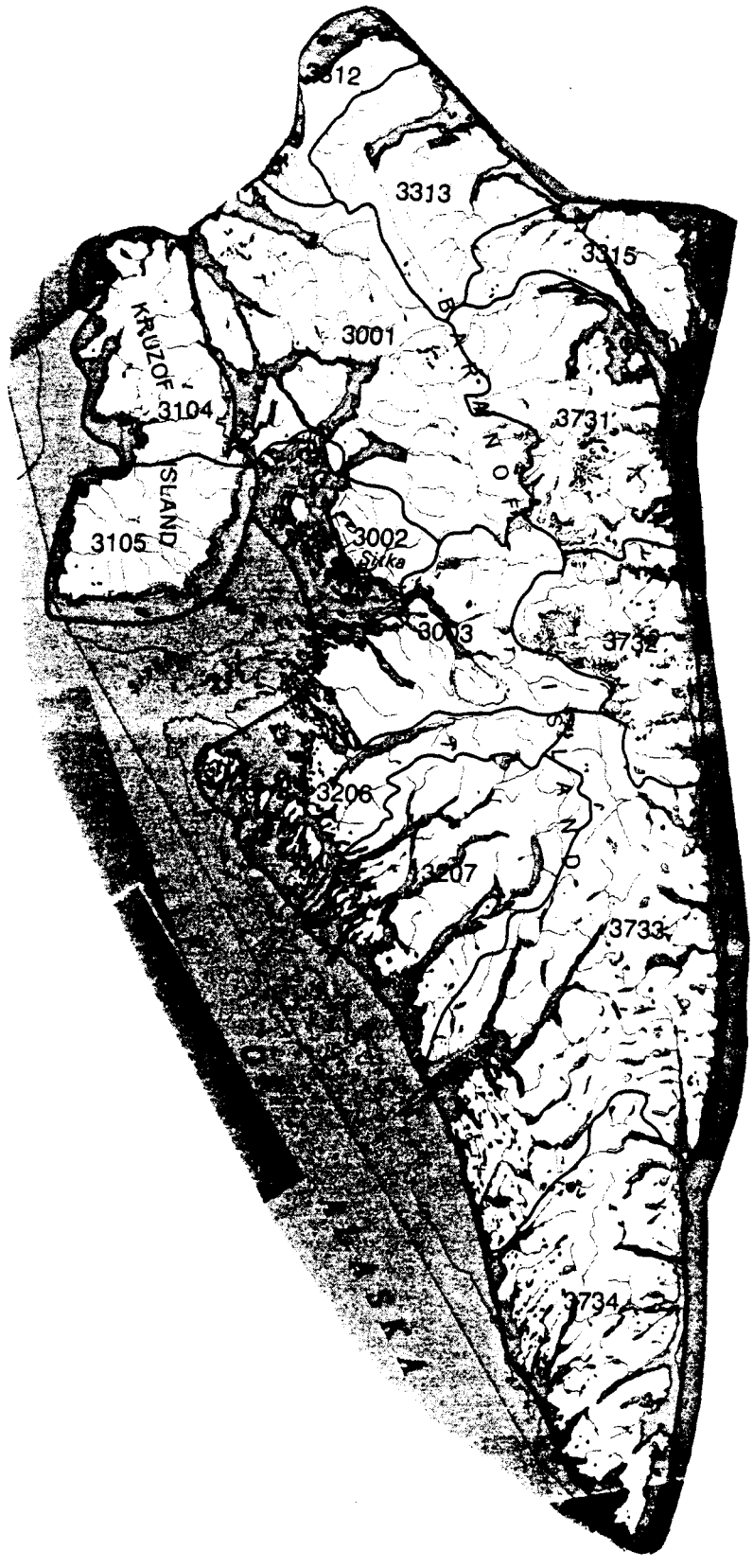

Fig. 2. Baranof and Kruzof Islands deer harvest areas.

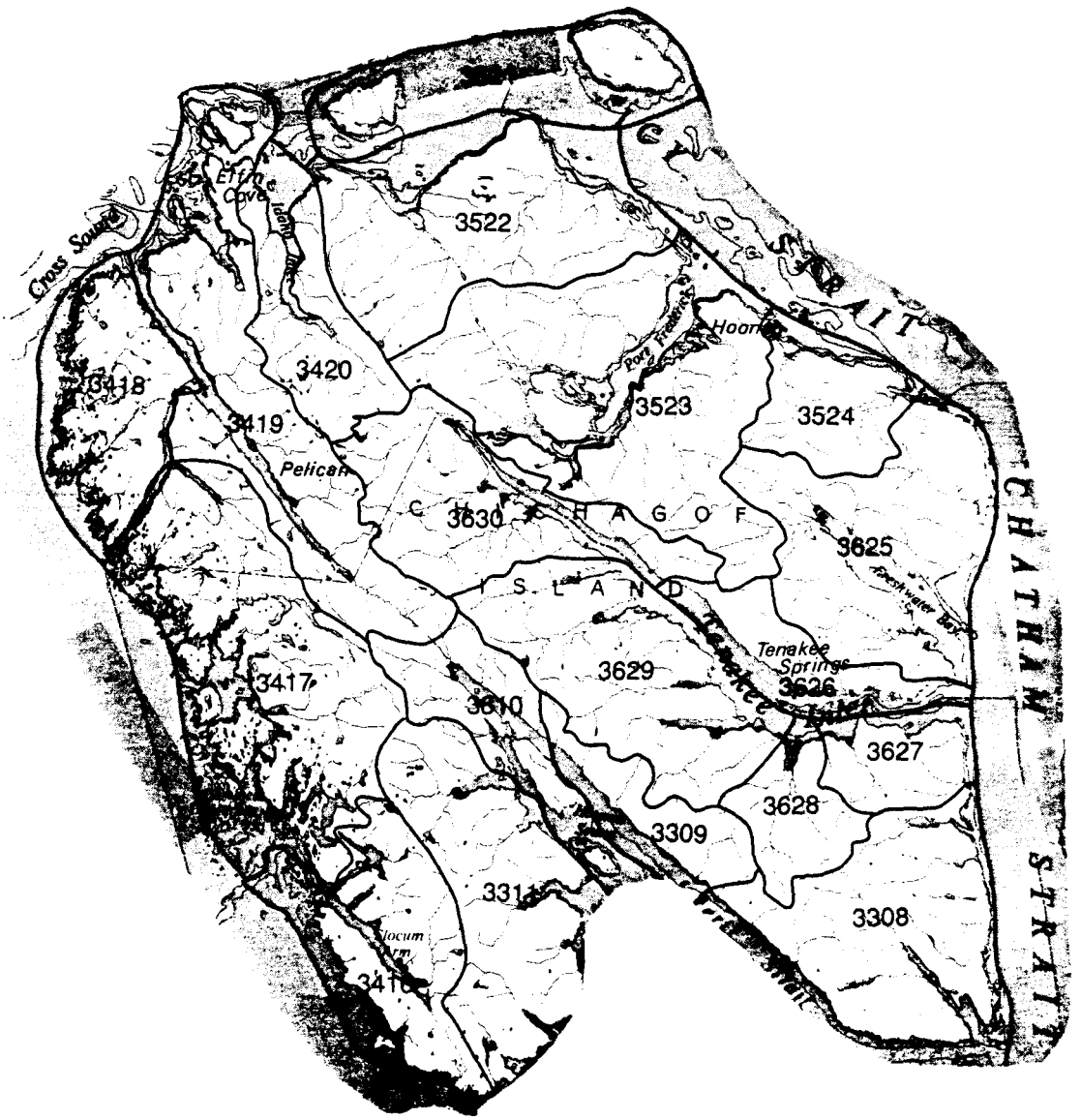

Fig. 3. Chichagof and Yakobi Island deer harvest areas.

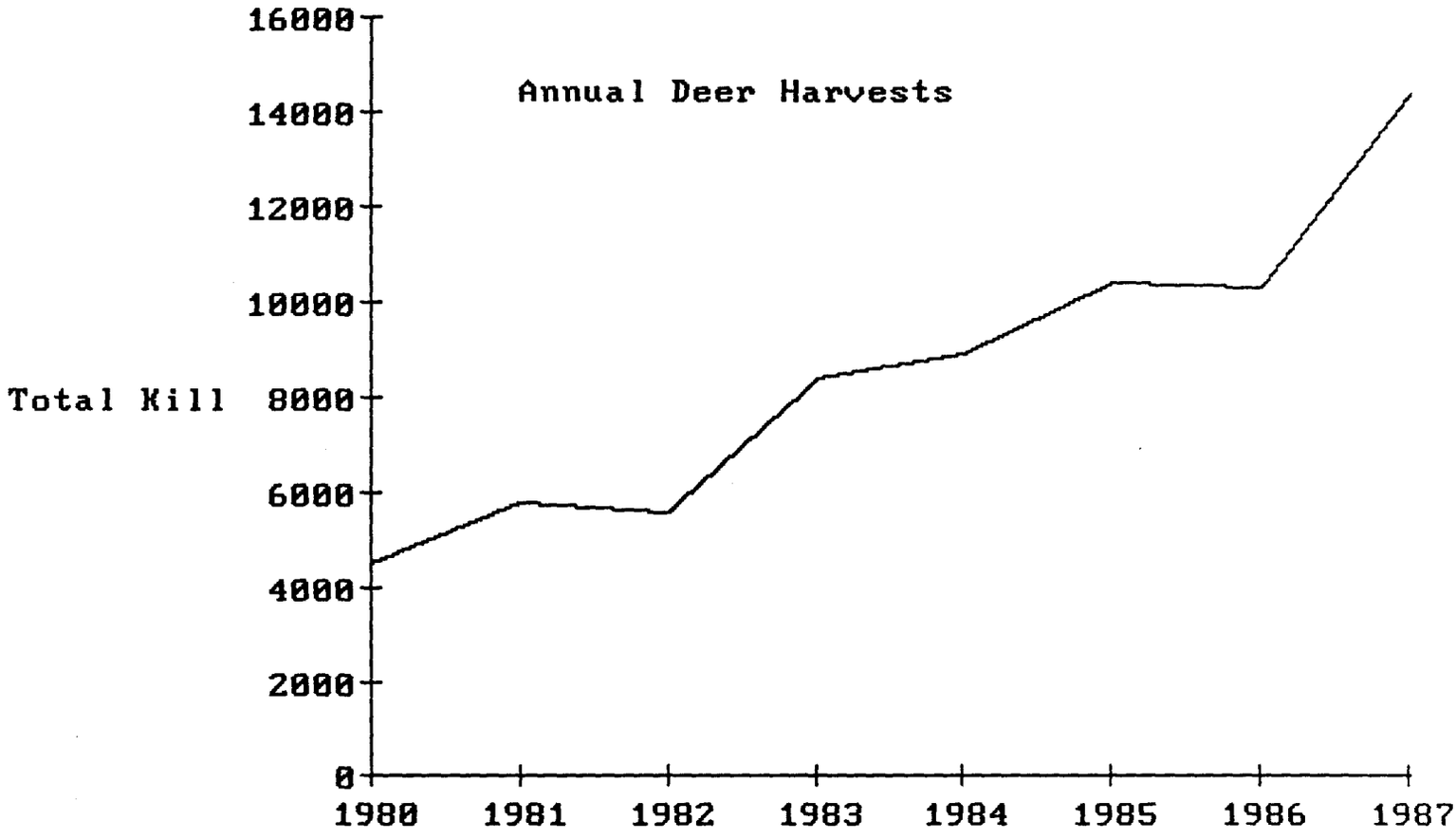

Fig. 4. Unit 4 deer harvest, 1980-1987.

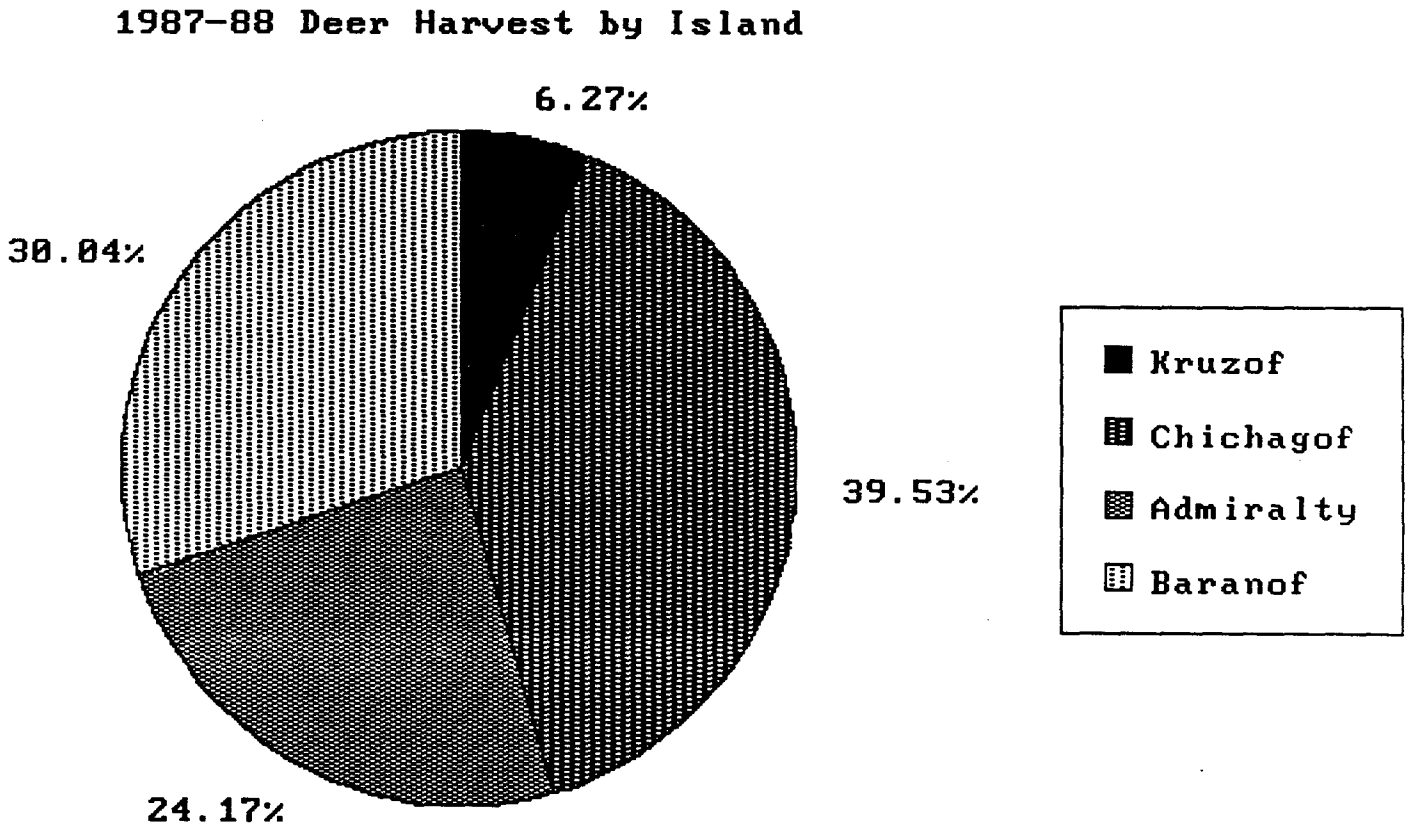

Fig. 5. Unit 4 harvest by island, 1987-88 season.

STUDY AREA

GAME MANAGEMENT UNIT: 6 (14,300 mi^2)

GEOGRAPHICAL DESCRIPTION: Prince William Sound and north Gulf Coast

BACKGROUND

Sitka black-tailed deer were introduced to Unit 6 by the Cordova Chamber of Commerce beginning in 1916. Eight deer captured near Sitka, Alaska, were released on Hawkins and Hinchinbrook Islands in Subunit 6D. Between 1917 and 1923 an additional 16 were released to supplement the original stocking. The transplanting of deer to Prince William Sound was the first big game transplant in Alaska and ranks as one of the most successful (Burris and McKnight 1973).

The deer quickly exploited virgin habitat, dispersing to most islands in Prince William Sound as well as to the adjacent mainland. The initial population peak, around 1945, caused sufficient habitat damage to reduce subsequent carrying capacity (Robards 1952). Reynolds (1979) reported major winter die-offs in the late 1940's, mid-1950's, late 1960's and the early 1970's. He identified snow depth and duration as the primary factors limiting deer abundance and distribution.

Deer temporarily extended their range, in spite of topographical barriers caused by recent favorable climatic conditions. Roberson (1986) reported 19 observations along Interior highways in the Copper River basin; the farthest northern observation was 175 km north of previously known range. In recent years, deer have been observed as far west as Unit 15 on the Kenai Peninsula (T. Spraker, pers. commun.). While deer tracks were observed this year at Strawberry Point in Subunit 6A, the previous eastern-most observation had been at Cape Yakataga (Alaska Game Commission files).

