U.S. Fish and Wildlife Service

Federal Aid In Wildlife Restoration

ALASKA

JOB COMPLETION REPORTS — NOT FOR PUBLICATION

Project W-3-R-11 Alaska June 30, 1957

Wildlife Investigations

Sitka Black-Tailed Deer Studies

David R. Klein, Wildlife Management Biologist

Robert F. Scott
Supervisor, Game Restoration

Clarence J. Rhode
Executive Officer
Alaska Game Commission

ALASKA GAME COMMISSION

JUNEAU

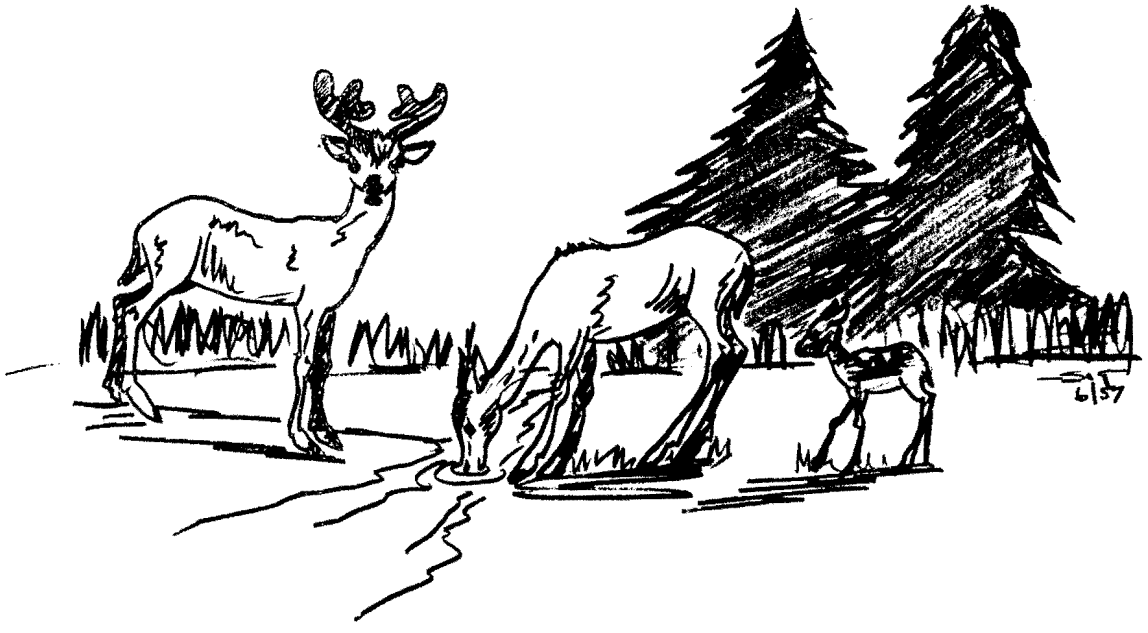
Territory of Alaska Project W-3-R-11

WORK PLAN E

SITKA BLACK-TAILED DEER STUDIES

July 1, 1956 - June 30, 1957

CONTENTS



Job No. 1 Development and Testing of Direct and Indirect Census Methods

ABSTRACT

Index areas were established to standardize aerial censusing. The open winter precluded further development and testing of census methods.

OBJECTIVES

To obtain more accurate and uniformly applicable methods of determining numbers of deer on Southeast Alaska ranges.

TECHNIQUES USED

Tabulation sheets were drawn up and printed to encourage uniformity in reporting aerial and surface counts of deer. The sheets were provided with space for recording variables such as snow depth, time of day, stage of tide and weather conditions to enable evaluation of the significance of each variable in relation to the counts. On the reverse side of each sheet a list of the winter beach count index areas was printed with their priority ratings. The mild, snow-free winter limited further development of census methods.

