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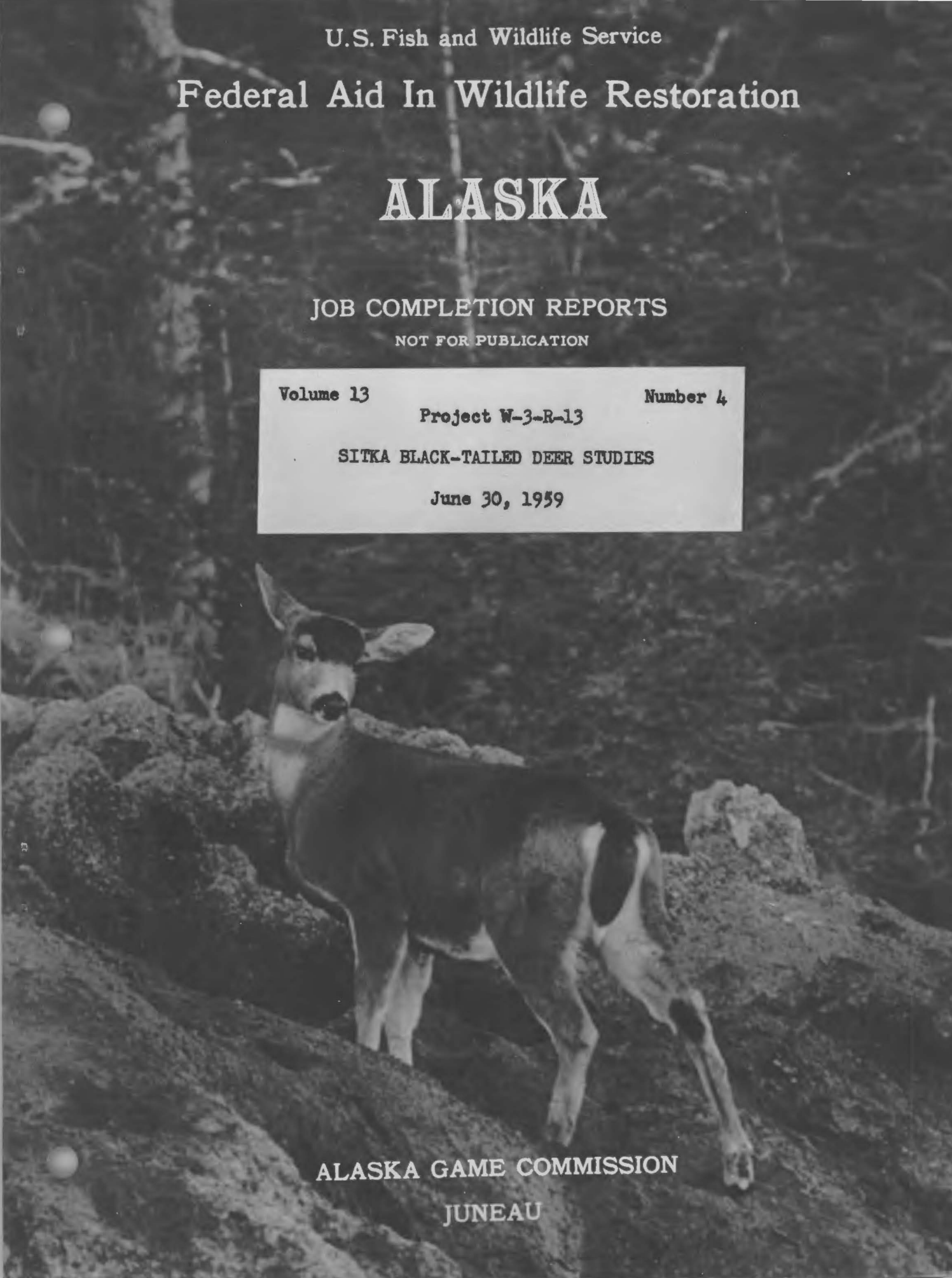
Volume 13 Number 4

Project W-3-R-13

SITKA BLACK-TAILED DEER STUDIES

June 30, 1959



ALASKA GAME COMMISSION

JUNEAU

Volume 13 Number 4

JOB COMPLETION REPORTS

Project W-3-R-13 Alaska June 30, 1959

Wildlife Investigations
Work Plan E

SITKA BLACK-TAILED DEER STUDIES

Personnel

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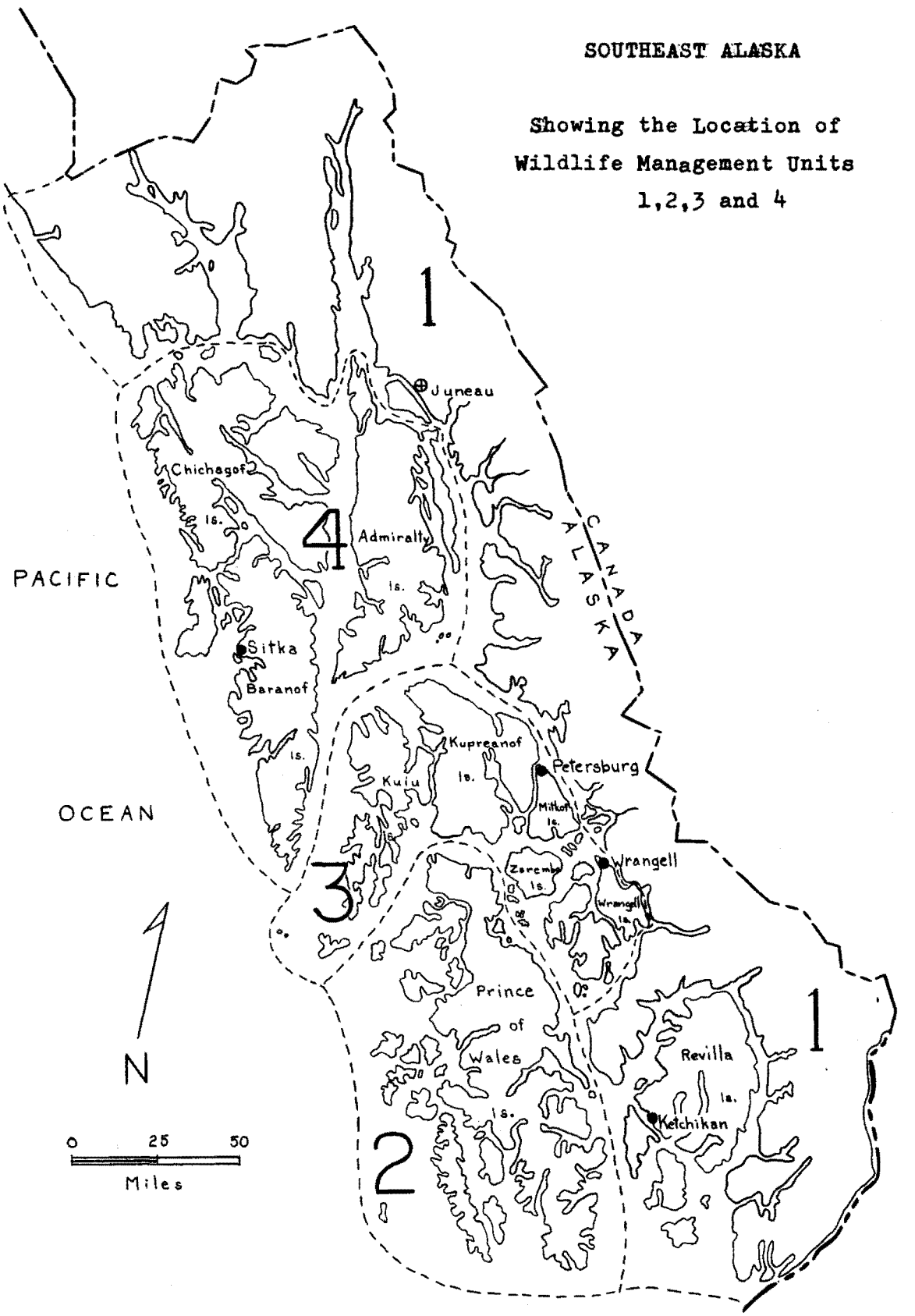
Not for Publication

(The results described in these reports are preliminary and often fragmentary in nature. Conclusions are subject to change with further investigation and interpretation).