Relationships between deer range and habitat characteristics of Prince William Sound were the focus of recent research activities. Eck (1983) found an inverse relationship between biomass of deer winter browse species and percentage of spruce and net volume of timber stands. Shishido (1986) followed radio-collared deer and assessed deer pellet group density relationships to numerous habitat variables. He identified seasonal range characteristics for deer; he found that during the mild winters of 1981-82 and 1982-83 deer wintered in forested habitat (i.e., less than 60% crown closure, >50% hemlock and >12%spruce) on south-facing slopes below an elevation of 300 feet (91 m). He also identified a strong correlation between the 1981-82 pellet group densities and tree

basal area, Vaccinium and Coptis biomass, deviation in crown cover, and net timber volume. He cautioned that deer would be restricted to higher density timber stands during years of deep snow.

Previous population and habitat monitoring efforts in Unit 6 included deer pellet group transects (Merriam 1965), winter composition-trend counts (Sheets 1960), summer aerial alpine composition-trend counts (Merriam 1965), Vaccinium browse utilization transects (Reynolds 1979), population age structuring from deer jaws supplied by hunters (Sheets 1961), winter-killed deer beach surveys (Sheets 1960), and deer composition surveys by boat (Griese 1987).

Deer harvest by hunters in Unit 6 has been monitored by varying methods since the first legal deer season in 1935; contacting hunters in the field and at home was the most frequently used method. A hunter report form that was first distributed in 1960 (Sheets 1961) was required by 1965; however, it provided gradually less than acceptable harvest data (Reynolds 1979) and was discontinued in 1980. A sample of Cordova residents has been interviewed annually since 1965 to assess hunter effort and success (Reynolds 1979, Griese 1988). In 1980, 1983, and 1984 deer hunter questionnaires were distributed to a large percentage of Alaskan deer harvest ticket holders (Griese and Miller 1987).

Reynolds (1979) reported annual harvests in Unit 6 ranging between 500 and 1,500 prior to 1978. Griese and Miller (1987) identified an average annual increase of 14% in the harvest between 1980 and 1984, reaching 2,200 deer. The harvest peaked in 1986, exceeding 3,000 deer (Griese 1988).

The greatest future impact to deer abundance in Unit 6 will be the loss of critical winter habitat and an increasing predator population. The timber practice of clear-cutting the major lowland timber stands on private and public land on Montague Island will produce a long-lasting reduction in winter habitat. Deer winter habitat in Unit 6 is much more limited than that in Southeast Alaska, and snow depths vary more dramatically. An expanding wolf population on the mainland, which is promoted by unnecessarily restrictive harvest methods, will probably expand to Hinchinbrook and Montague Islands within the next 10 to 20 years. Successful deer management must therefore concentrate on winter habitat preservation.

POPULATION OBJECTIVES

To maintain a deer population that will sustain an annual harvest of 1,500 deer, including 60% males, and a minimum hunter success rate of 50%.

METHODS

The deer harvest in Unit 6 was derived from 3 separate hunter surveys. A deer hunter questionnaire was distributed to a 60%

sample of individuals (i.e., except for residents of Southeast Alaska) acquiring 1987 Alaska deer harvest tickets (Appendix A). A 25% sample of Southeast Alaskan deer harvest ticket holders provided additional effort and success data that were incorporated into the total effort and success estimate (Appendix B). A 10% sample of Cordova residents holding harvest tickets was interviewed in person for effort and success information to provide continuity in that database. An index of the annual success of Cordova residents, which may reflect deer abundance, was produced by multiplying 3 values: (1) number of active hunters/number of harvest tickets or hunting licenses issued; (2) number of successful hunters/number of active hunters; and (3) number of male deer killed/all harvested deer. This index uses hunter interest (i.e., a function of anticipated success), hunter success, and the chances to select the sex of deer to reflect deer abundance and availability. Deer per hunter and days per harvested deer were not incorporated into the index because they appeared to be influenced by the bag limit and annual hunting conditions.

An aerial composition count of deer congregated on the shoreline of the 3 major islands was conducted on 25 March in a Piper PA-12 to assess winter survival of fawns. Deer were classified as adult, fawn (short yearling), or unknown age.

Deer pellet group transects were established according to Kirchoff and Pitcher (1988) to better monitor population trend and to assist in land management decisions. Eight of 21 uniform coding units (UCU) on the 3 major islands (Figure 1) were sampled with 132 to 226 65.6-ft^2 (20-m^2) plots. Mean number of pellet groups counted per plot were utilized for the initial winter density evaluation. Lastly, during early February 5 pellet groups aged at 5 to 60 days old were staked adjacent to Orca Inlet for persistence verification.

RESULTS AND DISCUSSION

Population Status and Trend

I believe the deer population in Unit 6 is continuing to increase since the reported low level in 1972. Hunter questionnaires since 1980 have suggested a recent increase in hunter efforts and harvest levels, while measurements of hunter success (e.g., % successful hunters, hunting days/deer, and deer killed/successful hunter) varied only slightly (Appendix C). The hunter success index of Cordova deer hunters, collected since 1965, also indicates a recent peak in success, possibly reflecting a peak in deer availability and abundance (Figure 2).

Deer pellet group transects on the 3 major islands produced overall "moderate" pellet group densities (Table 1). Conditions for the count were good: clear skies, subfreezing temperatures, and snow depth on the beaches ranging from zero to 24 inches. The count was conducted during an ebbing to low tide between 0900 and 1200 hours. The highest average pellet group density (2.4 groups/plot) was

found in the Shelter Bay UCU on Hinchinbrook Island, and the lowest average density (0.5g/p) was in the Port Chalmers UCU on Montague Island. Kirchoff and Pitcher (1988) suggested that mean pellet group densities ranging from 1 to 2 groups/plot in Southeast Alaska reflected moderate deer densities. Even though transects were conducted in late May and early June, snow persistence prevented sampling above an elevation of 260 to 1000 feet. The high deterioration rate for pellet groups observed near Cordova may suggest a higher relative deer density, compared with equal pellet groups observed in Southeast Alaska.

March composition counts provided additional insight into the relative distribution of deer during the winter (Table 2); when inspected again on 20 May, only 1 group was easily discernable. Precipitation measured for that period less than 1 mile away was 63 inches. Precipitation rates (Fisch 1979) or moisture (Harestad and Bunnell 1987) have influenced pellet persistence in Southeast Alaska and the Pacific Northwest. High precipitation rates in Unit 6 may have caused pellet group counts to substantially underrepresent November-May pellet deposition. In descending magnitude, the number of deer observed per linear mile of shoreline was highest in Jeanie Cove, Northeast Montague, and Zaikoff Bay UCUs.

Population Size:

The size of the deer population in Unit 6 has never been formally estimated. Based on the estimated harvest levels, spring age composition, and relative population stability, I estimate that 8,000-12,000 deer wintered in Unit 6 in 1987-88.

Population Composition:

The March shoreline deer composition survey suggested that a minimum of 21% of the population were short yearlings (Table 2). Twenty-five percent of 178 deer identified according to age were short yearlings. The sample population may be biased toward 1 age or sex class because of differences in behavior or observation. A March 1986 beach survey (i.e., by boat) of Montague and Hinchinbrook Islands produced 30% short yearlings for 105 deer identified according to age (Griese 1987).

Mortality

Season and Bag Limit:

The open season for subsistence, resident, and nonresident hunters is 1 August to 31 December. The bag limit is 5 deer; however, antlerless deer may be taken only from 15 September to 31 December.

Human-induced Mortality:

Hunter questionnaire results provided estimates for hunting effort and harvest within numerous hunt areas by month and hunter

residency (Appendix B). An estimated 2,020 (± 121, 90% CI) individuals hunted 9,919 (± 461, 90% CI) days and killed 2,828 (± 174, 90% CI) deer. The estimated harvest represented a 29% increase from the 1984 harvest (Appendix C). This increase represents an average annual increase of 8.5%. The number of hunters and hunter days for the same period increased 26% and 27% respectively.

Based on interviews with 10% of the harvest ticket holders, Cordova deer hunters killed an estimated 1,300 deer. Hunter questionnaire results indicated a harvest by Cordova hunters near 1,170, representing 41% of the total estimate. Further comparison of results of the 2 survey methods showed similarities in composition and the chronology of harvest, and number of deer/successful hunter (Table 3).

Distribution of the deer harvest changed slightly in 1987 (Table 4). Longer periods of inclement weather apparently reduced accessibility to Montague Island, reducing the percentage of deer taken on that island. Hawkins and Hinchinbrook Islands produced a combined deer harvest equal to that on Montague Island.

Hunter Residency and Success. Questionnaire results indicated that hunter success and effort by residency were disproportionately distributed. Although Anchorage hunters accounted for 36% of hunting days; they took only 28% of the deer. Whereas, Unit 6 residents accounted for 32% of hunting days and 49% of the harvest. Efforts by other Alaskans were comparable to Anchorage hunters. Questionnaire results probably underrepresented the harvest and effort by Unit 6 rural residents, especially for residents of Tatitlek and Chenega Bay (Appendix B).

Harvest Chronology. Since 1983 hunters have killed the largest percentage of the deer in November (Table 5). Deer typically have reduced wariness during the November rutting period; thus their higher vulnerability attracts greater hunter interest. The substantial snow accumulation that drives deer to the beaches also attracts hunters and can influence harvest peaks. Snow accumulation and favorable boating weather caused higher harvest during December 1980.

Transport Methods. Hunter questionnaire results indicated that deer hunters in Unit 6 relied on boats (66%) and aircraft (29%) to reach their hunt areas in 1987 (Appendix B). Most of Unit 6 deer reside on islands, and little road access exists.

Natural Mortality:

In mid-May 1987 rains began and continued at record levels for several weeks. Continuous rainfall during that time of year was unusual for Prince William Sound. The effect of the rain on fawn survival has not been not documented, but is expected to be deleterious. Hunters reported seeing fewer fawns than normal at

the beginning of the hunting season; this factor may confirm that expectation.

Low winter mortality was concentrated on short yearlings. While no mortality surveys were conducted, few carcasses were found during incidental pellet-group transects or by the public. Deep, persistent snow accumulations at sea level began in March, following the beach composition survey, and lasted through April. This late-snow accumulation was not as lethal as expected.

Game Board Actions and Emergency Orders

Deer hunting seasons and bag limits were last changed by the Board of Game in 1982. The bag limit was increased from 4 to 5 deer so that hunters could take more of an increasing surplus. The Board has not made a decision on the role that deer have in the subsistence harvest for residents of Unit 6 .

Current seasons and bag limits appear to be meeting the desires of the public, while meeting the management objectives. Until hunting success falls below 50%, reduction of the bag limit is not recommended. While the deer population in Unit 6 could support a higher harvest, an increase in the bag limit may slightly reduce overall hunter success rates and promote wanton waste; therefore, it should not be proposed at this time.

CONCLUSIONS AND RECOMMENDATIONS

Population objectives were exceeded for the reporting period. Attaining these objectives in the future will depend on snow accumulation and duration, availability of adequate winter habitat, and a regulatory response to reduced deer densities that, in turn, will reduce bag limits and length of seasons.

Since 1972 the deer harvest and hunter success have increased steadily, reflecting an increasing deer population. The harvest has approached 3,000 deer for the last 2 years with only the slightest indication that population growth has been affected. If population stabilization has occurred, it have been the result of poor fawn survival slowing growth during periods of high harvest.

At the current density, season length and bag restrictions are not expected to cause a decline in the population; however, if winter conditions cause one, bag limits should be reduced to maintain a relatively high success rate for hunters. Changes in bag limits would also be much preferred by the rural residents over reductions in the length of the season.

The accumulation of trends in pellet group densities has provided valuable population information on which to base future regulatory changes as well as a response to increasing land management decisions. The continuation and expansion of this program are considered to be essential for responsible deer management.

Beach composition surveys in the spring should be continued; however, they would be of a greater value if fall composition surveys were also conducted, because comparison of fawn components could then be made. Securing an adequate fall sample from the alpine has been difficult. Experimentation with improved fall aerial survey techniques, such as infrared filming, should be conducted.

Continuity of a statewide harvest database is also essential to management. In light of the competition for resources in Prince William Sound, large gaps in hunter effort and resource utilization data can be disastrous for deer and their users. An annual hunter questionnaire to 25% of the "railbelt" harvest ticket holders, similar to survey methods currently conducted in Southeast Alaska, should fill that data gap.

Reserving an essential portion of the timbered lowlands on the major deer producing islands is the ultimate goal expected from the current management efforts. Hunters spent an estimated $1.3 million in 1987 to hunt deer in Unit 6 (Appendix B). That expenditure should rate deer in Unit 6 as a truly valuable renewable resource that demands attention from land managers; however, without strong data, land managers and development industries will deny their validity as an important resource.

LITERATURE CITED

Burris, O. E., and D. E. McKnight. 1973. Game transplants in Alaska. Alaska Dep. Fish and Game, Tech. Bull. No. 4, Juneau. 57 pp.

Eck, K. C. 1983. Forest characteristics and associated deer forage production on Prince William Sound Islands. M. S. Thesis. Univ. Alaska, Fairbanks. 60 pp.

Fisch, G. 1979. Deer pellet deterioration. Pages 207-218 in O. C. Wallmo and J. W. Schoen, eds. Sitka black-tailed deer: Proceedings of a conference in Juneau, Alaska. U. S. Dep. Agric. For. Serv., Alaska Reg., Juneau. Series No. R10-48. 231 pp.

Griese, H. J. 1987. Unit 6 deer survey-inventory progress report. Pages 17-26 in B. Townsend, ed. Annual report of survey-inventory activities. Part VI. Deer. Vol. XVII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-5. Job 2.0. Juneau. 30pp. pp.

_____. 1988. Unit 6 deer survey-inventory progress report. Pages 22-26 in S. O. Morgan, ed. Annual report of survey-inventory activities. Part VI. Deer. Vol. XVIII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-6. Job 2.0. 28 pp.

_____, and S. Miller. 1987. Summary of Alaska Game Management Unit 6 deer hunter surveys, 1980, 1983 and 1984. Appendix to: H. J. Griese. 1987. Unit 6 deer survey-inventory progress report. Pages 17-26 in B. Townsend, ed. Annual report of survey-inventory activities. Part VI. Deer. Vol. XVII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-5. Job 2.0. Juneau. 30 pp.

Harestad, A. S., and F. L. Bunnell. 1987. Persistence of black-tailed deer fecal pellets in coastal habitats. J. Wildl. Manage. 51:33-37.

Kirchoff, M. D., and K. W. Pitcher. 1988. Deer pellet-group surveys in Southeast Alaska, 1981-1987. Alaska Dep. Fish and Game. Fed. Aid in Wild. Rest. Res. Final Rep. Proj. W-22-6. Job 2.9. Juneau. 113 pp.

Merriam, H. R. 1965. Deer report. Vol. VI. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Rep. Proj. W-6-R-5,6. Jobs 1,2,3,4. Juneau. 39 pp.

Reynolds, J. R. 1979. History and current status of Sitka black-tailed deer in Prince William Sound. Pages 177-183 in O. C. Wallmo and J. W. Schoen, eds. Sitka black-tailed deer: Proceedings of a conference in Juneau, Alaska. U. S. Dep. Agric. For. Serv., Alaska Reg., Juneau. Series No. R10-48.

Robards, F. C. 1952. Annual report game, fur and game fish. U. S. Fish and Wildl. Serv. Cordova. (Memorandum)

Roberson, K. 1986. Range extension of the Sitka black-tailed deer, Odocoileus hemionus sitkensis, in Alaska. Can. Field-Nat. 100 (4):563-565.

Shishido, N. 1986. Seasonal distribution and winter habitat use by Sitka black-tailed deer in the Prince William Sound region, Alaska. M. S. Thesis. Univ. of Alaska, Fairbanks. 105 pp.

Sheets, A. 1960. Sitka black-tailed deer investigations, Pages 48-63 in Anonymous ed. Annual Rep. of Prog. Invest. Proj. of 1959-1960 Seg. Vol. I. Proj. W-6-R-1. Job 2. Juneau.

_____. 1961. Sitka black-tailed deer investigations, Pages 71-111 in Anonymous ed. Annual Rep. of Prog. Invest. Proj. of 1960-1961 Seg. Vol. II. Prog. W-6-R-2. Job 2. Juneau.

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Table 1. Deer pellet-group count results by Uniform Coding Unit (UCU) in Unit 6, May 1988.