FINDINGS

Standardization of aerial censusing methods was accomplished through the establishment of representative beach index strips in the important deer wintering areas (Job Compl. Rep. #2) Further cataloging of the many environmental factors which influence the results of aerial beach counts was attempted through controlled counts in which the known variables were assessed to enable determination of their significance. Due to the open nature of the winter, with no periods of heavy snow accumulation, effective conditions for obtaining beach counts did not exist. Deer were well dispersed throughout the winter onto "transitional" ranges which normally receive use only during late fall and early spring. Concentrations in the beach fringe areas were relatively light in view of the total populations present. Consequently, aerial beach counts were effective only as a source of adult:fawn ratios.

RECOMMENDATIONS

Continuation of the development and testing of census methods should be done when suitable conditions again permit.

Prepared by: David R. Klein
Wildlife Mgt. Biologist

Approved by: Robert F. Scott
Supervisor, Game Restoration

Date: June 30, 1957

Job No. 2 Selection and Establishment of Representative Management Index Areas

ABSTRACT

Deer management index areas were established throughout Southeast Alaska to insure uniformity, continuity and standardization in the collection and recording of field data. Four types of index areas were used as follows:

1.)Index areas were established and defined for conducting the winter beach counts of live deer. 2.) Beach transects were established in the important wintering areas for spring surveys of winter mortality. 3.) Range plots (browse enclosures) were established on the winter range and protected from deer browsing by fencing. 4.) Browse inventory transects, to be used as indicators of browse utilization and range trend, were laid out on the winter range.

TECHNIQUES USED

Complete coverage of the deer range was not attempted in the selection of these indices of population welfare and range condition. The index areas were chosen to be representative of particular regions. Emphasis was placed on present productivity of deer, hunting pressure, accessibility and indicated future productivity of deer. Experimental sites to record the effects of logging and wolf control were also established.

Winter Mortality Beach Transects: Permanent beach transects were established in the key management areas to be used in recording extent of winter mortality. These transects are walked in the spring at the level of mean high tide and carcasses and remains of dead deer seen on the beach or in the brush fringe are recorded by sex, age, condition of bone marrow and apparent cause of death. Mortality figures of the number of dead deer found per mile of beach are used for comparison of areas. Sex and age ratios of the winter mortality are determined from carcasses found. The locations of the winter mortality beach transects are listed in the Appendix.

Winter Beach Count Index Areas: Extensive beach areas adjacent to the deer winter ranges were designated as winter beach count index areas. Priority ratings based on deer density, accessibility to hunting, hunting pressure received, etc., were given to each area to stress the importance of counts from the respective areas. The location and description of these beach count areas are listed in the Appendix. Annual aerial and boat counts of deer during the periods when deer are concentrated on the beach are made on these index areas. Whenever counts are made, whether for that purpose or in conjunction with enforcement patrols or other duties, an effort is made to secure total coverage of the index areas visited.

Printed tabulation sheets are used to record date, mode of travel, observers, time of day, stage of tide, snow depth, weather conditions, animals counted and other pertinent data. Frequent counts on the priority areas are obtained whenever possible as the reliability of the results are strengthened by replicate counts.

Browse Enclosures: Twelve browse enclosures were constructed to supplement the four enclosures erected in the spring of 1955. The enclosures are located on the key management index areas. Locations and site descriptions are listed in the Appendix. The accompanying map (Figure 1) shows locations of browse enclosures in relation to the line transects. The 10x10 foot plots are protected by a six foot fence of galvanized wire netting. Record photographs were made for future comparison. Prominently placed signs mark the location of each enclosure to encourage examination and familiarization with the browse studies by sportsmen and other interested persons.

Browse Inventory Transects: Twenty line transects were set up in the deer management index areas and permanently marked. The transects, which are one-half mile in length, are of the line-intercept type and are parallel to the beaches in the wintering areas. The transects are used to determine degree of utilization, density and vigor of the key winter browse species, blueberry and huckleberry (Vaccinium ovalifolium and Vaccinium parvifolium), after the period of winter use. Utilization is recorded by noting the percent of the total number of twigs (previous season's growth) which has been browsed on each plant checked. Although a browsed twig usually has more than 50 percent of the current or previous summer's growth remaining, degree of utilization was based on number of twigs utilized as the remaining stubs of browsed twigs are no longer palatable to deer. Consequently, 100 percent utilization does not mean death for the plant. Much of the current growth, including buds, still remains on each of the browsed twigs and a healthy, vigorous plant will sprout from these buds and recover. It appears that Vaccinium in Southeast Alaska will withstand indefinite browsing of 60 to 75 percent and will quite likely produce maximum quantities of available browse under these conditions although variations due to site conditions undoubtedly occur. Density is determined by observation of the number of key browse plants per 1000 square feet. Vigor is recorded on a scale of one to three corresponding to good, moderate and poor. This scale of vigor closely approaches that used in range studies elsewhere which stresses the age categories of young, mature and decadent.