C O N T E N T S


SOUTHEAST ALASKA
Showing the Location of
Wildlife Management Units
1,2,3 and 4
1
2
3
4
Juneau
Chichagof
Is.
Admiralty
Is.
Sitka
Baranof
Is.
Kuiu
Is.
Kupreanof
Is.
Petersburg
Mitkof
Is.
Wrangell
Zarembo
Is.
Wrangell
Is.
Prince
of
Wales
Is.
Revilla
Is.
Ketchikan
PACIFIC
OCEAN
CANADA
ALASKA
N
0
25
50
Miles

Job No. 1 DETERMINATION OF POPULATION TRENDS

ABSTRACT

The relatively mild winter did not offer opportunities for aerial beach counts of deer. Limited fawn-adult ratios obtained by boat in February indicated excellent fawn survival to that time. Fawn-adult ratios were 44 fawns:100 adults for 209 deer counted.

OBJECTIVES

To determine trends in total population numbers and age and sex composition.

TECHNIQUES USED

The relatively mild open winter did not result in large concentrations of deer in the beach areas. Consequently, no opportunity existed for aerial counting of deer in the management index areas. Limited fawn-adult ratios were obtained during February in the Petersburg area when brief and localized snow conditions offered an opportunity for composition counts. During this time deer were counted on the beach areas of Mitkof and Kupreanof Island from a slow-moving, outboard-powered skiff.

FINDINGS

The summarization of composition counts obtained during February 1959 is presented in Table 1. Fawn-adult ratios reflect good fawn survival through the period of the counts. The ratios of 40 or more fawns per 100 adults are considerably higher than the average for this same period from previous years counts. The continuing mild weather after the period of the counts undoubtedly resulted in excellent winter survival of fawns and will certainly be reflected in a large portion of 1½-year old deer in the 1959 hunter-harvest.

RECOMMENDATIONS

Herd composition counts should be continued during all periods when segregation of sex and age is practical.

Prepared by: David R. Klein
Wildlife Mgt. Biologist

Approved by: Sigurd T. Olson
Acting Supervisor
Game Restoration

Date: June 30, 1959

TABLE 1 WINTER DEER COMPOSITION COUNTS
1959

Date	Location	No. Fawns	% Fawns to Adults	% Fawns of Total	No. Adults	Total Counted
2/12	Wrangell Narrows	19	58	37	33	52
2/13	Yellow Is. to Pt. Mitchell	26	40	29	65	91
2/14	East Shore Duncan Canal	19	40	29	47	66
	Totals	64	44	31	145	209

Job No. 2

SEX AND AGE COMPOSITION AND PHYSICAL CONDITION OF DEER IN THE HUNTER TAKE

ABSTRACT

The sex ratios of the annual harvests have shown a continuing increase in the take of does, reaching 29 per cent in 1958. Age ratios of the kill reflected a slight renewed surge in the rate of population growth. The proportion of young animals in the harvest was greater than in 1957, 1956 and 1955 but less than the 1954 and 1953 levels. The 3½-year age class was reduced below the normal level. The minimum population estimate was 123,000 and the actual total kill of 13,000 represents an 11 per cent harvest. Female age ratios showed a larger proportion of yearling and old age deer than was true among bucks. Young bucks constituted the major portion of the early season kill while the reverse was true after the rut was initiated. The yearling hind foot measurements appear to reflect better summer growing conditions in 1958 than in 1956 and 1957. Average dressed weights of harvested deer were 105 pounds for males and 65 pounds for females.

OBJECTIVES

To evaluate sex and age composition and physical characteristics of the deer harvested during the legal open season.

TECHNIQUES USED

Deer jaws, weights and measurements were obtained from as large a sample of hunter-killed deer as possible. Through local publicity and cooperation from other Fish and Wildlife Service and Forest Service personnel, 611 deer jaws were collected from hunters during the 1958 legal harvest. Whenever practical, chest girth and hind foot measurements and dressed weights were taken along with information relative to sex, date and location of the kill. Chest girth measurements were taken immediately behind the shoulders with the chest cavity closed. Hind feet were measured from the tip of the hoofs to the proximal end of the calcaneus. Weights obtained were from eviscerated "field dressed" animals, with head, hide and feet attached.

FINDINGS

Sex Breakdown of Kill: The sex ratio of the harvest was 71 per cent bucks as compared to 74 per cent in 1957 and 85 per cent in 1956. While the total harvest increased by 58 per cent over 1957, the doe take increased by 76 per cent. The greater increase in the take of does was apparently the result of greater densities of deer in 1958 and, also, an increase in numbers of hunters. With increased densities of deer, does are readily available early in the season and new hunters show less selectivity for bucks than the more experienced hunters. There were 103 days of open season on bucks in 1958 (Aug. 20-Nov. 30) and a 47 day antlerless season

(Oct. 15-Nov. 30). Seasons and limits (4 either sex deer) were identical in 1957 and 1958.

Male Age Distribution: The age distribution of male deer killed during the 1958 season from various areas throughout Southeast Alaska is shown in Table 1. The proportionate ratios of varying age deer represented in the kill for all of Southeast Alaska are shown graphically in Figure 1, in comparison with the age distribution from previous years (1953-1958). Regional breakdowns of these values are presented in Figure 2. Prior to 1958 a gradual leveling off was evident in the rate of population growth as reflected in the age proportions of the harvest. The proportion of young animals showed a gradual decrease from the 1953 level while old animals increased (Fig. 1). The 1958 figures reflect a renewed surge in the rate of growth to a rate somewhere between the 1954 and 1953 levels. This is apparently the product of the excellent survival during the winters of 1956-57 and 1957-58. It should be borne in mind that additional factors tend to accentuate the apparent high ratio of young animals in the population. The 3½-year age class, which is normally one of the largest age groups represented in the harvest and composes over 50% of the older deer, was reduced in 1958. This age group suffered heavy winter loss as fawns in the winter of 1955-56. Also, "antlerless" deer seasons have been longer in 1957 and 1958 than in previous years, allowing greater availability of yearling bucks previously not legal under the three inch or visible antler law. Both of the above mentioned factors tend to mask gradual trends in population growth in one year's data if viewed independently.

Female Age Distribution: This year a sample of 117 female deer jaws was collected. Age ratios of female deer represented in the kill are shown in Table 2 with bar graph comparisons of the 1955, 1956 and 1957 values in Figure 3. Ratios are somewhat similar to the male ratios with the exception that the yearling class is appreciably larger than other groups in the female sample, while in males the yearling and 2½-year groups are quite similar. This is explained by the slight bias in the collection of the male yearling deer which are not equally available to the hunter due to their limited antler development. The reduced 3½-year age class was also apparent in the female age ratios.

Comparison of the female age ratios from Unit 3 with those from Unit 4, show a significant difference in the 3½-year age groups. Apparently the fawn loss of the winter of 1955-56 was much greater in Unit 4 than in Unit 3 and is reflected accordingly in the 3½-year age groups from the two areas.

Chronological Age and Sex Distribution: Age distribution of male deer killed throughout the season showed considerable variation. During August and September young deer made up the greatest portion of the kill, while the onset of the rut brought about a reverse of this situation. Table 3 shows that during August 20 through September 30, sixty-one per cent of the kill were yearling

deer while this age group comprised only 30 per cent of the total season's kill. Mature bucks, which were at higher, more inaccessible elevations during the early portion of the season, moved to lower areas and became available to hunters as frosts killed the alpine vegetation and the physiological drive of the rut stimulated increased movement of these deer.

Estimate of Population and Harvest: It is possible to arrive at a rough estimate of the per cent harvest of the total deer population by comparison of age ratios in the kill with previous years. In making such calculations, certain basic assumptions are necessary; 1.) It must be realized that the age structures from jaws sampled represent only hunted populations and calculations based on these samples apply only to the portion of the total population that receives significant hunting pressure. 2.) Heavy hunting pressure would tend to reduce each of the older age groups, and if no significant reduction in older age groups is apparent from year to year, it follows that hunting pressure is not heavy. Any kill greater than 25-30 per cent of the total adult bucks would be reflected in the following year's age structures. There has been no decrease in the older age groups; in fact, a slight increase is indicated. 3.) Adult bucks (over 1 yr. of age) seldom exceed 25 per cent of a deer population and are much less than this under heavy hunting pressure (buck law). Using the above figures and assuming the maximum take of 30 per cent of the bucks, it is possible to make the following calculations:

$$13{,}000 \text{ (total harvest)} \times 71\% \text{ (bucks)} = 9{,}225 \text{ total buck harvest}$$

$$\frac{9{,}225 \text{ buck harvest}}{30\% \text{ portion of bucks harvested}} = 30{,}800 \text{ total bucks in population}$$

$$\frac{30{,}800 \text{ total bucks in population}}{25\% \text{ portion of bucks in population}} = 123{,}000 \text{ total hunted population}$$

The figure of 123,000 is then a minimum population estimate based on the maximum buck harvest under the given conditions. For instance, if it is assumed that the buck harvest was less than 30 per cent of the bucks in the population, say 15 per cent, and this assumption has equal validity, then the total population would be 246,000. If the more conservative low estimate of 123,000 is used, the total take of 13,000 represents an 11 per cent harvest.

