

1960-6

ALASKA DEPARTMENT OF FISH & GAME

1960-61 Pittman-Robertson Project Report

DIVISION OF GAME

VOLUME II, No. 1

SITKA BLACK-TAILED DEER INVESTIGATIONS

Work Plan A



Juneau, Alaska

SITKA BLACK-TAILED DEER INVESTIGATIONS

Photo # 1

Sitka black-tailed deer abound in Southeastern Alaska, on the islands in Prince William Sound, and on the northeast portion of Kodiak Island. (Photo by Harry Merriam)

Photo # 2

Composition surveys of Sitka black-tailed deer show an average fawn-doe ratio of 67:100 - 88% of the fawns observed were twins and 4% were triplets. (Photo by Harry Merriam)

Photo # 3

Department Biologists set up transects to determine summer alpine range utilization by deer. (Photo by David R. Klein)

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ANNUAL REPORT OF PROGRESS, 1960-1961
FEDERAL AID IN WILDLIFE RESTORATION PROJECT W-6-R-2
GAME INVESTIGATIONS OF ALASKA

STATE OF ALASKA

William A. Egan, Governor

Alaska Department of Fish and Game

Clarence L. Anderson, Commissioner

Division of Game

James W. Brooks, Director
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Juneau, Alaska.)

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ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-61 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-Tailed Deer
Investigations

Job No: 1-a

Title: Determination of
Population Levels,
Structures and Trends,
Southeast Alaska

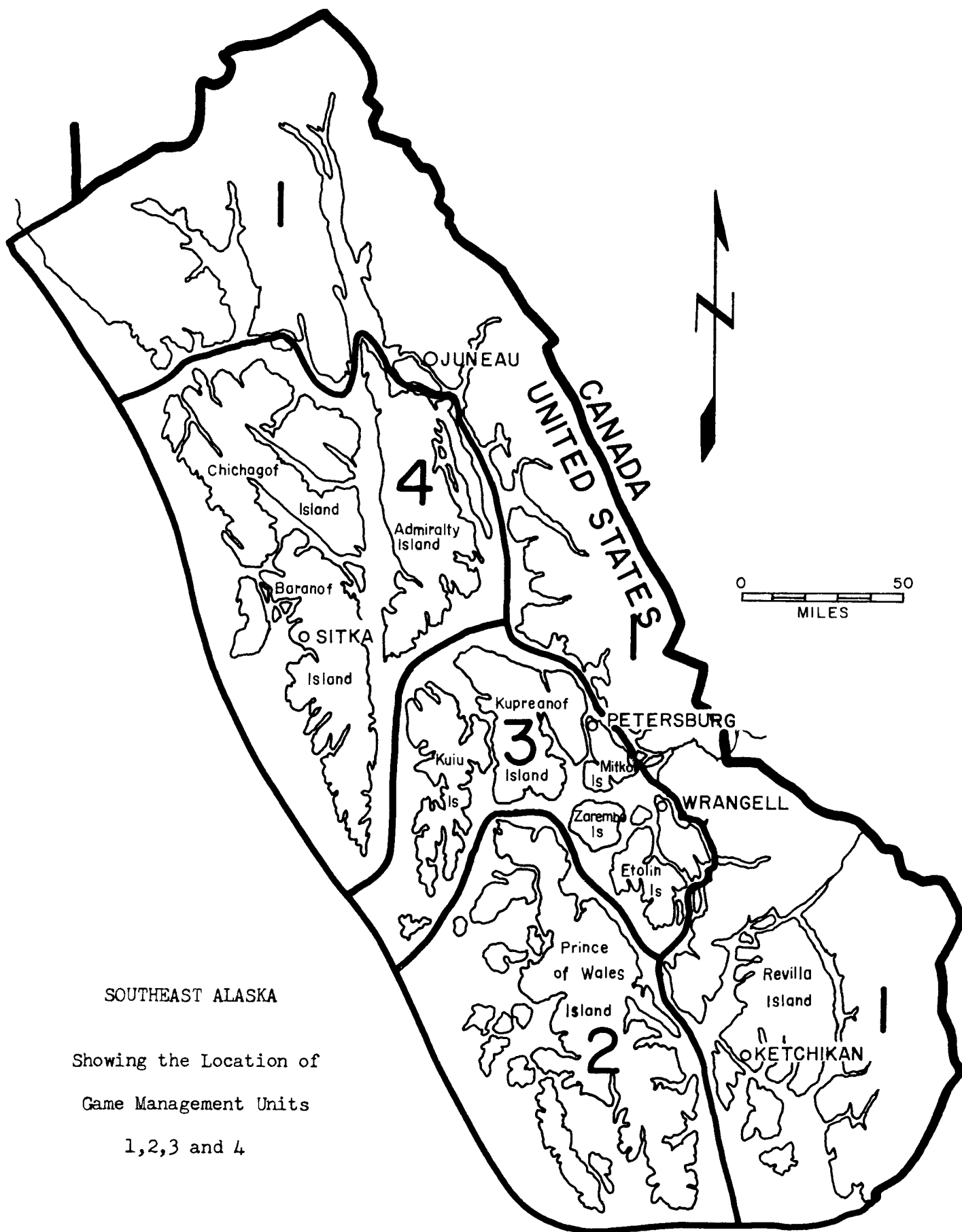
PERIOD COVERED: July 1, 1960, to June 30, 1961

ABSTRACT:

Deer populations remain at a relatively high level throughout Southeast Alaska. Productivity is good and the total hunter harvest is relatively low. The estimated total legal deer harvest in 1960 was 12,440 animals. Hunter success averaged 83 per cent for all of Southeast Alaska, each hunter taking an average of 2.3 deer in 6.8 days in the field. Fifty-three per cent of the hunter harvest of male deer was 3-1/2 years of age and older. Wolf predation, south of Frederick Sound, may be significant while other mortality factors are low. The estimated deer population in Southeast Alaska exceeds 200,000 animals. Range utilization of key browse species for the winter of 1960-61 was 11 per cent less than for the winter of 1959-60.

OBJECTIVES:

To determine current population levels, structures and trends of deer in Southeast Alaska.



SOUTHEAST ALASKA

Showing the Location of
Game Management Units
1,2,3 and 4

TECHNIQUES:

The data presented in W-6-R-2, Job No. A-1a, are a summation of W-6-R-2, Job Numbers A-1b through A-1e.

FINDINGS:

Composition counts, hunter harvest data, mortality factors and range conditions all imply that the deer population remains at a high level throughout most of Southeast Alaska. Age composition and harvest data indicate a population in excess of 200,000 animals. This population is not in excess of the carrying capacity of the summer range (which is abundant in most areas), however, it could cause severe utilization of the narrow beach fringe areas which constitutes the winter range during periods of heavy snowfalls.

Composition counts on Kupreanof and Mitkof Islands show a ratio of 64 fawns per 100 adults at low elevations and 18 fawns per 100 adults on alpine ranges. The ratio of fawns to adults at low elevations is higher than that of the total population as adult males tend to remain at higher levels than does with fawns. Sixty-eight per cent of the fawns observed were twins and four per cent triplets.

Age ratios of hunter harvested male deer showed a slight increase in deer over 2-1/2 years of age (53 per cent in 1960 compared to 48 per cent in 1959), which can be attributed to an especially large 3-1/2 year age class which in turn can be traced back to an excellent fawn crop in the spring of 1957. Hunter success increased from 74 per cent in 1959 to 83 per cent in 1960, the average hunter taking 2.3 deer, while the hunting effort per deer decreased from 3.6 days in 1959 to 2.9 days in 1960. The total estimated hunter harvest (excluding illegal kill and crippling losses) was 12,440 animals in 1960 compared to 11,000 in 1959.

Winter mortality due to starvation was extremely low. In searches conducted along ten miles of beach fringe, only one deer was found, to which death could be attributed to starvation. No indications of extensive mortality due to parasites or disease have been observed. Wolf predation may be a factor limiting deer numbers south of Frederick Sound. Range studies conducted in the spring of 1961 showed much

higher utilization values for areas north of Frederick Sound where no wolves are present. As the high hunter success per unit effort also shows an abundance of deer in areas where wolves are present, the wolves may be a healthy influence in the environment.

Range evaluations showed winter utilization of Vaccinium sp. was 57 per cent in 1961 compared to 66 per cent in 1960. Utilization was much lower south of Frederick Sound than in the northern areas. Relatively heavy utilization near Juneau and Sitka in spite of heavy hunting pressure and mild winters indicates high deer populations. Snow depths are somewhat greater in these areas and deer may have been forced to winter at slightly lower elevations than those areas south of Frederick Sound.

SUBMITTED BY:

APPROVED BY:

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Game Biologist
June 30, 1961

David R. Klein
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James W. Brooks, Director
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ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-61 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-Tailed Deer
Investigations

Job No: 1-b

Title: Abundance and
Composition Surveys

PERIOD COVERED: July 1, 1960, to June 30, 1961

ABSTRACT:

Low elevation composition counts showed ratios of 83 fawns and 90 yearlings per 100 does while counts in alpine areas gave ratios of 44 fawns, 45 yearlings and 138 bucks per 100 does. Ratios determined from all counts were 61 fawns, 67 yearlings and 99 bucks per 100 does. The fawn-adult ratio was 30:100. Sixty-eight per cent of the fawns observed were twins and 4 per cent were triplets. Age composition of deer in the hunter harvest was 4 per cent fawns, 24 per cent 1-1/2, 21 per cent 2-1/2, 27 per cent 3-1/2, 14 per cent 4-1/2, and 10 per cent 5-1/2 (or older) years of age. The estimated deer population of Southeast Alaska exceeds 200,000 animals.

OBJECTIVES:

To determine population abundance and sex and age composition of Southeast Alaska deer herds.

TECHNIQUES:

Alpine deer composition counts were made at elevations above 1500 feet on important summer ranges of Kupreanof Island. Counts on Woronkofski and Coronation Islands were made by David R. Klein, P-R Coordinator, in conjunction with field studies in those areas. Counts were normally conducted on foot, however, two aerial counts, one by Piper Cruiser float plane and the other using a Hiller B-2 helicopter, were made. Ground observations were made from vantage points using 7 x 35 binoculars.

Low elevation counts along beaches and highways were made throughout the year incidental to other work.

FINDINGS:

Summaries of composition counts made in Southeast Alaska from July 1, 1960, to June 30, 1961, are given in Tables 1 and 2. Figure 1 delineates the boundaries of alpine counts made on Kupreanof Island. Age and sex ratios determined from 1101 deer counted showed 64 fawns per 100 adults in low areas and 18 fawns per 100 adults in alpine habitat. There is an apparent tendency for does with fawns and deer of yearling age to remain at lower elevations than bucks during the summer months. For this reason there may be a correlation between the buck-doe ratio on alpine ranges in summer and the productivity of the deer herd (the higher the productivity, the smaller the proportion of does on high summer range).

Alpine counts indicated a ratio of 138 bucks per 100 does. This high proportion of bucks does not reflect the condition of the entire population, but results from a larger segment of the buck than the doe population utilizing high summer range. Ratios of bucks to does at low levels are deleted as several of the counts were made during the winter months when it was often impossible to differentiate between sexes. Productivity may be higher than the ratio of fawns per doe indicates, however, insufficient data are available for valid conclusions. Observations of 136 fawns showed a 68 per cent incidence of twinning and 4 per cent triplets.

Table 1. Summary of deer composition counts in Southeast Alaska.
July 1, 1960 - June 30, 1961

LOW ELEVATION COUNTS							
Location	Yearlings			Adults		Unident- ified	Total
	Fawns	Bucks	Does	Bucks	Does		
Woronkofski Is.	2	5	6	5	8	3	29
Mitkof Is.	34	25	25	21	48	31	184
Kupreanof Is.	40	3	18	2	35	35	140
Totals	76	33	49	28	91	76	353
HIGH ELEVATION COUNTS (Alpine)							
Woronkofski Is.	17		8	44	38	40	147
Mitkof Is.	3	2		1	4	4	14
Kupreanof Is.	30	25	17	114	73	233	492
Totals	50	27	25	159	115	277	653
OTHER COUNTS							
Coronation Is.	5		12	32	26	6	81
Mainland (Horn Cliffs)	4	1	2	2	3	2	14
All SE Alaska	135	61	88	221	223	373	1101

Table 2. Ratios of fawn, yearling and male deer per 100 females from composition counts in Southeast Alaska, 1960-61.

LOW ELEVATION COUNTS				
Location	Fawns:100 Does	Yearlings: 100 Does	Fawns: 100 Adults	Bucks: 100 Does
Woronkofski Is.	25	137	17	
Mitkof Is.	71	104	49	
Kupreanof Is.	114	60	108	
All Low Elevations	83	90	64	
HIGH ELEVATION COUNTS				
Woronkofski Is.	45	21	21	116
Kupreanof Is.	41	52	16	156
All High Elevations	44	45	18	138
OTHER AREAS				
Coronation Is.	19	46	9	123
All SE Alaska	61	67	30	99

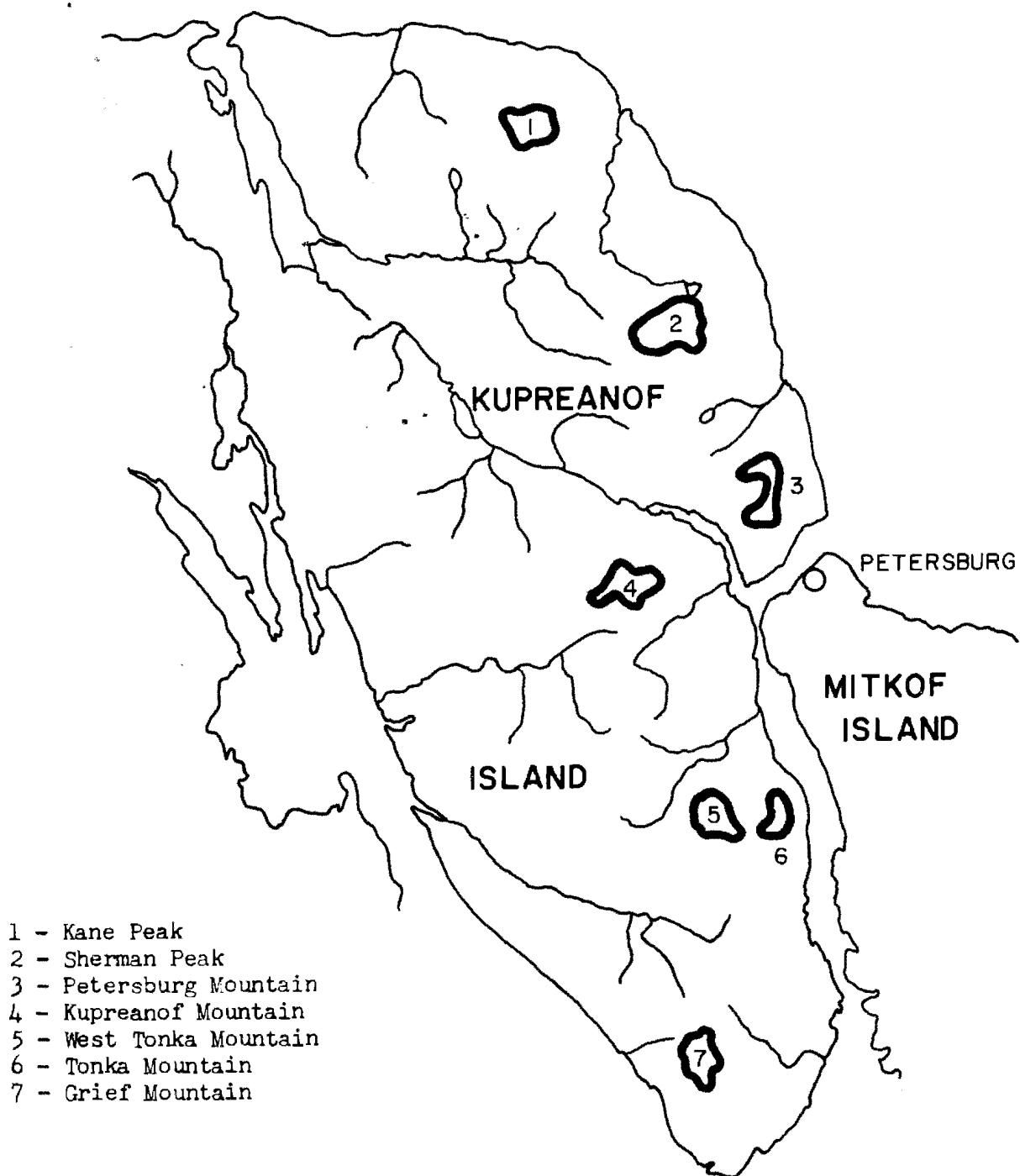


Figure 1. A map of a portion of Kupreanof Island showing the locations of alpine deer counts made in 1960.

Composition counts made on foot in alpine areas show the most promise for providing indications of population status. Relatively large numbers of deer may be observed in delineated areas which may be recounted year after year. Aerial counts from planes proved unsatisfactory as age and sex composition could not be readily determined and deer were difficult to locate unless observation conditions were optimum. One count was made utilizing a Hiller B-2 helicopter. This method was reasonably satisfactory, however, the noise of the aircraft frightened many deer from the area before sex or age could be determined. The charter cost of \$100.00 per hour for helicopter time is prohibitive for extensive counts.

Application of the Chi-Square Test of Independence shows a significant difference at the 0.05 level in sex and age composition of deer for both high and low elevation counts made on the different islands. Variations are greatest for low level counts on Kupreanof Island where counts were all made during the winter months along the beaches. A larger number of fawns was observed than the calculated "expected" value. This is logical as fawns are the first age class to be forced to the beach fringe by increasing snow depths. High Chi-Square values for other sex and age classes for Kupreanof Island compared to low level counts in other areas reflects the difficulty of determining sex and age classes by winter beach count methods and indicates that these counts are of dubious value.

Comparing all counts made on Mitkof, Woronkofski and Kupreanof Islands to those made on Coronation Island, a significantly higher "observed" than "expected" value for adult males was obtained from Coronation Island than for the other areas. This very possibly reflects the very light hunting pressure on Coronation Island compared to the more accessible other islands. The fact that Chi-Square values for alpine counts were lowest for Kupreanof Island where systematic counts were conducted indicates that this method may provide a reliable index to the deer population of this area.

The estimated population of deer in Southeast Alaska exceeds 200,000. As it is impossible to obtain an accurate census, the population estimate is based on kill statistics.

Such an estimate is undoubtedly low as hunting pressure is concentrated near centers of populations, being very low throughout much of the total deer range. Applying composition and harvest data to the yield tables published by Kelker (1952), the estimated population is 192,690. Calculations are given below:

Population estimates determined from Kelker's "Yield Table"

Average fawn births per adult doe 1+
Doe kill 20%+
Number of does per buck after hunting
season 2 (may be higher)
Total deer kill 15,550
Total removal from population = 8.07%

$$\frac{8.07}{15,550} \times \frac{100}{\text{total population}}$$

Total Population = 192,690

Lauckhart (1950) and Longhurst (1952) both describe methods for estimating populations in terms of deer left in the field for each buck killed. Using these methods and the conservative figure of 15 deer left for each buck taken, the total population would approximate 233,250.