The transects are conspicuously marked with painted blazes on trees along the lines. On each line intercept transect twenty equally spaced observations are made in which utilization, density and vigor are recorded (one observation point every 132 feet). Numbered aluminum tags placed on the closest Vaccinium plant with available browse at each of these points aid in their location. Locations of the line transects are described in the Appendix and are shown on the accompanying map.

FINDINGS

The establishment and recording of the representative management index areas enables standardization of techniques in conducting the natural mortality studies (Job #5), the study of population trends (Job #3) and the browse studies (Job #6).

RECOMMENDATIONS

Strict adherance to the use of the index areas in the conduct of related studies is essential for accurate and standardized results. Thorough disemination and frequent reemphasis of these techniques to cooperators will be made.

Prepared by: David R. Klein, Wildlife Mgt. Biologist

Approved by: Robert F. Scott, Supervisor, Game Restoration

Date: June 30, 1957

APPENDIX

MANAGEMENT INDEX AREAS FOR AIR AND SURFACE WINTER BEACH COUNTS

Priority	Index Area
	KETCHIKAN AREA
1	George Inlet (entire Bay)
1	Carroll Inlet (Carroll Pt. to Nigelius Pt., both sides)
1	Gravina Island (East side, Vallenar Bay to Blank Inlet)
1	Helm Bay (entire Bay)
1	Cholmondeley Sound (Divide Head to Chasina Is.,both sides)
2	Port Stewart
2	Cleveland Peninsula (Ship Is. to Caamaino Pt.)
2	Neets Bay
2	Duke Island (Ryus Bay to Grave Pt.)
2	Pt. Alava (Cone Pt. to Alava Bay)
	WRANGELL AREA
1	Zimovia Strait (Wrangell Is., Pats Cr. to Village Is.)
1	Zimovia Strait (Etolin Is., Olive Cove to Found Is.)
1	Snow Pass (Macnamara Pt. to Pt. Nesbitt)
1	Whale Pass (both sides)
2	Mosman Inlet
2	McHenry Anchorage
2	Fools Inlet
2	Onslow Island
2	Woronkofski Island
2	Vank Island
	WEST COAST PRINCE OF WALES AREA
2	El Capitan Pass (Fontaine Is. to Sarkar Pt.)
2	Tuxekan Pass (Sarkar Pt. to Southend Tuxekan Is.)
2	Suemez Is. (Port Dolores east to Point Bocas)
	PETERSBURG AREA
1	Wrangell Narrows (Kupreanof Is., Petersburg Cr. to Hood Point)
1	Duncan Canal (Hood Pt. to Ohmer Sl.)
1	Totem Bay (Incl. Little Totem)
1	Louise Cove
2	Rocky Pass
2	Wrangell Narrows (Mitkof Is. and Woewodski Is.)
2	Pinta Pt. to West Point
2	Kah Sheets Bay to Pt. Barrie (Not incl. Kah Sheets and Totem Bays)
2	Security Bay

Appendix - Management Index Areas

Priority	Index Area
	SITKA AREA
1	Nakwasina Pass(both sides)
1	Peril Straits (Middle Pt. to Pt. Elizabeth incl. Deadman Reach)
1	Fish Bay
1	Rodman Bay
1	Katlian Bay
1	Olga and Neva Straits
1	Ushk Bay
2	Hoonah Sound (N.E. side, north end Moser Is. to Broad Is.)
2	Saook Bay
2	Portlock Harbor
2	Lisianski Strait
	JUNEAU AREA
1	Pybus Bay
1	Gambier Bay
1	Mole Harbor
1	Tenakee Inlet (Crab Bay (included) to South Passage Pt.)
1	Douglas Is. (West Side, Pt. Tantallon to Outer Pt.)
1	Young Bay (Pt. Symonds to Stink Cr.)
1	Hawk Inlet
2	Eliza Harbor
2	Hood Bay
2	Glass Peninsula (Faust Is. Point to Pt. Hugh)
2	Port Frederick (Hoonah Is. to Portage-west side)
2	Funter Bay