UCU	Name	Location	UCU acreage (thousands)	No. plots	Mean groups/ plot
1802	Port Chalmers	Montague Island	19.9	172	0.46
1804	Zaikoff Bay	Montague Island	14.6	183	1.30
1807	Patton Bay	Montague Island	28.6	220	1.23
1810	San Juan Bay	Montague Island	11.0	207	1.00
Subtotal		Montague Island	74.1	782	1.02
1902	Shelter Bay/Deer Cove	Hinchinbrook Island	13.4	186	2.40
1905	Hook Point	Hinchinbrook Island	26.6	226	1.17
Subtotal		Hinchinbrook Island	40.0	412	1.73
2001	NE Hawkins Island	Hawkins Island	15.3	132	1.33
2003	SW Hawkins Island	Hawkins Island	15.5	167	0.85
Subtotal		Hawkins Island	30.8	299	1.06
TOTAL			144.9	1493	1.22

Table 2. Shoreline deer composition count by UCU in Unit 6, March 1988.

UCU	Location	Linear miles searched	Number Deer Observed					Deer/ mile
			Adults	Yearlings	(%)	Unidentified	Total	
1801	Montague Island	23.0	10	0	(0)	0	10	0.4
1802	Montague Island	32.5	1	0	(0)	2	3	0.1
1803	Montague Island	17.0	9	2	(18)	1	12	0.7
1804	Montague Island	17.0	25	9	(26)	4	38	2.2
1805	Montague Island	23.0	20	11	(35)	22	53	2.3
1806	Montague Island	6.5	1	1	(50)	0	2	0.3
1807	Montague Island	16.5	10	4	(29)	0	14	0.8
1808	Montague Island	9.0	26	5	(16)	0	31	3.4
1809	Montague Island	10.5	2	0	(0)	1	3	0.3
1810	Montague Island	13.0	6	1	(14)	2	9	0.7
1812	Montague Island	10.0	2	0	(0)	1	3	0.3
Subtotal	Montague Island	182.5	112	33	(23)	33	178	1.0
1901	Hinchinbrook Island	27.0	6	2	(25)	2	10	0.4
1902	Hinchinbrook Island	14.0	7	1	(13)	1	9	0.6
1903	Hinchinbrook Island	10.0	0	0	--	0	0	0.0
1905	Hinchinbrook Island	21.0	0	0	--	0	0	0.0
Subtotal	Hinchinbrook Island	72.0	13	3	(19)	31	9	0.3
2001	Hawkins Island	31.0	0	0	--	0	0	0.0
2002	Hawkins Island	13.0	1	3	(75)	4	8	0.6
2003	Hawkins Island	8.0	3	3	(50)	6	12	1.5
Subtotal	Hawkins Island	52.0	4	6	(60)	10	20	0.4
TOTAL		306.5	129	42	(25)	46	217	0.7

Table 3. Comparison of separate deer hunter surveys of Cordova harvest ticket holders for the 1987 hunting season.

	Questionnaire	(%)	Hunter interview	(%)
Hunter Sample[a]	190		66	
No. Hunted	145	(76)	47	(71)
No. Successful	105	(72)	38	(81)
Days Hunted	767		351	
Reported Harvest:				
Male	216	(63)	78	(59)
Female	108	(32)	48	(37)
Unknown	17	(5)	5	(4)
Total	341		131	
Chronology of Harvest:				
August	28	(8)	12	(11)
September	2	(6)	15	(14)
October	51	(15)	25	(23)
November	84	(25)	28	(25)
December	93	(27)	30	(27)
Unknown/other[b]	64	(19)	0	(0)
Means:				
Days/Hunters	5.4		7.5	
Days/Successful Hunter	6.0		8.5	
Days/Deer	2.3		2.7	
Deer/Active Hunter	2.4		2.8	
Deer/Successful Hunter	3.3		3.5	
Estimated Total Harvest	1170		1300	

[a]Number of respondents only.
[b]Deer killed date is unknown or outside of legal hunting season.

Table 4. Comparison of distribution of estimated deer harvest for Unit 6, 1980, 1983, 1984 and 1987.

Area	Estimated deer harvest (%)			
	1980	1983	1984	1987
Montague Island	590 (45)	941 (48)	1183 (50)	1050 (37)
Hinchinbrook Island	170 (13)	243 (12)	349 (17)	582 (21)
Hawkins Island	249 (19)	262 (13)	232 (11)	474 (17)
Knight Island	79 (6)	125 (6)	80 (4)	129 (5)
Naked Island	52 (4)	122 (6)	150 (7)	150 (5)
Southwestern PWS	52 (4)	157 (8)	92 (4)	206 (7)
Eastern PWS	26 (2)	44 (2)	62 (3)	59 (2)
Green Island	52 (4)	48 (2)	66 (3)	35 (1)
Northern PWS	1 (<1)	--[a]	15 (1)	63 (2)
Total	1,310 (100)	1,958 (100)	2,244 (100)	2,828 (100)

[a] 1983 unknown location kills were proportionally distributed among known locations.

Table 5. Comparison of Unit 6 historical deer harvest chronology ascertained from deer hunter questionnaires.

Month	No. deer reported killed									
	1980	%	1983	%	1984	%	1987	%	Mean	%
Unk/other[a]	32	3	33	5	49	7	146	18	65.0	8.3
August	49	5	25	4	30	4	54	7	39.5	5.1
September	77	8	56	9	68	9	48	6	62.3	8.0
October	189	20	145	23	222	30	146	18	175.5	22.5
November	288	31	234	38	259	35	239	29	255.0	32.7
December	307	33	127	20	118	16	179	22	182.8	23.4
Total	942	100	620	100	746	100	812	100	780.0	100.0

[a]Unknown month or reported month outside of open hunting season.

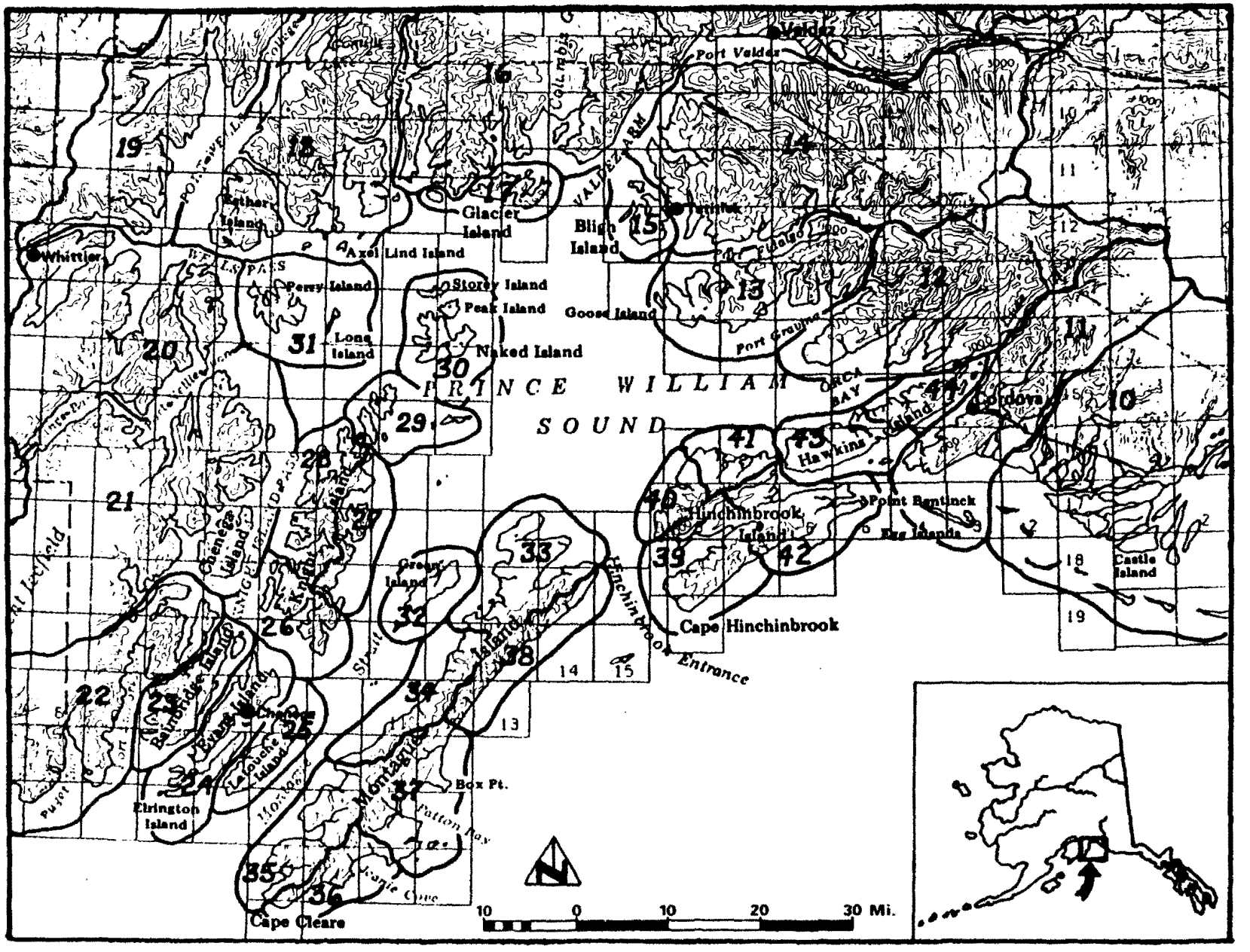


Figure 1. Hunt areas in Prince William Sound, Unit 6.

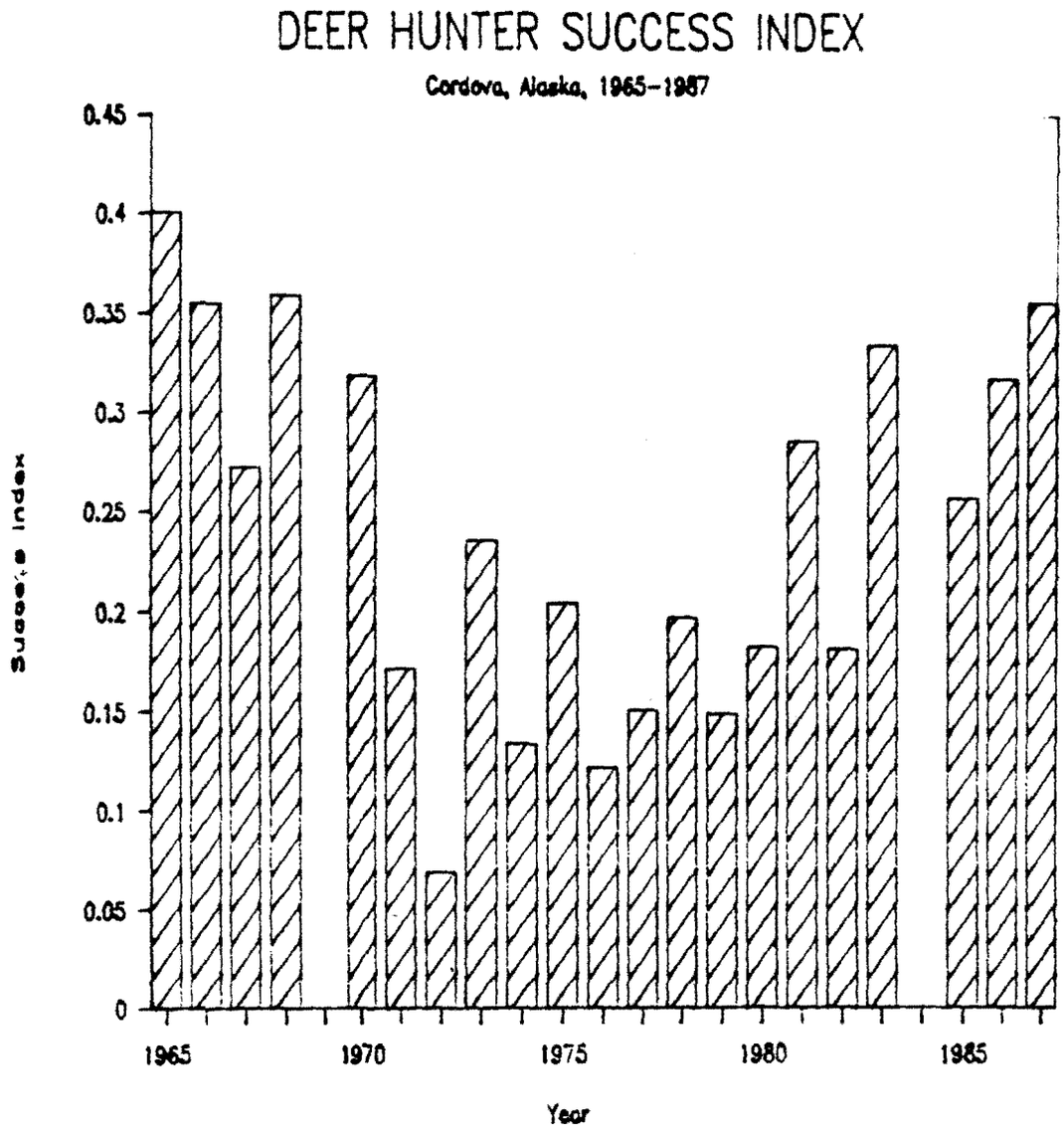


Figure 2. Deer hunter sucess index (%) for Cordova residents, 1965-1987.

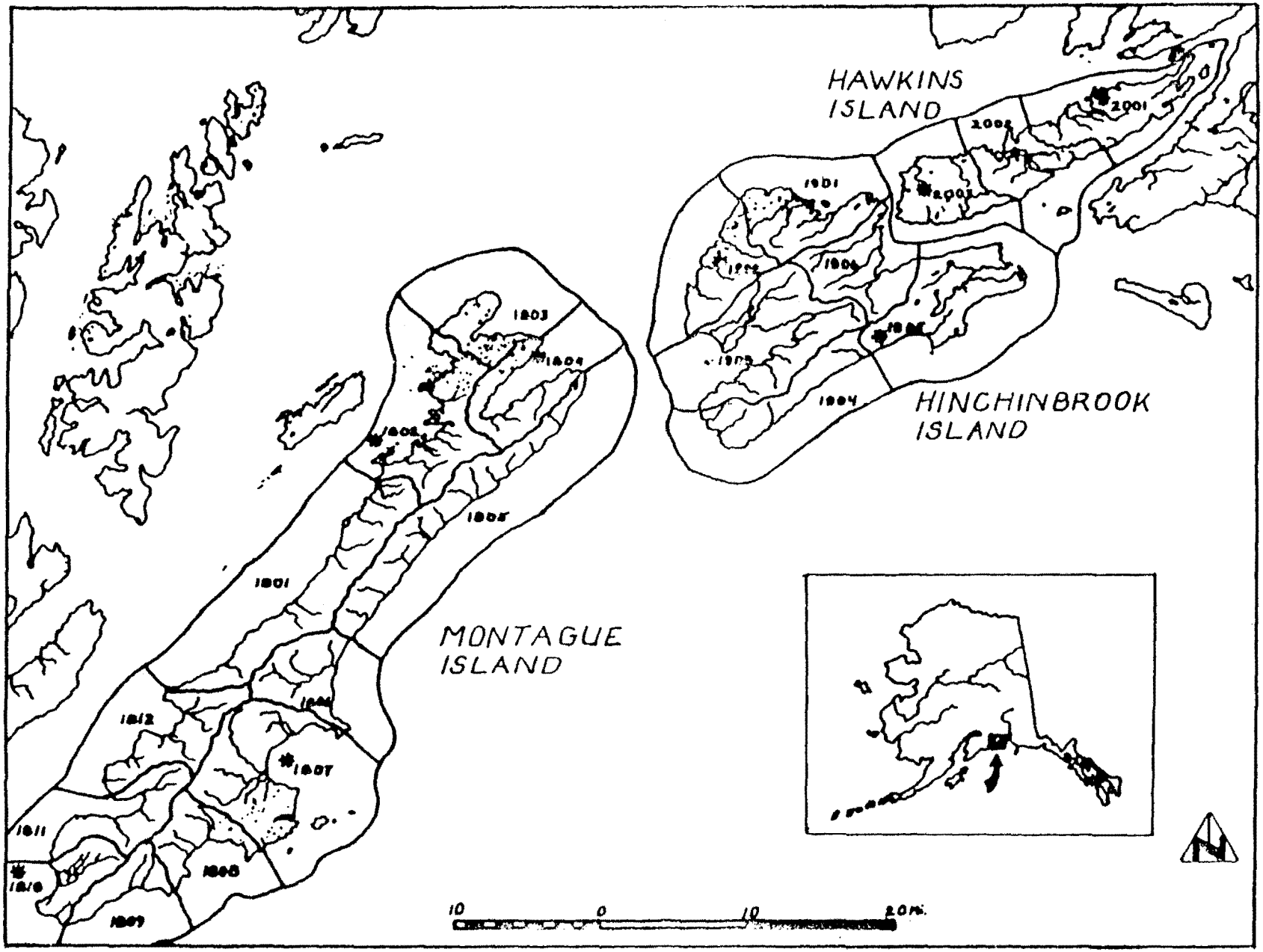


Figure 3. Subhunt areas in Hawkins, Hinchinbrook and Montague Islands.