Age composition of male deer in the hunter harvest shows a higher proportion of older age animals in the population than in 1959 (53 per cent over 2-1/2 years of age in 1960 compared to 48 per cent in 1959). This may indicate a stabilizing population for, beginning with a peak in 1958, the proportion of young animals in the hunter kill has steadily decreased. This is extremely similar to the decline in the proportion of younger age animals in the harvest from 1953 to 1957 as shown in Figure 2, Job No. 1-d, of this report.

RECOMMENDATIONS:

Alpine composition counts should be continued. Counts should be repeated in the same delineated areas from year to year to establish trends.

Information on productivity should be obtained by recording all observations of does with fawns and by collecting and analysing an adequate sample of female reproductive tracts.

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June 30, 1961

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LITERATURE CITED:

Kelker, George H. 1952. Yield tables for big game herds. J. Forestry, 50(3):206-207.

Lauckhart, J. B. 1950. Determining the big game population from the kill. Trans. No. Amer. Wildl. Conf., 15:644-650.

Longhurst, William M., Starker A. Leopold, and Raymond F. Dasmann. 1952. A survey of California deer herds, their ranges and management problems. Calif. Dept. of Fish and Game Bull. No. 6. 136 pp.

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-61 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-Tailed Deer
Investigations

Job No: 1-c

Title: Natural Mortality
Surveys, Southeast
Alaska

PERIOD COVERED: July 1, 1960, to June 30, 1961.

ABSTRACT:

Three deer carcasses were found during searches conducted in 20 different localities in April and May of 1961. Light natural mortality is attributed to extremely mild weather conditions. Predation by wolves is considered relatively heavy on the islands south of Frederick Sound. Six species of parasites were found to be utilizing the Sitka black-tailed deer as a host animal.

OBJECTIVES:

To determine the sex and age composition, the extent and area-wide breakdown of the natural mortality as an index of the winter welfare of the deer herds.

TECHNIQUES:

Ten miles of beach fringe were examined for deer carcasses during April and May in conjunction with range studies in Southeast Alaska. The immediate area along each

browse transect was searched as well as the adjacent beach fringe. Carcasses were examined and cause of mortality, age, sex, approximate time of death and condition at time of death were determined when possible. Parasites were obtained from collected and hunter-killed deer and identified by Kenneth Neiland, Alaska Department of Fish and Game Parasitologist.

FINDINGS:

Three deer carcasses were found in the ten miles of beach fringe examined. All three animals were males, 5-1/2 years of age or older. Two of these deer were in good physical condition at the time of death, while the other contained no fat reserve in the bone marrow or on the carcass and death may have been due to starvation. Winters in Southeast Alaska have been very mild for five consecutive years and consequently deaths due to starvation have been infrequent.

Wolves are by far the most important predators on deer in Southeast Alaska but are not found on the islands north of Frederick Sound. Brown and black bears and wolverine prey on deer to a lesser extent. Garceau (1960) analysed 131 wolf scats from Kupreanof Island in 1958 and found 95.5 per cent contained deer remains. The wolf population has presumably increased with the deer population and evidence of wolves is common on the mainland and on the islands south of Frederick Sound. Twenty-two per cent of 150 deer hunters interviewed from Wrangell and Petersburg in the spring of 1961 saw evidence of wolves while hunting. Captive adult wolves held at the Petersburg Experimental Fur Farm consumed six to seven pounds of feed per day. An average wolf (feeding primarily on deer) would theoretically consume a minimum of 20 deer per year and very possibly 50 would be more realistic. The potential impact of wolf predation is certainly substantial.

Predation by bears and wolverine occurs, but is not considered important. In August, 1960, two hunters observed a brown bear stalk and kill a large buck near Todd on Chichagof Island. On another occasion, in June 1961, a troller saw a brown bear swimming in Peril Straits in pursuit of a deer. A moose hunter reported that in September 1960, while hunting near the Stikine River, he

heard a fawn crying and upon investigation found a wolverine tearing at the animals hindquarters.

Deer in Southeast Alaska are relatively free of parasites. An examination of 24 deer by Neiland (1961) demonstrated the presence of the following six species: Dictyocaulus viviparus (lung worm), Oesophagostomum venulosum (caecal worm), Setaria cervi (body cavity thread worm), Cephenemyia jellisoni (nose bot), Moniezia benedeni and the larval stage of Taenia hydatigena (tapeworms). Five of six wolves examined from Kupreanof Island were hosts to Taenia hydatigena (adult stage).

RECOMMENDATIONS:

Natural mortality surveys should be continued. Transects should parallel browse inventory transects to enable utilization and mortality observations to be made simultaneously. If natural mortality exceeds 1.5 deer per mile of beach fringe, additional observations should be made in predetermined areas.

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June 30, 1961

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LITERATURE CITED:

Garceau, Paul. 1960. Food habits and hunting behavior of wolves, Southeast Alaska. Alaska Dept. of Fish and Game, P-R Proj. W-6-R-1, Job No. K-3.

Neiland, Kenneth. 1961. Parasitism in the Sitka Black-tailed deer. Alaska Dept. of Fish and Game, P-R Proj. W-6-R-2, Job No. M-2.

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-61 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-tailed Deer
Investigations

Job No: 1-d

Title: Characteristics of
Hunter Harvest,
Southeast Alaska

PERIOD COVERED: July 1, 1960, to June 30, 1961

ABSTRACT:

The 1960 deer hunting season in Southeast Alaska was open from August 20 through December 15, 118 consecutive days. The either sex season extended from October 1 through December 15. The bag limit was four deer of either sex with the exception of Units 1 and 5 where the bag could include only two does. The deer season was extended in certain areas by emergency regulation from December 16, 1960, through January 31, 1961, with a bag limit of two deer of either sex. The hunter success averaged 83 per cent for all of Southeast Alaska, ranging from 67 per cent in Juneau to 90 per cent for the small towns and villages. The total estimated hunter kill was 15,550 (including illegal kill and crippling loss). Twenty-one per cent of the kill consisted of females and 39 per cent of the hunters took at least one doe. Animals older than 2-1/2 years of age constituted 53 per cent of the kill, the 3-1/2 year age class composing the largest segment of the harvest. Sixty-eight per cent of the kill was made after October 15, the majority of the kill being made in low timbered and muskeg areas. Hind foot measurements of deer, up to and including the 2-1/2 year

age class, were slightly longer in 1960 than in 1959. The average dressed weight for bucks was 106 pounds and for does 74 pounds.

OBJECTIVES:

To secure information relative to the total deer kill, area and chronological distribution of the kill, hunter success, and to determine and evaluate the sex and age composition and physical characteristics of the deer harvested.

TECHNIQUES:

Post season hunter interviews were conducted in Juneau, Sitka, Petersburg, Wrangell, Kake, Angoon, Pelican and Hoonah by the writer and in Ketchikan, Craig and Klawock by Management Biologist Loren Croxton. Hunters were questioned as to the number of days hunted, number of deer killed, sex, date, elevation and location of kills. These interviews were followed by a postal survey sent to 5,000 boxholders asking the same questions as the interviewers. Data were tabulated by IBM machines and the results compared. Lower jaws were collected from 412 hunter-killed deer and age classes, up to and including 5-1/2 years, were determined by tooth wear and replacement. Dressed weights were taken of eviscerated animals with head, hide and feet attached. Chest girth measurements were taken immediately behind the front leg. Hind foot measurements were taken from the tip of the hoof to the proximal end of the calcaneus. Metacarpal bones were collected from 127 deer and lengths compared to hind foot measurements. Assistance in collecting harvest data was obtained from other personnel within the Department, the U.S. Forest Service and Boy Scout troops.

FINDINGS:

Hunter Success

Hunter success was determined from hunter interviews conducted throughout Southeast Alaska and is presented in Table 1. Table 1-a gives the same data, but obtained through a postal survey. Confidence limits at the 0.05 level were $\pm 3\%$ for the hunter interview and $\pm 2\%$ for the postal survey. The majority of items compare favorably with the exception

Table 1. Summary of the 1960 deer hunter harvest data from hunter interviews for Southeast Alaska.

	Juneau	Ketchikan	Petersburg	Sitka	Wrangell	Villages	All South-east Alaska
Hunter Success	67%	89%	83%	81%	86%	90%	83%*
Ave. No. Deer Per Hunter	1.7	2.4	2.4	2.3	2.5	2.4	2.3
Ave. No. Days Hunted	5.8	7.5	7.5	6.2	6.8	6.8	6.8
Ave. No. Days Hunted Per Deer	3.5	3.1	3.1	2.8	2.7	2.8	2.9
Ave. No. Deer Seen Per Hunter	20	14	18	21	22	29	21
Female Portion of Kill	24%	22%	22%	23%	25%	16%	21%
Hunters Taking at Least One Doe	33%	44%	42%	40%	47%	34%	39%
Hunters Taking Four Deer	22%	26%	29%	25%	40%	26%	27%
No. of Licenses Sold	2249	1741	597	1051	434	389	6461
License Holders Who Didn't Hunt	19%	0%	8%	15%	15%	7%	10%
New Hunters (didn't hunt in 1959)	26%	11%	12%	25%	22%	12%	17%
Total Kill for Town	3100	4180	1320	2050	920	870	12440
Sample Size	100	101	75	100	74	144	594

Total Legal Kill	=	12,440
Estimated Illegal Kill (15%)	=	1,840
Estimated Crippling Loss (10%)	=	<u>1,240</u>
Total Kill		15,520

* Confidence limits at the 0.05 level = 83% \pm 3%.

Table 1a. Summary of the 1960 deer hunter harvest data from postal reports for Southeast Alaska.

	Juneau	Ketchikan	Petersburg	Sitka	Wrangell	Villages	All South-east Alaska
Hunter Success	70%	79%	91%	79%	83%	94%	80%*
Ave. No. Deer Per Hunter	1.9	1.9	2.6	2.1	2.3	2.6	2.1
Ave. No. Days Hunted	6.2	7.8	7.7	6.8	7.3	9.6	7.2
Ave. No. Days Hunted Per Deer	3.3	4.1	3.0	3.2	3.2	3.7	3.4
Ave. No. Deer Seen Per Hunter	10	12	19	20	22	20	16
Female Portion of Kill	27%	20%	19%	20%	26%	18%	22%
Hunters Taking at Least One Doe	38%	32%	36%	33%	47%	34%	37%
Hunters Taking Four Deer	25%	17%	37%	28%	33%	29%	28%
No. of Licenses Sold	2249	1741	597	1051	434	389	6461
License Holders Who Didn't Hunt	30%	34%	10%	18%	17%	11%	22%
New Hunters (didn't hunt in 1959)	20%	19%	11%	25%	20%	16%	19%
Total Kill for Town	2990	2180	1400	1810	830	550	9760
Sample Size	311	178	145	217	112	77	1040

Total Legal Kill	=	9,760
Estimated Illegal Kill	=	1,460
Estimated Crippling Loss	=	<u>980</u>
Total Kill		12,200

* Confidence limits at the 0.05 level = 80% \pm 2%.

of "License Holders Who Did Not Hunt." It was evident that many individuals did not read the enclosed instructions and returned the cards even if they were not license holders. The information obtained from the postal returns was consistently more conservative than that from the hunter interviews. Samples of hunter survey and postal report card forms are included in the Appendix. All data included in this report are based on the hunter interviews unless otherwise stated.

Hunter success averaged 83 per cent for all of Southeast Alaska and was highest in the villages and Ketchikan which had 90 and 89 percent, respectively. The very high success in Ketchikan is unusual and is possibly due to sampling technique. Success since 1957 has never been higher in Ketchikan than in Petersburg or Wrangell. The hunter success for Ketchikan determined from the postal survey was 79 per cent which is probably a more accurate figure. The hunter success for Southeast Alaska in 1960 was only slightly less than that of 1958 when the success was 83.5 per cent, the highest on record. In 1958, snow conditions resulted in deer moving to lower elevations during the later portion of the season, concentrating them in a relatively narrow zone of beach fringe and making them readily accessible to hunters. No such conditions existed in 1960; the weather throughout the entire hunting season was mild and deer remained widely dispersed. The fact that success was high in spite of a wide dispersal of the deer indicates a large population.

The average hunter killed 2.3 deer, spent 6.8 days in the field hunting and saw an average of 21 deer while actually hunting. At least one doe was taken by 21 per cent of the hunters and 27 per cent took their limit of four deer. Table 2 shows the proportion of hunters from each town who killed no, one, two, three, or four deer. Wrangell hunters appear to be the most successful, 40 per cent taking their limit of four deer.

Estimate of the Hunter Harvest

The hunting season for 1960 was the most liberal on record since 1925 when the first regulations were published by the Alaska Game Commission. Seasons and bag limits from 1925 through 1961 are summarized in Table 3. The regular

Table 2. Number of deer taken by residents of each town in Southeast Alaska during the regular 1960 season.

Number of Deer	Juneau	Ketchikan	Petersburg	Sitka	Wrangell	Villages	All South- east Alaska
No Deer	35%	11%	17%	19%	14%	10%	17%
One Deer	25%	16%	10%	13%	19%	16%	16%
Two Deer	9%	24%	13%	16%	13%	24%	18%
Three Deer	11%	24%	31%	27%	14%	24%	22%
Four Deer	22%	25%	29%	25%	40%	26%	27%
Sample Size	81	101	69	85	63	134	533

Table 3. Seasons and bag limits for deer in Game Management Units 1 through 4 of Southeast Alaska from 1925 to 1961.

Year	BAG LIMIT			SEASON		Remarks
	Buck	Doe	Total	Bucks	Does	
1925	3		3	9/16 - 12/15		3" min. antlers
1926	3		3	9/1 - 11/30		3" min. antlers
1927	3		3	9/1 - 11/30		3" min. antlers
1928	3		3	9/1 - 11/30		3" min. antlers
1929	3		3	9/1 - 11/30		3" min. antlers
1930	3		3	8/20 - 11/15		3" min. antlers
1931	3		3	8/20 - 11/15		3" min. antlers
1932	3		3	8/20 - 11/15		3" min. antlers
1933	3		3	8/20 - 11/15		3" min. antlers
1934	3		3	8/20 - 11/15		3" min. antlers
1935	3		3	8/20 - 11/15		3" min. antlers
1936	3		3	8/20 - 11/15		3" min. antlers
1937	3		3	8/20 - 11/15		3" min. antlers
1938	3		3	8/20 - 11/15		3" min. antlers
1939	3		3	8/20 - 11/15		3" min. antlers

Table 3 (continued)

Year	BAG LIMIT			SEASON		Remarks
	Buck	Doe	Total	Bucks	Does	
1940	3		3	8/20 - 11/15		3" min. antlers
1941	3		3	8/20 - 11/15		3" min. antlers
1942	2		2	9/16 - 11/15		3" min. antlers
1943	2		2	9/16 - 11/15		3" min. antlers
1944	2		2	9/1 - 11/15		3" min. antlers
1945	2		2	9/1 - 11/15		3" min. antlers
1946	2		2	9/1 - 11/15		3" min. antlers
1947	2		2	9/1 - 11/15		3" min. antlers
1948	2		2	9/1 - 11/15		3" min. antlers
1949	2		2	9/1 - 11/7		3" min. antlers
1950	2		2	9/1 - 11/15		3" min. antlers
1951	2		2	9/1 - 11/15		3" min. antlers
1952	2		2	8/20 - 11/15		3" min. antlers
1953	2		2	8/20 - 11/22		Visible antlers
1954	3		3	8/20 - 11/22		3" min. antlers

Table 3 (continued)

Year	BAG LIMIT			SEASON		Remarks
	Buck	Doe	Total	Bucks	Does	
1955	2	1	3	8/20 - 11/22	11/15-11/22	3" min. antlers
1956	3	1	3	8/20 - 11/26	11/13-11/26	No does in Unit 1
1957	4	4	4	8/20 - 11/30	10/15-11/30	3 bucks and no does in Unit 1
1958	4	4	4	8/20 - 11/30	10/15-11/30	3 bucks and no does in Unit 1
1959	4	4	4	8/20 - 11/30	10/15-11/30	4 bucks or 3 bucks and 1 doe in Unit 1
1960	4	4	4	8/20 - 12/15	10/1 -12/15	4 bucks or 2 bucks and 2 does in Unit 1
1961	4	4	4	8/1 - 11/30	9/15-11/30	4 bucks or 2 bucks and 2 does in Unit 1

deer hunting season was open for 118 days with a bag limit of four deer of either sex except in Units 1 and 5 where not more than two of the four deer limit could be does. The total deer kill during the 1960 hunting season is estimated to be 15,550 animals. This kill is composed of a legal kill of 12,440, and illegal kill of 1,870 and a crippling loss of 1,240. The legal kill of 12,440 was calculated by determining the number of license holders in each town and subtracting the per cent which held licenses but did not hunt (from hunter interviews). The remainder was then multiplied by the average number of deer per hunter to determine the total kill for each town which was in turn increased by a conservative 15 per cent for illegal kill and 10 per cent for crippling losses.

Very little information is available concerning the contribution of crippling losses and illegal kill to the total hunter harvest, however, its importance cannot be overlooked. Costley (1948), Dahlberg and Guettinger (1956), Taber and Dasmann (1958), Banasiak (1961) and Brown (1961) estimate crippling losses in various states to range from 10 to 75 per cent of the take-home kill. The average hunter in Southeast Alaska is unquestionably more efficient than hunters in most other states and the crippling loss is probably quite low. It will, however, probably fall within the low range of other areas and is estimated to be at least 10 per cent of the take-home kill.

The illegal kill is quite another matter. Enforcement of game regulations has never been intensive in Southeast Alaska. This is due in part to the small number of enforcement personnel assigned to cover the vast area of Southeast Alaska. Enforcement is further impeded by slow methods of transportation (usually boat) and inclement weather conditions. In addition to these factors, enforcement officers are charged with the enforcement of commercial fishing as well as game regulations. In lieu of the fact that commercial fishing is extremely important to the economy of the State, the enforcement of game laws tends to be neglected. Historically, both Indian and white residents of Southeast Alaska who live in remote areas have taken game as they needed it, regardless of seasons. Severinghaus and Cheatum (1956) state that in most localities throughout North America, the illegal kill is second only to the legal

kill as a contributing factor to deer mortality, and in some states even exceeds the legal kill. The occupational characteristics of most residents of Southeast Alaska also favors a high illegal kill. Most jobs are seasonal, residents being free from occupational responsibility from October until the following spring. This enables the hunter to spend almost as much time as he desires in the pursuit of game and where deer are abundant and readily accessible, a large illegal kill is to be expected. In the absence of further information, it is estimated that the illegal kill of deer in Southeast Alaska amounts to at least 15 per cent of the legal kill and may be much greater.

The calculations for determination of the 1960 hunter harvest are shown in Table 4. The increase in the 1960 kill over 1959 is attributed to increased hunting effort, particularly prior to November 1. The average hunter in 1960 spent 6.8 days in the field compared to 6.1 days in 1959.

Chronological Distribution of the Kill

The distribution of the 1960 hunter harvest by two week periods is shown in Figure 1. The distribution of the kill by locality and Management Unit is presented in Table 5. The deer kill in 1960 was much more evenly distributed than in past years. Sixty-eight per cent was made during the last half of the 16 week season compared to 91 per cent in the last six weeks of the 1959 season. The largest segment of the kill (25 per cent) was made during the first two weeks of November. Past years have shown that hunting pressure is usually greatest during the later portion of the season. At this time the commercial fishing season is completed and more people are free to hunt and in addition the deer are being forced to lower elevations by accumulating snow.