Appendix

DEER WINTER MORTALITY BEACH TRANSECTS

Southern Region

George Inlet (West Side - White River Boy Scount Camp south to Creek opposite Coon Island)

Gravina Island (Tongass Narrows - browse enclosure #7 opposite Channel Is. northwest one mile to 1st creek & bight.)

Helm Bay (Force Island float to browse enclosure #1)

Central Region

Onslow Island (Enclosure #8 to Gull Pt.)

Whale Pass (Beginning of browse transect northeast two miles to small bight.)

Snow Pass (Beginning of browse transect southeast two miles to bight & creek)

Totem Bay (East limit of bay two miles north to 1st creek)

Duncan Canal (Hogues Bight northeast two miles to end of bight past high island)

Big John Bay (Enclosure #9 northeast two miles to boulders on beach)

Wrangell Narrows (Three Mile Petersen Cr. south two miles to bight before Tonka - skip Skogges Cr.)

Northern Region

Pybus Bay (one half mile northwest & southeast of enclosure #12 - total of one mile)

Mole Harbor (Flaw Point west to 1st creek & cabin site)

Douglas Island (Boddy cabin at Lena Creek west to Pt. Hilda)

Mansfield Peninsula (Bear Cr. south to spit opposite Horse & Colt Is.)

Hawk Inlet (Greens Cr. to cannery)

Tenakee Inlet (Crab Bay to Saltery Bay - two miles)

Deadman Reach (Northeast end of browse transect to opposite Otstoia Is.)

Rodgers Point (Enclosure #3 south & west two miles into Ushk Bay)

Nakwasina Passage (Enclosure #11 west two miles to point before deep bight)

Appendix

BROWSE ENCLOSURES

#1. Constructed: 4/8/55 Helm Bay - S.W. shore 2 mi. N.W. of Forss Is.

Site Description: N.E. exposure, 4 ft. above max. high tide, 15 ft. from beach edge.

Vegetation: Ground cover - Moss, hemlock-redcedar forest type, Vaccinium density 10 plus/100 sq. ft., vigor of 2, utilization 70%.

#2. Constructed: 3/16/55 (destroyed by windfall and reconstructed 4/18/57 adjacent to original location). Wrangell Narrows, Kupreanof Is., ½ mi. S. of Threemile Petersen Cr.)

Site Description: E. exposure, 3 ft. above max. high tide, 15 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type.

Vaccinium -	55 plants 0-2 ft.
	35 plants 2-4 ft.
	vigor - 1
	utilization 75%
Rubus spectabilis-	1 plant 1 ft.
Oploganax horridum -	3 stems (clump) 1-2 ft.

#3. Constructed: 4/16/55 Peril Straits - ½ mi. S.W. of Rodgers Point.

Site Description: S.E. exposure, 10 ft. above max. high tide, 75 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type with widely scattered yellow cedar, Vaccinium density 10 plus/100 sq. ft., vigor of 2, utilization 95% (several years overuse).

#4. Constructed: 4/27/55 Douglas Is. - 2 mi. N. of Pt. Tantallon in Gastineau Channel. Adjacent to Forest Service trail.

Site Description: E. exposure, 40 ft. above max. high tide, 130 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type, Vaccinium density 10 plus/100 sq. ft., vigor of 2, utilization 90%.

Appendix - Browse Enclosures

#5. Constructed: 4/4/56 Bond Bay - 1 mi. N. of Bond Bay.

Site Description: S.E. exposure, 40 ft. above max. high tide, 150 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-red cedar forest type (muskeg edge).

Vaccinium - 5 plants 0-2 ft.
2 plants 2-4 ft.
vigor - 3
utilization 95% (several years overuse)

Gaultheria shallon - 30% of ground cover
utilization 50% (leaves)
(higher stems dying back).