Appendix A. Deer hunter questionnaire for Game Management Units 6 and 8 for 1987 hunting season.

GENERAL QUESTIONS

16514

1. Did you hunt deer in Alaska during the 1987–88 season? YES ___ NO ___

   If YES, proceed to question number 2.

   If NO, skip to question number 7.

2. We would like to know what factors you consider in determining where to hunt deer. Indicate how desirable each of the following conditions is in selecting your deer hunting area. Use numeral 5 for highly desirable, 4 for desirable, 3 for not considered, 2 for undesirable, and 1 for highly undesirable:

CONDITION

A. Deer very abundant ___
B. Few other hunters ___
C. Public cabin available ___
D. Roads present ___
E. Timber clearcut present ___
F. Area undeveloped ___
G. Boat anchorage present ___
H. Accessible by airplane ___
I. Other harvestable game or fish present ___
J. Brown bear present ___

3. How much money did you spend on your deer hunting activities during the 1987–88 season? Report only YOUR share of the expenses and include the costs for transportation, equipment, ammunition, food, lodging, fuel, special clothing, transportation and preparation of meat, taxidermy, and guiding fees. _____

4. Did you hunt deer in Southeast Alaska (Game Management Units 1, 2, 3, 4, or 5)? YES ___ NO ___

5. Did you hunt deer in Prince William Sound (Game Management Unit 6)? YES ___ NO ___

   If YES, please go to page 2 and complete the questions for Prince William Sound, then return to question 6 on this page.

   If NO, proceed to question 6.

6. Did you hunt deer on Kodiak or the adjacent islands (Game Management Unit 8)? YES ___ NO ___

   If YES, please go to page 6 and complete the questions for Kodiak and Adjacent Islands, then return to question 7 on this page.

   If NO, proceed to question 7.

7. If you have hunted deer in Prince William Sound in previous years, and you would like to comment on availability of public use facilities in that area, then please complete question 10 on page 3.

THANK YOU FOR YOUR COOPERATION. PLEASE FOLD, STAPLE OR TAPE, AND MAIL THE SURVEY AS INDICATED ON THE BACK OF THE FORM.

GAME MANAGEMENT UNIT 6, PRINCE WILLIAM SOUND

Please answer each question completely.
Report only for ***yourself***. Do NOT include your hunting partners or family.

---

1. How many ***separate*** deer hunting ***trips*** did you make during the 1987–88 season? _____
   (enter number of trips)

2. On how many different days did you hunt deer during the 1987–88 season? _____
   (enter total number of days)

3. Refer to the PRINCE WILLIAM SOUND map on page 4. Place a small "x" on the map in ***each*** of the locations where you hunted. You may have several "x's" in one hunt area. If you hunted from a boat, you should place an "x" on ***each*** beach you searched for deer.

4. Please fill in a column in the table below for each "Hunt Area" in which you hunted during the 1987–88 season. Refer to the PRINCE WILLIAM SOUND map to identify the Hunt Area. The Hunt Areas are numbered. For example, Naked Island is Hunt Area number 30.

   Use the following code numbers for the primary method of transportation you used to travel to the hunt area:

   1 Private airplane
   2 Commercial air taxi
   3 Private boat
   4 Charter boat
   5 Highway vehicle
   6 Off-road vehicle
   7 _____ (other)

   Use the following code numbers to indicate the type of lodging that you used while in the field:

   1 None, I did not stay overnight in the field
   2 Boat
   3 Public cabin
   4 Private cabin or lodge
   5 Tent

1987–88 Season **ONLY**	Example	1st Hunt Area	2nd Hunt Area	3rd Hunt Area	4th Hunt Area	5th Hunt Area	6th Hunt Area	7th Hunt Area	8th Hunt Area	9th Hunt Area	10th Hunt Area
Hunt Area number where you hunted	10										
Number of days spent hunting	5										
Transportation method used	3										
Type of lodging	1										
Did you hire an outfitter or guide? (Yes or No)	YES										

(continue to next page)

GAME MANAGEMENT UNIT 6, PRINCE WILLIAM SOUND

16514

5. Did you kill any deer in Game Management Unit 6 during the 1987–88 season? **YES**___ **NO**___

6. Please fill in the following table for each deer ***you*** killed in Game Management Unit 6. Use the same code numbers for Hunt Area that you used to answer question 4.

	Month of Kill (circle one)	Sex (circle one)	Hunt Area (from map)	Specific Location (such as river, lake, bay, island, etc.)
1st deer	Aug. Sept. Oct. Nov. Dec.	Doe Buck		
2nd deer	Aug. Sept. Oct. Nov. Dec.	Doe Buck		
3rd deer	Aug. Sept. Oct. Nov. Dec.	Doe Buck		
4th deer	Aug. Sept. Oct. Nov. Dec.	Doe Buck		
5th deer	Aug. Sept. Oct. Nov. Dec.	Doe Buck		

7. How many brown bears did you see while deer hunting in Unit 6? _____

8. Did you encounter a brown bear in a situation where you felt threatened? **YES**___ **NO**___
If you answered yes, please describe the circumstances. _____

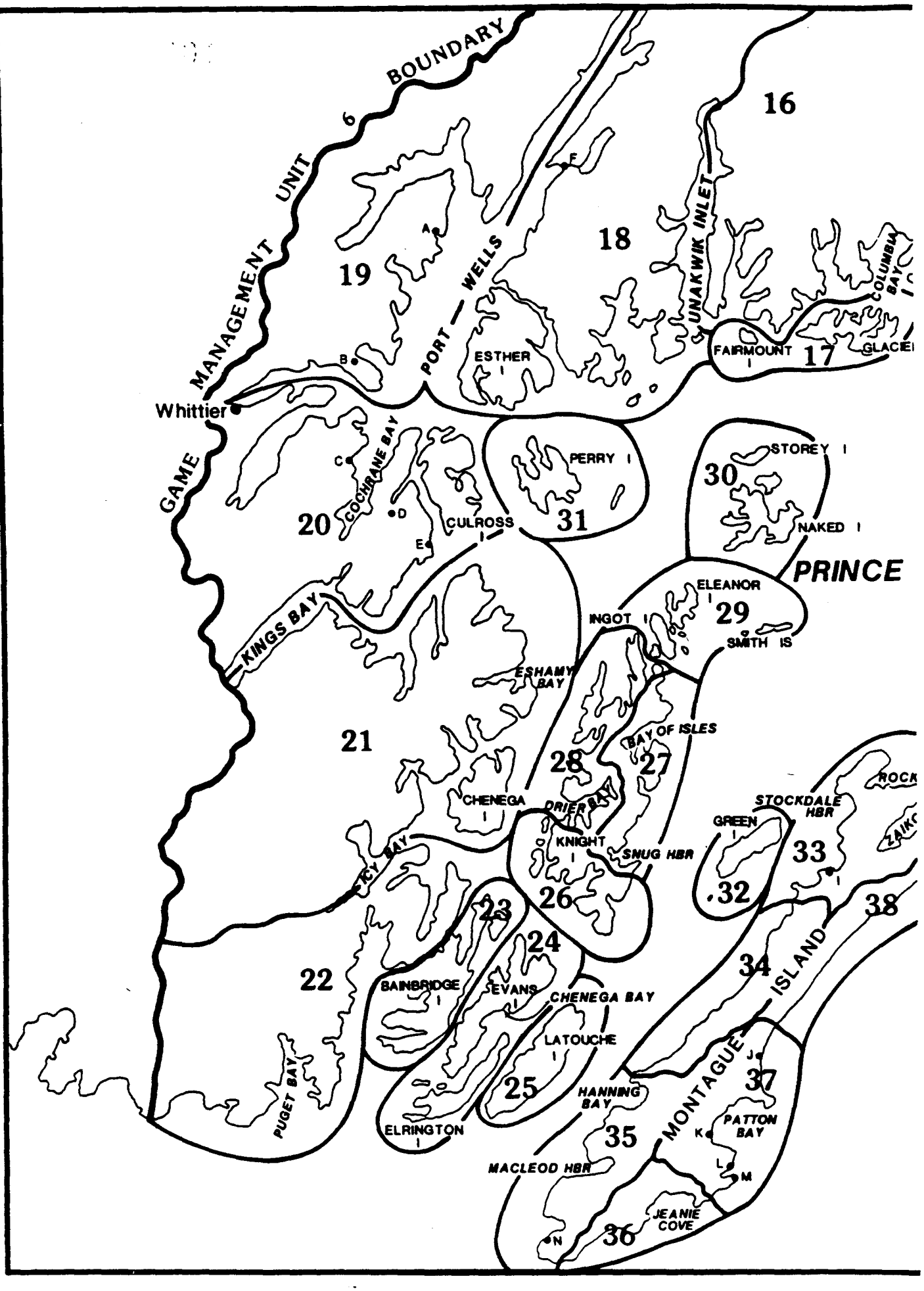
9. Do you have any comments that you would like to add? _____

10. Would you like to see additional recreational facilities in Prince William Sound? **YES**___ **NO**___
If YES, what facilities would you prefer and where would you prefer to locate them? Indicate your preferences from the list below. Order your preferences by writing a 1 next to your highest priority, a 2 next to your second highest priority, etc. Indicate the location where you would like to see the facility located by writing in the Hunt Area number of the area from the Prince William Sound map.

Facility	Preference	Location
Cabin	_____	_____
Anchor Buoy	_____	_____
Tent Platform	_____	_____
Trails	_____	_____
Roads	_____	_____
Other _____ *(specify)*	_____	_____

(Please return to question #6 on page 1)

HUNT AREA NUMBERS IN PRINCE WILLIAM SOUND



Appendix B. RESULTS OF THE 1987-88 DEER HUNTER QUESTIONNAIRE: GAME MANAGEMENT UNIT 6

INTRODUCTION

A questionnaire to determine the total number of deer killed and hunting effort within Unit 6 was last distributed to deer hunters after the 1984 hunting season (Griese and Miller 1987). Obtaining current detailed hunting data was necessary to develop land management plans and to help identify the real and potential effects of timber harvest, commercial outfitters, and varying levels of hunting pressure. In 1988 a questionnaire was distributed to a sample of hunters acquiring 1987-88 Alaska deer harvest tickets. This questionnaire was designed to provide hunter success and effort information for each of 34 hunt areas as well as information relating to land-use patterns, types of transportation, facilities used, and desired additions to recreational facilities.

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OBJECTIVES

1. To determine hunter effort by success, hunt area, and hunter residency.

2. To determine the distribution of deer harvested by sex, month, hunt area, and hunter residency.

3. To provide estimates of total number of individuals hunting deer, deer killed, and hunting days in Unit 6.

4. To determine other characteristics of Unit 6 deer hunters including transportation methods, lodging and commercial operators used, conflicts with brown bears, hunt area selection criteria, needs for new facilities, and estimated hunting expenditures.

METHODS

A questionnaire designed to solicit 1987-88 deer hunting information for Units 6 and 8 was randomly distributed to 6,579 harvest ticket holders during March 1988. The sample came from 10,803 harvest ticket holders. A 2nd mailing of questionnaires was made to nonrespondents but not to undeliverable addresses. Hunters in Unit 6 were asked to report effort and success for each

of 34 subdivisions (hunt areas) of the unit (Fig. 1). Hunting effort in Unit 6 was measured as the number of hunters, hunts, and days spent hunting in each area. Success was assessed for the individual hunter.

A comparison of hunter success rates between 1st and 2nd mailings indicated no significant difference for Unit 6 hunters ($\underline{X}^2$ = 1.98, df = 1, $\underline{P}$ = 0.159). Extending rates of effort and success throughout the harvest ticket population was considered acceptable in this evaluation.

The estimated total number of individuals hunting in Unit 6 was derived from the responses to our questionnaire and a similar questionnaire distributed in Southeast Alaska (Region I). In our questionnaire 18% of 3,270 responding individuals hunted in Unit 6. We assumed this participation rate could be applied to the population of harvest ticket holders; i.e., 0.18 X 10803 = 1959 hunters. Wildlife Conservation staff from Region I distributed a similar questionnaire to 25% of their 12,949 harvest ticket recipients; less than 2% (40 of 2,244) of their respondents indicated they hunted in Units 6 or 8 (M. Thomas, pers. commun.). We therefore assumed that 2% of these harvest ticket holders hunted in Units 6 or 8 and that they hunted there in the same proportion established by our questionnaire results. Respondents to our questionnaire hunted in Units 6 and 8 at a ratio of 1:2.8; therefore, Region I provided an additional 61 hunters (40/2244 X 12949 X 1/3.8) to the total estimate for Unit 6: 2020 hunters.

The estimates of the total number of deer killed and days hunted in Unit 6 were calculated by multiplying the average number of deer killed by sampled hunters (1.4, $\underline{N}$ = 579) and the average number of days hunted by the sample (4.9, $\underline{N}$ = 583) to the sum of estimated hunters (2,020).

Estimates for total deer killed and total hunting days for each hunt area were derived from the following equations:

EDKx X HADKx/DK = EHADKx
EHDx X HAHDx/HD = EHAHDx

where:

EDKx = Estimated deer kill for hunt area x;
EHDx = Estimated hunting days in hunt area x;
HADKx = Reported deer killed in hunt area x;
HAHDx = Reported hunting days in hunt area x;
EHADKx = Estimated total deer killed in hunt area x;
EHAHDx = Estimated total hunting days in hunt area x.

DK = Total reported Unit 6 deer kill; and
HD = Total reported hunting days in Unit 6.

To evaluate the importance of the characteristics of the hunt area, hunters were asked to select the level of desirability for specific

characteristics. Values of +2, +1, 0, -1, and -2 were assigned to the selections "highly desirable, desirable, not considered, undesirable, and highly undesirable", respectively. The average importance of each characteristic was considered to be the sum of values divided by the number of hunters answering that question.

RESULTS

A total estimated 2,020 (±121, 90% CI) individuals hunted an estimated 9919 (±758, 90% CI) days and killed an estimated 2828 (±286, 90% CI) deer in Unit 6. These results suggest that Unit 6 has experienced an almost 30% increase in hunters, hunting effort, and harvest since 1984.

Hunters receiving deliverable questionnaires, returned them at the low rate of 53% after 2 mailings. Only 47% of questionnaires sent to Unit 6 residents were returned, compared with 62% returned by Anchorage residents and 58% returned by all others. Return rates for deliverable questionnaires in 1980, 1983, and 1984 were 72%, 63%, and 77%, respectively. Hunters were sent 2 reminder letters in 1980 and no reminder letters in the latter 2 years of questionnaires (Griese and Miller 1987). The low return rate is attributed to the length and detail requested on the questionnaire. Because of the low response rate, caution should be taken when considering the results. A response rate of only 53% poses some question to the broad application of effort and harvest rates to the entire harvest ticket population.

Of the 968 hunts reported in Unit 6, 44% were successful (Table 1). Because of their proximity to Cordova, hunt areas 43 and 44 on Hawkins Island accounted for 18% of the hunts. Areas 33 and 37 on Montague Island accounted for a combined percentage of 16% of the hunts. Sixty percent of the successful hunts occurred in areas 33, 37, 39, and 40.

Respondents reported 2,865 days hunted in Unit 6 (Table 1). Montague Island accounted for 36% of the total hunting effort; hunt areas 33, 35, and 37 accounted for 32%. Hawkins and Hinchinbrook Islands, (i.e., areas 39-44), accounted for 28% of all hunting days.

Successful hunters hunted 51% of 2,865 total reported hunting days. It would appear that successful and unsuccessful hunters expended almost equal hunting effort; however, successful hunters averaged 3.7 days per hunt, (Table 1) while unsuccessful hunters averaged only 2.8 days per hunt.

Responding hunters reported a minimum harvest of 811 deer: 64% males, 32% females, and 5% not specified. Sixty seven percent of all deer whose sex was known were males. Hunt areas 33 on Montague Island accounted for the greatest percentage of the harvest; i.e., 17%. Areas 37 accounted for the 2nd-highest harvest, followed by area 43 and 44 on Hawkins Island (Table 1). Hunters reported the greatest deer harvest (30%) during the month of November (Table 2).

Eighteen percent of the hunters failed to provide the month of their harvest. The 2 largest monthly harvests for individual hunt areas were in areas 33 and 37 in November.