Table 5 shows that hunting pressure varies with the time and locality. The Mainland, Gravina Island, Revilla Island, Prince of Wales Island, Woronkofski Island and Vank Island are preferred early season hunting sites. Hunting pressure is greatest in most other areas during late October and November.

Table 4. Total deer harvest for each town in Southeast Alaska - 1960.

Town	Total No. License Sales	% Who Did Not Hunt	Ave. No. Deer Per Hunter	Calculation	Total Kill For Town
Juneau	2249	19	1.7	(2249-427) 1.7	3097
Ketchikan	1741	0	2.4	(1741-0) 2.4	4178
Petersburg	597	8	2.4	(597-48) 2.4	1318
Sitka	1051	15	2.3	(1051-158) 2.3	2054
Wrangell	434	15	2.5	(434-65) 2.5	922
Villages	389	7	2.4	(389-27) 2.4	869
Total kill for Southeast Alaska					12,438

Total legal kill = 12,440
 Illegal kill (15%) = 1,870
 Crippling loss (10%) = 1,240
 Total kill = 15,550

portion of the Ketchikan kill coming from Unit 2 (9 per cent in 1960 compared to 20 per cent in 1959). Juneau hunters travel the greatest distance to hunt, 22 per cent hunting Chichagof Island. Table 7 combines the data from Table 4 (kill for each town) with that of Table 6 (distribution of hunting pressure for each town) and gives the actual distribution of hunting pressure for all Southeast Alaska. Management Unit No. 3 undoubtedly has the highest deer population per unit area of all localities in Southeast Alaska while Unit 1 has the lowest. In spite of this, Table 7 shows that the largest single segment of the harvest came from Revilla and Gravina Islands. This indicates that as long as hunting is relatively good, hunters will hunt near their home towns rather than traveling to better hunting locations and also that the kill for most localities of Southeast Alaska is directly proportional to the human population of that area.

Elevation of the Hunter Kill

Weather conditions dictate, to a large extent, the elevation at which deer are most abundant at a given time. As the snow recedes in June, most of the adult bucks move to the summer alpine ranges above 1,500 feet in elevation where they remain until the first killing frosts which normally come in late September or early October. The forbs on the alpine ranges die quickly after the heavy frosts and the deer move down into the high timber. With the onset of the rut in October and November the bucks tend to travel over wider areas and may be found anywhere from the beach to the high timber. November normally brings snowfalls which force the deer to lower elevations. This is the time when hunting is usually most productive. A smaller proportion of the doe, fawn and yearling buck population utilizes the summer alpine range than do adult bucks. Table 8 shows the proportion of the kill made at various elevations throughout the hunting season. As expected, the alpine kill takes place early in the season with the kill at all other elevation levels being more evenly distributed and greatest in late October and November.

People of various towns hunt at different elevations. Table 9 shows that more residents of the Ketchikan area hunt the higher elevation levels than do those of most other towns. Residents of the outlying villages hunt the high timber and

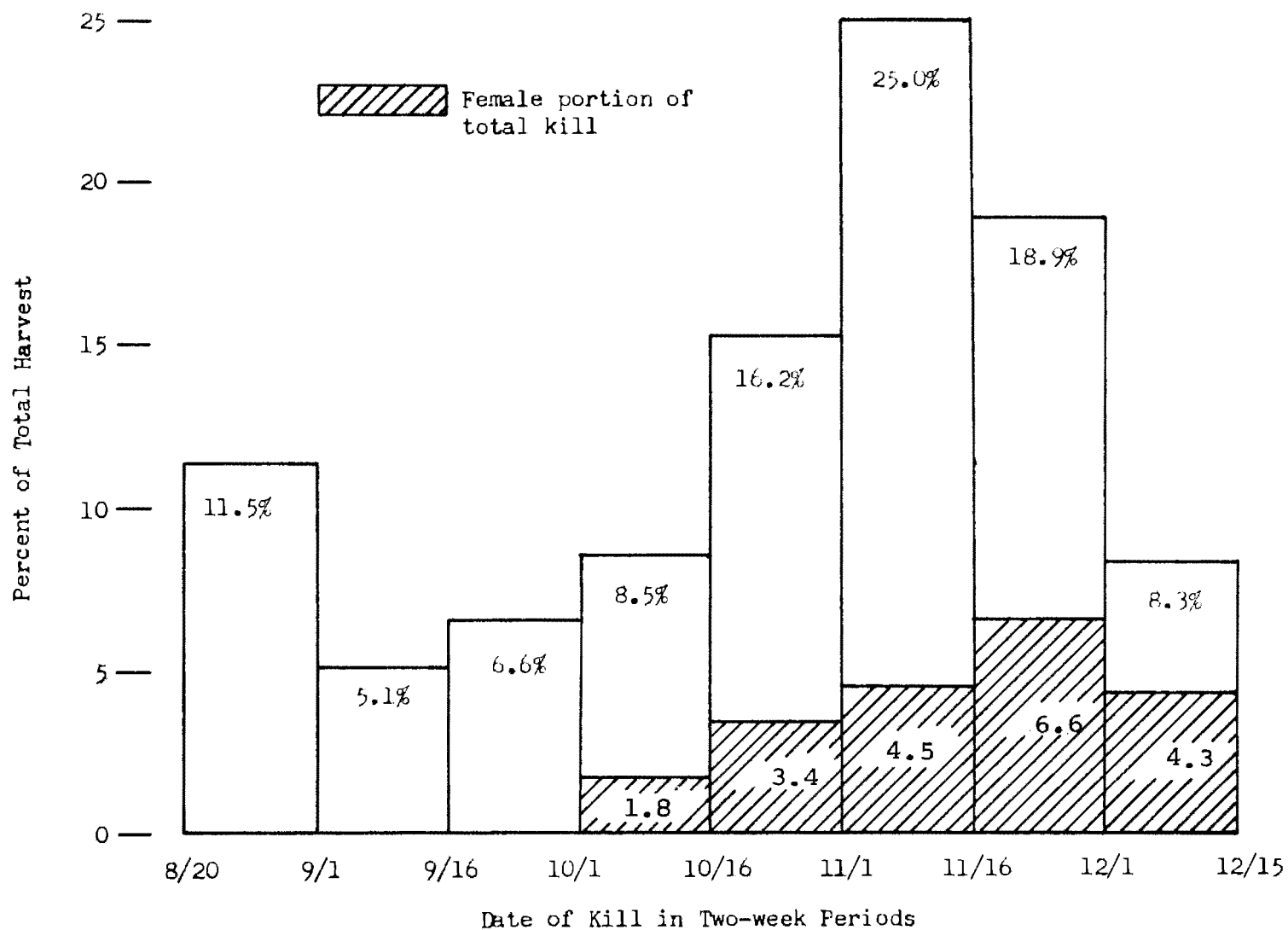


Figure 1. Chronological distribution of the 1960 deer hunter harvest in Southeast Alaska.

Table 5. Chronological distribution by locality of the 1960 hunter harvest in Southeast Alaska.

Locality	Per cent kill in each time period								Sample Size
	8/20-8/31	9/1-9/15	9/16-9/30	10/1-10/15	10/16-10/31	11/1-11/15	11/16-11/30	12/1-12/15	
Management Unit # 1									
Douglas Island	14	3	10	7		14	42	10	29
Mainland									
(N. of Stikine R.)	12	38				50			8
Mainland									
(S. of Stikine R.)	41	6	11	10	6	12	12	2	51
Revilla, Gravina Is.	17	10	15	12	15	8	12	11	112
Total for Unit #1	22	9	13	10	10	12	16	8	200
Management Unit #2									
Prince of Wales Is.	32	10	8	8	9	17	10	6	78
* West Coast Islands	12	12	18	18	22	4	12	2	50
Total for Unit #2	24	11	12	12	14	12	11	4	128
Management Unit #3									
Kuiu Island	3		3	19	19	56			31
Kupreanof Island	4	4	6	4	20	40	16	6	159
Mitkof, Woedwodski Is.	1	4	1	4	25	33	26	6	83
Zarembo, Bushy, and									
Shrubby Islands			2	4	12	39	39	4	49
Woronkofski and									
Vank Islands	24	9	9	5	5	14	29	5	21
Etolin, Onslow Is.	16	9			28	22	19	6	32
Wrangell Island	9	9	5	5	27	18	23	4	22
Total for Unit #3	6	4	4	5	20	35	21	5	397
Management Unit #4									
Chichagof Island	11	1	3	7	21	26	20	11	197
Admiralty Island	2	6	4	13	11	33	20	11	105
Kruzof Island			4			11	55	30	27
Baranof Island	12	3	9	13	16	20	16	11	115
Total for Unit #4	9	2	5	10	16	25	21	12	444
All Southeast Alaska	12	5	7	8	16	25	19	8	1169

* South of Sumner Strait

The female portion of the total kill averaged 20 per cent from October 1 through November 15. The proportion of does in the harvest increased during late November and December to 52 per cent of the total kill.

The 1960 regular season extended to December 15. This is the first time since 1925 that the season has extended beyond November 30. The kill during December was very light, only 8 per cent of the total harvest, even though weather conditions were favorable for hunting. The low kill in December may indicate that there is a limit to the extent liberalization of seasons will result in significant increases in the kill. Sportsmen may lose interest if the season is overly long.

Of special interest is the relatively large portion of the kill (12 per cent) made during the first two weeks of the season. The early kill is usually less than 5 per cent. This may be due to two factors; the first being more interest in early hunting (all areas showed a higher proportion of deer taken during the last two weeks of August) and to the high proportion of deer killed in August in Unit No. 2, an area which had not been previously sampled.

Sex Ratio of the Kill

The sex ratio of the harvest, determined from hunting interviews, was 21 per cent does and 79 per cent bucks. The percentage of does in the harvest was 24 per cent in 1959 and 29 per cent in 1958. The smaller proportion of females in the 1960 harvest correlates with the higher proportion of the kill prior to the opening of the doe season on October 1. Hunters from Wrangell took the largest proportion of does per hunter (25 per cent) and those from the villages the smallest (16 per cent). Most hunters in Southeast Alaska prefer to take bucks even though does may be more available and provide more palatable meat after the initiation of the rut.

Distribution of the Hunter Harvest by Locality

Table 6 shows that most hunters in Southeast Alaska hunt the areas closest to their place of residence. The only major deviation from 1959 values is the smaller

Table 6. Distribution of the 1960 deer hunter harvest for each town in Southeast Alaska

Per cent of kill by locality for each town						
Locality	Juneau	Ketchikan	Petersburg	Sitka	Wrangell	Villages
Management Unit #1						
Douglas Island	23					
Mainland						
(N. of Stikine R.)	4		1			
Mainland						
(S. of Stikine R.)	1	21				
Revilla, Gravina Is.		50				
Total for Unit #1	28	71	1			
Management Unit #2						
Prince of Wales Is.		9		2	2	16
*West Coast Islands						17
Total for Unit #2		9		2	2	33
Management Unit #3						
Kuiu Island		9			1	5
Kupreanof Island	4	8	63		2	8
Mitkof, Woewodski Is.	1		36		15	
Zarembo, Bushy, and						
Shrubby Islands					34	
Woronkofski and						
Vank Islands					14	
Etolin, Onslow Is.		2			18	
Wrangell Island					14	
Total for Unit #3	5	19	99		98	13
Management Unit #4						
Chichagof Island	22			28		38
Admiralty Island	43			1		15
Kruzof Island	1			13		
Baranof Island	1	1		56		1
Total for Unit #4	67	1		98		54
Sample Size	133	231	166	192	155	325
Total kill for Town	3097	4178	1318	2054	922	869
*South of Sumner Strait						

Table 7. Distribution of the 1960 deer harvest in Southeast Alaska by Game Management Units.

Locality	Per cent of total kill						Totals
	Juneau	Ketchikan	Petersburg	Sitka	Wrangell	Villages	
Management Unit #1							
Douglas Island	6						6
Mainland							
(N. of Stikine R.)	1						1
Mainland							
(S. of Stikine R.)		7					7
Revilla, Gravina Is.		17					17
Total for Unit #1	7	24					31
Management Unit #2							
Prince of Wales Is.		3				1	4
West Coast Islands						1	1
Total for Unit #2		3				2	5
Management Unit #3							
Kuiu Island		3					3
Kupreanof Island	1	3	7			1	12
Mitkof, Woewodski Is.			4		1		5
Zarembo, Bushy, and							
Shrubby Islands					3		3
Woronkofski and							
Vank Islands					1		1
Etolin, Onslow Is.		1			1		2
Wrangell Island					1		1
Total for Unit #3	1	7	11		7	1	27
Management Unit #4							
Chichagof Island	5			5		3	13
Admiralty Island	12					1	13
Kruzof Island				2			2
Baranof Island				9			9
Total for Unit #4	17			16		4	37
Total for All SE Alaska	25	34	11	16	7	7	100
Sample Size	3097	4178	1318	2054	922	869	12,438

Table 8. Correlation between time and elevation of the 1960 male deer harvest for Southeast Alaska.

Time Period	Per cent of kill in each time period				Sample Size
	Beach	Low Timber or Muskeg	High Timber or Muskeg	Alpine	
8/1 - 8/31	8	6	10	66	131
9/1 - 9/15	2	4	12	14	59
9/16 - 9/30	11	6	13	11	74
10/1 - 10/15	6	9	10	3	75
10/16 - 10/31	29	18	15	4	143
11/1 - 11/15	23	31	26		232
11/16 - 11/30	15	20	10	1	139
12/1 - 12/15	6	6	4		44
Totals	100	100	100	100	897

Table 9. Per cent of 1960 male deer harvest at various elevations for residents of each Southeast Alaskan town.

Town	Elevation of kill				Sample Size
	Beach	Low Timber or Muskeg	High Timber or Muskeg	Alpine	
Juneau	5%	68%	16%	11%	100
Ketchikan	8%	43%	26%	23%	178
Petersburg	2%	69%	24%	5%	126
Sitka	1%	71%	15%	13%	140
Wrangell	10%	71%	11%	8%	115
Villages	9%	54%	26%	11%	247
All SE Alaska	6%	60%	21%	13%	906

muskegs, but not the alpine areas. Most hunters in Southeast Alaska do the majority of their hunting in the low timber and muskegs. Table 10 gives the per cent of male and female deer taken at each elevation level for each Management Unit. Unit 1 shows the greatest proportion of deer taken at high elevations. In all other units, 60 per cent or more of the deer were taken at low elevations.

Age Distribution of the Hunter Harvest

The age distribution of hunter killed deer for the 1960 season is given in Table 11. Tables 12 and 13 show the age classes of the male and female kill, respectively. The age distribution for male deer is represented graphically in Figure 2, compared to previous years, and in Figure 3 by Management Unit for 1960. The sample size from Unit No. 2 is inadequate. Calculation of Chi-Square values for age classes from Table 11 shows no significant difference at the 0.05 level for deer from various units.

Fifty-three per cent of the 1960 deer harvest was composed of animals 3-1/2 years of age or older compared to 48 per cent in 1959. The 3-1/2 year age class constituted 27 per cent of the total harvest and was the largest age class represented. No single age class dominated the kill in 1960 as the 2-1/2 year age class did in 1954 and 1959. The slightly higher proportion of older age deer in the 1960 harvest than in 1959 is attributed to the dominant 3-1/2 year age class which was part of the younger age class in 1959. The continued high proportion of older age deer in the hunter harvest reflects the light hunting pressure in most areas and a tendency toward stabilization through lowered productivity as shown by the steady decline in younger age animals in the harvest since 1958 in Figure 2. The trend for age classes from 1953 to 1955 is very similar to that shown from 1958 through 1960. In both 1953 and 1958, the harvest consisted of a high proportion of young animals which tended to level off in succeeding years.

A high proportion in an age class in any given year is usually reflected in succeeding years. Figure 4 represents graphically the residual effect of dominant age classes as shown by the shaded columns. The increase in the proportion of 2-1/2 year old deer in the harvest from

Table 10. Per cent of the 1960 deer harvest for each Game Management Unit in Southeast Alaska taken at various elevation levels.

MALES					
Location	Elevation of kill				Sample Size
	Beach	Low Timber or Muskeg	High Timber or Muskeg	Alpine	
Management Unit #1	8	37	25	30	154
Management Unit #2	6	64	13	17	110
Management Unit #3	8	69	19	4	303
Management Unit #4	4	61	24	11	333
All Southeast Alaska	6	60	21	13	900
FEMALES					
Management Unit #1	14	67	14	5	43
Management Unit #2	11	83	6		18
Management Unit #3	5	80	15		92
Management Unit #4	11	77	11	1	90
All Southeast Alaska	9	77	13	1	243

Table 11. Age groups by per cent of deer represented in the 1960 legal harvest for Southeast Alaska.

Location	Age Class						Sample Size
	Fawn	1-1/2	2-1/2	3-1/2	4-1/2	5-1/2	
Management Unit #1	7	21	22	26	14	10	58
Management Unit #2	9	9	37	27	9	9	11
Management Unit #3							
Kuiu Island			25	75			4
Kupreanof Island	1	27	18	30	15	9	138
Mitkof, Woewodski Is.	5	17	30	20	17	11	99
Woronkofski, Vank Is.			50		25	25	4
Total for Unit #3	2	22	23	27	16	10	245
Management Unit #4							
Chichagof Island	6	41	12	23	6	12	17
Admiralty Island	10	28	12	26	16	8	50
Baranof Island		36	19	29	6	10	31
Total for Unit #4	6	33	14	27	11	9	98
All Southeast Alaska	4	24	21	27	14	10	412

Confidence limits at the 0.05 level for "All Southeast Alaska" related to the total hunter kill.

Fawns	4%	±	10%
1-1/2	24%	±	9%
2-1/2	21%	±	9%
3-1/2	27%	±	8%
4-1/2	14%	±	9%
5-1/2	10%	±	10%

Table 12. Age groups by per cent of male deer represented in the 1960 legal harvest for Southeast Alaska.

Location	Age Class						Sample Size
	Fawn	1-1/2	2-1/2	3-1/2	4-1/2	5-1/2	
Management Unit #1	4	22	22	28	15	9	54
Management Unit #2	12	12	26	38	12		8
Management Unit #3	2	18	25	26	17	12	200
Management Unit #4	8	26	15	28	13	10	79
All Southeast Alaska	4	21	22	27	16	10	341

Table 13. Age groups by per cent of female deer represented in the 1960 legal harvest for Southeast Alaska.