Hind Foot, Chest Girth and Dressed Weights: The hind foot, chest girth and dressed weight measurements from 1958 harvested deer are recorded in Table 4, 5 and 6 for male deer and Table 7 for female deer. The hind foot measurement has proved to be the simplest of the three measurements to obtain accurately, being less subject to variation through misunderstanding by cooperators and requiring a minimum of equipment and effort. Also, the hind foot appears to be a better key to population welfare than chest girth and less subject to temporary weather and sexual-physiological

changes. Chest girth and dressed weight are useful in reflecting the progression of the rut and, also, are good indicators of late summer and fall physical condition. The amount of adipose accumulation present in fall harvested deer, as reflected in chest girth and dressed weight, is an index to summer range quality and auspiciousness of the growing season.

Hind foot, chest girth and dressed weight measurements were obtained from hunter killed male deer in Management Unit 3 and to a lesser extent from other Units. Sample sizes are too small, except from Unit 3, to allow valid comparisons of regional variations in measurements. A comparison of average hind foot measurements from yearling bucks for 1958 and 1957 shows some variation which may be due to varying seasonal conditions. The average yearling hind foot measurements were 16.57 inches in 1958 and 16.29 in 1957 (standard deviations = 0.37 inches in 1958 and 0.58 in 1957). Although the variation existing between the 1957 and 1958 values is not wide enough to have statistical reliability, it is likely that the lower yearling value in 1957 is a true reflection of this condition in the population. This is borne out by comparison of the 2½-year age group measurements in 1958 with the value for this age group in other years. It is apparent in 1958 that the 2½-year class had a mean hind foot measurement below that of other years and since this age group was the yearling group of 1957, the reduced hind foot measurement supports the preceding data. This variation between the 1957 and 1958 yearlings can be explained by the differences in length and auspiciousness of the growing seasons in 1956, 1957 and 1958. The 1956 growing season was particularly wet with a late Spring. In 1957 conditions were somewhat improved but the season was again very wet. The growing season in 1958 was characterized by an early Spring and a dry, warm Summer. Undoubtedly, the more favorable conditions in 1958 contributed to increased growth of yearlings in that year as compared to the two previous years.

Chest girth and dressed weight measurements showed little change from 1957. The average dressed weight of males killed was 105 pounds, while females averaged 65 pounds. Table 6 shows the weight range and average weights of males and females of all age classes represented in the kill. Dressed weights of bucks reflected a gradual weight increase through the season until the onset of the rut. Per cent increase was greatest among young bucks and decreased with age. Young deer, which utilize for growth almost all food energy metabolized during the summer months, do not start to put on fat until the end of summer. Older deer that are growing more slowly, or have attained full body growth, start to develop fat reserves early in the summer. Consequently, accumulation of fat, which is directly reflected in dressed weight increase, is gradual and nearly complete at the beginning of the hunting season in old deer, while young bucks have to acquire their winter fat reserves in a much shorter period prior to the rut. Loss of weight in bucks, associated with the rut, is greater in mature deer than in yearlings and possibly 2½-year old deer. Table 8 shows the

relationship of weight loss in male deer of all age groups during the course of the hunting season. Three and one half year old deer showed a loss of 21 per cent of their dressed weight from the last two weeks of October to the last two weeks of November. Yearlings showed a loss of only 11 per cent in the same period. Small losses in the older age groups are probably not representative and apparently reflect insufficient sample size.

RECOMMENDATIONS

Effort should be made to increase the hunter harvest to more nearly approach the level required to maintain high productivity and good herd welfare without jeopardizing the range. Since available numbers of hunters are not sufficient to enable an adequate harvest in all areas under any conditions at the present deer population levels, there is little need for concern of over-harvest. Increased take of does, the producing segment of the population, is desirable to maintain high productivity in those areas where hunting pressure can be directed.

Continued relaxation of controls on predators will be necessary in those areas where adequate control of the herds is not being accomplished through hunter harvest. Management Unit 3 definitely falls in this category as well as parts of Units 1 and 2.

The collection of information from hunter-killed deer should be continued as an index to population welfare.

Prepared by: David R. Klein
Wildlife Mgt. Biologist

Approved by: Sigurd T. Olson
Acting Supervisor
Game Restoration

Date: June 30, 1959

TABLE 1 AGE GROUPS BY PER CENT OF MALE DEER REPRESENTED IN THE 1958 LEGAL HARVEST (August 20-November 30)

	Age in Years					Sample
	1½	2½	3½	4½	5½+	of Jaws
Management Unit #1	21	26	19	17	17	47
Management Unit #3						
Wrangell Narrows	32	22	11	14	19	88
Lindenberg Peninsula	37	22	16	12	13	76
Mitkof, Kup. & Kuiu Is.	31	26	15	14	14	215
Wrangell, Etolin, Zarembo Is.	24	22	24	18	12	50
Total for Unit #3	30	25	17	15	14	265
Management Unit #4						
North Admiralty Is.	25	20	5	30	10	20
South Admiralty Is.	34	29	9	5	23	86
Baranof & Chichagof Is.	33	30	10	7	20	40
Total for Unit #4	33	28	9	9	21	144
Total for All Southeast	30	26	15	13	16	481

FIGURE 1 AGE DISTRIBUTION OF HUNTER-KILLED MALE DEER IN SOUTHEAST ALASKA, 1953-1958

(Data from Table 1)