Hunter success and effort were disproportionately distributed among zones of hunter residency. Although Anchorage hunters accounted for 36% of the hunting days in Unit 6, they killed 28% of the reported harvest (Table 3); whereas, Unit 6 residents accounted for 32% of the hunting days but capitalized on their greater familiarity of the unit to account for 49% of the harvest. Other Alaskans accounted for 30% of the hunting days and 23% of the harvest.

The distribution of deer killed by Anchorage hunters (Table 4) suggest that Montague Island, particularly hunt areas 33, 35 and 37, was important to them. Unit 6 residents killed most of their deer in hunt areas 43 and 44 on Hawkins Island and area 33 on northern Montague Island. Other Alaskan residents killed most of their deer on Montague, Naked, and Hinchinbrook Islands.

Respondents reported that private boats and air taxis provided 80% of their transportation to deer hunting areas in Unit 6 (Table 5). Private boats were uniformly the dominant form of transportation to most hunt areas, with the exception of the southern and eastern portions of Montague Island and the mainland east of Cordova. Charter boats concentrated on Naked, northern Montague, and western Hinchinbrook Islands. Notably missing in the reported results was ORV use on the major islands. The use of ORV's by hunters has increased in recent years, primarily on Hawkins and Hinchinbrook Islands. Respondents who used them reported the primary method of transportation to the islands was either boat or airplane.

Respondents overnighted predominantly on boats, while hunting in Unit 6 (Table 6). Day only hunts were a common practice in hunt areas near communities and hatcheries. Only 14% of the hunters in Unit 6 braved the coastal weather in tents. Respondents seemed to be confused on the location or status of cabins in Unit 6, as indicated by their wide use of areas where public cabins are now available.

Respondents indicated that commercial outfitters or guides are generally not used by deer hunters in Prince William Sound. Of 932 respondents to the question, only 21 (2.2%) hired an outfitter or guide. Hunt areas and number of hunters involved in these operations, respectively, are as follows: 33 (4 hunters); 42 (3); 27, 29, 30, 43 and 44 (2); and 26, 28, 34 and 39 (1).

Only 84 hunters indicated whether they observed brown bear while deer hunting. The design of the question apparently produced the low response rate, reducing the value of the results; e.g., hunters who had not observed bears were not likely to indicate that they saw zero bears. One hunter reported seeing 8 bears.

Of 564 hunters in Unit 6, only nine (2%) felt threatened by brown bears encountered while hunting deer; those hunters reported that they hunted in the following hunt areas, in descending order: 39 (4 hunters); 40 (3); 42 and 43 (2); and 33, 41, and 44 (1). Areas hunted that have no brown bears were not considered. Hinchinbrook Island stood out as the primary area of bear and deer hunter conflicts, followed by Hawkins Island.

Deer hunters in Unit 6 selected hunting areas where they felt deer were abundant, hunter densities were low, and access was primarily by boat (Table 7). They apparently felt areas accessible by road and having clearcuts were undesirable for hunting. In descending magnitude, hunters were less decisive about the importance of other game, brown bears, access by airplane, and the presence of cabins. Individuals hunting deer elsewhere in Alaska differed only in their greater desire for airplane and road access.

The majority (64%) of deer hunters in Unit 6 preferred no additional facilities. In order of preference, those facilities that were desired by the remainder were cabins, tent platforms, anchor buoys, trails, and roads. Daily average hunting expenditure for hunting in Unit 6 ranged from $77 for residents of Unit 6 to $400 for residents of Unit 8. When a weighted average of these daily costs ($133.69) was multiplied by the total estimated hunting days (9919), hunters spent approximately $1.3 million in 1987.

DISCUSSION

Because the hunter questionnaire was too long and difficult to follow, it reduced the response rate. Clearly, future questionnaires should be designed for maximum response rate, while providing minimum deer management data needs.

Evidence that effort and success differed between hunters of different zones of residency suggested that unweighted application of effort and success rates provided less accurate estimates. In addition, disproportionate response rates from the different zones of residency were likely to underestimate the actual harvest and effort.

The reported harvest of Tatitlek and Chenega Bay villages produced a largely underestimated projected deer harvest. The return rate of questionnaires for these villages was well below the overall average. Of 24 deliverable questionnaires only 4 (17%) were returned. Only 10 deer were reported killed by those hunters, producing an estimated harvest of 34, using the overall projection factor (1.4) or 96 using a projection factor tailored for their response rate. In a house-to-house survey, Subsistence Division staff recorded a range of 128-133 deer killed by Tatitlek residents in 1987 (L. Stratton, pers commun). Similarly, the actual harvest by Chenega Bay residents probably ranged between 50 and 80 deer. An adjusted harvest for the residents of this portion of Unit 6 would more closely approach 200 deer, 6 times the uncorrected projection. Future estimates of deer harvest, number of hunters,

and hunt days should be individually calculated by zone of residency to attempt to more accurately represent the true levels in Unit 6.

The deer population in Unit 6 is thriving under a long series of mild or moderate winters. The increasing deer harvest over the past decade is beneficial to the enlarging deer population because it reduces competition for winter food sources. Evidence of the increasing deer population in Unit 6 is the substantial harvest in northern Prince William Sound.

The Prince William Sound deer population at its current density and level of exploitation is a valuable resource, even when considering only hunter expenses. Not included in this value are nonconsumptive user expenses, use values (i.e., user's willingness to pay over and above current expenditures), existence values (i.e., what one would pay just to keep it there), and other values. This annually perpetuating resource becomes more than an incidental recreational resource, when the total economic value is considered. Land managers should closely evaluate other resource uses that would cause long-term reductions in the deer population, if they wish to maintain the public's trust.

LITERATURE CITED

Griese, H.J. and S. M. Miller. 1987. Summary of Alaska Game Management Unit 6 deer hunter surveys, 1980, 1983 and 1984. Appendix to: H.J. Griese. 1987. Unit 6 deer survey-inventory progress report. Pages 17-26 in B. Townsend, ed. Annual report of survey-inventory activities. Part VI. Deer. Vol. XVI. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Project W-22-5. Job 2.0. Juneau. 30pp.

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Table 1. Reported and estimated deer hunting effort and success by hunt area during 1987 in Unit 6, Alaska.

Hunts in Area				Days Hunted[b]				Deer Harvested		
Hunt Area	Reported No.	Reported (%)	(%) Successful	Reported No.	Reported (%)	Estimated Total[a]	Successful Hunts	Reported No.	Reported (%)	Estimated Total[a]
10	3	0.3	33	6	0.2	21	--	1	0.1	3
11	25	2.6	24	79	2.8	274	2.0	6	0.7	21
12	21	2.2	24	36	1.3	125	3.8	7	0.9	24
13	3	0.3	0	13	0.5	45	--	0	0.0	0
14	2	0.2	0	11	0.4	38	--	0	0.0	0
15	5	0.5	20	13	0.5	45	1.0	1	0.1	3
16	5	0.5	40	14	0.5	48	2.5	2	0.2	7
17	13	1.3	38	42	1.5	145	2.4	8	1.02	8
18	6	0.6	50	15	0.5	52	3.0	5	0.6	17
19	10	1.0	50	11	0.4	38	1.2	8	1.0	28
20	47	4.9	26	138	4.8	478	3.1	21	2.6	73
21	22	2.3	41	59	2.1	204	3.1	19	2.3	66
22	1	0.1	0	4	0.1	14	--	0	0.0	0
23	6	0.6	33	9	0.3	31	1.0	2	0.2	7
24	24	2.5	21	40	1.4	138	2.0	8	1.0	28
25	12	1.2	42	14	0.5	48	1.6	10	1.2	35
26	17	1.8	29	37	1.3	128	2.8	9	1.1	31
27	21	2.2	33	59	2.1	204	4.9	14	1.7	49
28	16	1.7	6	31	1.1	107	1.0	1	0.1	3
29	36	3.7	31	73	2.5	253	3.1	13	1.6	45
30	55	5.7	44	186	6.5	644	4.3	43	5.3	150
31	16	1.7	6	32	1.1	111	4.0	1	0.1	3
32	19	2.0	32	68	2.4	235	5.5	10	1.2	35
33	92	9.5	62	313	10.9	1084	3.7	138	17.0	481
34	11	1.1	55	30	1.0	104	3.3	8	1.0	28
35	52	5.4	35	264	9.2	914	5.1	38	4.7	133
36	23	2.4	57	79	2.8	274	4.2	26	3.2	91
37	66	6.8	65	339	11.8	1174	5.6	79	9.7	275
38	6	0.6	33	13	0.5	45	3.0	3	0.4	10
39	27	2.8	63	80	2.8	277	3.1	41	5.1	143
40	17	1.8	82	36	1.3	125	2.8	33	4.1	115
41	56	5.8	55	176	6.1	609	3.6	59	7.3	206
42	48	5.0	44	123	4.3	426	3.5	39	4.8	136
43	75	7.7	49	194	6.8	672	3.3	72	8.9	251
44	95	9.8	44	202	7.1	699	2.5	64	7.9	223
Unk	15	1.5	40	26	0.9	90	6.5	22	2.7	77
Total	968	100	44	2865	100	9919	3.7	811	100	2828

[a] Total estimate incorporates results of Region 1 questionnaire.
[b] Mean of sum of individual hunter's deer killed/day. Hunters not specifying days or number of deer harvested were excluded.

Table 2. Reported harvest by month and hunt area in Unit 1, 1987.

Hunt area	Aug.	%	Sept.	%	Oct.	%	Nov.	%	Dec.	%	Unk.	%	Total	%
10	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	1	0.1
11	1	0.1	0	0.0	1	0.1	2	0.2	2	0.2	0	0.0	6	0.7
12	0	0.0	1	0.1	3	0.4	1	0.1	2	0.2	0	0.0	7	0.9
13	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
14	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
15	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	1	0.1
16	0	0.0	0	0.0	0	0.0	0	0.0	2	0.2	0	0.0	2	0.2
17	0	0.0	1	0.1	0	0.0	4	0.5	0	0.0	3	0.4	8	1.0
18	0	0.0	0	0.0	0	0.0	5	0.6	0	0.0	0	0.0	5	0.6
19	0	0.0	0	0.0	0	0.0	0	0.0	6	0.7	2	0.2	8	1.0
20	0	0.0	0	0.0	2	0.2	9	1.1	9	1.1	1	0.1	21	2.6
21	0	0.0	0	0.0	0	0.0	5	0.6	13	1.6	1	0.1	19	2.3
22	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
23	0	0.0	0	0.0	1	0.1	1	0.1	0	0.0	0	0.0	2	0.2
24	2	0.2	2	0.2	1	0.1	1	0.0	0	0.0	2	0.2	8	1.0
25	1	0.1	1	0.1	0	0.0	0	0.0	8	1.0	0	0.0	10	1.2
26	0	0.0	0	0.0	0	0.0	4	0.5	3	0.4	2	0.2	9	1.1
27	1	0.1	0	0.0	1	0.1	3	0.4	0	0.0	9	1.1	14	1.7
28	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	1	0.0	1	1.7
29	2	0.2	0	0.0	3	0.4	3	0.4	4	0.5	1	0.1	1	3.6
30	5	0.6	3	0.4	8	1.0	12	1.5	10	1.2	5	0.6	43	5.3
31	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
32	0	0.0	0	0.0	4	0.5	1	0.1	0	0.0	5	0.6	10	1.2
33	6	0.7	6	0.7	35	4.3	40	4.9	21	2.6	30	3.7	138	17.0
34	4	0.5	0	0.0	1	0.1	0	0.0	0	0.0	3	0.4	8	1.0
35	0	0.0	1	0.1	11	1.4	11	1.4	3	0.4	12	1.5	38	4.7

-continued-

Table 2. Continued.

Hunt area	Aug.	%	Sept.	%	Oct.	%	Nov.	%	Dec.	%	Unk.	%	Total	%
36	4	0.5	4	0.5	4	0.5	11	1.4	2	0.2	1	0.1	26	3.2
37	1	0.1	2	0.2	11	1.4	37	4.6	11	1.4	17	2.1	79	9.7
38	0	0.0	0	0.0	0	0.0	3	0.4	0	0.0	0	0.0	3	0.4
39	3	0.4	3	0.4	10	1.2	10	1.2	9	1.1	6	0.7	41	5.1
40	0	0.0	0	0.0	8	1.0	3	0.4	13	1.6	9	1.1	33	4.1
41	2	0.2	0	0.0	12	1.5	18	2.2	14	1.7	13	1.6	59	7.3
42	4	0.5	5	0.6	4	0.5	6	0.7	12	1.5	8	1.0	39	4.8
43	9	1.1	9	1.1	12	1.5	19	2.3	15	1.8	8	1.0	72	8.9
44	8	1.0	10	1.2	13	1.6	13	1.6	13	1.6	7	0.9	64	7.9
Unk	1	0.1	0	0.0	1	0.1	15	1.8	5	0.6	0	0.0	22	2.7
Total	54	6.7	48	5.9	146	18.0	239	29.5	178	21.9	146	18.0	811	100

Table 3. Reported deer hunter effort and harvest by zone of residency in Unit 6, 1987.

Residency zone	Days hunted				Deer killed			
	No. days	%	No. hunters	%	No. deer	%	No. hunters	%
Unit 6 Rural	777	27	146	25	344	42	148	26
Unit 6 Nonrural[a]	149	5	30	5	50	6	30	5
Subtotal	926	32	176	30	394	48	178	31
Anchorage	1044	36	223	38	227	28	222	38
Alaska-Other	852	30	174	30	187	23	169	29
Non-Alaska	42	1	10	2	3	<1	10	2
Total	2864	100	583	100	811	100	579	100

[a] Hunters with Valdez or Whittier mailing addresses.

Table 4. Reported harvest for hunt area by zone of hunter residency in Unit 6, 1987.

Hunt area	Unit 6		Anchorage		All other[a]		Total	
	No. deer	%	No. deer	%	No. deer	%	No. deer	%
10	1	0.3	0	0.0	0	0.0	1	0.1
11	6	1.5	0	0.0	0	0.0	6	0.7
12	7	1.8	0	0.0	0	0.0	7	0.9
15	1	0.3	0	0.0	0	0.0	1	0.1
16	2	0.5	0	0.0	0	0.0	2	0.2
17	1	0.3	4	1.8	3	1.6	8	1.0
18	2	0.5	0	0.0	3	1.5	6	0.6
19	4	1.0	4	1.8	0	0.0	8	1.0
20	6	1.5	8	3.5	7	3.7	21	2.6
21	8	2.0	5	2.2	6	3.2	19	2.3
23	2	0.5	0	0.0	0	0.0	2	0.2
24	3	0.8	5	2.2	0	0.0	8	1.0
25	4	1.0	0	0.0	6	3.2	10	1.2
26	1	0.3	8	3.5	0	0.0	9	1.1
27	5	1.3	3	1.3	6	3.2	14	1.7
28	0	0.0	1	0.4	0	0.0	1	0.1
29	4	1.0	6	2.6	3	1.6	13	1.6
30	18	4.6	7	3.1	18	9.5	43	5.3
31	1	0.3	0	0.0	0	0.0	1	0.1
32	4	1.0	3	1.3	3	1.6	10	1.2
33	65	16.5	53	23.3	20	10.5	138	17.0
34	0	0.0	6	2.6	2	1.1	8	1.0
35	0	0.0	23	10.1	15	7.9	38	4.7
36	0	0.0	14	6.2	12	6.3	26	3.2
37	6	1.5	44	19.4	291	5.3	79	9.7
38	2	0.5	1	0.4	0	0.0	3	0.4
39	26	6.6	6	2.6	9	4.7	41	5.1
40	22	5.6	4	1.8	7	3.7	33	4.1
41	38	9.6	5	2.2	16	8.4	59	7.3
42	31	7.9	3	1.3	5	2.6	39	4.8
43	66	16.8	3	1.3	3	1.6	72	8.9
44	52	13.2	0	0.0	12	6.3	64	7.9
Unk	6	1.5	11	4.8	5	2.6	22	2.7
Total	394	100	227	100	190	100	811	100

[a] All other includes other Alaskans, nonresidents, and non-U.S. citizens.

Table 5. Reported transportation method by hunt area for deer hunters in Unit 6, 1987.