Location	Age Class						Sample Size
	Fawn	1-1/2	2-1/2	3-1/2	4-1/2	5-1/2	
Management Unit #1	50		25			25	4
Management Unit #2			67			33	3
Management Unit #3	5	36	16	27	11	5	44
Management Unit #4		50	7	29	7	7	14
All Southeast Alaska	6	35	17	25	9	8	65

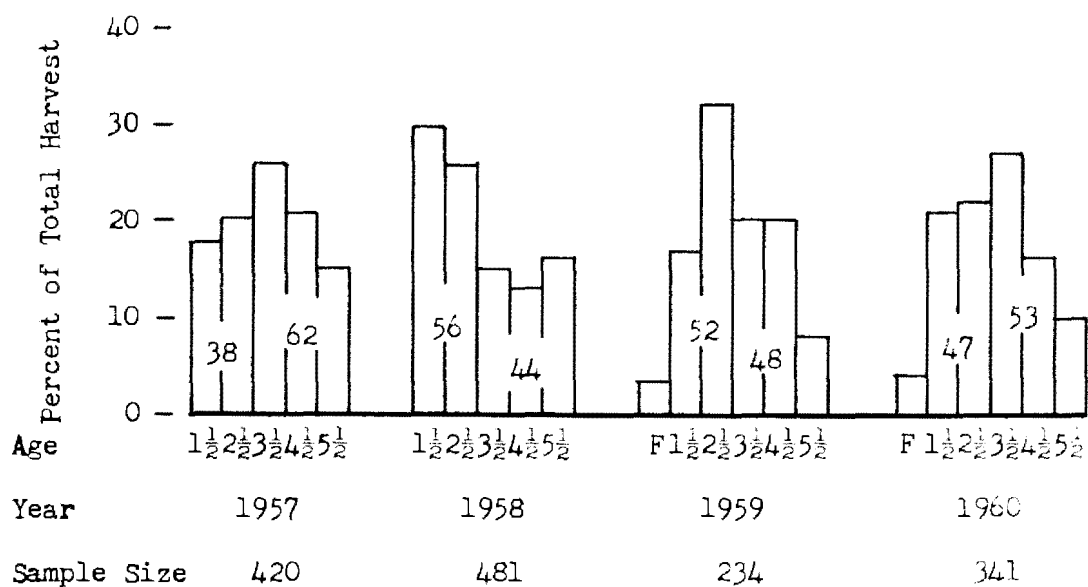
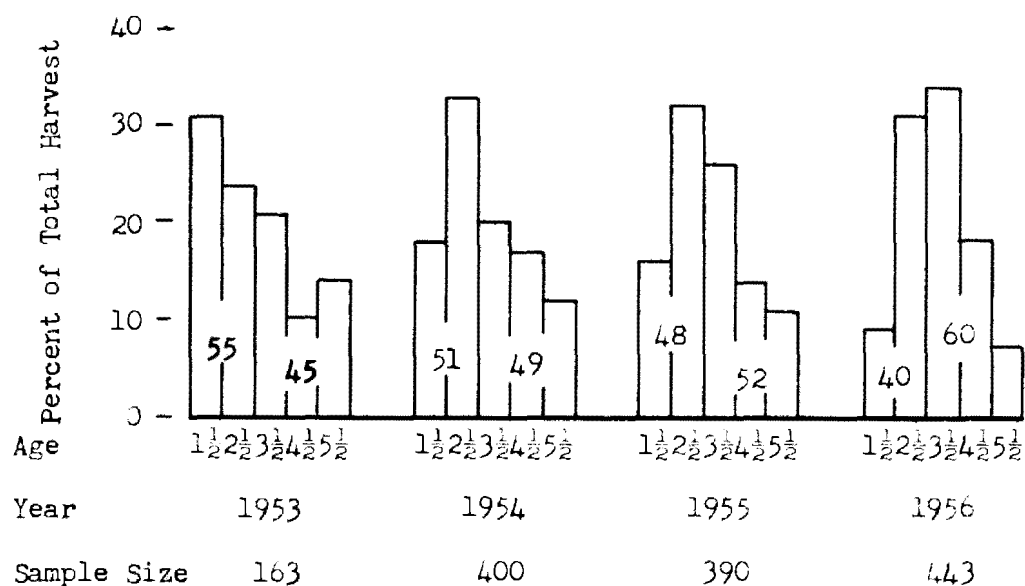


Figure 2. Age distribution of male deer in the legal harvest for Southeast Alaska from 1953 to 1960.

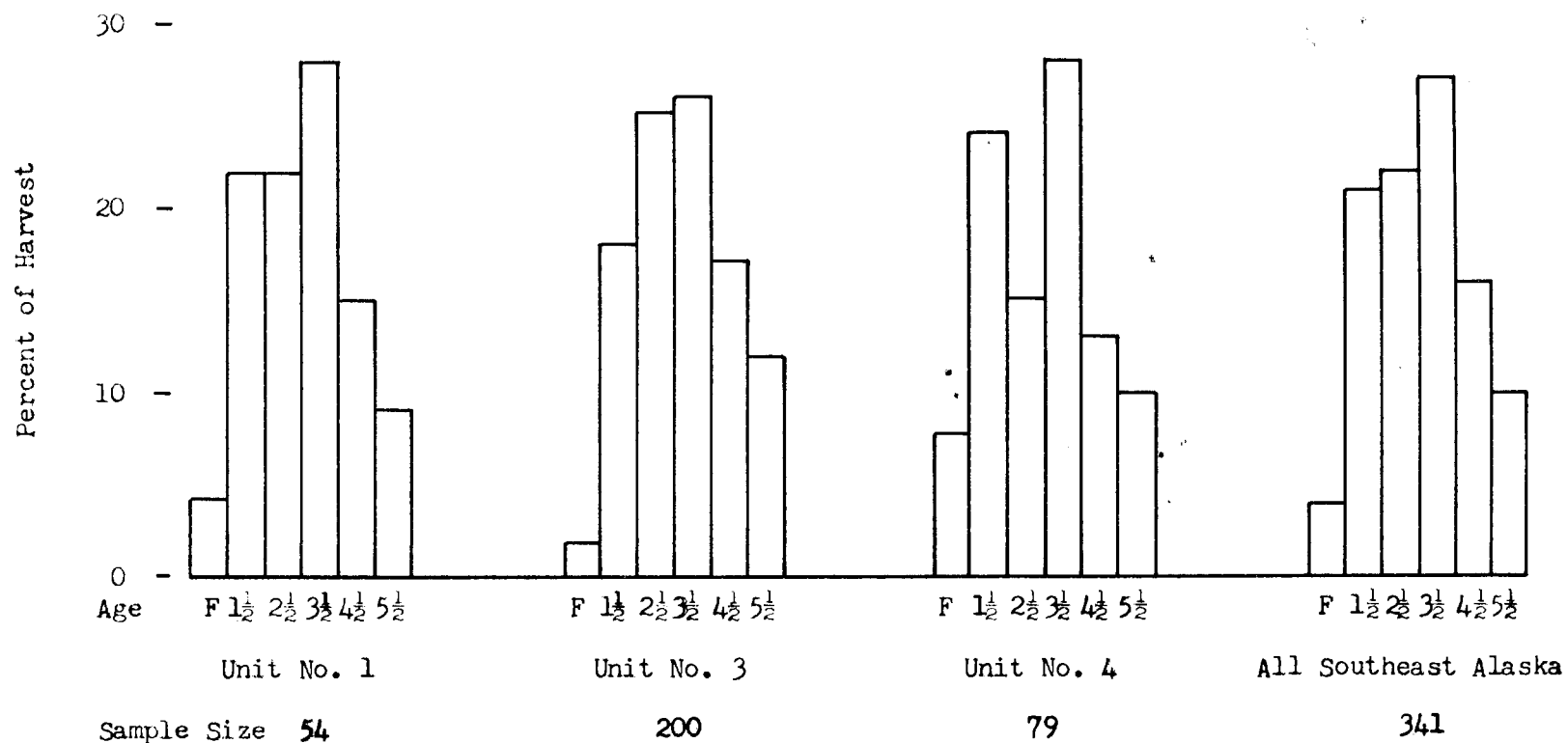


Figure 3. Age distribution of male deer in the 1960 hunter harvest for Game Management Units 1, 3 and 4 of Southeast Alaska.

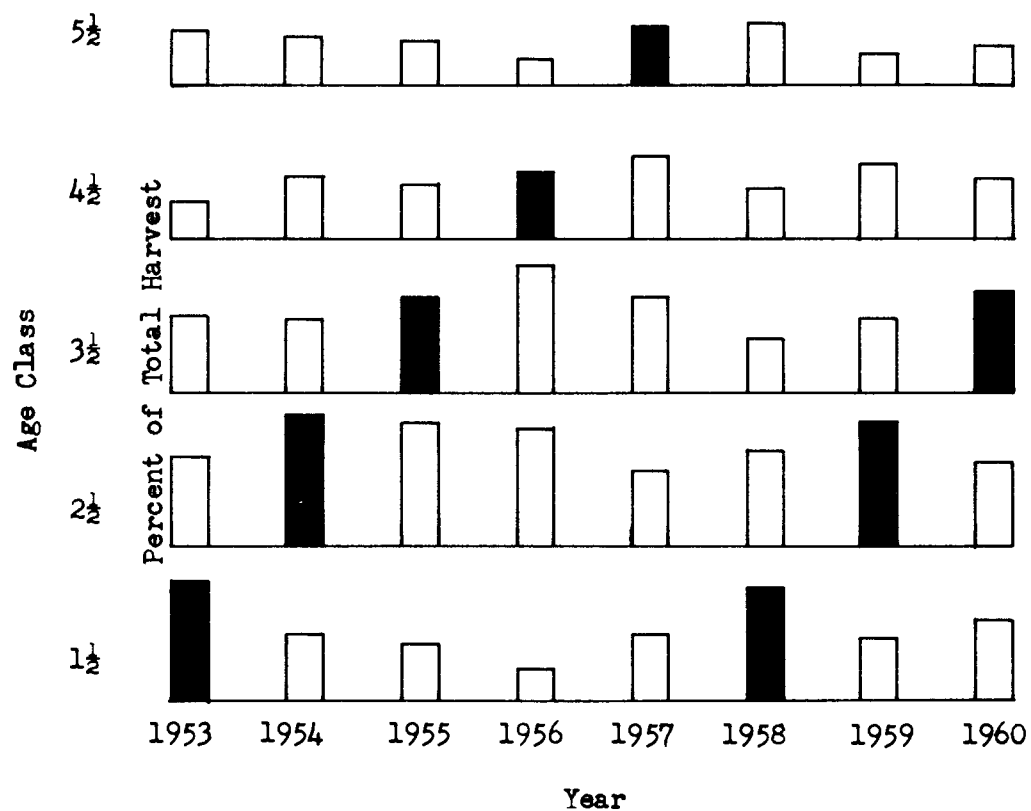


Figure 4. Graph showing the residual effect of dominant age classes in the deer hunter harvest from 1953 to 1960 (shaded columns show the residual effect of a dominant $1\frac{1}{2}$ year age class).

1953 to 1954 shows its impact on the population until 1957 when the 5-1/2 year class was greater than in 1956. This effect is not always present, but the similarity is readily observed. The high proportion of 3-1/2 year old deer in the harvest in 1960 can be traced back to a good fawn crop in 1957 which was reflected by a high proportion of 1-1/2 year age deer in the 1958 harvest and again by the dominant 2-1/2 year age class in 1959.

Winter range conditions also affect the age classes represented in the hunter harvest. Figure 5 illustrates an inverse relationship between the winter range utilization in the spring and the percent of 1-1/2 year age animals in the following fall harvest. Without exception, from 1955 through 1960, when utilization increased, the proportion of 1-1/2 year age deer in the hunter harvest decreased. This relationship is probably due to higher fawn losses during winters which are more severe and consequently the browse shows a higher degree of utilization.

Management Unit No. 4, and particularly Chichagof Island, appears to have a higher proportion of 1-1/2 year old deer in the 1960 harvest than other localities of Southeast Alaska, but it is not significant at the 0.05 level.

The female age distribution, as shown in Table 13, may actually be more representative of the total population, even though the sample size is considerably smaller than that of male deer. Hunters tend to be more biased toward shooting older males than females. Most hunters prefer a well antlered trophy, but it is difficult to estimate the size of does when there is no similar basis for comparison available.

Chronological Age Distribution

Chronological age distribution of deer in the 1960 hunter harvest is shown in Table 14. The 2-1/2 and 3-1/2 year age classes consistently made up the largest segment of the harvest throughout the season with the exception of the last half of November when the 1-1/2 year class was largest. Percentages of yearling deer were greatest in the early season and again in late November. The contribution of each age class in the harvest for any given time period depends, to a large extent, on hunter selectivity and the availability

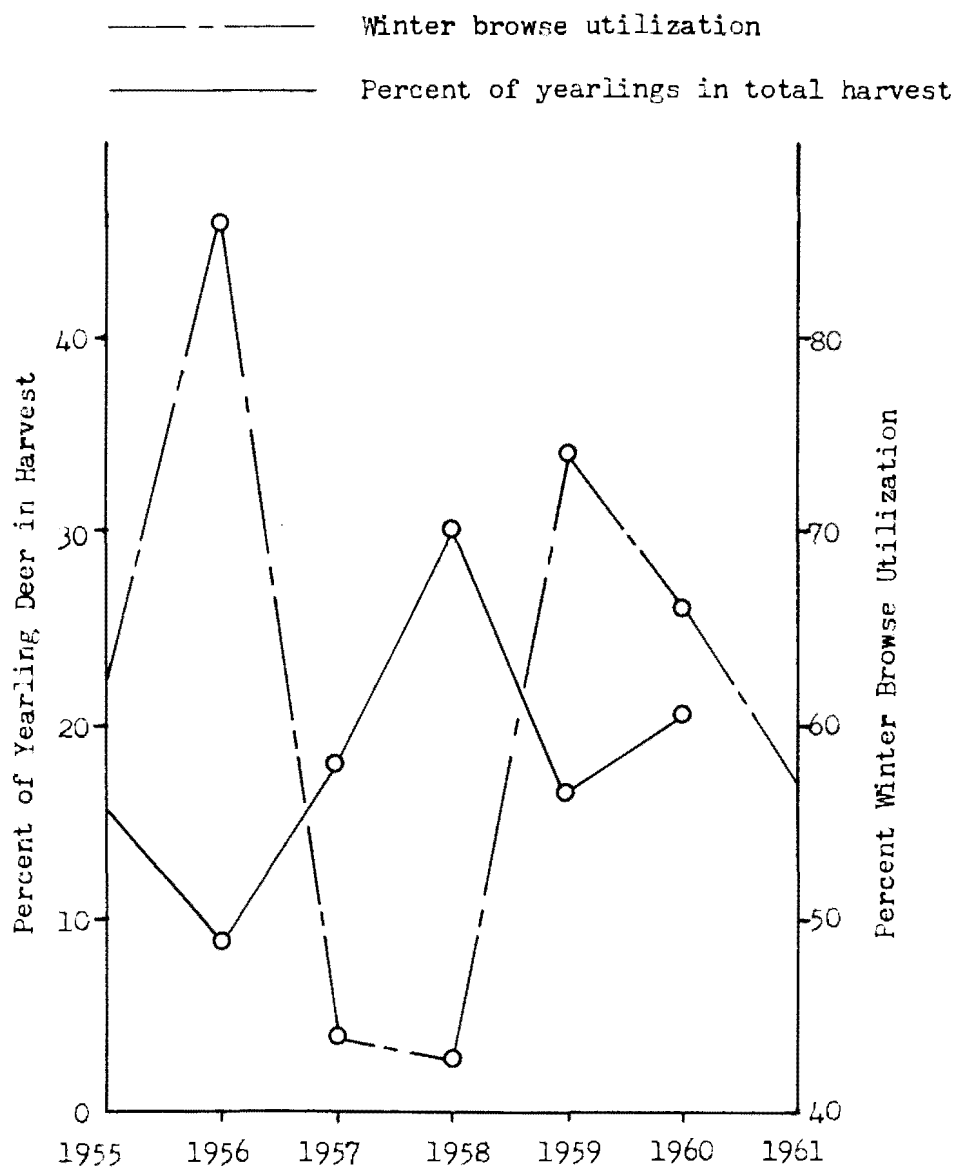


Figure 5. Curves showing the relationship between winter browse utilization and the percent of yearling deer in the following fall harvest for Southeast Alaska, 1955 - 1960.

Table 14. Chronological age distribution in per cent of male deer in the 1960 hunter harvest for Southeast Alaska.

Per Cent Kill in Each Time Period							
Date of Kill	Age Class						Sample Size
	Fawn	1-1/2	2-1/2	3-1/2	4-1/2	5-1/2	
8/20 - 8/31		25	20	35	5	15	20
9/1 - 9/15		31	13	38	12	6	16
9/16 - 9/30			25	50	25		4
10/1 - 10/15	7	13	40	13	13	14	15
10/16 - 10/31	5	17	28	17	17	16	36
11/1 - 11/15	1	18	25	30	17	9	158
11/16 - 11/30	7	30	17	20	15	11	60
12/1 - 12/15	13	19	9	31	19	9	32
Total Sample size							341

Table 15. Per cent of male deer in each antler and age class in the 1960 hunter harvest for Southeast Alaska.

No. of Antler Points*	Age Class					
	Fawn	1-1/2	2-1/2	3-1/2	4-1/2	5-1/2
Nubbin	100	41				
Spike		51	11	5		11
Two-point		8	64	23	6	
Three-point			25	54	37	5
Four-point				16	36	58
Five-point				2	21	26
Sample Size	3	37	36	43	33	19

* Eye-guard counted as point if over 1 inch long.

of the age group. Hunters usually prefer to take large bucks if available; however, the early season kill normally consists primarily of young bucks, larger bucks being more inaccessible. In 1960 the large portion of older age animals in the kill may be attributed to the increased early season hunting in high areas and to the large proportion of 3-1/2 year age deer in the population.

Antler Classes of Male Deer

Table 15 shows the per cent of male deer in each antler point class for each age group. Eye guards were considered as a point if over one inch in length and points on only one beam were counted. Overlap of point classes was noted in all age groups except fawns, which were all "nubbin" or "button" bucks. Variations from spike-class to five-point were observed in bucks 3-1/2 years old and older. With the exception of fawns, the 2-1/2 year age group was most consistent (64 per cent were two-point bucks). Two sets of Sitka black-tailed deer antlers, taken in the vicinity of Petersburg in 1960, measured by the writer were large enough to be entered in the Boone and Crockett Club Records of North American Big Game. One scored 115-2/8 and the other 110-4/8 points.

Weights and Measurements

Dressed weight, hind foot, metacarpal bone and chest girth measurements are given in Tables 16 through 21. Values for hind foot, chest girth measurements and dressed weights were consistently slightly higher than since 1956.

The average dressed weight, of eviscerated animals, with head, hide and feet attached, averaged 106 pounds for male deer and 74 pounds for females. The largest buck weighed during the 1960 season was taken on Wrangell Island and the dressed weight was 202 pounds. Deer apparently continue to gain in weight through 5-1/2 years of age even though bone growth is essentially complete at 2-1/2 years of age.

Chronological dressed weights are shown in Table 17. Although the sample is relatively small, it can be seen that weight losses associated with the beginning of the rut are much less pronounced in 1-1/2 and 2-1/2 year old deer than in older age classes. Older deer continue gaining weight through the end of September, when first rutting activity

Table 16. Average dressed weights in pounds for deer in each age class in the 1960 hunter harvest for Southeast Alaska.