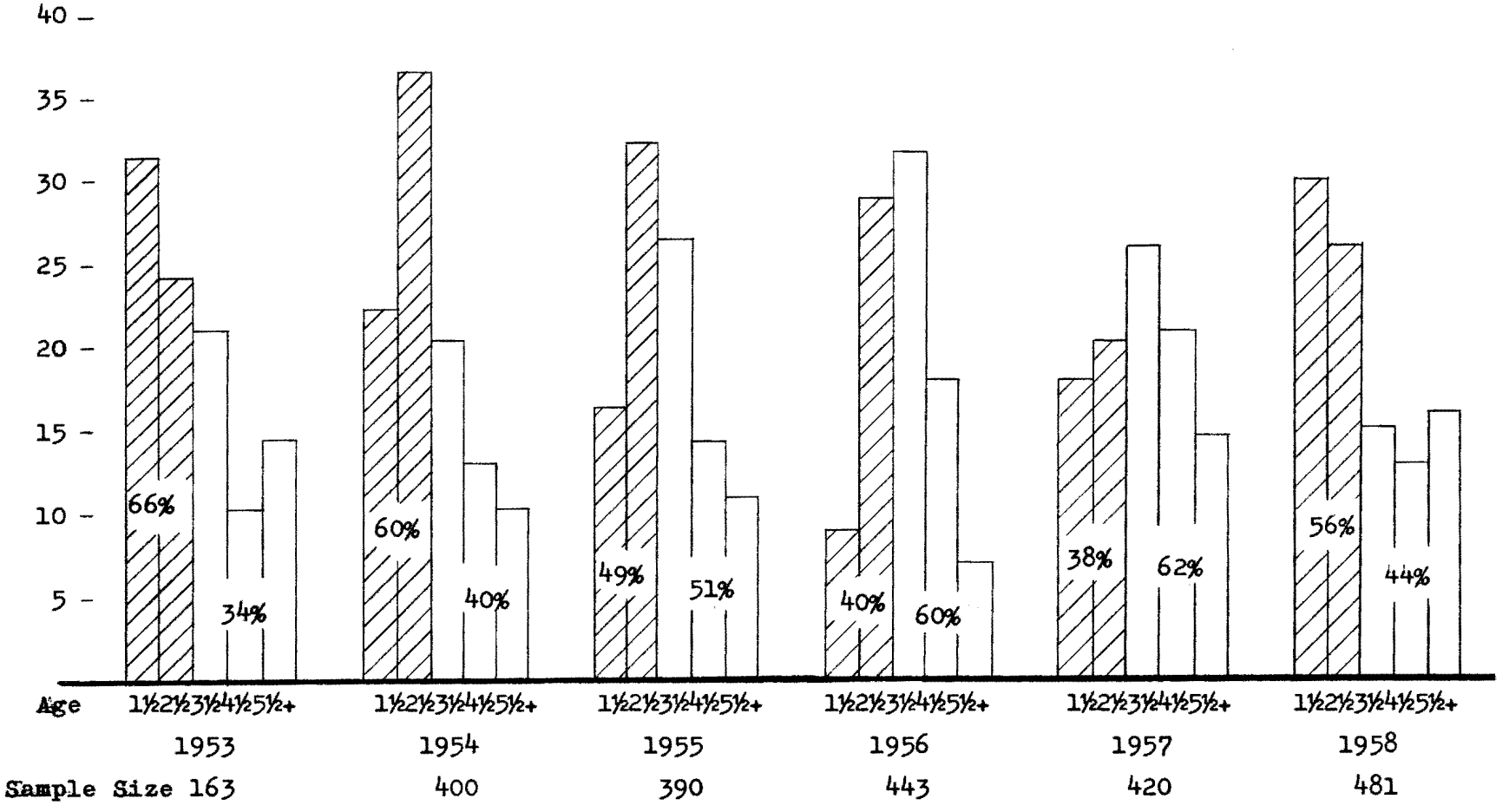


FIGURE 2½ AGE DISTRIBUTION OF MALE DEER IN THE LEGAL HARVEST IN MANAGEMENT UNITS 1, 3 & 4

(Data from Table 1)

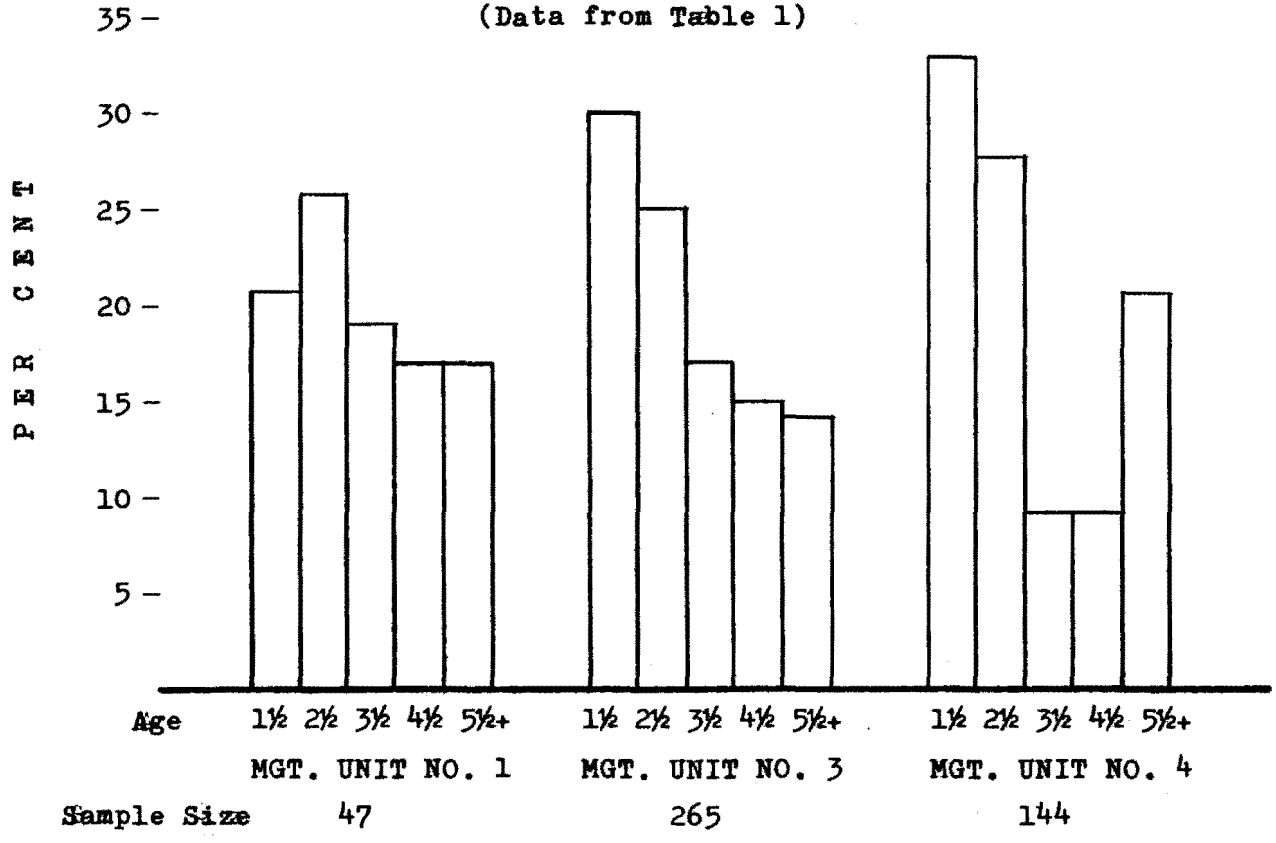


TABLE 2 AGE DISTRIBUTION BY PER CENT OF FEMALE DEER KILLED IN MGT. UNITS 3 AND 4 SOUTHEAST ALASKA, 1958

	6mo.	1½yrs.	2½yrs.	3½yrs.	4½yrs.	5½+yrs.	No. Jaws
MGT. UNIT #3 Mitkof, Kup., Kuiu, Wrangell, Etolin & Zarembo Is.	5	40	13	17	13	13	40
MGT. UNIT #4 Admiralty, Baranof & Chichagof Is.	13	15	13	4	12	17	74
ALL S.E. ALASKA	14	26	16	9	15	19	117

TABLE 3 CHRONOLOGICAL VARIATIONS IN AGE PROPORTIONS OF MALE DEER IN THE 1958 HARVEST

Period	1½ yrs.	2½ yrs.	3½ yrs.	4½ yrs.	5½+ yrs.	No. Samples
8/20 - 9/30	61%	20%	7%	5%	7%	59
Entire Season	30%	26%	15%	13%	16%	481

FIGURE 3 AGE DISTRIBUTION OF FEMALE DEER KILLED IN LEGAL HARVESTS, 1955-1958

(Data from Table 2)