Hunt area	Private airplane	%	Air taxi	%	Private boat	%	Charter boat	%	Highway vehicle	%	Off-road vehicle	%	Other/ unknown	%	Total
10	0	0	0	0	1	33	0	0	0	0	1	33	1	33	33
11	2	8	0	0	6	23	0	0	9	35	0	0	9	35	26
12	0	0	2	9	17	74	0	0	0	0	0	0	4	17	23
13	0	0	0	0	3	100	0	0	0	0	0	0	0	0	3
14	0	0	0	0	1	50	1	50	0	0	0	0	0	0	2
15	0	0	0	0	5	100	0	0	0	0	0	0	0	0	5
16	0	0	0	1	20	3	60	1	20	0	0	0	0	0	5
17	0	0	2	15	6	46	4	31	0	0	0	0	1	8	13
18	0	0	1	17	5	83	0	0	0	0	0	0	0	0	6
19	0	0	3	30	7	70	0	0	0	0	0	0	0	0	10
20	0	0	5	10	41	84	2	4	1	2	0	0	0	0	49
21	1	5	1	5	19	86	1	5	0	0	0	0	0	0	22
22	0	0	0	0	1	100	0	0	0	0	0	0	0	0	1
23	0	0	1	17	5	83	0	0	0	0	0	0	0	0	6
24	0	0	3	12	19	76	3	12	0	0	0	0	0	0	25
25	0	0	2	17	9	75	0	0	0	0	0	0	1	8	12
26	1	6	1	6	14	82	1	6	0	0	0	0	0	0	17
27	1	5	2	9	17	77	2	9	0	0	0	0	0	0	22
28	1	6	1	6	14	88	0	0	0	0	0	0	0	0	16
29	0	0	0	0	31	91	3	9	0	0	0	0	0	0	34
30	0	0	6	11	40	71	10	18	0	0	0	0	0	0	56
31	0	0	1	6	13	81	2	13	0	0	0	0	0	0	16
32	0	0	5	26	13	68	1	5	0	0	0	0	0	0	19
33	11	12	13	14	50	56	13	14	0	0	0	0	3	3	90
34	7	64	1	9	3	27	0	0	0	0	0	0	0	0	11
35	14	27	31	60	7	13	0	0	0	0	0	0	0	0	52
36	12	55	9	41	1	5	0	0	0	0	0	0	0	0	22
37	23	35	41	62	1	2	0	0	0	0	0	0	0	0	66
38	4	57	1	14	2	29	0	0	0	0	0	0	0	0	7

-continued-

Table 5. Continued.

Hunt area	Private airplane	%	Air taxi	%	Private boat	%	Charter boat	%	Highway vehicle	%	Off-road vehicle	%	Other/ unknown	%	Total
39	1	4	2	7	24	89	0	0	0	0	0	0	0	0	27
40	1	6	3	18	10	59	2	12	0	0	0	0	1	6	17
41	2	4	12	22	30	55	8	15	0	0	0	0	3	5	55
42	15	29	10	20	24	47	0	0	0	0	0	0	2	4	51
43	1	1	13	16	65	78	0	0	0	0	0	0	4	5	83
44	1	1	14	14	82	83	0	0	0	0	0	0	2	2	99
Unk	0	0	0	0	4	80	0	0	0	0	0	0	1	20	5
Total	98	10	187	19	593	61	54	6	10	1	1	<1	33	3	976

Table 6. Reported overnight lodging of deer hunters by hunt area in Unit 6, 1987.

Hunt area	None	%	Boat	%	Public cabin	%	Private cabin	%	Tent	%	Unknown	%	Total
10	0	0	0	0	0	0	0	0	2	67	1	33	3
11	21	81	2	8	1	4	0	0	0	0	2	8	26
12	10	43	10	43	0	0	0	0	0	0	3	13	23
13	0	0	1	33	0	0	0	0	2	67	0	0	3
14	1	50	0	0	0	0	0	0	1	50	0	0	2
15	1	20	2	40	0	0	0	0	2	40	0	0	5
16	1	20	0	0	0	0	2	40	1	20	1	20	5
17	0	0	6	46	0	0	1	8	6	46	0	0	13
18	3	50	1	17	0	0	1	17	1	17	0	0	6
19	0	0	9	90	1	10	0	0	0	0	0	0	10
20	4	8	30	61	5	10	1	2	9	18	0	0	49
21	2	9	15	68	1	5	1	5	3	14	0	0	22
22	0	0	0	0	1	100	0	0	0	0	0	0	1
23	0	0	6	100	0	0	0	0	0	0	0	0	6
24	2	8	22	88	1	4	0	0	0	0	0	0	25
25	3	25	9	75	0	0	0	0	0	0	0	0	12
26	0	0	14	82	0	0	1	6	2	12	0	0	17
27	0	0	20	91	0	0	0	0	2	9	0	0	22
28	0	0	13	81	1	6	0	0	2	13	0	0	16
29	0	0	30	88	1	3	0	0	3	9	0	0	34
30	3	5	43	77	1	2	1	2	6	11	2	4	56
31	1	6	11	69	0	0	2	13	2	13	0	0	16
32	0	0	14	74	4	21	1	5	0	0	0	0	19
33	7	8	66	73	8	9	0	0	7	8	2	2	90
34	2	18	4	36	0	0	0	0	5	45	0	0	11
35	1	2	7	13	12	23	9	17	23	44	0	0	52
36	7	32	1	5	2	9	1	5	11	50	0	0	22
37	1	2	1	2	29	44	11	17	22	33	2	3	66

-continued-

Table 6. Continued.

Hunt area	None	%	Boat	%	Public cabin	%	Private cabin	%	Tent	%	Unknown	%	Total
38	0	0	2	29	2	29	0	0	3	43	0	0	7
39	2	7	20	74	0	0	1	4	4	15	0	0	27
40	2	12	9	53	0	0	1	6	3	18	2	12	17
41	6	11	29	53	14	25	2	4	2	4	2	4	55
42	14	27	16	31	13	25	5	10	2	4	1	2	51
43	30	36	39	47	1	1	6	7	4	5	3	4	83
44	50	51	29	29	1	1	3	3	11	11	5	5	99
Unk	0	0	2	40	0	0	0	0	0	0	3	60	5
Total	174	17	483	49	99	10	50	5	141	14	29	3	976

Table 7. Desirability values for hunt area characteristics considered by individuals hunting deer in Unit 6 vs. individuals hunting deer elsewhere in Alaska.

Characteristic	Hunted Unit 6 (N = 593			Hunted elsewhere (N = 1595)		
	Mean desirability value[a]	No. hunters not considering characteristics	%	Mean desirability value[a]	No. hunters not considering characteristics	%
Deer abundance	+1.35	38	(6)	+1.45	78	(5)
Few hunters	+1.28	43	(7)	+1.41	121	(8)
Undeveloped	+1.10	73	(12)	+1.13	207	(13)
Boat access	+0.80	114	(19)	+0.46	501	(31)
Other game available	+0.50	203	(34)	+0.62	473	(30)
Airplane access	+0.37	177	(30)	+0.75	372	(23)
Cabin available	-0.17	229	(39)	-0.37	584	(37)
Brown bear present	-0.40	173	(29)	-0.22	562	(35)
Clearcuts present	-0.67	211	(36)	-0.53	600	(38)
Road access	-1.12	144	(24)	-0.87	316	(20)

[a] Desirablility value is mean of N values where: "highly desirble" = +2; "desirable" = +1; "not considered" = 0; "undesirable" = 1; and "highly undesirable" = 2.

Appendix C. Comparison of deer hunter questionnaire results for Game Management Unit 6, 1989, 1983, 1984, and 1987.

	1980	1983	1984	1987
Harvest ticket holders sampled	16756	10169[a]	11726[a]	10803[b]
Questionnaires distributed	16756	6000	6000	6579
Percent deliverable questionnaires returned	72	63	77	53
Mailings	3	1	1	2
Respondents hunting Unit 6	899	323	545	583
Estimate of total hunters	1250	1020	1600	2020[c]
Reported successful hunters (%)	439 (49)	260 (81)	318 (58)	317 (55)
Reported deer killed	942	620	746	811
Estimate of total deer killed	1310	1959	2198	2828[c]
Percent male deer in reported kill	64	62	64	64
Percent deer killed by Cordovans	37	--[d]	34	41
Reported hunter days	4455	1692	2542	2864
Estimated total hunter days	6350	5540	7800	9919[c]
Means:				
Hunting days/hunter	5.0	5.2	4.8	4.9
Hunting days/deer	4.7	2.7	3.4	3.5
Deer killed/hunter	1.0	1.9	1.4	1.4
Deer killed/successful hunter	2.2	2.4	2.4	2.6

Appendix C. Continued.

	1980	1983	1984	1987
Percent successful hunters taking:				
5 or more deer[e]	0.6	10.8	11.3	17.9
4 deer	11.3	10.8	10.4	9.7
3 deer	13.5	17.7	18.2	14.4
2 deer	26.2	26.2	21.7	24.8
1 deer	48.5	34.6	38.4	33.2

[a] 1983 and 1984 questionnaires sampled only "rainbelt" harvest ticket holders.
[b] Sample excludes Southeast Alaska ticket holders.
[c] Estimate includes estimates for Southeast Alaska harvest ticket holders.
[d] Data collected but not separated.
[e] Legal bag limit increased from 4 to 5 in 1982.

STUDY AREA

GAME MANAGEMENT UNIT: 8 (8750 mi^2)

GEOGRAPHICAL DESCRIPTION: Kodiak, Afognak, and adjacent islands.

BACKGROUND

Sitka black-tailed deer were first introduced into the Kodiak area in 1924. Numbers steadily increased until deep and persistent snow conditions in 1969-70 and 1970-71 resulted in a precipitous population decline. Milder weather since 1971 has allowed deer to expand into all available habitat. Deer now occur in high densities in habitat types ranging from mature Sitka spruce timber on Afognak-Shuyak and northern Kodiak Islands to heath-sedge tundra vegetation on southwestern Kodiak Island.

Both harvest and hunting pressure have increased steadily since the late 1970's. From an estimated annual harvest of 587 deer in 1972, the harvest has increased to more than 10,000 in 1987. More remote parts of western Kodiak Island receive little hunting pressure, while relatively high hunter densities occur in easily accessible areas of northern Kodiak and Afognak Islands. Although the demand for deer hunting is still increasing, it is doing so at a slower rate than that recorded before the statewide slump in the Alaskan economy developed in 1987. Despite a 5.5-month-long season and a liberal bag limit, the deer population remains underharvested. Only in northeastern Kodiak Island, with its good road access and dense human population, does hunting have the potential to impact the deer population.

POPULATION OBJECTIVES

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

METHODS

Hunter questionnaires were mailed to 6,579 deer harvest ticket holders. Hunting effort and harvest data were extrapolated from 3,270 questionnaires returned, using estimators developed from previous hunter surveys (Smith 1986).

Natural mortality was assessed by (1) walking transects in coastal deer wintering areas, (2) interviewing local residents, and (3) monitoring winter snow conditions. No population composition surveys were conducted during this reporting period. Limited observations of range conditions were incidentally made during winter mortality surveys.

RESULTS AND DISCUSSION

Population Status and Trend

The deer population is high throughout Unit 8. Improved hunting success reported by hunters on Afognak Island in 1987 indicates the population there has recovered from a moderate decline that occurred there in the early 1980's.

Population Size:

Dense vegetative cover, precipitous terrain, and seasonal movements of deer make estimating population numbers extremely difficult. While the estimated harvest in 1987 exceeded 10,000 deer, many areas received relatively light hunting pressure. The deer population probably exceeds 100,000 animals. Developing census methods for deer is not a high priority, because the population is relatively lightly harvested and is subject to large fluctuations associated with winter severity.

Hunters perceive the population to be abundant. The largest number of general comments (49) on the 1987-88 questionnaire had to do with abundant deer (Table 1). Only a few responses referred to perceived deer scarcity.

Hunters reported seeing a high proportion of yearling deer during the 1987-88 hunting season. In early October hunters reported seeing large groups of mostly yearling deer of both sexes along beaches on western Kodiak Island. The high abundance of yearling deer was consistent with the apparent high overwinter survival during the 1986-87 winter. Other data were collected during this reporting period.

Mortality

Season and Bag Limit:

The open season for subsistence, resident, and nonresident hunters in that portion of Kodiak Island north of the access road from Port Lions to Crescent Lake 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 north of a line from Sequel Point to Pasagshak Pass and north of the area draining into Ugak Bay east of a line from the mouth of Saltery Creek to Crag Point is 1 August to 31 October. The bag limit is 1 deer; however, antlerless deer may be taken only from 1 to 31 October.

The open season for subsistence, resident, and nonresident hunters in that portion of Kodiak Island east of a line taken only from the mouth of Saltery Creek to Crag Point draining into Ugak Bay and south of a line from Sequel Point to Pasagshak Pass is 1 August to 15 December. The bag limit is 1 deer; however, antlerless deer may

be taken only from Oct. 1-Oct 31. The open season for the remainder of Unit 8 is from 1 August to 7 January. The bag limit is 5 deer; however, antlerless deer may be taken only from Sept. 15-January 7.

Human-induced Mortality:

Questionnaires suggest that hunters killed an estimated 13,801 deer in Unit 8 during the 1987-88 season, an increase from the most recent previous estimate of 8,905 deer in the 1984-85 season (Table 2). Hunting effort also increased from an estimated 22,830 days afield in 1984-85 to 31,668 days in 1987-88 (Table 3). The estimates of total harvest and hunter-days afield for 1987-88 were inflated, however. A comparison of questionnaires returned after the 1st mailing with those returned after the 2nd mailing showed statistically significant declines in the frequency of hunting and success for those returning questionnaires after the 2nd mailing. Because the estimations were based on the assumption that harvest ticket holders who returned questionnaires hunted and killed deer with the same frequency as those who didn't return questionnaires, a significantly higher but unquantified estimate occurred. Also, the response rate was lower in 1987-88 (43%) than in 1984-85 (77%), resulting in even greater potential for error in the estimations.

Males composed 80% of the known-sex harvest in 1987-88, an increase from the 74% recorded in 1984-85 (Table 2). Unreported and out-of-season harvests commonly occur in remote areas in Unit 8. In addition to the legal sport harvest, an estimated 1,000 deer were illegally harvested. The frequency of hunters taking the 5-deer bag limit was 27%, higher than that recorded in the 2 previous hunter surveys (Table 4). The distribution of the deer harvest shifted; a higher percentage of the harvest was taken from Kodiak Island in 1987-88, while the harvests from Afognak, Raspberry, and Shuyak Islands declined (Table 5).

Hunter Residency and Success. Hunter success in 1987-88 was 80%, similar to previous hunter survey results (Table 3). An average of 2.5 deer were killed by each hunter afield in 1987-88. Hunters from other Alaskan communities took an increasing share of the harvest, compared with that taken by residents of Unit 8 (Table 6). Residents of communities outside Unit 8 killed 68.3% of the resident deer harvest in 1987-88, compared with 61.2% in 1984-85. Alaska residents killed 98% of the reported harvest in 1987-88; and nonresidents accounted for 2.0%. Similar distribution of hunting effort between residents and nonresidents also occurred (Table 7).

Harvest Chronology. November (40.7%) and October (26.1%) were the months with the highest harvest in 1987-88 (Table 8).

Transport Methods. Boats (38.6%) were the method of most often used by hunters, followed by aircraft (33.6%), highway vehicles (17.7%), off-road vehicles (5.2%), other means (2.9%), and unspecified means (3.9%).

Natural Mortality:

Residents of the Larsen and Uyak Bay areas on western Kodiak Island reported finding numerous dead deer along beaches during the 1987-88 winter. Significant winter mortality was confirmed in April 1988, when a search of approximately 4.5 miles of coastline near Chief Cove, produced remains of 52 deer that appeared to have died of malnutrition. The mortalities included 30 fawns, 4 yearlings, 8 adults, and 10 deer of unknown age. Although some winter losses were reported throughout Unit 8, the heaviest mortality occurred in the Spiridon, Zachar, and Uyak Bay drainages, where snow was unusually persistent near sea level from November through March.

Habitat

Incidental observations on browse conditions were made during investigations of winter mortality near Spiridon Bay in April 1988. Highbrush cranberry showed signs of extremely heavy use, with severely hedged plants and few live stems. Willows and elderberry also showed signs of heavy use. The latter was severely browsed with many decadent plants. Browse conditions seen near Spiridon Bay were probably representative of most of western Kodiak Island.

Game Board Actions and Emergency Orders

Seasons and bag limits have remained unchanged for the past 5 years. The Board of Game reduced the bag limit from 7 deer to 5 deer and changed the season closure from 31 January to 7 January for the 1983-84 season. That change was supported mainly by the Kodiak Fish and Game Advisory Committee, based on concerns that wanton wasting and localized overharvesting had resulted from the higher bag limit.

CONCLUSIONS AND RECOMMENDATIONS

Population objectives for Unit 8 deer were attained. I recommend that the present season dates and bag limit be retained. Although increased harvest could be supported in many remote areas, it is unlikely that increasing season length or raising the bag limit would markedly affect the harvest. Relatively high transportation costs essentially limits the harvest in remote areas of Unit 8. If public demand for increasing deer harvest develops, there is little doubt that the population in many areas could support such an increase.

LITERATURE CITED

Smith, R. B. 1986. Unit 8 deer survey-inventory progress report. Pages 27-30 in B. Townsend, ed. Annual report of survey-inventory activities. Part VI. Deer. Vol. XVII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-5. Job 2.0. Juneau. 30pp.