Menziesia ferruginea - 2 clumps 2-4 ft.

#6. Constructed: 4/5/56 George Inlet - 3/4 mi. S. of White River Boy Scout camp.

Site Description: E. exposure, 70 ft. above max. high tide, 200 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type (widely scattered red cedar).

Vaccinium - 25 plants 0-2 ft.
9 plants 2-4 ft.
3 plants 4-6 ft.
vigor - 2
utilization 90%

Menziesia ferruginea - 1 plant 6 ft.

Tsuga heterophylla - 1 tree 5 in. dia.
1 tree 1½ in. dia.

Picea sitchensis - 1 tree 3 in. dia.

#7. Constructed: 4/7/56 Gravina Island - opposite Channel Is. in Tongass Narrows.

Site Description: N.E. exposure, 15 ft. above max. high tide, 50 ft. from beach.

Vegetation: Ground cover - moss, hemlock-red cedar (muskeg edge).

Vaccinium - 50 plants 0-2 ft.
20 plants 2-4 ft.
vigor - 2
utilization 80%

Gaultheria shallon -	30% of ground cover utilization 10%
Thuja plicata -	2 plants 0-2 ft. 1 plant 2-4 ft.
Tsuga heterophylla -	4 plants 0-2 ft. 1 plant 2-4 ft.
Picea sitchensis -	1 plant 0-2 ft.

#8. Constructed: 4/18/56 Onslow Island - 3/4 mi. S.E. of Gull Pt. on W. shore.

Site Description: W. exposure, 3 ft. above max. high tide, 50 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type.

Vaccinium - 14 plants 0-2 ft.
5 plants 2-4 ft.
vigor - 3
utilization 100%

Tsuga heterophylla - 50 plants 0-1 ft.

#9. Constructed: 4/22/56 Big John Bay - ½ mi. E. of outer point on the N. shore.

Site Description: S.E. exposure, 3 ft. above max. high tide, 15 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type.

Vaccinium - 23 plants 0-2 ft.
5 plants 2-4 ft.
vigor - 3
utilization 90%

#10. Constructed: 4/25/56 Duncan Canal - ½ mi. N. of Hood Pt., E. shore.

Site Description: S.E. exposure, 5 ft. above max. high tide, 50 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type.

Vaccinium - 31 plants 0-2 ft.
4 plants 2-4 ft.
vigor - 2
utilization 95%

Appendix - Browse Enclosures

#11. Constructed: 4/29/56 Nakwasina Passage - ½ mi. N.W. of pass on Baranof Is.

Site Description: S.W. exposure, 3 ft. above max. high tide, 30 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type.
Vaccinium - 35 plants 0-2 ft.
6 plants 2-4 ft.
1 plant 4-6 ft.
vigor - 3
utilization 100%
Elymus mollis - 6 clumps

#12. Constructed: 5/3/56 Pybus Bay - ¼ mi. S. of Old Man Cr.

Site Description: S.W. exposure, 3 ft. above max. high tide, 30 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type.
Vaccinium - 19 plants 0-2 ft.
vigor - 3
utilization 100%
Menziesia ferruginea - 1 plant 1 ft.
10 seedlings 0-1 ft.

#13. Constructed: 5/4/56 Mole Harbor - 1½ mi. W. of Flaw Pt. on N. shore.

Site Description: S. exposure, 15 ft. above max. high tide, 200 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type.
Vaccinium - 19 plants 0-2 ft.
vigor - 3
utilization 100%

#14. Constructed: 5/6/56 Douglas Is. - 3 mi. S. of Point Hilda (near Boddy cabin).

Site Description: S.W. exposure, 8 ft. above max high tide, 40 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type.

Vaccinium - 20 plants 0-2 ft.
9 plants 2-4 ft.
vigor - 3
utilization 90%
Menziesia ferruginea - 5 plants 4-6 ft.
Oploganax horridum - 1 stem 1 ft.
2 stems 6 ft.

#15. Constructed: 5/12/56 Fivemile Cr., Kupreanof Is. - ½ mi. N.E. of creek.