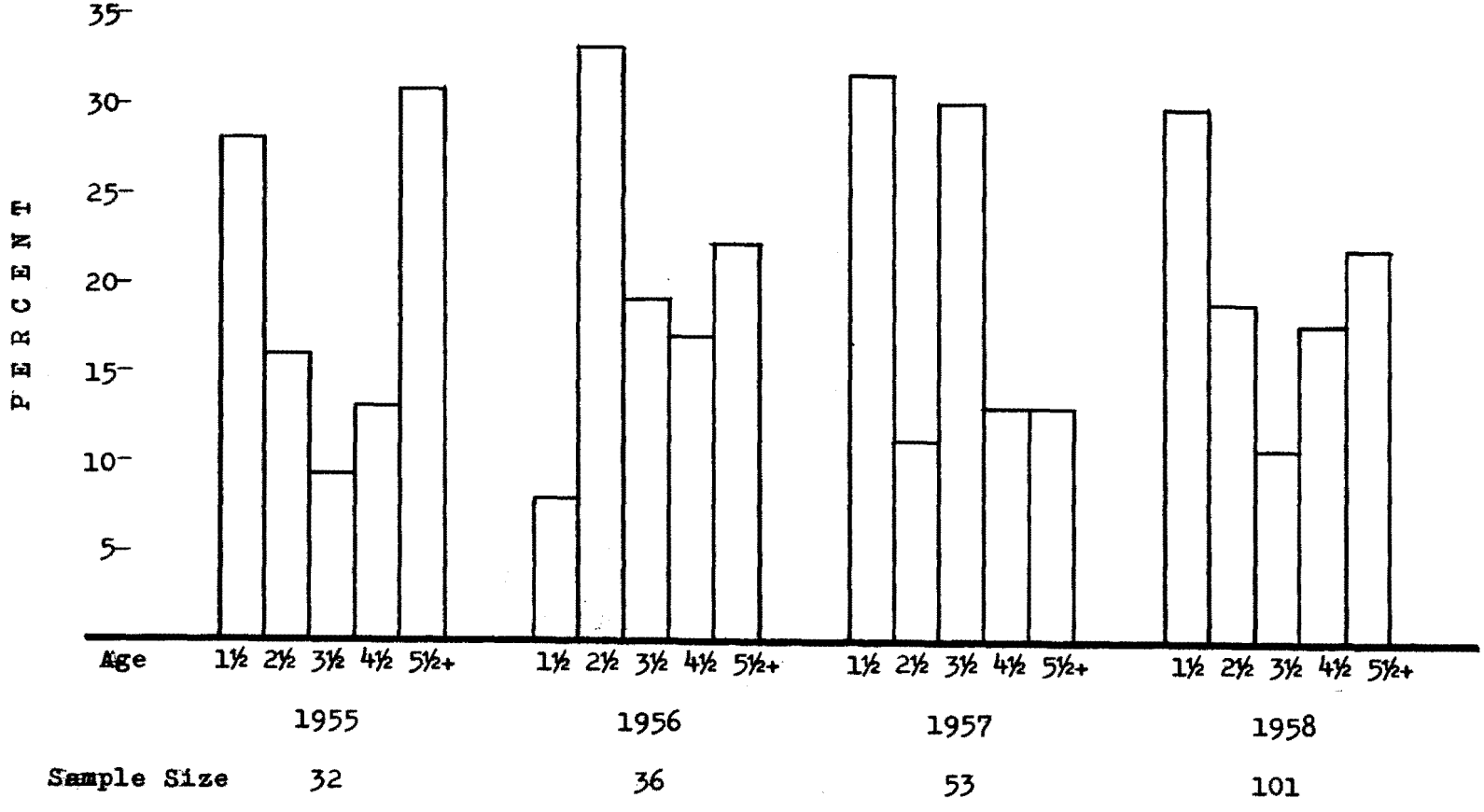


TABLE 4 HIND FOOT MEASUREMENTS OF MALE DEER IN THE 1958 HARVEST, SOUTHEAST ALASKA

(Measurements in inches)

LOCATION	1½ Yrs. Mean	1½ Yrs. No. Samples	2½ Yrs. Mean	2½ Yrs. No. Samples	3½ Yrs. Mean	3½ Yrs. No. Samples	4½ Yrs. Mean	4½ Yrs. No. Samples	5½+ Yrs. Mean	5½+ Yrs. No. Samples
UNIT # 1 (Mainland & Ketchikan area)	16.33	3	16.94	4	17.75	1	- -	- -	17.42	3
UNIT # 2 (Prince of Wales Is.)	16.50	1	- -	-	17.08	3	16.00	1	- -	-
Wrangell Narrows	16.53	9	16.96	11	17.56	4	17.37	6	17.21	12
Mitkof Island	17.00	1	17.28	10	17.13	4	17.50	3	17.25	5
Kupreanof & Kuiu Is.	16.64	27	16.91	20	17.17	12	17.50	14	17.44	13
Wrangell, Etolin, Zarembo & War. Is.	16.46	7	16.60	5	17.29	7	17.56	4	16.81	4
ALL OF UNIT # 3	16.61	35	16.97	36	17.20	24	17.51	22	17.31	23
UNIT # 4 (Admiralty, Baranof & Chichagof Is.)	16.45	5	17.13	4	16.88	2	16.88	2	17.50	3
S.E. ALASKA	16.57	44	16.98	43	17.18	29	17.40	24	17.34	28

TABLE 5 CHEST GIRTH MEASUREMENTS OF MALE DEER IN THE 1958 HARVEST, SOUTHEAST ALASKA

(Measurements in inches)

LOCATION	1½ Yrs. Mean	1½ Yrs. No. Samples	2½ Yrs. Mean	2½ Yrs. No. Samples	3½ Yrs. Mean	3½ Yrs. No. Samples	4½ Yrs. Mean	4½ Yrs. No. Samples	5½+ Yrs. Mean	5½+ Yrs. No. Samples
UNIT # 1 (Mainland & Ketchikan area)	30.92	3	36.00	3	41.00	1	- -	-	38.50	1
UNIT # 2 (Prince of Wales Is.)	34.00	1	- -	-	37.83	3	38.50	1	- -	-
Wrangell Narrows	31.25	10	33.71	12	35.56	4	36.35	5	35.48	13
Mitkof Island	31.75	1	33.08	9	35.50	4	36.92	3	37.60	5
Kupreanof & Kuiu Is.	31.35	27	33.76	24	35.29	12	37.30	15	37.46	13
Wrangell, Etolin, Zarembo & War. Is.	33.18	7	34.00	5	36.39	7	38.40	5	38.06	4
ALL OF UNIT # 3	31.73	35	33.68	38	35.66	23	37.49	23	37.60	22
UNIT # 4 (Admiralty, Baranof & Chichagof Is.)	31.25	7	34.93	7	34.00	3	42.00	1	38.00	2
S.E. ALASKA	31.65	46	33.97	48	35.89	30	37.71	25	37.67	25

TABLE 6 DRESSED WEIGHTS OF DEER IN THE 1958 HARVEST SOUTHEAST ALASKA

(In Pounds)

	MALES			FEMALES		
Age	Mean	Wt. Range	No. Samples	Mean	Wt. Range	No. Samples
6 mo.				27	22-32	2
1½ yrs.	74	55-115	41	58	42-81	12
2½ yrs.	95	73-130	49	73	60-95	5
3½ yrs.	110	85-150	33	74	63-84	4
4½ yrs.	128	99-158	29	71	62-78	5
5½+ yrs.	126	85-161	39	74	54-85	6
All ages	105	55-161	191	65	22-95	34

TABLE 7 MEASUREMENTS OF WEIGHT, CHEST GIRTH AND HIND FOOT OF FEMALE DEER TAKEN IN THE 1958 HARVEST, S.E. ALASKA

(Measurements in pounds & inches)

	Dressed Weight		Chest Girth		Hind Foot	
Age	Mean	Sample Size	Mean	Sample Size	Mean	Sample Size
6 mo.	27	2	22.88	2	14.25	1
1½ yrs.	58	12	28.64	14	15.75	12
2½ yrs.	73	5	33.25	5	16.50	4
3½ yrs.	74	4	33.50	4	16.50	4
4½ yrs.	71	5	31.71	6	16.21	6
5½+yrs.	74	6	29.75	4	16.13	4

TABLE 8 WEIGHT VARIATIONS IN MALE DEER ASSOCIATED WITH THE RUT IN THE 1958 HARVEST, SOUTHEAST ALASKA

	MEAN WEIGHT IN POUNDS					
Date Killed	1½yrs.	2½yrs.	3½yrs.	4½yrs.	5½+yrs.	No. Sample
9/17 - 9/30	75	--*	--*	--*	--*	10
10/1 - 10/14	77	--*	--*	--*	150	10
10/15 - 10/28	75	107	125	135	127	49
10/29 - 11/11	72	84	108	119	128	54
11/12 - 11/30	67	88	99	115	125	47
Per cent loss of wt. 10/15-10/28 to 11/12-11/30	11%	18%	21%	16%	2%	

*Insufficient data available.

Job No. 3 SURVEY OF NATURAL MORTALITY

ABSTRACT

Natural mortality in Southeast Alaska was very light during the past winter. Two cases of mortality associated with parasitism were encountered. A review of known deer parasites in Alaska is presented.

OBJECTIVES

To determine the sex and age composition and regional breakdown of the natural mortality.

TECHNIQUES USED

Representative winter mortality beach transects were walked and deer mortality recorded as outlined in Completion Report, June 30, 1957, Job #2.

FINDINGS

Approximately 15 miles of beach area were searched and only five dead deer were found. Two of these deer died of accidental causes, being in good physical condition at death, while the others contained no fat reserves in the bone marrow and quite likely died of starvation. Winter mortality was considered very light. While limited mortality undoubtedly occurred, the failure of the deer to concentrate in the beach areas during the mild winter resulted in wide dispersal of the carcasses.

Two incidences of parasitism associated with the death of deer were encountered. One fawn was found dead on Strait Island, apparently the victim of lung worm (Dictyocaulus filaria). Another fawn died shortly after being found in a weakened condition and autopsy revealed a large mass of 36 nasal bots (Cephenemyia jellisonia) in the pharygeal pouches.