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Table 1. Summary[a] of hunter comments on deer questionnaire in Unit 8, 1987-88.

Topic	No. Responses
Favor more liberal regulations	32
Favor more conservative regulations	31
Favor no change in regulations	6
Favor daily or trip bag limit	7
Deer abundant	49
Deer scarce	9
Harvest/hunting pressure excessive	14
Favor closer regulation of outfitters	6
Bow hunted or favor archery-only regulations	9
Favor public use cabins	11
Oppose public use cabins	7
Favor meat caches at public use cabins	3
Illegal activities/need more enforcement	21
Checked by enforcement in field	3
Survey poorly designed	6

[a] This summary includes responses by hunters on important management issues which were not addressed elsewhere in the questionnaire. It is not a complete accounting of all responses received.

Table 2. Deer harvest data in Unit 8, 1983-87.

Year	Estimated harvest M	%M	F	%F	Unk	Total harvest
1983	7,238	74%	2,432	26%	227	9,897
1984	6,245	74%	2,202	26%	458	8,905
1985	--	--	--	--	--	--
1986	--	--	--	--	--	--
1987	10,436	80%	2,609	20%	756	13,801[a]

[a] Inflated estimate.

Table 3. Estimated hunting effort and hunter success in Unit 8, 1983-87.

Year	No. hunters	No. days afield	Percent hunter success	Mean No. deer/hunter
1983	4,113	21,903	81%	2.4
1984	3,948	22,830	81%	2.3
1985	--	--	--	--
1986	--	--	--	--
1987	5,726	31,668[a]	80%	2.4

[a] Inflated estimate.

Table 4. Incidence of hunters killing 1, 2, 3, 4, and 5 deer in Unit 8, 1987-88.

No. deer killed	1983-84 percentage of hunters	1984-85 percentage of hunters	1987-88 percentage of hunters
1	24%	25%	24%
2	19%	20%	18%
3	17%	19%	17%
4	16%	13%	14%
5	13%	23%	27%
5+	1%	--	--

Table 5. Distribution of estimated deer harvest in Unit 8, 1983-84, 1984-85, and 1987-88.

Island	1983-84 No.	%	1984-85 No.	%	1987-88 No.	%
Afognak, Raspberry, Shuyak	3,943	40%	2,962	34%	3,277	25%
Western Kodiak	4,598	46%	4,243	48%	6,697	51%
Eastern Kodiak	1,356	14%	1,596	18%	3,047	23%

Table 6. Distribution of reported deer harvest by residency of hunter in Unit 8, 1984-85 and 1987-88.

	1984-85		1987-88	
	No. deer	%	No. deer	%
Nonresident	--	--	80	2.0
Anchorage	855	29.8	1,251	31.0
Other Alaska	902	31.4	1,422	35.3
Kodiak Islands	1,110	38.8	1,278	31.7
Total	2,867		4,031	

Table 7. Distribution of reported deer hunting effort by residency of hunter in Unit 8, 1984-85 and 1987-88.

	1984-85		1987-88	
	No. days	%	No. days	%
Nonresident	--	--	409	4.6
Anchorage	1,745	24.6	2,496	28.1
Other Alaska	1,994	28.1	2,622	29.5
Kodiak (Unit 8)	3,350	47.2	3,367	37.9
Total	7,089		8,894	

Table 8. Deer harvest chronology in Unit 8, 1984-85.

Year	Aug.	(%)	Sept.	(%)	Oct.	(%)	Nov.	(%)	Dec.	(%)	Jan.	(%)
1983-84[a]	484	(5%)	720	(7%)	2,509	(25%)	3,695	(37%)	1,768	(18%)	692	(7%)
1984-85[b]	120	(5%)	243	(9%)	738	(28%)	1,083	(41%)	402	(15%)	72	(3%)
1987-88[b]	158	(5%)	273	(8%)	872	(26%)	1,360	(41%)	586	(18%)	91	(3%)

[a] Extrapolated harvest.

[b] Reported harvest.

APPENDIX A

PRELIMINARY REPORT ON THE DEER HUNTER SURVEY FOR GAME MANAGEMENT UNIT 8, 1987-88

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December 1, 1988

Introduction

Following the 1987-88 season, a comprehensive questionnaire survey addressing harvest and hunting effort, economic factors, hunter interactions with brown bears, and factors influencing selection of hunting areas was mailed to a random sample of hunters who had obained deer harvest tickets for the season. Similar questionnaires were used in the 1980-81, 1983-84, and 1984-85 hunting seasons for Units 6 and 8. The earlier surveys indicated a trend of increasing growth of both hunting effort and harvest in Unit 8. Increasing hunting pressure and associated commercial activities require that the Department continue to improve its information base on deer hunting. The 1987-88 survey was intended for use by game managers as well as land management agencies that administer lands used by hunters. The U. S. Fish and Wildlife Service and the U. S. Forest Service assisted in design of the questionnaire and provided substantial funding to the Alaska Department of Fish and Game.

The contributions of G. Bos, J. Dinnocenzo, H. Griese, C. Hepler, S. Malutin, S. Miller, R. Strauch, and other Wildlife Division Conservation staff assisting with this project is gratefully acknowledged. The assistance of J. Bellinger, Kodiak National Wildlife Refuge Manager, in initiating and securing funding for this project is appreciated.

Methods

A questionnaire was designed to provide detailed data on deer harvest and hunting effort that would be comparable with that obtained from previous hunter surveys. Additional questions were designed to solicit information on the types of facilities and commercial services used by deer hunters. The interactions between brown bears and deer hunters were assessed with questions on the number of and the frequency of potentially threatening encounters with bears. Hunters were asked to estimate their expenditures on deer hunting trips so that the economic impacts of deer hunting could be evaluated.

Questionnaires were mailed to a random sample of 6,579 of the 10,803 people who obtained deer harvest tickets for the 1987-88 hunting season. One reminder letter was sent to harvest ticket holders who did not respond to the initial mailing. Data from individual questionnaires returned were entered into a data-base computer file and edited for accuracy. Estimates of the total hunter numbers, hunter days afield, and harvest were made using a computer program used for analysing data from the questionnaires (Appendix B). Hunter comments and narratives were compiled in abbreviated format.

Results

Results of the deer hunter survey are summarized in Tables 1-21. The questionnaire return rate was 53%, using a 90% confidence limit (Table 1). The total estimated number of hunters afield in Unit 8 was 5,726 (CI = 5,560-5,892). The estimated deer harvest and days afield were 13,803 (CI = 13,246.2-14,356.1) and 31,668 (CI = 30,319-33,017), respectively; however, they were determined to be inaccurately high, based on a statistical comparison of the responses to the 1st and 2nd (i.e., reminder) mailing of the questionnaires. The estimates were based on an assumption that the harvest ticket holders had the same success rate as those who returned the questionnaires; however we found that respondents to the second mailing had a lower success rate and a lower frequency of actually hunting than did respondents to the initial mailing. Assuming that people who failed to respond at all, hunted even less frequently with less success than the respondents, the estimates were too high. Unfortunately, a correction factor for the estimates could not be developed without additional mailings.

Hunting occurred in all 25 hunting areas, and deer were reported killed in every area, except Sitkinak Island (Table 2). Afognak, Raspberry, and Shuyak Islands accounted for 25% of the harvest and 26% of the hunter days. Kodiak and adjacent islands contained 75% of the harvest and 74% of the hunter days.

Hunters killed 80% males and 20% females (Table 3). Males composed at least 70% of the harvest in all but the eastern Kizhuyak Bay (65%) and Shuyak Island (66%) hunt areas. Alaska residents took 98% of the deer reported killed by hunters with known residency (Table 5). Residents of Unit 8 reported taking less than one-third of the deer killed, although a lower response rate by Unit 8 residents (42%), compared with that of mainland Alaskans (58%), may have biased those results. The full 5-deer bag limit was reported for 26% of the successful hunters (Table 6). Most nonresidents hunters (66%) killed only 1 deer.

November was the peak month for deer harvest with 417% of the season's take (Table 7). October and November accounted for 67% of the harvest. The highest percentages of male deer killed were reported in August and September (Table 8).

The highest success for individual hunts occurred in Kiliuda Bay (87%), Uyak Bay (86%) and Karluk Lake (86%): hunt areas 28, 18, and 21, respectively (Table 9). The lowest hunting success occurred in areas transected by the road system on northeastern Kodiak Island (i.e., hunt areas 32, 33, 34).

Unsuccessful hunters hunted an average of 2.8 days per hunt, and successful hunters averaged 4.1 days per hunt (Table 10). A mean of 3.6 days was spent in the field per hunt by successful and unsuccessful hunters combined.

Alaska residents accounted for 95% of the reported hunter days afield (Table 11). Residents of Unit 8 expended 38% of the days afield, compared with 58% of the days afield spent by other Alaskan residents. Successful and unsuccessful hunters spent an average of 5.9 and 4.2 days afield, respectively (Table 12). Successful and unsuccessful hunters combined spent an average of 5.5 days afield.

Resident hunters averaged 81% hunting success compared to 66% by nonresidents (Table 13). Overall hunter success was 80%. Hunter success increased with the number of days spent afield (Table 14). An average of 2.1 days was spent hunting for each deer reported killed.

Private boats, followed by aircraft and highway vehicles, were the most utilized methods of transportation for deer hunters (Table 15). Nearly equal numbers of hunters reported using boats, private cabins, and tents for lodging while deer hunting (Table 16). Only 7% of the deer hunters reported hiring a guide or outfitter (Table 17).

A question directed at determining considerations made by hunters when selecting a deer hunting area revealed that deer abundance, low hunter density, and lack of development were the factors rated most desirable in a hunting area (Table 18). Undesirable factors considered most frequently were presence of roads, clear-cuts, and brown bears.

Some insights into the economic impacts of deer hunting were gained from a question on expenditures made by deer hunters. Overall, hunters spent an average of $140.83 for every day in the field (Table 19). Nonresident U.S. citizens spent $608.58 and foreigners spent $773.81 per day afield.

Only 95 hunters (6%) who responded indicated they felt threatened by an encounter with a brown bear (Table 20). Most hunters who reported seeing bears saw only 1 or 2 bears, but 13 hunters reported seeing 20 or more bears (Table 21). Specific areas where bear encounters were most common couldn't be determined, but responding hunters observed that hunters observed most bears in drainages where they were still actively feeding on salmon. High numbers of bears were reported by hunters at Karluk Lake. A summary of narratives written by hunters who responded to these questions will be appended to the final report.

Discussion

An increase in the deer harvest and hunting effort was indicated by the 1987-88 survey. Total harvest was estimated at 8,905 deer in the 1984-85 season, well below the 13,803 deer estimated for 1987-88. The number of hunters afield increased from an estimated 3,948 in 1984-85 to 5,726 in 1987-88. Hunter days afield increased from 22,830 in 1984-85 to 31,668 in 1987-88. Although a real increase in harvest and hunting effort since 1984 was indicated

from other sources, including contacts with outfitters and transportation services catering to deer hunters, the magnitude of the increase cannot be determined, because the estimates for 1987-88 were inflated as the result of uncorrected positive response base on the sample.

Harvest and hunting pressure has steadily shifted away from the northern islands, including Afognak, Raspberry, and Shuyak, to Kodiak Island. Deer harvest on Kodiak and adjacent islands increased from 60% successful hunters in 1983-84 to 66% in 1984-85. During the 1987-88 season, 75% of the harvest was from Kodiak and adjacent islands.

Males accounted for 80% of the harvest in 1987-88, higher than the 74% recorded in both the 1983-84 and 1984-85 surveys. The high percentage of males reflects high survival during the previous 1986-87 winter, the generally high abundance of deer throughout Unit 8, and hunter selection for male deer.

Hunter success was 81% in 1987-88, identical to that recorded in the 1983-84 season. The 5-deer bag limit was reported by 28% of the hunters, compared with only 23% in the 1983-84 and 1984-85 seasons.

Increasing participation in deer hunting by residents of mainland Alaskan communities was indicated. Mainland Alaskans, who took 61% of the deer killed by Alaskans in the 1984-85 season, killed 66% of the deer in 1987-88, even when considering a 90% CI.

The important economic impacts of deer hunting are apparent from the results of the 1987-88 questionnaire. Nearly 7% of the hunters reported using services of outfitters or guides. Air taxi services and charter boats were used by 31% of the hunters. The average expenditure per hunter per day afield was $140.83. Assuming a minimum of 25,000 days was spent in the field, deer hunters in Unit 8 expended over $3.5 million in 1987-88.

Deer hunters frequently saw brown bears while hunting, but relatively few serious confrontations occurred. Only 95 hunters (6%) among the 1,542 who responded reported encountering a bear in a threatening situation. Presence of brown bears was considered to be more of an undesirable than a desirable factor in hunters' selections of a hunting area.

Recommendations

A simpler format should be used for future questionnaires. The length and complexity of the 1987-88 questionnaire was criticized by several respondents, and the complexity may have been a factor in the low response rate. A more comprehensive questionnaire should be used once every 5-7 years.

Additional mailings should be budgeted for in future surveys to develop a correction factor for obtaining more accurate estimates

of total harvest and total hunter effort.

Deer hunter surveys should be conducted annually. Surveys at less frequent intervals have limited management applications, because deer populations can fluctuate so widely each year. Sending a simplified mail questionnaire to a smaller sample of harvest ticket holders on an annual basis should be considered, if acceptable statistical methods can be developed. The growing public interest in deer hunting justifies a more intensive management efforts.

Table 1. Summary of returns from deer hunter questionnaires for Game Management Unit 6 and 8, 1987-88.

	No.	%
Questionnaires sent	6,579	100.0%
Questionnaires returned	3,270	49.7%
Questionnaires not returned	2,871	43.6%
Questionnaires not deliverable	438	6.7%

Questionnaires returned by residency of hunters (Zone of Residency)

	No. questionnaires returned	No. questionnaires sent	% of questionnaires returned
Foreign	5	6	83.3
USA (non-Alaska)	98	191	51.3
Anchorage	1079	1873	57.1
GMU 6	244	535	45.6
GMU 8	783	2017	38.8
Alaska-other	1061	1957	54.2
	3270	6579	

Questionnaires returned by residency of hunters (Railbelt)

	No. questionnaires returned	No. questionnaires sent	% of questionnaires returned
Foreign	5	6	83.3
USA (non-Alaska)	98	191	51.3
Anchorage	2998	5926	50.1
GMU 6 (non-railbelt)	4	25	16.0
GMU 8 (villages)	106	295	35.9
Alaska-other	59	136	43.4
	3270	6579	

Table 2. Estimated deer harvest and hunter days afield in Game Management Unit 8, 1987-88.

Hunt Area	No. deer killed	% deer killed	No. days hunted	% days hunted
10-Shuyak I.	428	3.1	923	2.9
11-W. Afognak I.	1,310	9.6	3,619	11.5
12-E. Afognak I.	947	6.9	2,074	6.6
13-Raspberry I.	756	5.5	1,629	5.2
14-Kupreanof Pen.	1,584	11.6	2,560	8.1
15-Uganik I.	537	3.9	1,133	3.6
16-Uganik Bay	1,279	9.4	2,873	9.1
17-Spridon-Zachar Bay	1,095	8.0	2,100	6.9
18-Ugak Bay	937	6.8	1,471	4.7
19-Larsen Bay	390	2.9	699	2.2
20-Sturgeon R.	164	1.2	405	1.3
21-Karluk Lake	209	1.5	397	1.3
22-Frazer Lake	65	0.5	508	1.6
23-Olga Bay	274	2.0	600	1.9
24-Deadman Bay	113	0.8	188	0.6
25-Sitkinak I.	0	--	26	0.1
26-Aliulik Pen.	322	2.4	765	2.4
27-Sitkalidak I.	308	2.2	427	1.4
28-Kiliuda Bay	592	4.3	1,063	3.4
29-S. Ugak Bay	629	4.6	1,306	4.1
30-Hidden Basin	410	3.0	879	2.8
31-Lake Miam	229	1.7	883	2.8
32-Narrow Cape	58	0.4	364	1.2
33-Chiniak Bay	308	2.2	1,828	5.8
3-Narrow Strait	287	2.1	1,578	5.0
35-E. Kizhuyak Bay	445	3.3	1,151	3.7
Unknown area	127	---	221	---
Total	13,803	100.0	31,670	100.0

Table 3. Distribution of reported deer kill by hunt area and sex in Game Management Unit 8, 1987-88.