Location	<u>MALE DEER</u>						Sample Size
	Age Class						
	Fawn	1-1/2	2-1/2	3-1/2	4-1/2	5-1/2	
Management Unit #1		62	61	90	155	152	9
Management Unit #2			93	142	125		3
Management Unit #3		68	91	105	125	140	77
Management Unit #4	34		92	112	116	148	9
All Southeast Alaska	34	67	87	106	127	141	
Sample Size	1	15	17	28	22	15	98

Average weight of all male deer in sample - 106 pounds

<u>FEMALE DEER</u>						
All Southeast Alaska	66	78	72	88	90	
Sample Size	9	5	6	3	1	24

Average weight of all female deer in sample - 74 pounds

Table 17. Chronological dressed weights in pounds for male deer in each age class in the 1960 hunter harvest for Southeast Alaska.

Date of Kill	Age Class						Total
	Fawn	1-1/2	2-1/2	3-1/2	4-1/2	5-1/2	
8/20 - 8/31				125		142	
9/1 - 9/15				119	122	169	
9/16 - 9/30					176		
10/1 - 10/15					168	165	
10/16 - 10/31		73	96	125	144	156	
11/1 - 11/15		67	90	101	123	132	
11/16 - 11/30	34	67	85	90	109		
12/1 - 12/15		78			115	118	
Sample Size	1	16	17	28	22	15	99

Table 18. Hind foot measurements in inches from deer in the 1960 hunter harvest for Southeast Alaska.

	<u>MALE DEER</u>						Sample Size
	Age Class						
<u>Location</u>	<u>Fawn</u>	<u>1-1/2</u>	<u>2-1/2</u>	<u>3-1/2</u>	<u>4-1/2</u>	<u>5-1/2</u>	
Management Unit #1		17.0	16.3	16.6	17.5		8
Management Unit #2					17.5		1
Management Unit #3		16.7	17.5	17.3	17.6	17.4	59
Management Unit #4	14.5	17.0	17.1	17.3	17.8	17.6	14
All Southeast Alaska	14.5	16.7	17.3	17.3	17.6	17.4	82

<u>FEMALE DEER</u>							
All Southeast Alaska	13.8	15.7	16.4	16.1	16.7	16.0	22

Table 19. Length of metacarpal bones in millimeters from deer in the 1960 hunter harvest for Southeast Alaska.

Location	<u>MALE DEER</u>						Sample Size
	Age Class						
	Fawn	1-1/2	2-1/2	3-1/2	4-1/2	5-1/2	
Management Unit #1		175.2	177.2	171.5	183.0		7
Management Unit #2			179.0		173.0		2
Management Unit #3	142.5	169.6	176.6	176.7	178.5	178.2	76
Management Unit #4	144.0	171.4	174.2	177.9	177.8	176.8	18
All Southeast Alaska	143.6	170.9	176.4	176.7	178.4	178.0	103

<u>FEMALE DEER</u>							
All Southeast Alaska	139.0	161.8	168.6	166.1	166.8	166.8	24

Table 20. Chest girth in inches for deer in the 1960 hunter harvest for Southeast Alaska.

Location	<u>MALE DEER</u> Age Class						Sample Size
	Fawn	1-1/2	2-1/2	3-1/2	4-1/2	5-1/2	
Management Unit #1		32.0	34.0	37.4	40.4		6
Management Unit #2			35.0		39.0		2
Management Unit #3		30.5	34.0	36.3	37.7	39.0	41
Management Unit #4	25.0	36.0	40.0	38.7	38.8	39.8	12
All Southeast Alaska	25.0	31.9	35.3	36.8	38.3	39.0	61

<u>FEMALE DEER</u>					
All Southeast Alaska	30.1	31.6	30.4	37.0	13

Table 21. Chronological variation in chest girth in inches for male deer in the 1960 hunter harvest for Southeast Alaska.

Date of Kill	<u>MALE DEER</u> Age Class						Sample Size
	Fawn	1-1/2	2-1/2	3-1/2	4-1/2	5-1/2	
8/20 - 8/31			35.0	37.2			4
9/1 - 9/15		30.0		38.0		43.0	3
9/16 - 9/30					39.0		1
10/1 - 10/15				37.5			1
10/16 - 10/31		30.9	33.0	36.5	38.3	40.5	7
11/1 - 11/15		31.6	33.8	36.7	38.4	38.2	36
11/16 - 11/30	25.0	32.0	34.0	34.0	35.0		6
12/1 - 12/15		33.0			37.0		2

begins. After this time fat reserves are utilized and weight is lost. Four and one-half year old deer showed a 35 per cent weight loss between the dates of October 1 and December 1.

Hind foot measurements of male deer, as shown in Table 18, ranged from 14.5 inches for fawns to 17.4 inches for 5-1/2 year old deer. No apparent growth was noted after 2-1/2 year of age. A comparison of hind foot lengths for male deer from Unit 3 for the period of 1957 through 1960 shows that hind foot measurements for deer from this area were all slightly longer in 1960 than in previous years. This may be due to the series of long growing seasons experienced from 1957 through 1960.

Metacarpal bones removed from the front legs of hunter killed deer were cleaned, dried and then measured to the nearest millimeter. Measurements recorded in Table 19 show that either bone growth is essentially complete by the time deer attain 2-1/2 years of age or that there may be yearly variations in growth depending upon the favorableness of the growing season. This would primarily affect deer in their first three years of life. In 1960 it appears that the 2-1/2 year age class shows better than average growth. The metacarpal bone measurement gives a more reliable measurement than hind foot (which varies with hoof wear and measuring techniques) and is relatively easy to obtain. These measurements should effectively show variations in growth from year to year as well as on different ranges. Another useful function of metacarpal measurements is the determination of sex if the jaw is also available. Often when examining deer remains all that is available for observation are a few scattered bones. If the jaw and a metacarpal bone are present, it can be seen from Figure 6 that the sex can also be determined as the length of metacarpal bones of male deer are consistently longer than those of female deer of the same age. This would only hold true for deer from similar environments and with similar growth characteristics. Figure 7 shows that when confidence limits at the 0.05 level are plotted for male and female bone lengths, for each age class, overlap only occurs in the 1-1/2 year age group.

Chest girth measurements are given in Tables 20 and 21. Girth increases directly with weight as can be seen by comparison with Table 16. Both chest girth and weight of male

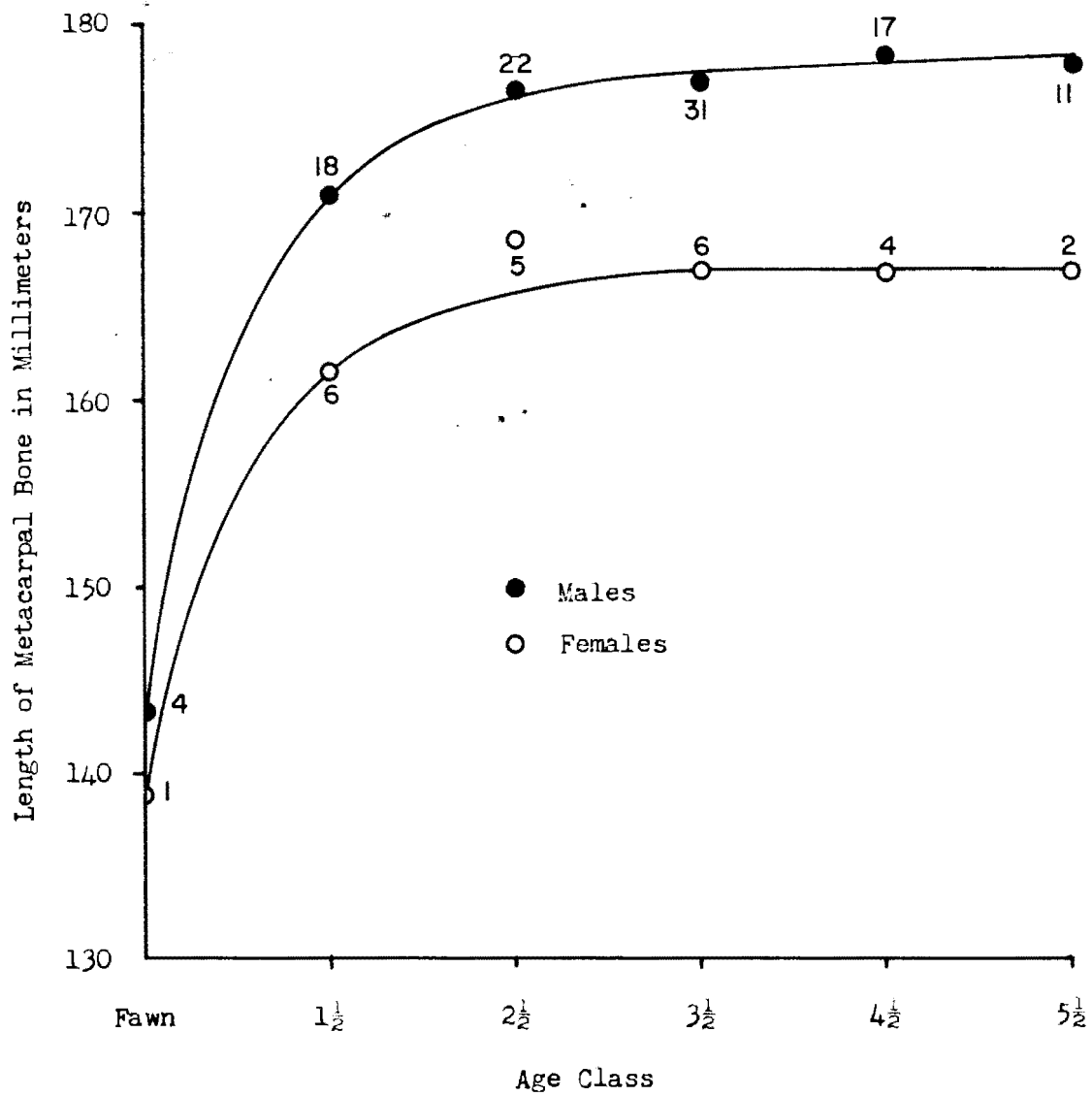


Figure 6. Curves showing the relationship between age and length of the metacarpal bone for male and female deer in Southeast Alaska.

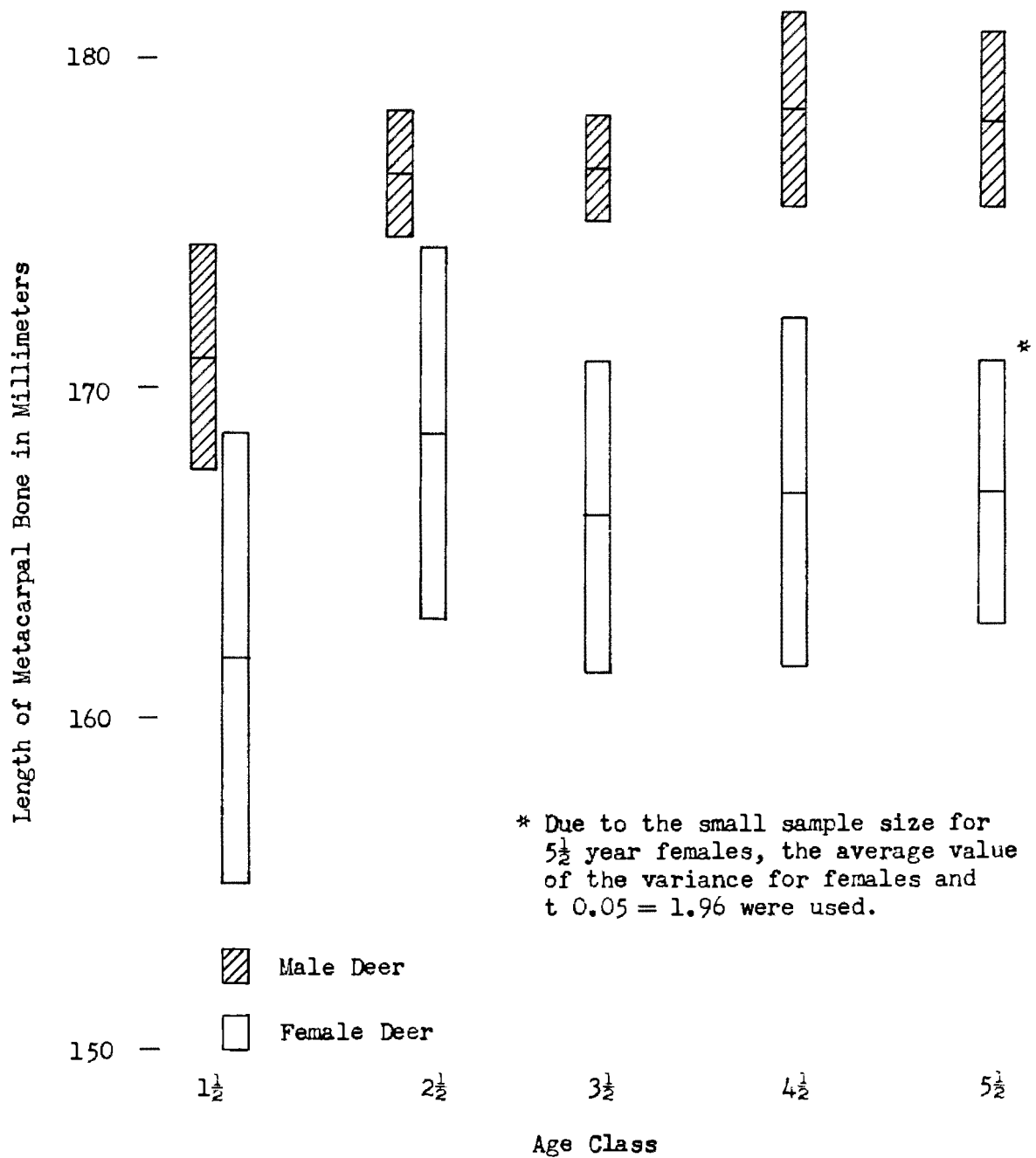


Figure 7. Graph showing the confidence limits at the 0.05 level for lengths of metacarpal bones for male and female deer in the 1960 hunter harvest for Southeast Alaska.

deer vary with the physiological changes associated with the rut and are unreliable unless the date taken is also known.

Special Deer Season

The 1960 regular deer season was extended in portions of Game Management Units 2, 3, and 4 by an emergency regulation from December 16, 1960, through January 31, 1961. A bonus bag limit of two deer of either sex was allowed which was not counted in the bag limits prescribed for the 1960 or 1961 regular seasons. The areas which were open to hunting are described as follows:

1. All of Chichagof Island.
2. That part of Admiralty Island lying south of a line drawn from the mouth of Pack Creek on the east, west to Lake Kathleen, thence along the south shore of Lake Kathleen and the outlet stream of Lake Kathleen to the outlet of such stream into Chatham Strait and that portion of Glass Peninsula south of a line drawn from Twin Point on the east, west to a point opposite the south end of Bug Island.
3. Kuiu, Etolin, and Zarembo Islands.
4. The western drainages of Prince of Wales Island from Point Baker on the north to Cape Chacon on the south, including the offshore islands west of Prince of Wales Island lying in Game Management Unit 2.

The extended season was to allow for better utilization of high deer populations as well as to aid many residents suffering economically from a disastrous fishing season in Southeast Alaska in 1960.

Post season hunter surveys showed the kill during the special season was slightly more than 1 per cent of the regular season kill and had no measurable effect on the total population. Some people were certainly benefited by such a season and no harm was done. Most residents of outlying villages welcomed the opportunity to take additional deer, but few actually took advantage of it.

RECOMMENDATIONS :

Continued abundance of deer throughout Southeast Alaska indicates that deer should be utilized to the fullest extent possible without decreasing their value as a game animal. An earlier opening date will promote more hunting of alpine areas in the early fall.

The Department should promote the construction of hunter-access trails to alpine areas. Such trails would increase early season hunting pressure in these areas.

No predator control is recommended unless the need for it can be demonstrated.

Collection of hunter harvest information should be continued. Emphasis should be placed on the collection of deer jaws for aging and metacarpal bones for determination of growth.

Post season hunter interviews may be effectively replaced by a postal hunter questionnaire sent to a sample of licensed hunters. A larger sample could be obtained at less cost and effort. Hunter interviews should be continued in villages where returns from postal surveys are very poor.

SUBMITTED BY:

APPROVED BY:

Harry Merriam
Game Biologist
June 30, 1961

David R. Klein
P-R Coordinator

James W. Brooks, Director
Division of Game

APPENDIX

Dear Hunter:

Enclosed you will find a self-addressed postal card which we would like you to fill out and return to the Alaska Department of Fish and Game. Everyone who holds a 1960 hunting license should complete and return the card, whether they hunted deer during the 1960 regular season or not.

The purpose of this card is to determine the total number of deer killed in Southeast Alaska as well as other important biological information which is necessary for the wise management of Alaska's deer. Your cooperation will be appreciated.

Below is an example of a card completed by a hunter who killed three deer during the 1960 regular season.

DEER HUNTER REPORT - SOUTHEAST ALASKA - 1960

Please return card by March 1, whether you killed game or not.

Did you hunt deer in Alaska in 1959? ☒ Yes ☐ No
 Did you hunt deer in the 1960 regular season? ☒ Yes ☐ No
 Total number of days spent actually hunting deer 12
 Total number of deer observed while hunting 55
 Total number of deer killed ☐ None, ☐ (1), ☐ (2), ☒ (3), ☐ (4)

Deer Killed	Sex	Date of Kill	Location of Kill
1st	<u>M</u>	<u>Aug. 20</u>	<u>Young's Bay, Admiralty Is.</u>
2nd	<u>F</u>	<u>Nov. 15</u>	<u>Freshwater Bay, Chichagof I.</u>
3rd	<u>M</u>	<u>Nov. 16</u>	<u>Freshwater Bay, Chichagof I.</u>
4th			

Remarks Saw two wolves on beach at Hamilton Bay, Kupreanof Is. on 10-22-60
 Town of Residence Juneau

Sincerely yours,

Harry Merriam

Game Biologist
 Alaska Dept. of Fish & Game

HUNTER HARVEST SURVEY SOUTHEAST ALASKA - 1960

Town

Hunt deer in 1960 regular season?YesNo

Hunt in Southeast Alaska in 1959?YesNo

Total days hunted in 1960

Total deer observed while hunting

Total number of deer killed during 1960 regular seasonMaleFemale

KILL DATA

SPECIES	MALE	FEMALE	DATE	ELEVATION	LOCATION OF KILL
1st Deer					
2nd Deer					
3rd Deer					
4th Deer					
1st Black Bear					
2nd Black Bear					
3rd Black Bear					
Brown Bear					
1st Goat					
2nd Goat					
Moose					

Remarks:

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-61 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-tailed Deer
Investigations

Job No: 1-e

Title: Range Studies,
Southeast Alaska

PERIOD COVERED: July 1, 1960 to June 30, 1961

ABSTRACT:

Winter browse utilization during the winter of 1960-61 averaged 57 per cent for all of Southeast Alaska. Utilization was lighter than has occurred since 1958. Three additional transects and one browse enclosure were established.

OBJECTIVES:

To determine the relative degree of utilization of various food species by Sitka black-tailed deer with emphasis on winter use of browse and changes in density and vigor of browse species. To determine the effects of population density and weather conditions as reflected by degree of use, species and zones of utilization.