A review of parasites known to occur in Alaska deer is presented in Table 1. Dr. Robert Rausch, of the Arctic Health Research Center, assisted with some of the parasite identifications and supplied data on parasite incidence.

RECOMMENDATIONS

The collection of natural mortality information should be continued on an annual basis.

Prepared by: David R. Klein
Wildlife Mgt. Biologist

Approved by: Sigurd T. Olson
Acting Supervisor
Game Restoration

Date: June 30, 1959

TABLE 1 PARASITES KNOWN TO OCCUR IN BLACK-TAILED DEER IN ALASKA

Species	Area of Infection	Date	Records of Occurance
Nasal bots, Cephenemyia jellisoni*	Pharyngeal pouches	Common	Islands & mainland
Lung worms, Dictyocaulus filaria*	Lungs & bronchi	Common	Islands & mainland
Tapeworm larvae, Taenia hydatigena	Liver & omentum	11/58	Mitkof & Kupreanof Is.
Tapeworm larvae, Taenia krabbei	Muscle tissue	10/58	Woronkofski Island
Tapeworm larvae, Echinococcus granulosus	Lungs	11/58	Baranof Island

*Specific terminology is subject to confirmation

Job No. 4 EVALUATION OF HUNTER HARVEST

ABSTRACT

Eighty-eight per cent of the 1958 deer harvest was obtained during the last six weeks of the season. Hunter success averaged 83 per cent and varied from 72 to 93 per cent. The doe take was 29 per cent of the total harvest. The estimated total legal kill was 13,000, while the kill by licensed hunters was 9,400.

TECHNIQUES USED

Hunter deer harvest information for the 1958 deer season was obtained from samples of deer jaws collected, field contacts with hunters and post-season hunter interviews.

Chronological distribution of the kill was determined from the sample of deer jaws collected. The post-season hunter interviews were made in Juneau, Sitka, Petersburg, Wrangell and Ketchikan. Game management agents C. Graham and L. Reynoldson assisted with the interviews in Ketchikan. Interviews were conducted in a manner similar to those described in Job No. 7, Fed. Aid Report, June 30, 1957, W-3-R-11, Alaska. Hunters were asked the number and sex of the deer they killed, where they were killed, days hunted and additional pertinent information about their hunts. The total kill for each town was figured on a proportion basis, using ratios of deer jaws collected from hunters interviewed to those collected from the entire town or by comparison to hunters interviewed to the total hunters in the town.

FINDINGS

The chronological distribution of the kill is shown in Figure 1. The breakdown of the kill by two week periods reflects the concentration of the kill in the latter portion of the season. Eighty-eight per cent of the total harvest was obtained during the last six weeks of the fourteen-week season. This compares with the 1957 harvest when the kill during this same portion of the season was 90 per cent. It is obvious from these data that the early opening of the deer season does not significantly effect the total harvest. Consequently, any attempt to manipulate the kill should be directed toward the latter portion of the season.

The results of the post-season hunter interviews are presented in Table 1. The 1958 deer harvest was the largest on record. The total estimated kill was 13,000 animals, with 9,400 of these being taken by licensed hunters. Accordingly, hunter success and the average take per hunter was higher for all areas than during the 1957 season. The total kill figures were obtained by adjusting the 1956 and 1957 values (based on sample questionnaires) by the increased average take and the increased proportion of hunters in 1958.

Hunter success averaged 83 per cent for all Southeast Alaska hunters and was highest in Petersburg and Wrangell which had 93 and 92 per cent success, respectively. The 83 per cent average is quite likely the highest general area, deer hunter success in North America. Also, the average take of 2.4 deer per hunter is probably about as high an average take as can be expected under any conditions. It is interesting to note that with our existing number of hunters, if every hunter took his limit of four deer the total harvest would be approximately 22,000. This is only 18 per cent of the minimum population estimate (Job No. 2).

The take of does averaged 29 per cent, however, hunter selectivity very definitely was responsible for the low take of does. The hunter interviews showed that less than 7 per cent of the hunters took more than one doe, 5 per cent took two does, less than 2 per cent took three does and none of the randomly chosen sample of 450 hunters took four does.

A breakdown of the kill by areas is shown in Table 2. This information was also obtained from the hunter interviews. Accessibility determines hunting pressure to a large extent and accounts for the large kills adjacent to centers of human populations. However, the best hunting areas, that is those areas with the greatest densities of deer, tend to attract hunting parties from all Southeast Alaska towns. This is particularly true of the centrally located Kuiu, Kupreanof and Mitkof Islands and also southern Admiralty Island. It is interesting to note that large percentages of the kills of Ketchikan and Juneau hunters (20 and 14 per cent, respectively) were taken on Kupreanof and Kuiu Islands and this activity was almost wholly concentrated in Rocky Pass and Duncan Canal.

RECOMMENDATIONS

Hunter harvest data should be gathered annually to determine the effectiveness of the harvest.

It is obvious from the sex breakdowns of the kill that increasing the bag limit will not effectively increase the take of does. To obtain a larger proportion of does, special antlerless seasons are necessary.