Site Description: S.E. exposure, 4 ft. above max. high tide, 10 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type.
Vaccinium - 30 plants 0-2 ft.
10 plants 2-4 ft.
vigor - 1
utilization 100%
Menziesia ferruginea - 10 stems (one clump) 2½ ft.
Rubus spectabilis - 7 plants 2 ft.
Sambucus callicarpa - 4 stems 0-2 ft.
Alnus sinuata - 3 plants 0-2 ft.
utilization 30%

#16. Constructed: 5/19/56 Woronkofski Is. - opposite Drag Is.

Site Description: S. exposure, 15 ft. above max. high tide, 75 ft. from beach edge.

Vegetation: Ground cover - moss, hemlock-spruce forest type.
Vaccinium - 6 plants 0-2 ft.
19 plants 2-4 ft.
1 plant 4-6 ft.
vigor - 1
utilization 75%

#17. Constructed: 5/14/57 Blind River, Mitkof Is. - 1 mi. N.W. of power house bridge N. side of highway.

Site Description: S.W. exposure, 60 ft. above max. high tide, 400 ft. from river (100 ft. from highway).

Vegetation: Ground cover - moss, hemlock-spruce forest type.

Appendix - Browse Enclosures

Vaccinium -	74 plants 0-2 ft.
	18 plants 2-4 ft.
	vigor - 1
	utilization 60%
Menziesia ferruginea -	2 plants 0-2 ft.
	2 plants 4-6 ft.
Tsuga heterophylla -	3 seedlings 0-6 in.

FIGURE 1


CANADA
ALASKA
Skagway
HAINES
Juneau
Yakutat
NORTH PACIFIC OCEAN
CHATHAM STRAIT
FREDERICK SOUND
NORTH PACIFIC OCEAN
Sitka
Petersburg
Wrangell
SUMNER STRAIT
Ketchikan
ALASKA
CANADA
DIXON ENTRANCE
Browse Enclosures
Browse Inventory Transects
SOUTHEAST ALASKA
Scale
0 15 30 45 miles

Appendix — LOCATION OF BROWSE INVENTORY TRANSECTS (½ mile transects, blazed and painted with painted blazes on beach at beginning of each line)

Ketchikan

George Inlet	Beginning at enclosure #6 and running south parallel to the bay.
Gravina Island	Beginning at enclosure #7 and running south parallel to the beach.
Helm Bay	Northeast shore, Beginning ¼ mile northwest of Helm Lake Cr. flats (Prominent white paint on tree) and running northwest parallel to the beach.
	Southwest shore, beginning opposite south end of forss Island and running northwest parallel to beach.

Wrangell

Onslow Island	Beginning at enclosure #8 and running northwest parallel to beach.
Whale Pass	Beginning in small bight on south end of peninsula between Squaw Creek and Neck Bay and running northeast parallel to the beach of Whale Pass.
Zarembo Island	Snow Pass, opposite Tide Island, beginning at small bight and running southeast parallel to the beach.

Petersburg

Duncan Canal	Northeast shore, beginning at enclosure #10 and running northwest parallel to beach.
Wrangell Narrows	Beginning at enclosure #2 and running south parallel to beach.
Frederick Sound	Beginning at enclosure #15 at Fivemile Cr., Kupreanof Is. and running north parallel to beach.
Rocky Pass	Beginning at enclosure #9, Big John Bay and running northeast parallel to beach.
Mitkof Island	Beginning at enclosure #17, Blind River and running northwest parallel to highway.
Pybus Bay	Beginning at enclosure #12 and running southeast parallel to beach.

Appendix - Browse Inventory Transects

Gambier Bay	North Shore, beginning in first bight in bay from old cannery and running southwest to point.
Mole Harbor	Beginning at enclosure #13 and running east to Flaw Pt.
Douglas Island	Beginning at enclosure #14 and running west parallel to beach.
Sitka	
Deadman Reach	Beginning at blazed and painted tree at southwest end and running northeast parallel to beach.
Rodgers Point	Beginning at enclosure #3 and running southwest into Ushk Bay.
Nakwasina Pass	Beginning at enclosure #11 and running west parallel to beach.