Hunt Area	No. bucks	% bucks	No. does	% does	No. unk. sex	Total No. deer	% of total
10-Shuyak I.	80	66.7	40	33.3	5	125	3.1
11-W. Afognak I.	284	78.9	76	21.1	23	383	9.5
12-E. Afognak I.	213	78.9	57	21.1	7	277	6.9
13-Raspberry I.	154	72.0	60	28.0	7	221	5.5
14-Kupreanof Pen.	338	77.5	98	22.5	27	463	11.5
15-Uganik I.	106	72.1	41	27.9	10	157	3.9
16-Uganik Bay	300	83.3	60	16.7	14	374	9.3
17-Spiridon-Zachar Bay	256	81.3	59	18.7	5	320	7.9
18-Uyak Bay	228	84.8	41	15.2	5	274	6.8
19-Larsen Bay	89	78.8	24	21.2	1	114	2.8
20-Sturgeon R.	47	97.9	1	2.1	0	48	1.2
21-Karluk Lake	46	78.0	13	22.0	2	61	1.5
22-Frazer Lake	14	73.7	5	26.3	0	19	0.5
23-Olga Bay	73	92.4	6	7.6	1	80	2.0
24-Deadman Bay	27	84.3	5	15.6	1	33	0.8
25-Sitkinak I.	0	---	0	---	0	0	--
26-Aliulik Pen.	84	94.4	5	6.0	5	94	2.3
27-Sitkalidak I.	63	76.8	19	23.2	8	90	2.2
28-Kiliuda Bay	142	87.1	21	12.9	10	173	4.3
29-S. Ugak Bay	145	81.5	33	18.5	6	184	4.6
30-Hidden Basin	83	78.3	23	21.7	14	120	3.0
31-Lake Miam	57	87.7	8	12.3	2	67	1.7
32-Narrow Cape	14	82.4	3	17.7	0	17	0.4
33-Chiniak Bay	69	80.2	17	19.8	4	90	2.2
34-Narrow Strait	60	77.9	17	22.1	7	84	2.1
35-E. Kizhuyak Bay	83	65.3	44	34.7	3	130	3.2
Unknown Location	31	88.6	4	11.4	2	37	0.9
Total	3,086	79.8	780	20.2	169	4,035	100.0

Table 4. Reported deer harvest in Game Management Unit 8 by zone of residency and railbelt zone, 1987-88.

Zone of residency	No. deer killed	% deer killed	Mean no. deer killed per hunter	Std. dev.
Foregin	0	-	-	-
USA (non-Alaskan)	80	2.0	1.0	0.84
Anchorage	1,251	31.0	2.7	1.84
GMU 6	13	0.3	2.2	1.17
GMU 8	1,278	31.7	2.1	1.79
Other Alaskan	1,413	35.0	2.8	1.78
Total	4,035	100.0	2.4	1.83

Railbelt residency	No. deer killed	% deer killed	Mean no. deer killed per hunter	Std. dev.
Foregin	0	-	-	-
USA (non-Alaskan)	80	2.0	1.0	0.84
Railbelt	3,820	94.7	2.5	1.83
GMU 8 non-railbelt	73	1.8	2.1	1.81
Other Alaskan	62	1.5	2.3	1.86
Total	4,035	100.0	2.4	1.83

Table 5. Number of deer reported killed in Game Management Unit 8 by residency of hunter, 1987-88.

Residency	No. hunters responding	% hunters responding	No. deer killed	% deer killed	Mean no. deer killed per hunter
Unknown	13	0.8	24	0.6	1.9
Non-resident	98	5.9	96	2.4	1.0
Resident	1,559	93.4	3,911	97.0	2.5
Total	1,670	100.0	4,031	100.0	2.4

Table 6. Reported number of hunters taking 1, 2, 3, 4, and 5 deer in Game Management Unit 8 by residency, 1987-88.

No. deer killed	No. non-residents	% of non-residents	No. residents	% of residents	No. unknown residency	% of unknown residents	Total no. hunters	% of total hunters
1	43	66.2	279	22.1	2	22.2	324	24.2
2	16	24.6	227	17.9	2	22.2	245	18.3
3	4	6.2	215	17.0	3	33.3	222	16.6
4	1	1.5	187	14.8	1	11.1	189	14.1
5	1	1.5	357	28.2	1	11.1	359	26.8
Total	65	100	1,265	100.0	9	99.9	1,339	100.0

Table 7. Chronology of reported deer harvest in Game Management Unit 8, 1987-88.

Month	No. deer killed	% with known kill date
August	158	4.7
September	273	8.2
October	872	26.1
November	1,360	40.7
December	586	17.5
January	91	2.7
Unknown	695	---
Total	4,035	

Table 8. Sex of reported deer kill in Game Management Unit 8 by month of kill, 1987-88.

Month	No. males	% males	No. females	% females	No. unknown sex	Total no.
August	148	94.3	9	5.7	1	158
September	215	80.2	43	16.0	15	273
October	643	77.2	189	22.7	40	872
November	1,072	79.8	272	20.2	16	1,360
December	453	79.3	118	20.7	15	586
January	61	72.6	23	27.3	7	91
Unknown	494	79.7	126	20.3	77	697
Total	3,086	79.8	780	20.1	171	4,037

Table 9. Number of individual deer hunts reported in Game Management Unit 8 by area and hunting success, 1987-88.

Area hunted	No. unsuccessful hunts	% unsuccessful hunts	No. successful hunts	% successful hunts	Total no. hunts	% of total hunts
10	16	26%	46	74%	62	2.3
11	48	32%	179	68%	263	9.9
12	45	28%	115	72%	160	6.0
13	53	35%	100	65%	153	5.7
14	60	25%	177	75%	237	8.9
15	35	33%	72	67%	107	4.0
16	111	22%	148	78%	189	7.1
17	32	24%	99	76%	131	4.9
18	14	14%	85	86%	99	3.7
19	23	33%	46	67%	69	2.6
20	5	22%	18	78%	23	0.9
21	3	14%	19	86%	22	0.8
22	7	39%	11	61%	18	0.7
23	11	27%	30	73%	41	1.5
24	5	23%	17	77%	22	0.8
25	2	100%	0	0%	2	0.1
26	10	19%	44	81%	54	2.0
27	8	20%	33	80%	41	1.5
28	9	13%	60	87%	69	2.6
29	25	27%	69	73%	94	3.5
30	21	28%	53	72%	74	2.8
31	68	60%	45	40%	113	4.2
32	47	77%	14	23%	61	2.3
33	124	60%	84	40%	208	7.8
34	112	61%	71	39%	183	6.9
35	57	47%	65	53%	122	4.6
Unknown	28	66%	14	34%	42	1.6
Total	945	36%	1,714	64%	2,659	100.0

Table 10. Reported number of days hunted in Game Management Unit 8 by area and hunting success, 1987-88.

Area hunted	Unsuccessful hunters		Successful hunters		All hunters		% of total days hunted
	No. days hunted	Mean No. days hunted per hunt	No. days hunted	Mean No. days hunted per hunt	No. days hunted	Mean No. days hunted	
10	53	3.3	198	4.6	251	4.3	2.9
11	267	3.5	717	4.5	984	4.2	11.4
12	122	2.8	442	4.3	564	3.9	6.6
13	104	2.3	339	4.0	443	3.4	5.1
14	106	2.0	590	3.8	696	3.4	8.1
15	101	3.4	207	3.1	308	3.2	3.6
16	131	3.5	650	4.8	781	4.5	9.1
17	115	3.8	456	4.9	571	4.6	6.6
18	42	3.5	358	4.6	400	4.4	4.6
19	58	2.9	132	3.1	190	3.0	2.2
20	13	2.6	97	5.4	110	4.8	1.3
21	11	3.7	97	5.4	108	5.1	1.3
22	91	15.2	47	5.2	138	9.2	1.6
23	25	2.5	138	5.1	163	4.4	1.9
24	10	2.5	41	3.4	51	3.2	0.6
25	7	3.5	0	---	7	3.5	0.1
26	36	4.0	172	4.5	208	4.4	2.4
27	12	2.0	104	3.6	116	3.3	1.3
28	31	5.2	258	4.8	289	4.8	3.4
29	60	2.9	295	4.5	355	4.1	4.1
30	42	2.1	197	4.1	239	3.5	2.8
31	124	1.9	116	3.1	240	2.4	2.8
32	70	1.7	29	3.2	99	1.9	1.1
33	299	2.5	198	2.5	497	2.5	5.8
34	248	2.4	181	2.8	429	2.5	5.0
35	104	2.1	209	3.5	313	2.9	3.6
Unknown	24	3.4	36	6.0	60	4.6	0.7
Total	2,306	2.8	6,304	4.1	8,610	3.6	100.0

Table 11. Reported deer hunting effort in Game Management Unit 8 by residency, 1987-88.

Zone of residency	Total No. days hunted	No. hunters responding	Mean No. days hunted/ hunter	% of total days hunted
Foreign	26	4	6.5	0.3
USA (non-Alaskan)	383	71	5.4	4.3
Anchorage	2,496	456	5.5	28.1
GMU 6	43	6	7.2	0.5
GMU 8	3,367	598	5.6	37.9
Alaska-other	2,575	473	5.4	29.0
Total	8,890	1,608	5.5	100.0

Railbelt zone	Total No. days hunted	No. hunters responding	Mean No. days hunted hunter	% of total days hunted
Foreign	26	4	6.5	0.3
USA (non-Alaskan)	383	71	5.4	4.3
Railbelt	8,162	1,477	5.5	91.8
GMU 8 (non-railbelt)	174	31	5.6	2.0
Other non-railbelt	145	25	5.8	1.6
Total	8,890	1,608	3.6	100.0

Table 12. Reported deer hunting effort in Game Management Unit 8 by residency of hunter and by hunter success, 1987-88.

Residency	Successful Hunters			Unsuccessful Hunters		
	No. hunters responding	No. days hunted	Mean no. days hunted	No. hunters responding	No. days hunted	Mean no. days hunted
Resident	1,213	7,099	5.9	283	1,189	4.2
Non-resident	59	348	5.9	30	141	4.7
Unknown	9	47	5.2	4	12	3.0
Totals	1,281	7,494	5.9	317	1,342	4.2

Residency	Unknown hunting success			All hunters		
	No. hunters responding	No. days hunted	Mean no. days hunted	No. hunters responding	No. days hunted	Mean no. days hunted
Resident	8	46	5.8	1,504	8,334	5.5
Non-resident	2	8	4.0	91	497	5.5
Unknown	0	0	0	13	59	4.5
Totals	10	54	5.4	1,608	8,890	5.5

Table 13. Reported deer hunter success in Game Management Unit 8 by residency of hunter, 1987-88.

Residency	No. successful hunters	No. unsuccessful hunters	Percent hunters success
Non-resident	59	30	66.3
Resident	1,213	283	81.1
Unknown	9	4	69.2
Total	1,281	317	80.2

Table 14. Hunter success in Game Management Unit 8 by reported number of days hunted, 1987-88.

No. days hunted	No. successful hunters	% successful	No. unsuccessful hunters	% unsuccessful
1	84	60.4	55	39.6
2	121	67.6	58	32.4
3	144	75.0	48	25.0
4	186	80.9	44	19.1
5	206	83.1	42	16.9
6	149	89.2	18	10.8
7	102	85.7	17	14.3
8	78	91.8	7	8.2
9	40	85.1	7	14.9
10	65	84.4	12	15.6
>10	106	92.2	9	7.8

Mean no. days hunted to kill a deer = 2.1
Mean no. deer killed per day hunted = 0.5

Table 15. Transportation used by deer hunters to reach hunting areas in Game Management Unit 8, 1987-88.

Transportation used	No. hunters responding	% of hunters responding
Private plane	156	5.9
Air taxi	731	27.7
Private boat	923	35.0
Charter boat	95	3.6
Highway vehicle	415	15.7
Off-road vehicle	137	5.2
Other	77	2.9
Unknown	104	3.9
Totals	2,638	

Table 16. Types of lodging used by deer hunters in Game Management Unit 8, 1987-88.

Lodging	No. hunters responding	% of hunters responding
None	706	26.8
Boat	515	19.5
Public cabins	160	6.1
Private cabins	530	20.1
Tent	584	22.1
Unknown	141	5.3
Total	2,638	

Table 17. Use of guides/outfitters by deer hunters in Game Management Unit 8, 1987-88.

Guide/outfitter use	No. hunters responding	% of hunters responding
Used guide/outfitter	175	6.6
Did not use guide/outfitter	2,302	87.3
Unknown	161	6.1
Total	2,638	

Table 18. Summary of factors considered by hunters in selecting preferred deer hunting areas in Game Management Unit 8, 1987-88.

Condition (no. responses)	Desireable[a]		Undesireable[a]		Not considered	
	% of hunters responding	No. hunters responding	% of hunters responding	No. hunters responding	% of hunters responding	No. hunters responding
Deer very abundant (2,090)	91.8	1,919	2.2	45	6.0	126
Few other hunters (2,085)	88.0	1,834	3.8	79	8.2	170
Public cabins available (1,892)	21.1	399	34.7	656	44.2	837
Roads present (1,903)	13.2	252	61.7	1,175	25.0	476
Timber clearcut present (1,855)	12.6	233	42.4	787	45.0	233
Area undeveloped (2,028)	77.9	1,579	7.7	157	14.4	292
Boat Anchorage present (1,989)	54.3	1,081	13.6	270	32.1	638
Accessible by airplane (1,992)	57.6	1,148	14.0	279	28.4	565
Other harvestable game or fish present (1,960)	54.9	1,075	9.4	184	35.8	701
Brown bear present (1,955)	24.3	475	36.9	722	38.8	758

[a] "highly desirable" and "desireable" responses were combined; "highly undesireable" and "undesireable" responses combined.

Table 19. Daily cost of deer hunting in Game Management Unit 8 by residency, 1987-88.

Zone of residency	No. hunters	% of hunters	Average cost (dollars)	Std. dev.
Foreign	2	0.1	773.81	84.18
USA (non-Alaskan)	63	3.3	608.58	671.38
Anchorage	405	21.4	159.20	156.81
GMU 6	3	0.2	150.00	105.36
GMU 8	484	25.5	75.39	164.42
Other Alaskan	408	21.5	132.19	224.15
Total	1,895	100.0	140.83	415.78

Railbelt zone	No. hunters	% of hunters	Average cost (dollars)	Std. dev.
Foreign	2	0.1	773.81	84.18
USA (non-Alaskan)	63	3.3	608.58	671.38
Railbelt	1,210	63.9	124.25	191.18
GMU 8 Nonrailbelt	69	3.6	36.72	35.08
Other Nonrailbelt	21	1.1	117.95	130.10
Total	1,895	100.0	140.83	415.78

Table 20. Summary of responses by deer hunters who hunted in Game Management 8 to question "Did you encounter a brown bear in a situation where you felt threatened", 1987-88.

Replied Yes		Replied No.	
No. hunters	% Hunters	No. hunters	% hunters
95	62%	1,447	93.8%

Table 21. Brown bear sightings reported by deer hunters in Game Management Unit 8, 1987-88.

No. bears seen	No. hunters	% hunters
0	376	37.8
1	222	22.3
2	136	13.7
3	94	9.5
4	42	4.2
5	39	3.9
6	18	1.8
7	10	1.0
8	8	0.8
9	8	0.8
10	12	1.2
11-20	16	1.6
>20	13	1.3
Unknown	3	--
	997	

1,266 hunters did not respond to question

APPENDIX B

Estimates of total deer kill and hunting days were derived from a simple equation:

$$HTH/RH * DK \text{ or } HD = EDK \text{ or } EHD$$

where:

HTH = Number of total harvest ticket holders;
RH = Number of hunters responding to questionnaire;
DK = Total reported deer killed in Unit 8;
HD = Total reported hunting days in Unit 8;
EDK = Estimated Unit 8 deer kill; and
EHD = Estimated hunting days.

Estimates for deer killed and hunting days per hunt area were derived from the following equations:

$$EDK * HADK_x/DK = EHADK_x$$
$$EHD * HAHD_x/HD = EHAHD_x$$

where:

$HADK_x$ = Reported deer killed in hunt area x;
$HAHD_x$ = Reported hunting days in hunt area x;
$EHADK_x$ = Estimated total deer killed in hunt area x;
$EHAHD_x$ = Estimated total hunting days in hunt area.

To compare deer density to hunting pressure the average number of hunting days to kill a deer were calculated. The calculations were derived as follows:

$$\Sigma HD/DK_{yx}/N_x$$

where:

HD_{yx} = Days hunted by hunter y in hunt area x;
DK_{yx} = Deer killed by hunter y in hunt area x; and
N_x = Number of hunters hunting hunt area x.

To evaluate the importance of hunt area characteristics to hunters, values of +2, +1, 0, -1, and -2 were assigned to the selections "highly desirable", not considered, "undesirable and highly undesirable" respectively. The average importance of each characteristics was considered to be the sum of values divided by the number of hunters answering that question.

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