Prepared by: David R. Klein
Wildlife Mgt. Biologist

Approved by: Sigurd T. Olson
Acting Supervisor
Game Restoration

Date: June 30, 1959

FIGURE 1 CHRONOLOGICAL DISTRIBUTION OF THE 1958 DEER HARVEST SOUTHEAST ALASKA

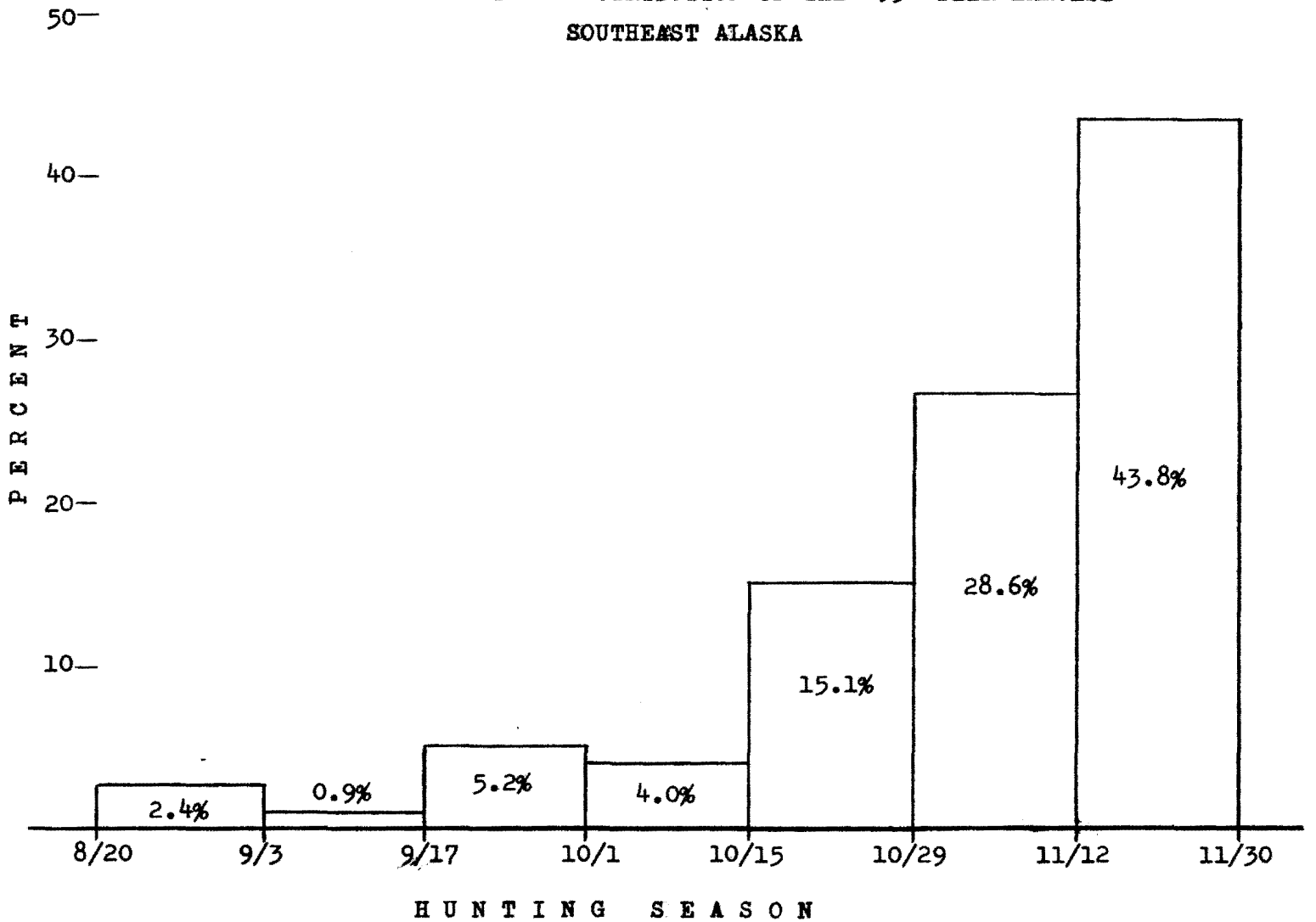


TABLE 1

THE DEER HARVEST AND HUNTER SUCCESS DURING THE 1957 AND 1958 DEER SEASONS, SOUTHEAST ALASKA

	Juneau		Sitka		Petersburg		Wrangell		Ketchikan	
	1958	1957	1958	1957	1958	1957	1958	1957	1958	1957
Hunter Success	72%	66%	79%	60%	93%	74%	92%	76%	89%	59%
Av. No. Deer Per Hunter	1.9	1.5	2.2	1.2	2.8	2.1	3.1	1.8	2.3	1.2
Total Kill for Town	1500	875	1400	550	1800	1100	1600	850	1200	550
Per Cent Kill of Does	27%	22%	35%	20%	19%	29%	39%	29%	14%	18%
Total Kill of Does	400	200	500	110	350	320	600	250	170	100
Hunters Getting Limit	25%	9%	31%	7%	43%	33%	56%	13%	24%	9%
Av. No. Days Hunted Per Hunter	5.2	6.3	5.8	4.6	7.5	6.7	5.9	4.6	6.7	5.2
No. Days Hunted Per Deer Killed	2.7	4.2	2.7	3.9	3.8	3.2	1.9	2.6	2.9	4.3
Per Cent of New Hunters	30%		40%		26%		24%		15%	
Sample Size	100	100	75	70	100	100	50	75	104	100

	1958	1957
Total kill by licensed hunters -	9400	4900
Total kill by all hunters -	13000	8250
Each hunter averaged -	2.4 deer	1.5 deer
Av. hunter success-	83.5%*	70.0%

*Confidence limits at the 95% level of reliability = 81.0%-86.0%

TABLE 2 DISTRIBUTION OF 1958 DEER HARVEST, SOUTHEAST ALASKA

Per cent of Kill	Location of Kill
JUNEAU HUNTERS	
36	Northern Admiralty Island
26	Southern Admiralty Island
14	Kupreanof or Kuiu Island
12	Douglas Island
10	Chichagof Island
2	Mainland
SITKA HUNTERS	
57	Islands adjacent to channels south of Salisbury Sound and the Sitka Sound area.
31	Islands adjacent to Sergins Narrows and Peril Strait northeast of Salisbury Sound
10	Kruzof Island
2	Other areas
PETERSBURG HUNTERS	
42	Wrangell Narrows
13	Mitkof Highway
13	Duncan Canal
71	All of Kupreanof Island
24	All of Mitkof Island
3	Other areas
WRANGELL HUNTERS	
29	Etolin Island
24	Zarembo Island
17	Wrangell Island
9	Mitkof Island
9	Kupreanof Island
7	Woronkofski Island
5	Other areas
KETCHIKAN HUNTERS	
26	Revilla Island
21	Prince of Wales Island
20	Kupreanof or Kuiu Island
12	Cleveland Peninsula
5	Etolin and Onslow group Islands
5	Gravina Island
11	Other areas

SUPPLEMENTARY BROWSE STUDIES

ABSTRACT

Three additional browse enclosures were established at the Maybeso Experimental Forest on Prince of Wales Island. Browse utilization inventories showed heavier utilization than has occurred since 1956. Degree of utilization was 74 per cent for all of Southeast Alaska. No significant change in density or vigor was indicated.

OBJECTIVES

To determine the winter utilization of browse, trends in range conditions (i.e., changes in density and vigor of browse species) and areawise quantitative and qualitative variations in browse conditions.

TECHNIQUES USED

Browse enclosure plots were checked and necessary repairs made. Three additional enclosures and associated study plots were established within the clear cut area at the Maybeso Experimental Forest on Prince of Wales Island. Forest Research Center personnel assisted in the establishment of these plots. Methods and procedures used in laying out and constructing the plots and detailed descriptions of the area and vegetation present are included in the attached Appendix.

Browse inventory transects were walked in April after the period of winter utilization by deer. Seventeen transects were checked throughout Southeast Alaska and the degree of utilization, density and vigor of the key browse species (Vaccinium ovalifolium and V. parvifolium) were recorded as outlined in the Completion Report, Job No. 2, June 1957. Browse inventories in the Sitka area were made by Game Agent Neil Argy and Forest Ranger Ray Karr. Paul Garceau, Alaska Department of Fish and Game Biologist, assisted with the surveys in the other areas.

FINDINGS

Information obtained from the browse inventory transects is summarized in Table 1. Utilization was, in almost every case, considerably higher than in 1958. Average utilization was 74 per cent for all of Southeast as compared to 43 per cent in 1958. The last year of comparable utilization was during the winter of 1955-56 when heavy snows forced the deer to areas adjacent to the beaches for about two months. Utilization averaged 86 per cent in the spring surveys of 1956. During the past winter, while conditions were generally mild, some snow accumulation did occur during mid-February. During this period of 2-3 weeks before rains settled the snow, deer concentrated in the beach areas in large numbers.

While the period of use of the beach fringe was brief, the large numbers of deer present rapidly utilized much of the available browse. This substantial increase in utilization over the 1958 level with only slightly more severe winter conditions, reflects the extreme population pressure present on our heavily populated deer ranges. It is obvious now that a relatively severe winter will result in complete elimination of forage in these critical wintering areas long before the winter is over. Heavy losses from starvation will be inevitable.

The density and vigor of browse plants, as reflected by the inventory, showed no significant change over the 1958 surveys. A slight decrease in general vigor of plants was apparent in the data but this may be the product of sampling bias.

An evaluation of the utilization data in the light of associated plant density was made and is presented in Table 2. It is obvious from examination of the table that very little difference occurs between utilization values obtained by the two methods of data analysis.

RECOMMENDATIONS

Annual browse surveys should be continued as they directly reflect population pressure and trends in winter range conditions.

Prepared by: _____ Approved by: _____

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Game Restoration

Date: June 30, 1959

TABLE 1 BROWSE INVENTORY OF SOUTHEAST ALASKA DEER WINTER RANGES, APRIL 1-23, 1959

(Vaccinium ovalifolium & parviflorum index species)

Area	Percent Utilization		Density-Plants Per 1000 sq.ft.	Vigor (Scale of 3)
	1958	1959		
KETCHIKAN	35	56	67	2.8
George Inlet, Revilla Is.	40	87	69	2.6
Gravina Island	24	63	64	2.9
Helm Bay (E. side)	27	12	57	2.9
Helm Bay (W. side)	47	61	76	2.9
PETERSBURG-WRANGELL	36	70	51	2.5
Onslow Island	16	92	17	2.7
Whale Pass, P.of W. Is.	21	8	72	2.7
Zarembo Island	75	86	1	2.6
Duncan Canal, Kupreanof Is.	41	84	34	2.7
Wrangell Narrows, Kupreanof Is.	38	96	68	2.3
Five Mile Cr., Kupreanof Is.	45	94	74	2.1
Big John Bay, Kupreanof Is.	24	48	62	2.5
Blind River, Mitkof Is.	26	55	83	2.4
JUNEAU-SITKA	60	91	34	2.4
Pybus Bay, Admiralty Is.	51	94	13	2.7
Gambier Bay, Admiralty Is.	69	96	24	2.7
Mole Harbor, Admiralty Is.	94	96	68	2.1
*Deadman Reach, Baranof Is.	17	82	38	2.3
*Rodgers Point, Chichagof Is.	32	99	20	2.1
*Nakwasina Passage, Baranof Is.	94	80	40	2.3
AVERAGE FOR ALL AREAS	43	74	49	2.5

*Surveys made by Neil Argy and Ray Karr in 1959.