TECHNIQUES:

Browse transects were checked during April and May after the period of winter utilization. Twenty-four transects were checked throughout Southeast Alaska. Forest Service personnel read transects located on southern Admiralty Island and pro-

vided transportation and assistance in the Petersburg District. Alaska Department of Fish and Game Management Biologist Loren Croxton assisted with those near Ketchikan. Utilization, density and vigor of the key browse species (Vaccinium ovalifolium and V. parvifolium) were recorded as outlined in the 1959-60 Pittman-Robertson Report of Alaska Wildlife Investigations, Work Plan A, Job No. 1-e.

Two additional browse transects were located on Woronkofski Island, one on Etolin Island and a two milacre browse enclosure was constructed jointly by Forest Service and Alaska Department of Fish and Game personnel on the Waterfall Cut-over Area located on Lindenberg Peninsula, Kupreanof Island. Methods of construction, location and description of the vegetation is included in the Appendix.

FINDINGS:

Utilization, density and vigor data obtained from browse inventory transects are summarized in Table 1. Browse utilization averaged 57 per cent throughout Southeast Alaska, 9 per cent less than for 1960 and 17 per cent less than for 1959. The last winter of lighter utilization was that of 1958 when the value was 43 per cent for all Southeast Alaska. Utilization in the Ketchikan and Petersburg districts was much lighter than near Juneau or Sitka. This is quite possibly due to the overall better quality and greater "carrying capacity" of the ranges south of Frederick Sound. Wolf predation south of Frederick Sound (wolves are not present on the islands north of Frederick Sound) may also influence range utilization. Deer are relatively abundant south of Frederick Sound and the presence of wolves has very possibly actually improved the status of the herd in most localities.

Hunting pressure has little apparent effect on Alaska's deer herd. Utilization on Douglas Island, an area which probably receives as heavy or heavier hunting pressure than any other locality, has shown a steady increase in utilization ranging from 24 per cent in 1957 to 63 per cent in 1961. This has taken place during a series of mild winters and indicates an increasing population in spite of the existing hunting pressure.

Table 1. Browse inventory of winter deer ranges in Southeastern Alaska, 1961.

Area	1959	1960	1961	Density Plants/1000 Sq. Feet	Vigor Scale of 3
<u>Ketchikan</u>	<u>56</u>	<u>67</u>	<u>44</u>	<u>4.0</u>	<u>2.2</u>
George Inlet	87	90	55	5.8	2.6
Gravina Island	63	42	36	1.8	2.2
East Helm Bay	12	40	25	3.4	1.4
West Helm Bay	61	97	62	5.0	2.5
<u>Petersburg-Wrangell</u>	<u>70</u>	<u>62</u>	<u>49</u>	<u>3.8</u>	<u>2.0</u>
Onslow Island	92	84	76	1.2	2.5
Whale Pass	8	7	8	4.8	1.5
Zarembo Island	86	97	95	0.6	2.5
Anita Bay			40	1.3	2.2
NE Woronkofski			36	3.3	1.8
SW Woronkofski			58	3.2	2.0
Duncan Canal	84	60	53	2.2	2.2
Wrangell Narrows	96	80	57	7.8	2.2
Blind River			26	7.4	1.6
Five Mile Creek	94	48	35	5.8	1.8
Big John Bay	48	62	53	3.8	1.8
<u>Juneau</u>	<u>96</u>	<u>70</u>	<u>70</u>		<u>2.3</u>
*Pybus Bay	94	76	60		2.4
*Gambier Bay	96	60	53		2.1
*Mole Harbor	96	90	88		2.4
*Eliza Harbor			68		2.6
*King Salmon Bay			85		2.6
Point Hilda		54	63	6.1	1.9
<u>Sitka</u>	<u>87</u>	<u>67</u>	<u>80</u>	<u>3.3</u>	<u>2.1</u>
Nakwasina Passage	80	58	74	2.8	2.2
Deadman's Reach	82	60	93	4.3	2.0
Rodgers Point	99	82	74	2.9	2.0
All Southeast Alaska	74	66	57	3.9	2.1

* Read by Forest Service personnel.

The trend toward lighter utilization reflects the mild winters experienced since 1957-58. Very light snow falls during these years allowed deer to remain at higher elevations than normal (on November 11, 1960, the majority of deer sign on Woronkofski Island was found to be above 1300 feet of elevation; on March 7, 1961, deer on Lindenberg Peninsula of Kupreanof Island were primarily located above 1000 feet).

It should be stressed that the lower utilization values for most areas of Southeast Alaska does not necessarily reflect a diminishing herd, but rather the environmental conditions present. During mild winters, stomach samples show that deer feed primarily on forbs such as Cornus canadensis, Rubus pedatus and Coptis spp. when available, utilizing Vaccinium spp. extensively only when snow depths make forbs unavailable. As long as hunter success remains high per unit of effort and the total harvest continues to increase, the herd is at least maintaining its status.

During the course of other field duties, deer habitat was inspected in several areas south of Frederick Sound. The general condition of deer range in these areas is given in Table 2. Utilization on the mainland areas near Petersburg was very light. Other areas showed moderate utilization and good vigor.

RECOMMENDATIONS:

Annual browse inventories should be continued. More transects should be established in areas which now have none.

The method of reading transects should be standardized to obtain comparable results from different observers. Density values should be clarified.

Whereas the U.S. Forest Service controls the habitat and the Alaska Department of Fish and Game controls the game thereon, a more extensive cooperative program for range analysis should be entered into by these organizations to eliminate duplication of effort and to more efficiently utilize available personnel.

Table 2. General conditions of deer habitat in selected localities south of Frederick Sound, Southeast Alaska, 1960-61.

Location	Remarks
Jap Creek, Mainland	*Utilization very light
Moonshine Creek, Mainland	Utilization moderate
Icy Cove, Mainland	Utilization light, <u>Vaccinium ovalifolium</u> very dense
St. John Harbor, Zarembo Is.	Utilization heavy
Whale Pass, No. Prince of Wales Island	Utilization light to moderate
Hole in the Wall, No. Prince of Wales Island	Utilization moderate to heavy
Kell Bay, Bear Harbor - So. Kuiu Island	Utilization moderate - healthy condition
Shipley Bay to Cape Pole - Kosciusko Island	Utilization moderate. Much good winter range available. Large herd can winter in this area.
Hollis Area - Prince of Wales Island	Large clearcut areas show excellent growth of <u>Vaccinium</u> spp. Little utilization except at fringes where sometimes moderate. Excellent range when not covered by snow.

* Key browse species - Vaccinium ovalifolium and V. parvifolium.

Heavy winter range utilization north of Frederick Sound, in spite of mild winters, indicates it would be desirable to obtain an additional harvest from this area.

SUBMITTED BY:

APPROVED BY:

Harry Merriam
Game Biologist

David R. Klein
P-R Coordinator

James W. Brooks, Director
Division of Game

APPENDIX:

Location and Description of Waterfall Browse Enclosure

The Waterfall Deer Enclosure (#24) was established on April 7, 1961, by personnel from the U.S. Forest Service and the Alaska Department of Fish and Game.

Methods: The study plots are located in associations of two's, one protected from browsing by a 6 foot high wire mesh fence and the other unfenced. The plots are two milacres in size (6.6 feet by 13.2 feet) the corners marked with iron rods painted orange. The fenced enclosure is 12.6 feet by 19.2 feet allowing a 3 foot buffer between the plot and the fence on all sides.

Location: The enclosure is located in Duncan Canal, Kuprenof Island, about 800 feet east of beach on bench of approximately 200 feet elevation. The enclosure bears S 50° W to the north end of High Castle Island and N 84° W to Rookery Island, the unfenced plot is located 30 feet to northwest of enclosure.

Photo Stakes: 1) Fenced Plot - 1/2 inch iron pipe, painted orange, on stump 20 feet northeast to northeast corner of enclosure. 2) Unfenced Plot - 1/2 inch iron pipe, painted orange, on stump 15 feet southeast of southeast corner of plot.

Site Description: Area clearcut in 1956-57. Total size of cut-over is 53 acres. Restocking rapidly with spruce and hemlock reproduction. Vaccinium spp. abundant, shows good vigor and heavy utilization (about 80 per cent). Slash moderate. Ground not appreciably disturbed by logging. Aspect is southerly. Slope - 15 per cent.

Location of Browse Inventory Transects Established in Southeast Alaska in 1960-61

Methods: Transects were established by specifications listed in Alaska Department of Fish and Game P-R project W-6-R-1, Work Plan A, Job No. 1-e.

Locations:

NE Woronkofski Island: Beginning point 1/4 mile southeast of Woronkofski Point and bearing N 40° E to Point Highfield and N 10° W to most westerly point of Liesnoi Island, running southeast parallel to the beach.

SW Woronkofski Island: Beginning at enclosure #16 (opposite Drag Island) and running northwest parallel to the beach.

Etolin Island: Beginning point on north side of Anita Bay and bears S 6° E to 2690 foot peak on south side of Anita Bay, N 64° W to Virginia Peak and N 59° E to Anita Point, and running westerly parallel to the north shore of Anita Bay.

Vegetation on Waterfall enclosure plot (#24) - August 15, 1961.

FENCED PLOT

Plant Species	Height	% Ground Cover	# Stems	# Plants	# Seedlings	# Advanced Reproduction	Vigor	Remarks
<u>Vaccinium ovalifolium</u>	to 2'	37	249	81			1.1	5% each of
<u>Rubus spectabilis</u>		5		4				<u>Blechnum spicant</u>
<u>Tsuga heterophylla</u>		5			8	8		<u>Epilobium angustifolium</u>
<u>Picea sitchensis</u>		5			21	9		<u>Sambucus cal</u>
<u>Rubus pedatus</u>		34						Grass
<u>Cornus canadensis</u>		48						
<u>Maianthemum dilitatum</u>		13						
Moss		67						

Vegetation on Waterfall check plot (#24) - August 15, 1961.

UNFENCED PLOT

Plant Species	Height	% Ground Cover	# Stems	# Plants	# Seedlings	# Advanced Reproduction	Vigor	Remarks
<u>Vaccinium ovalifolium</u>	to 2'	35	298	94			1.2	5% each of
<u>Tsuga heterophylla</u>		5			5	3		Grass
<u>Picea sitchensis</u>		5			5	6		<u>Ribes sanguineum</u>
<u>Rubus pedatus</u>		18						<u>Rubus spectabilis</u>
<u>Cornus canadensis</u>		82						
Moss		78						

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-61 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-tailed Deer
Investigations

Job No: 1-f

Title: Physiology of Growth
and Maintenance

PERIOD COVERED: July 1, 1960, to June 30, 1961

ABSTRACT:

The study was continued during the summer field season with the collection of deer specimens and completion of analysis of vegetation on the two study areas.

OBJECTIVES:

To determine the physiological factors affecting growth and maintenance in deer in Alaska and the criteria of the relationship of these factors to range types and conditions.

TECHNIQUES:

During June, July and August of 1960, field studies were conducted on Coronation and Woronkofski Islands. Sample specimens of deer were collected, weights and measurements and condition recorded and rumen samples collected for analysis. Qualitative and quantitative measurements of the forage and range were made through the use of forage samples collected for analysis and the establishment of point intercept transects. A total of 30 transects have now been completed on each of the two study islands.

Field work was accomplished with the assistance of biologists, Paul Garceau, Kenneth Neiland and Loren Croxton and biological aide Tom O'Farrell. Neiland examined all deer specimens collected to determine the degree of parasite infestation.

FINDINGS:

All of the vegetation work has now been completed. Additional deer specimens will be collected during the 1961 field season to complete the field work associated with the study. Evaluation of the data and reporting of it will be done upon completion of the study.

RECOMMENDATIONS:

The study should be continued to enable completion of data collection as outlined.

SUBMITTED BY:

APPROVED BY:

David R. Klein
Game Biologist
June 30, 1961

David R. Klein
P-R Coordinator

James W. Brooks, Director
Division of Game

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-1961 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-tailed
Deer Investigations

Job No: 2-a (Part I)

Title: Determination of
Population Levels,
Structure and Trends,
Kodiak Island

PERIOD COVERED: July 1, 1960 to June 30, 1961

ABSTRACT:

Data collected to date regarding population levels, structure and trends are incomplete and will be presented in a later report.

TECHNIQUES:

Population dynamics data collected during the course of other investigations have been compiled and evaluated to determine the current status of Kodiak deer herds.

FINDINGS:

Data collected to date regarding the population dynamics of Kodiak deer herds are incomplete at this time and will be presented in a later report.

SUBMITTED BY:

APPROVED BY:

Ronald F. Batchelor
Game Biologist
June 30, 1961

David R. Klein
P-R Coordinator

James W. Brooks, Director
Division of Game

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-1961 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-Tailed Deer
Investigations

Job No: 2-a (Part II)

Title: Determination of
Population Levels,
Structure and Trends,
Prince William Sound

PERIOD COVERED: July 1, 1960 to June 30, 1961

ABSTRACT:

The deer populations of Prince William Sound are believed to be increasing. The mild winters have resulted in high fawning success. A card questionnaire, aerial surveys and forage investigations have been used to arrive at these conclusions.

OBJECTIVES:

To determine current population levels, structures, trends and factors affecting Prince William Sound deer herds.

PROCEDURES:

Several techniques were initiated to provide information needed for estimating population dynamics of the Prince William Sound deer herds. The following is a discussion of the techniques.

1. Card Questionnaire.

A hunter harvest questionnaire was sent out to the Valdez and Cordova hunters. In addition to hunter harvest data the hunters were asked how many adult and juvenile deer they saw.

2. Aerial Transects.

I attempted to establish winter aerial transects.

3. Forage Investigations.

Five browse utilization transects were established and two exclosures were completed for this study.

FINDINGS:

The deer population of Prince William Sound is increasing. But, the deer have not reached such density that they have been interfering with the recovery of the key winter ranges.

Browse utilization estimates have been my principal source of population information. Population assumptions derived from this data were tempered by the understanding that browse utilization can result from increased numbers or simply an increased concentration of a fixed number.

The past four winters have been mild and the snowfalls have not persisted for long periods. The deer have not had to compete for their winter forage on most of the ranges. As a result, the does seem to have maintained good condition throughout the winter and appear to have had high fawning success. Mortality from winter-kill has been insignificant.

RECOMMENDATIONS:

This project should be continued to provide essential information for the management of the Prince William Sound deer herds.

SUBMITTED BY:

Arthur M. Sheets, Jr.
Game Biologist
June 30, 1961

APPROVED BY:

David R. Klein
P-R Coordinator

James W. Brooks, Director
Division of Game

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-1961 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-tailed
Deer Investigations

Job No: 2-b (Part I)

Title: Abundance and Compo-
sition Surveys,
Kodiak Island

PERIOD COVERED: December 1, 1960 to March 31, 1961

ABSTRACT:

During December aerial surveys and ground counts were attempted as a means of evaluating herd composition and winter distribution. Mild weather occurring during the month prevented the gathering of herd composition data, as deer normally on lowland winter ranges at this time remained scattered throughout the higher elevations. During January, February and March repeated attempts were made to gather distribution data, but mild weather and lack of snow made counting impossible.

OBJECTIVES:

To determine population abundance and sex and age composition of Kodiak deer herds.

TECHNIQUES:

Aerial surveys were conducted periodically throughout the winter for the purpose of ascertaining deer numbers and

winter distribution. On-the-ground observations, conducted during December, to obtain sex and age composition data were attempted but proved unsuccessful.

FINDINGS:

Unseasonably mild weather occurring during most of the winter prevented the gathering of sex and age composition data for the fall-winter period of 1960-61. In addition, the lack of an adequate snow cover for tracking deer prevented an enumeration of patterns of winter distribution.

RECOMMENDATIONS:

The collection of herd composition and distribution data on an annual basis is essential to proper management of the Sitka Black-tailed deer of the Kodiak Island Group and should be continued.

SUBMITTED BY:

APPROVED BY:

Ronald F. Batchelor
Game Biologist
June 30, 1961

David R. Klein
P-R Coordinator

James W. Brooks, Director
Division of Game

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-1961 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-Tailed Deer
Investigations

Job No: 2-b (Part II)

Title: Abundance and Composition
Surveys, Prince William
Sound

PERIOD COVERED: July 1, 1960 to June 30, 1961

OBJECTIVES:

To determine population abundance and sex and age composition of Prince William Sound deer herds.

PROCEDURES:

No work was accomplished on this job.

RECOMMENDATIONS:

This investigation should be continued.

SUBMITTED BY:

Arthur M. Sheets, Jr.
Game Biologist
June 30, 1961

APPROVED BY:

David R. Klein
P-R Coordinator

James W. Brooks, Director
Division of Game

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-1961 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-tailed
Deer Investigations

Job No: 2-c (Part I)

Title: Natural Mortality
Surveys, Kodiak Island

PERIOD COVERED: December 1, 1960 to May 5, 1961

ABSTRACT:

Natural mortality of deer in the Kodiak area during the winter of 1960-1961 was found to be very light.

OBJECTIVES:

To determine the sex and age composition, the extent, and the area-wise breakdown of natural mortality as an index to the winter welfare of the Kodiak deer herds.

TECHNIQUES:

Permanent winter mortality beach transects in key wintering areas were established to record the extent of winter mortality. These transects were walked in April and May in the high tide zone in one direction and within 200 yards of the beach in the opposite direction. Carcasses and remains of dead deer observed along the transects were recorded by sex and age and the cause of death when determinable. The mortality index for each transect is expressed as the number of deer carcasses observed per mile of transect.

FINDINGS:

During April and May six transects totalling eight miles of beach were walked with a total of six deer carcasses recorded. Of the six animals one, a female fawn, died from accidental drowning while the remaining five animals, all fawns, died of unknown causes. Fat reserves in the marrow of the long bones of the six animals indicated that they had suffered light to acute malnutrition. Five of the six carcasses investigated were found along one transect in the Monashka Bay area. It was believed that not all animals died on this transect as evidence indicated that perhaps four of the five carcasses were deposited on the beach through wave action.

RECOMMENDATIONS;

The collection of natural mortality data should be continued on an annual basis in order to properly manage and evaluate population structure of Kodiak deer herds.

SUBMITTED BY:

APPROVED BY:

Ron Batchelor
Game Biologist
May 22, 1961

David R. Klein
P-R Coordinator

James W. Brooks, Director
Division of Game

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-1961 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-Tailed Deer
Investigations

Job No: 2-c (Part II)

Title: Natural Mortality
Surveys, Prince William
Sound

PERIOD COVERED: July 1, 1960 to June 30, 1961

ABSTRACT:

No winter-killed deer were found or reported this year.

OBJECTIVES:

To determine the sex and age composition, the extent and area-wise breakdown of the natural mortality as an index of the winter welfare of the deer herds.

PROCEDURES:

Deer mortality surveys were conducted with the browse utilization estimates in April. Since no mortality was revealed along my approximately eight miles of transect, I made a special effort to search every beach fringe possible. I also questioned hunters during the early part of the deer season.

FINDINGS:

No winter-killed deer were found or reported this year.

The past six years have been mild and the snows have been light. The deer have not been forced to compete for forage. Consequently, this lack of winter-kill was expected.

RECOMMENDATIONS:

This study should be continued.

SUBMITTED BY:

APPROVED BY:

Arthur M. Sheets, Jr.
Game Biologist
June 30, 1962

David R. Klein
P-R Coordinator

James W. Brooks, Director
Division of Game

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-1961 SEGMENTState: AlaskaProject No: W-6-R-2Name: Alaska Wildlife
InvestigationsWork Plan: ASitka Black-tailed
Deer InvestigationsJob No: 2-d (Part I)Title: Characteristics of
Hunter Harvest,
Kodiak Archipelago

PERIOD COVERED: August 20, 1960 to November 30, 1960

ABSTRACT:

Approximately 490 hunters spent a total of 4,190 man-days in the field and harvested 390 deer during a 103 day season for a success ratio of 53 per cent. Of the total deer killed, 170 or 44 per cent were bucks and 220 or 56 per cent were does. The 1960 season marked the first time antlerless animals could be harvested on an unlimited basis. A collection of 77 deer jaws revealed that 64 per cent of the male sample was represented by animals in the 2.5 year or younger age classes, while these same classes for the female segment accounted for 50 per cent of the sample. Available data point to an existing differential age ratio between male and female segments of the population. Data concerning herd condition and welfare are presented in the text and in tabular form.

OBJECTIVES:

To secure information relative to the total deer kill and hunter success and to determine and evaluate the sex and age composition and physical characteristics of the Kodiak area deer harvest.

TECHNIQUES:

Harvest data for the 1960 deer season were obtained from post-season hunter questionnaires. In addition, information concerning hunting effort, distribution and success was obtained from field contacts with as many local hunters as was possible. Hunters checked in the field were requested to report their kills and turn in deer jaws to the Department's Kodiak office.

In August, prior to the opening of the 1960 big game seasons, jaw collection posters were distributed locally for hunters to observe. Advertisements were run in the Kodiak Mirror bringing to the attention of many local hunters the need for deer and elk jaws.

Lower jaws were collected throughout the season and analyzed to ascertain the age structure of the harvest and whenever possible hog-dressed weights and hind foot measurements were obtained for indices of herd condition and welfare.

FINDINGS:

The total 1960 harvest was 360 deer. This is shown in comparison with harvests, length of season and hunter success for previous years in Table 1.

Sex Breakdown of the Kill: The breakdown of the total legal harvest for 1960 was 170 or 44 per cent males and 220 or 56 per cent females. The great increase of females in the kill over last year can be attributed to a 103 day either-sex season, the first of this length for the Kodiak area.

Age Distribution of the Kill: The distribution by age classes of a segment of the 1960 harvest is presented in Tables 2 and 3. This distribution is based on a sample of 77 deer jaws collected throughout the season for aging purposes. Of the 77 jaws collected, 44 were from males, 32 from females and one from an unidentified animal. Nearly all jaws were collected from deer killed in the vicinity of the Kodiak road system and data obtained from them, therefore, reflect the status of herds adjacent to the road system.

Female Age Distribution: A sample of 32 female deer jaws was collected during the 1960 season. Age ratios for female deer represented in the kill are presented in Table 2. Female ratios were found to be unlike those of the males in that 50

Table 1. Sitka black-tailed deer kills, 1953-1960.

<u>Year</u>	<u>Kill</u>	<u>Number of Days of Open Season</u>	<u>Number of Hunters</u>	<u>Per Cent Hunter Success</u>
1953	38	4		
1954	26	10		
1955	40	42		
1956	60	67		
1957	197	103		35.0
1958	202	103		33.0
1959*	200	103		
1960**	390	103	490	53.0

* Three day either-sex season.

** One hundred and three day either-sex season.

Table 2. Comparison of age distribution of female deer kills, 1959-1960.

<u>Age Class</u>	<u>1959</u>		<u>1960</u>	
	<u>Per Cent</u>	<u>No. of Jaws Represented</u>	<u>Per Cent</u>	<u>No. of Jaws Represented</u>
0.5 Year	16		16	
1.5 Year	11		22	
2.5 Year	21		13	
3.5 Year	21		16	
4.5 Year	11		6	
5.5 Year +	21		28	
		<u>19</u>		<u>32</u>

Table 3. Comparison of age distribution of male deer kills, 1956-1960.

Age Class (Year)	<u>1956</u>		<u>1957</u>		<u>1958</u>		<u>1959</u>		<u>1960</u>	
	%	No. of Jaws Represented	%	No. of Jaws Represented	%	No. of Jaws Represented	%	No. of Jaws Represented	%	No. of Jaws Represented
00.5							17			11
1.5	23		35		38		44			32
2.5	32		10		24		21			20
3.5	22		17		12		6			11
4.5	13		17		14		6			9
5.5+	10		21		12		6			16
Totals		<u>38</u>		<u>77</u>		<u>58</u>		<u>48</u>		<u>44</u>

per cent of the female sample was comprised of animals in the 3.5 year or older age classes while these same year classes for the male segment represented only 36 per cent of the total. As was observed in nearby Afognak Island elk herds, all available data point to an existing differential age ratio between male and female segments of the population. The high proportion of older females in the population would be expected in herds where females were harvested on an unlimited basis for the first time as was the case in the Kodiak area during 1960.

No data for the female age structure of the 1959 harvest are available for comparison with current figures. The first either-sex season for the Kodiak area was in 1959, when antlerless animals were legally harvested the last three days of the general buck season.

Further data are needed before a full evaluation of the female segment of the population can be made.

Male Age Distribution: The age distribution of a sample of male deer killed during the 1960 season is shown in Table 3. In addition, proportionate ratios of varying aged deer represented in the 1960 kill are presented in comparison with the age distribution for previous years. In comparing the age distribution of the kill with previous years a gradual shift in the population from a large percentage of old aged males in 1956 to younger males in 1960 is apparent. This trend, while accentuated by the large harvest of young males during the 1959 and 1960 either-sex season, suggests a gradual increase in the productivity of the herd.

The percentage of young males, 2.5 year class or younger, occurring in the kill has increased from a low of 55 per cent in 1956 to a high of 81 per cent in 1959. Figures for 1960 indicate a drop from the high of the previous year to 64 per cent. The large proportion of young males occurring in the kill indicates high fawn survival during the last several years.

In the evaluation of age class data from hunter harvest deer, as has been stated in previous reports (Klein 1958 and 1959), it should be borne in mind that these ratios are proportionate representations of the legal harvest and some variations are bound to exist between them and the herds themselves. These variations are less likely to mask true

herd status when hunters are permitted to harvest animals of either sex and age class.

During the course of the analysis of the 1960 jaw sample, two jaws from males aged to be 15⁺ years were recorded. One animal had been harvested on Uganik Island by a local guide. According to the guide, the animal was in good condition, weighed in the neighborhood of 200 pounds and when eaten, was found to be very tasty. No records for the other old male are available.

Distribution of the Kill by Area: The distribution of the kill by area is presented in Figure 1. As has been the case in previous years the Kodiak road system received the greatest hunting pressure with the Chiniak Peninsula area accounting for 33 per cent of the kill, Broad Point 15 per cent, and Cliff Point 26 per cent. The Anton Larsen and Ouzinkie Narrows areas together accounted for 18 per cent of the kill. The remainder of the harvest was distributed throughout northern Kodiak and adjacent islands. Two deer were harvested from Uganik Island and several were removed from Whale Island, a productive area.

In 1959 the first legally harvested deer was removed from the Uganik Island area, where deer populations appear to be expanding. The Uganik animals accounted for the first deer harvested from the Kodiak National Wildlife Refuge.

Under present patterns of harvest, several apparently productive populations receive little or no hunting pressure. It is hoped in the near future that increased hunting pressure can be diverted to these underharvested areas.

Chronological Distribution of the Kill: The distribution of the kill by ten day periods is shown in Figure 2. The age distribution of the male harvest throughout the season was as expected. During August, September, and early October young males constituted the major portion of the kill, while following cooler weather and the onset of the rut, older animals made up the greater percentage. Mature bucks, inhabiting the higher, less accessible ranges during September and early October, moved to the low-land areas with the advent of the first heavy frosts occurring in late October and November.

The heaviest harvest of does occurred during the latter portion of the season when hunters were seeking deer of either

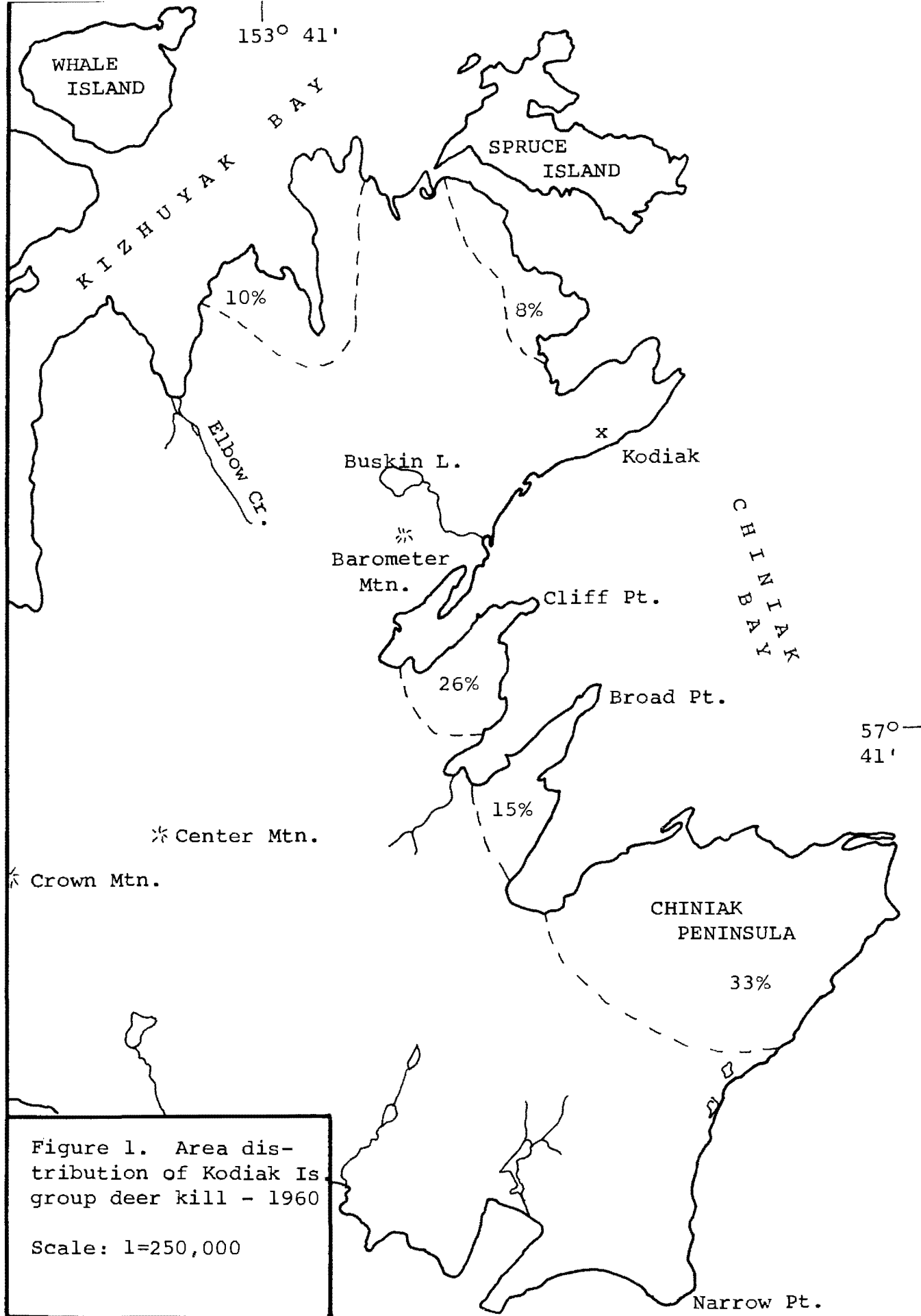
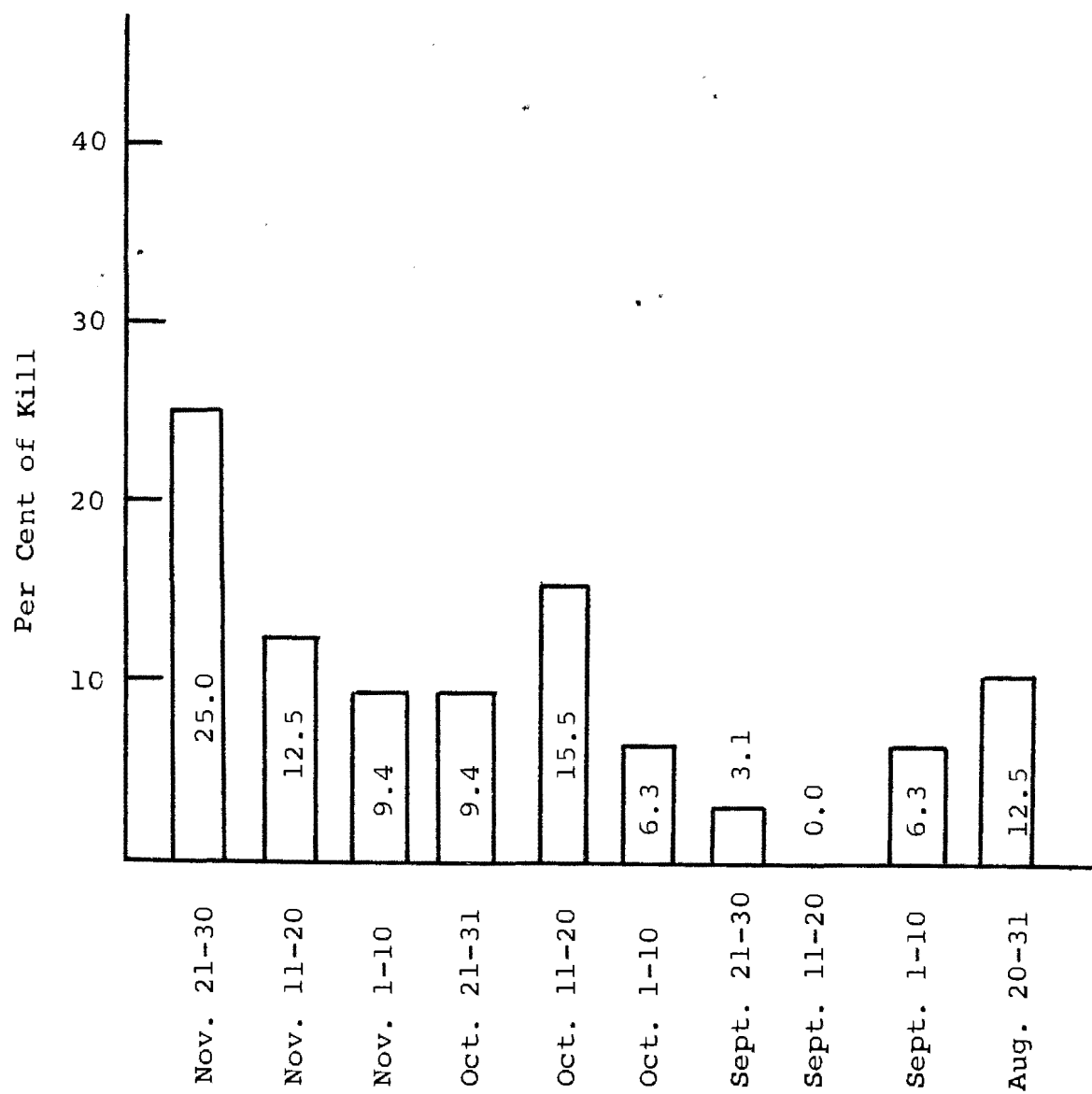


Figure 2. Chronological distribution of deer kill - 1960.



sex rather than bucks alone.

Hind Foot, Chest Girth and Dressed Weight Measurements:

Hind foot and dressed weight measurements for samples of deer harvested since 1957 are presented in Table 4. In studies conducted in Southeast Alaska, the hind foot measurement (from the tip of the hoof to proximal end of calcaneous bone) has proven to be the simplest of condition measurements to obtain accurately, as it was found to be less subject to variation and required a minimum of effort. It was also observed in the Southeast studies that the hind foot length appeared to be a better key to range quality than either chest girth or dressed weight measurements.

Dressed weights and hind foot measurements have been obtained from a sample of male deer harvested since 1957, in order to evaluate condition and welfare of Kodiak area deer herds.

Table 4 shows the relationship between hind foot measurements and assigned age classes for male deer. Animals occurring in the four year sample were harvested almost entirely from the vicinity of the Kodiak road system and thus, reflect only the physical condition of these herds. When comparing hind foot lengths of the Kodiak sample with those obtained by Klein for the 1957 and 1958 deer seasons from deer throughout Southeastern Alaska, it is apparent that Kodiak measurements run slightly larger for each age class. This may be the product of higher quality range at Kodiak but the sample size is too small to draw valid comparisons.

As noted from the Kodiak sample, the growth of the hind foot shows a marked increase from year to year through the 3.5 year class. Data presented in Table 4 suggest that maximum hind foot growth is attained by the time the male reaches the 3.5 year class or shortly thereafter.

Average dressed weights of deer harvested, by assigned age classes, are presented in Table 4. In addition, the weight ranges by class are also shown. The mean weight of samples for each age class indicates a progressive weight gain through the 5.5+ year class. Since the 5.5+ year class lumps all animals 5.5 and older as a group it is not possible to determine from these data at what age maximum weight is attained. Through the refinement of aging techniques of animals in the 5.5+ class and the collection of larger samples it is expected these data will be available.

Table 4. Mean dressed weight and hind foot measurements of male deer harvest during 1957-1960.*

<u>Age Class</u>	<u>Weight</u>			<u>Hind Foot</u>		
	<u>Mean</u>	<u>No. Samples</u>	<u>Range</u>	<u>Mean</u>	<u>No. Samples</u>	<u>Range</u>
Fawns	46	9	39-53	14.44	12	14.33-14.50
1.5	80	38	56-110	16.68	27	16.25-16.85
2.5	106	18	92-120	17.27	9	17.00-17.58
3.5	113	12	95-134	17.74	6	17.08-18.87
4.5	139	13	123-175	17.53	7	17.25-17.83
5.5+	149	16	118-182	17.37	8	17.33-17.50

* Measurements in pounds and inches.

Data pertaining to chest girth measurements are incomplete at this time and are to be presented in a later report.

Hunter Harvest - 1960: Hunter-harvest information for the 1960 deer season was obtained from field contacts with hunters and post-season hunter questionnaires obtained from a random hunter sample.

The 1960 deer season for the Kodiak Archipelago was from August 20 through November 30, a season of 103 days. During this period two animals of either sex comprised the bag limit.

The results of the post-season hunter questionnaires are presented in Table 5 and are discussed below. The kill figures are based on a 20 per cent random sample of all hunters for the Kodiak Island Group and this sample was projected to derive the total kill for the area.

Approximately 490 hunters were in the field for a total of 4,190 man days, and they harvested 390 deer for a success ratio of 53 per cent and a return of 0.1 deer per man day. Hunters participating in the hunt were almost entirely local Kodiak people. Table 5 indicates that 170 or 44 per cent of the deer harvested were males, while females accounted for 56 per cent or 220 animals. Of the 260 successful hunters, 130 or 50 per cent "limited out" with the legal two deer bag.

RECOMMENDATIONS:

As has been stated before, approximately 75 per cent of the deer kill for the Kodiak area occurs on a limited but productive area accessible to most hunters. If good deer management is to be practiced, every effort should be made to increase hunter harvest of deer in all areas of their range in order to secure the maximum use of the resource, maintain high productivity and to insure a proper balance between populations and their ranges.