TABLE 2 RELATIONSHIP OF INDEPENDENT UTILIZATION VALUES TO DENSITY-RELATED UTILIZATION VALUES FROM 1959 BROWSE INVENTORIES, S.E. ALASKA

The following equation was used to correlate density and utilization:

$$\text{Density-related Utilization} = \frac{(U_1 \times D_1)+(U_2 \times D_2)+(U_3 \times D_3)+\ldots.(U_{20} \times D_{20})}{D_1+D_2+D_3+\ldots.D_{20}}$$

U=Individual utilization observation.
D=Individual density observation.

Area	Percent Utilization	Per cent Density-Related Utilization
KETCHIKAN	56	56
George Inlet, Revilla Is.	87	91
Gravina Island	63	62
Helm Bay (E. side)	12	13
Helm Bay (W. side)	61	58
PETERSBURG-WRANGELL	70	74
Onslow Island	92	93
Whale Pass, P. of W. Is.	8	8
Zarembo Is.	86	90
Duncan Canal, Kupreanof Is.	84	95
Wrangell Narrows, Kupreanof Is.	96	98
Five Mile Cr., Kupreanof Is.	94	94
Big John Bay, Kupreanof Is.	48	52
Blind River, Mitkof Is.	55	61
JUNEAU-SITKA	91	92
Pybus Bay, Admiralty Is.	94	98
Gambier Bay, Admiralty Is.	96	95
Mole Harbor, Admiralty Is.	96	95
Deadman Reach, Baranof Is.	82	81
Rodgers Point, Chichagof Is.	99	99
Nakwasina Passage, Baranof Is.	80	83
AVERAGE FOR ALL AREAS	74	75

APPENDIX
Job No. 5

DEER RANGE STUDY PLOTS ESTABLISHED AT HOLLIS, ALASKA
July 8-10, 1958

The study plots are located in associations of two's with one plot protected from browsing by deer and the other plot unprotected. The plots are two milacres in area and rectangular in shape (6.6 ft. by 13.2 ft.). Five-foot cattle fencing, topped with one strand of barbed wire, was used to fence off the protected plots. The fenced enclosures are approximately 13 ft. by 19 ft., allowing a three-foot buffer strip between the fence and the protected plot to minimize extrinsic effects of the physical presence of the fence on the vegetation within the plots. The study plots are marked at all four corners by short sections of iron pipe, painted orange.

All plots are located in cutover areas. Logging generally took place six months prior to yarding as indicated for each site. Logging was by the high lead method which causes minimum scarification of the forest floor.

Station No. 21

Established: 7/8/58, Upper Maybeso Valley, 20 ft. north of spur #150 and 21½ chains from mainline road along spur.

Site Description: Elevation 250 ft. on cutover area, spruce was predominant. Area yarded in summer, 1956. Slash light to moderate. Ground cover not appreciably disrupted through logging.

Photo Stakes and Location:

Fenced Plot: Photo stake 12 ft. west of plot on large hemlock stump.

Unfenced Plot: South corner post located 20 ft. north of northeast corner of enclosure. Photo stake 10 ft. southwest of plot on large hemlock stump.

Station No. 22

Established: 7/8/58, Northeast sidehill, Maybeso Valley, 40 ft. southwest of spur #120 and 66 ft. northwest of line 107 and 50 ft. south of north base line.

Site Description: Elevation 700 ft., on cutover area. Area yarded in fall, 1955. Slash moderate. Ground cover not appreciably disrupted through logging.

Photo Stakes and Location:

Fenced Plot: Photo stake 6 ft. south of plot on hemlock stump.

Unfenced Plot: Northeast corner stake located 30 ft. south of south end of enclosure. Photo stake 15 ft. west of northwest corner on cedar stump.

Station No. 23

Established: 7/8/58, Lower Maybeso Valley, spruce flat, 125 ft. north of spur #130 and 435 ft. west along #130 from junction with #132.

Site Description: Elevation 75 ft., on cutover area. Area yarded in spring, 1954. Slash moderate. Ground cover moderately scarified by logging acticity.

Photo Stakes and Location:

Fenced Plot: Photo stake 9 ft. east of east corner of enclosure.

Unfenced Plot: Located 37 ft. southwest of southwest corner of enclosure. Photo stake 12 ft. east of plot.

STATION #21

FENCED PLOT

Species	Height	% Ground cover	No. Stems	No. groups or clusters	Vigor	Previous winter deer utilization	Seedlings	No. advance reproduction	Remarks
Vaccinium ovalifolium	to 3½'	40	62	15	1	<10%			Much new shoot growth
Cornus canadensis		<10							
Rubus pedatus		1		9					
Athyrium filix-femina		3		26					
Tsuga heterophylla							84	0	
Picea sitchensis							28	0	

Moss cover (Thuidium sp.) of forest floor has died out except for a few depauperate areas.

No deer pellet groups.

STATION #21

UNFENCED PLOT

Species	Height	% Ground cover	No. Stems	No. Groups or clusters	Vigor	Previous winter deer utilization	Seedlings	No. advance reproduction	Remarks
Vaccinium ovalifolium	to 3'	50	48	11	1	0			Much new shoot growth
Cornus canadensis		40							
Rubus pedatus		3		12					
Athyrium filix-femina		1		8					
Tsuga heterophylla							42	23	
Picea sitchensis							16	1	

Moss cover (Thuidium sp.) of forest floor has died out except for a few depauperate areas.

No deer pellet groups.

STATION #22

FENCED PLOT

Species	Height	% Ground cover	No. Stems	No. groups or clusters	Vigor	Previous winter deer utilization	Seedlings	No. advance reproduction	Remarks
Vaccinium ovalifolium	to 2½'	40	62	22	1	20%			Extremely vigorous
Cornus canadensis		20							
Rubus pedatus		1		13					
Athyrium filix-femina				1					
Tsuga heterophylla							8	32	
Picea sitchensis							3	1	
Thuja plicata							2		
Oplopanax horridus				1					

Moss cover (Thuidium sp.) of forest floor died out except for a few depauperate areas.

No deer pellet groups.

STATION #22

UNFENCED PLOT

Species	Height	% Ground cover	No. Stems	No. groups or clusters	Vigor	Previous winter deer utilization	Seedlings	No. advance reproduction	Remarks
Vaccinium ovalifolium	to 2½'	60	76	29	1	20%			Extremely vigorous
Cornus canadensis		30							
Rubus pedatus		5		15					
Athyrium filix-femina				1					
Blechnum spicant				1					
Tsuga heterophylla							9	19	
Picea sitchensis							2	0	

Moss cover (Thuidium sp.) of forest floor died out except for a few depauperate areas.

No deer pellet groups.

STATION #23

FENCED PLOT

Species	Height	% Ground cover	No. Stems	No. groups or clusters	Vigor	Previous winter deer utilization	Seedlings	No. advance reproduction	Remarks
Vaccinium ovalifolium	to 2½'	40	111	9	1	0			
Cornus canadensis		30							
Rubus pedatus		10		9					
Athyrium filix-femina		1		8					
Gymnacarpium sp.		2							
Tsuga heterophylla							0	10	
Picea sitchensis							1	0	
Rubus spectabilis		7		7					

Moss cover (Thuidium sp.) of forest floor died out except for a few depauperate areas.

No deer pellet groups.

One bear dropping.

STATION #23

UNFENCED PLOT

Species	Height	% Ground cover	No. Stems	No. groups or clusters	Vigor	Previous winter deer utilization	Seedlings	No. advance reproduction	Remarks
Vaccinium ovalifolium	to 3'	40	53	10	1	<10%			
Cornus canadensis		40							
Rubus pedatus		1		10					
Athyrium filix-femina		1		7					
Gymnocarpium sp.		5							
Tsuga heterophylla							3	21	
Picea sitchensis							2	2	

Moss cover (Thuidium sp.) of forest floor has died out except for a few depauperate areas.

No deer pellet groups.

Job No. 5 PREPARING DATA FOR PUBLICATION

The results of deer studies under previous segments of W-3-R were reviewed and a joint manuscript entitled "Natural Mortality Patterns of Deer in Southeast Alaska" was prepared by David R. Klein and Sigurd T. Olson for publication in The Journal of Wildlife Management. Actual publication will be covered in a subsequent job description.

Sigurd T. Olson
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