The continued collection of hunter-harvest and herd-status data is essential to the proper management of deer in the Kodiak Archipelago.

ACKNOWLEDGEMENT:

Sincere appreciation is extended to Mr. Will Troyer,

Table 5. Summary of deer hunter kill obtained for the Kodiak Island Group during the 1960 deer season (August 20 through November 30).

	<u>Number</u>	<u>%</u>
<u>Total Hunters</u>	490	
<u>Total Man Days of Hunting</u>	4190	
Mean number of days per hunter	9.3	
<u>Total Deer Killed</u>	390	
Males	170	44
Females	220	56
<u>Hunter Success</u>		
Unsuccessful hunters	230	47
Successful hunters (one or more deer)	260	53
One deer	130	50
Two deer	130	50
Number of deer per hunter (all hunters)	0.8	
Number of deer per hunter (successful)	1.5	
Number of deer taken per man days of hunting	0.1	
Number of hunters with one doe	90	34
Number of hunters with two does	30	12
Number of hunters with one buck	40	15
Number of hunters with two bucks	30	12
Number of hunters with one doe and one buck	70	27
Number of hunters with two deer limit	130	50

Refuge Manager of the Kodiak National Wildlife Refuge, for providing access to Refuge reports concerning black-tailed deer of the Kodiak area, from which many conclusions have been drawn.

LITERATURE CITED:

Klein, David R. 1959. Sitka black-tailed deer investigations. Project W-3-R-13 Job Completion Report. U.S. Fish & Wildlife Service, Juneau, Alaska.

_____ 1958. Sitka black-tailed deer investigations. Project W-3-R-12 Job Completion Report. U.S. Fish & Wildlife Service, Juneau, Alaska.

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ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-1961 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-Tailed Deer
Investigations

Job No: 2-d (Part II)

Title: Characteristics of Hunter
Harvest in Prince William
Sound

PERIOD COVERED: August 20, 1960 to June 30, 1961

ABSTRACT:

The 1960 Prince William Sound deer season resulted in a legal harvest of approximately 500 deer. Hunter success was 75 per cent with an average of 1.6 deer per hunter for 2.2 days of effort. Forty-one deer jaws were collected during the season.

OBJECTIVES:

To secure information relative to the total deer kill, area and chronological distribution of the kill, and hunter success, and to determine and evaluate the sex and age composition and physical characteristics of the deer harvested.

PROCEDURES:

Three techniques were used to collect kill information.

1. A temporary employee was stationed at the north end of Montague Island to collect kill information.
2. Valdez and Cordova hunters were sampled with card questionnaires.
3. A record was kept by meat processors and shippers in Cordova who handled game.

FINDINGS:

The estimated 500 legal deer harvest was taken from less than five per cent of the Prince William Sound deer ranges. Note, in Figure 1, that the hunters prefer the security of good anchorages to perhaps the slightly better hunting that may be found in the more exposed bays. In spite of this, the hunters enjoyed a success of 75 per cent with an average of 1.6 deer for an expenditure of 2.2 days effort (Table 1).

The Hawkins Island deer sustain the heaviest hunting pressure (Table 2). This is due to their proximity to Cordova and accessibility by small boats and skiffs in all but full-gale weather. In spite of this, only 60 per cent of the Island is hunted. The hunting effort here is never great on any one day. Seldom are there more than 20 hunters on the island at one time even during the estimated peak effort during early November (Table 3). Hunting of the other herds varies with the intensity of the weather.

A temporary employee was stationed at the north end of Montague Island throughout most of the season (Figure 1). He collected data from 36 deer during this time. The weather was generally severe and consequently the hunting effort suffered. The legal harvest for this 65-mile-long island was estimated at 50 deer. Although this resulted in the collection of insignificant data for statistical treatment, the data are presented in Tables 4, 5 and 6.

A 64 per cent return was obtained on the card questionnaires mailed to Valdez and Cordova hunters (Figure 2). The only correction recommended on the card is to change "areas hunted" to read "where killed."

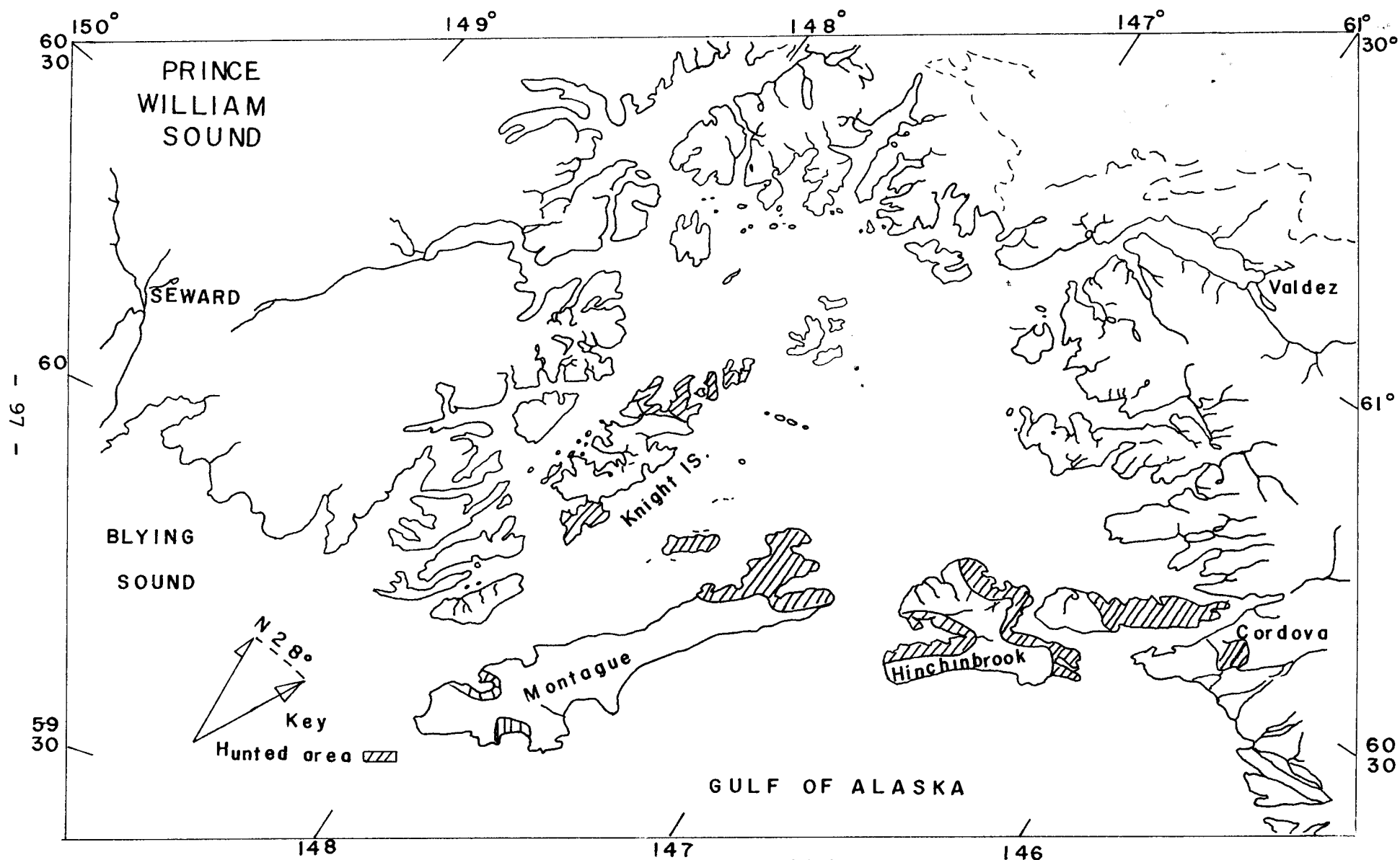


Figure 1. Areas hunted during the 1960 deer season

Table 1. Deer harvest for the 1960 Prince William Sound deer season.

Hunter Source	<u>Individual Total Kill</u>			Total	Charter Boats	Charter Planes	Hunter Success	% Licensed Hunters Hunt- ing Deer
	Male	Female	Juvenile					
Cordova	334	105	*	439	147		75 ⁱ	62.5
Valdez	*	*	*	18	20			
Seward	*	*	*	10		10		
Total				467	167	10		

Average number of days hunted = 2.2 days

Average number of deer killed per hunter = 1.6 deer

* Not enough data collected to estimate the kill

i = Based on hunters killing one deer

Table 2. Estimated distribution of legal hunting pressure in Prince William Sound during the 1960 deer season by per cent from all sources.

Hawkins Island	Montague Island	Hinchinbrook Island	Green Island	Cordova Mainland
50	11	25	2	12

Table 3. Chronological distribution of the 1960 legal deer harvest from Prince William Sound, August 20 to December 15.

Date	Per Cent Legal Kill
10/1 - 10/14	3
10/15 - 10/28	22
10/29 - 11/11	41
11/12 - 11/25	34

Table 4. Age groups of deer of both sexes taken in the 1960 legal deer harvest in Prince William Sound.

Age Group (Years)	Number	Per Cent
1/2	5	18
1-1/2	13	46
2-1/2	4	14
3-1/2	2	7
4-1/2	1	4
5-1/2 +	3	11

Table 5. Weights and measurements of all male deer checked in Prince William Sound, 1960.*

Age	<u>1/2 Year</u>		<u>1-1/2 Years</u>		<u>2-1/2 Years</u>		<u>3-1/2 Years</u>		<u>4-1/2 Years</u>		<u>5-1/2 Years</u>	
	Av.	Sample	Av.	Sample	Av.	Sample	Av.	Sample	Av.	Sample	Av.	Sample
Total Length			57.8	8	62.0	1	63.8	5	66.0	1	61.8	1
Shoulder Height			34.1	11	34.0	2	36.9	4	39.5	1	37.5	1
Girth	32.0	1	36.3	8	35.0	1	40.2	6	41.5	1	39.8	1
Hindfoot			16.3	13	16.1	2	17.4	5	17.0	1	16.8	1
Tail	3.5	1	5.5	6	5.5	2	4.9	4	4	1	4.5	1
Ear			5.7	10	5.8	2	6.0	5	6.3	1	6.0	1
Dressed Weight			81.7	8	105	1	129.5	5	148	1		

*Weights in pounds and measurements in inches.

Table 6. Measurements in inches of all female deer checked in Prince William Sound, 1960.

Age	<u>1/2 Year</u>		<u>1-1/2 Years</u>		<u>2-1/2 Years</u>		<u>3-1/2 Years</u>		<u>4-1/2 Years</u>		<u>5-1/2 Years+</u>	
	Av.	Sample	Av.	Sample	Av.	Sample	Av.	Sample	Av.	Sample	Av.	Sample
Total Length	46.7	3	55.3	2								
Shoulder Height	26.9	2	35.9	3			39.0	1			33.4	1
Girth	28.5	3	32.0	5			39.0	1			39.5	1
Hind Foot	14.6	4	15.7	3							16.3	1
Tail	4.4	2										
Ear	4.7	2	6.2	2								

SPORTSMAN PARTICIPATION IN HUNTING AND FISHING

PLACE
STAMP
HERE

RETURN TO SENDER IN 15 DAYS
ALASKA DEPARTMENT OF FISH AND GAME
BOX 669
CORDOVA, ALASKA

(TEAR OFF ALONG THIS LINE)

NO.....

The following information concerning your hunting success during the past season is needed for the effective management of our big game animals. Even though you did not hunt PLEASE RETURN THIS CARD.

SPECIES HUNTED	NUMBER OF DAYS HUNTED	AREAS HUNTED	NUMBER KILLED	ADULTS SEEN	FAWNS, CALVES, KIDS, OR CUBS SEEN	Transportation Used (Car, Boat, Etc.)
DEER						
MOOSE						
GOAT						
OTHER						

Thanks for your cooperation,

ALASKA DEPARTMENT OF FISH AND GAME

Figure 2. Card questionnaire used to collect hunter harvest data in 1960.

The local businesses that came in contact with big game meat were very cooperative in recording weights and numbers. This information is presented in Table 7.

RECOMMENDATIONS:

This study should be continued.

SUBMITTED BY:

APPROVED BY:

Arthur M. Sheets, Jr.
Game Biologist
June 30, 1961

David R. Klein
P-R Coordinator

James W. Brooks, Director
Division of Game

Table 7. The number and weights of deer handled by Prince William Sound businesses during the 1960 deer season.

Business	No. Handled	Total Weight (Lbs.)
Pacific Northern Airlines	5	395
Dinneens	13	893
K & E Foodland	27	1,947
C. T. David	6	393
Total	51	3,628

Average Weight = 71.1 lbs.

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-1961 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-tailed
Deer Investigations

Job No: 2-e (Part I)

Title: Range Studies,
Kodiak Island

PERIOD COVERED: December 1, 1960 to March 31, 1961

ABSTRACT:

Utilization of key browse species on three deer wintering areas along the Kodiak road system was unmeasurable during the winter-spring of 1960-61.

OBJECTIVES:

To determine the annual utilization of key browse species on key deer wintering areas along the Kodiak road system.

TECHNIQUES:

Ten browse utilization transects were established on three key winter ranges adjacent to the Kodiak road system in December in an attempt to evaluate annual browse removal. All transects were permanently located with the interval between plants randomly selected. Each transect consisted of 20 individual browse plants (Salix or Sam-bucus) and the average current annual growth of each was determined at the time of establishment. Per cent

utilization of each plant along a transect was determined in the spring when all plants were remeasured.

FINDINGS:

Unseasonably mild weather throughout the winter relieved pressure on the browse resources of several key winter ranges along the Kodiak road system by allowing deer normally wintering in these areas to winter at higher elevations. Utilization measurements taken from 200 willow and elderberry plants on three wintering areas revealed that the removal of current growth during the 1960-61 winter-spring period was negligible and could not be measured.

RECOMMENDATIONS:

The annual evaluation of browse removal on key deer wintering ranges is essential to the proper management of the Sitka Black-tailed deer of the Kodiak Island Group and should be continued.

SUBMITTED BY:

APPROVED BY:

Ronald F. Batchelor
Game Biologist
June 30, 1961

David R. Klein
P-R Coordinator

James W. Brooks, Director
Division of Game

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960-1961 SEGMENT

State: Alaska

Project No: W-6-R-2

Name: Alaska Wildlife
Investigations

Work Plan: A

Sitka Black-Tailed Deer
Investigations

Job No: 2-e (Part II)

Title: Range Studies, Prince
William Sound

PERIOD COVERED: July 1, 1960 to June 30, 1961

ABSTRACT:

Five browse utilization transects and two exclosures were completed during the past year. The information gained from the utilization transects indicates that the blueberry (Vaccinium ovalifolium) is recovering after continued light utilization. The associated species, such as alder (Alnus crispa) and hemlock (Tsuga heterophylla) no longer show measurable use.

OBJECTIVES:

To continue, without break in continuity, the browse studies initiated by the U. S. Fish and Wildlife Service (Federal Aid in Wildlife Restoration) which were aimed at determining winter utilization of browse, trends in range condition (i.e., changes in density and vigor of browse species) and area-wise quantitative and qualitative variations in browse conditions.

PROCEDURES:

The principal deer forage plant in Prince William Sound is blueberry (Vaccinium ovalifolium). Because of its importance, I selected it as the key species of the deer winter ranges.

The health of this blueberry is estimated by determining utilization, the amount of dead material, and the incidence of reproduction. This latter measure of vigor is obtained by comparing the density of young blueberry plants inside and outside exclosures at three-year intervals; whereas, the utilization and dead material are estimated annually. The technique used here is described below.

Estimating Utilization of Early Blueberry (Vaccinium ovalifolium). The estimation of current growth removal on the Prince William Sound blueberry required the development of a sampling technique that would satisfy the following requirements:

1. It must provide a measure of the amount of current growth removal by deer.
2. The sampling must be restricted to the same populations to provide comparative information for the development of trends and still be practicable in the dense rain forest where the relocation of small plots is difficult.
3. It must be acceptably sensitive without requiring uneconomical observer training.

Establishing the Transect. A key area on the winter range is selected and a transect is established on it in the following manner:

1. Mark and record the beginning of survey. This will require blazing, flagging, painting, surveying and the preparation of a plot. This step is essential to the relocation of the transect by new personnel.
2. Select a bearing along which to run the transect.

3. Establish a photo plot near the "beginning of survey" marker and set a stake for a focusing point. The distance to this focusing point will vary with the situation, however, it is well to remember that many of the fixed-focus cameras are focused for 12 feet. At this distance, acceptable depth of field is obtained for a photograph of small shrubs. Also, a titling board of two inch letters can be reproduced well at this distance. A titling board showing the locations, date, and type of photograph should always be included in the photo-plot for later identification of prints.

4. From a table of random numbers, select a random starting point. Then select the sampling interval. Restrict it to conform with the uniformity of the forage. In other words, if the transect is composed of plants that vary widely in size, degree of utilization, or site, the sampling interval should be short. On most or the key areas in Prince William Sound, I do not recommend an interval greater than 30 feet.

5. Sample size should be considered from the practical as well as the statistical standpoint. In any case, the sample should include at least 30 plots to provide sufficient degrees of freedom for the confident comparison of means.

6. All bearings, distances, dates and identification should be recorded on an aluminum plate fastened to the "beginning of survey" marker.

Estimating Utilization. The following technique has the requirements of representivity, size, and observer training.

1. The nearest shrub over one foot in height to the randomly selected starting point will be considered the first plot.

2. All of the current growth on the selected shrub will be examined for utilization regardless of its availability.

3. This examination will be done in .48 square foot increments of uncompressed current growth to facilitate the modification of this technique for use on forage production surveys.

4. Within each of these .48 square foot increments, the volume of current growth removal will be estimated and recorded in percent.

5. After the entire plant has been examined, an arithmetic mean of all of the .48 square foot estimate will be computed. This mean will then be considered the estimate of utilization for the plot. The averaging (pooling) of percentages is possible only if the percentages represent equal magnitudes, i.e. all the observations are of .48 square foot of current growth.

FINDINGS:

Utilization of blueberry has been light for the past two years. The improved health of the plants has been noticed in the development of more hardy current growth. Some of the dependable material has revived to produce leaders.

In general, range conditions are improving, There is no longer heavy use of the less preferred species such as alder and hemlock. Nevertheless, some of the hemlock is high lined from heavy use during past winters. The present condition of the Prince William Sound ranges can be seen in Table I.

Attempts to complete aerial distribution surveys were thwarted by insufficient snow. The annotated chart will be completed next year if snow conditions permit.

RECOMMENDATIONS:

The study should be continued.

SUBMITTED BY :

APPROVED BY:

Arthur M. Sheets, Jr.
Game Biologist
June 30, 1961

David R. Klein
P-R Coordinator

James W. Brooks, Director
Division of Game

Table 1. Condition of the blueberry (Vaccinium ovalifolium) on five transects in the Prince William Sound deer ranges, 1961.

Transect Location	MEAN VALUES			Degree of Hedging
	Percent Available	Percent Utilization	Percent Dead Material	
Salmo Point	80	11	25	moderate
Windy Bay	90	14	30	heavy
Anderson Bay	90	12	10	light
Green Island	90	13	15	light
Zaikof Bay	90	29	20	heavy