Job No. 3 Determination of Population Trends

ABSTRACT

Fawn survival was high throughout all of Southeast Alaska. In early winter the fawn:adult ratio on southern Admiralty Island was 34 percent. Late winter fawn:adult ratios were 33 percent on Lindenberg Peninsula of Kupreanof Island, 24 percent in the Sitka-Peril Straits area and 25 percent on southern Admiralty Island, Beach counts of deer were lower than during 1956 in almost all areas checked as a result of the mild winter which allowed wide dispersal of deer.

OBJECTIVES

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

TECHNIQUES USED

Aerial and surface counts of deer were made throughout the winter when deer were concentrated on the beaches and conditions permitted segregation of fawns and adults. Unsegregated winter beach counts were made on winter beach count index areas as designated in Job Completion Report #2.

FINDINGS

The past open winter resulted in unfavorable conditions for direct observations of deer. Aerial beach counts were necessarily greatly curtailed and in most instances counts obtained were lower than the 1956 figures. This may be misleading if interpreted as a general population decrease. It should be understood that winter beach counts are not direct indicators of the total population in any given area, as they are subject to many environmental variables; however, under comparable conditions they do reflect relative population pressure from area to area. A more realistic indication of population trends can be obtained through beach composition counts in which segregation of adults and fawns is possible.

Age Ratios: Fawn:adult ratios were obtained early in the winter on southern Admiralty Island by Game Management Agent Robards. The results of these counts, which show a relatively high fawn:adult ratio of 34 percent are included in Table 1. Southern Admiralty Island is an area of high deer population, with poor winter range conditions. Hunting pressure is significant but light in view of the density of deer present. The southeast exposure results in milder winter conditions than in surrounding areas, consequently, weather is not as important as the condition of the range in controlling the population. As the population growth continues with its added feed requirements winter range will play an increasingly important role in the welfare of this herd.

During February and March composition counts were obtained throughout much of the Southeast Alaska deer range. Table 2 shows the accumulated

results of these counts. Winter survival, as reflected in fawn:adult percentages, was good in all areas and considerably higher than in 1956. Low percentages in Kah Sheets and Totem Bays may be the result of disproportionately small samples. The high fawn:adult percentage on Lindenberg Peninsula of Kupreanof Island in comparison to ratios from southern Admiralty Island (Mole Harbor) and the Sitka-Peril Straits area are consistent with other indicators of the welfare of these herds. In addition to higher productivity, Kupreanof Island produces larger deer, hunter success is higher there and range condition better than on southern Admiralty Island or in the Sitka-Peril Straits area. Fawn survival on Lindenberg Peninsula was nearly twice as great in 1957 than during 1956 (1956-17%, 1957-33%).

Winter Beach Counts: Counts of deer were made by plane and boat on several beaches in key index areas. Results of these counts are recorded in Table 3. Counts in many areas, including the Sitka-Peril Straits area, produced negligible results due to the lack of concentration of deer adjacent to the beaches. The counts shown in Table 3 are in most cases considerably lower than those obtained in 1956. The two exceptions, Gambier Bay and Douglas Island, are areas in which the lower deer per mile ratios of 1956 were partially the result of counts made under unfavorable conditions. However, increasing deer populations in both areas undoubtedly contributed to the 1957 counts.

RECOMMENDATIONS

The high fawn survival during the winter of 1956-57 will result in continued population increase throughout all of Southeast Alaska. Liberal harvest is needed to utilize this resource and to maintain the health of the herds.

Continuation of the winter beach counts as an aid in the determination of population trends is recommended.

Prepared by: David R. Klein
Wildlife Mgt. Biologist

Approved by: Robert F. Scott
Supervisor, Game Restoration

Date: June 30, 1957

TABLE 1

FAWN:ADULT RATIOS
December 5-15, 1956

LOCATION	ADULTS	FAWNS	TOTAL	% FAWNS OF TOTAL	% FAWNS TO ADULTS
SO. ADMIRALTY ISLAND					
Herring Bay	13	4	17	24	31
Pybus Bay	13	4	17	24	31
Gambier Bay	51	18	69	26	35
Glass Peninsula	31	11	42	26	35
SO. ADMIRALTY IS. TOTALS	108	37	145	26	34

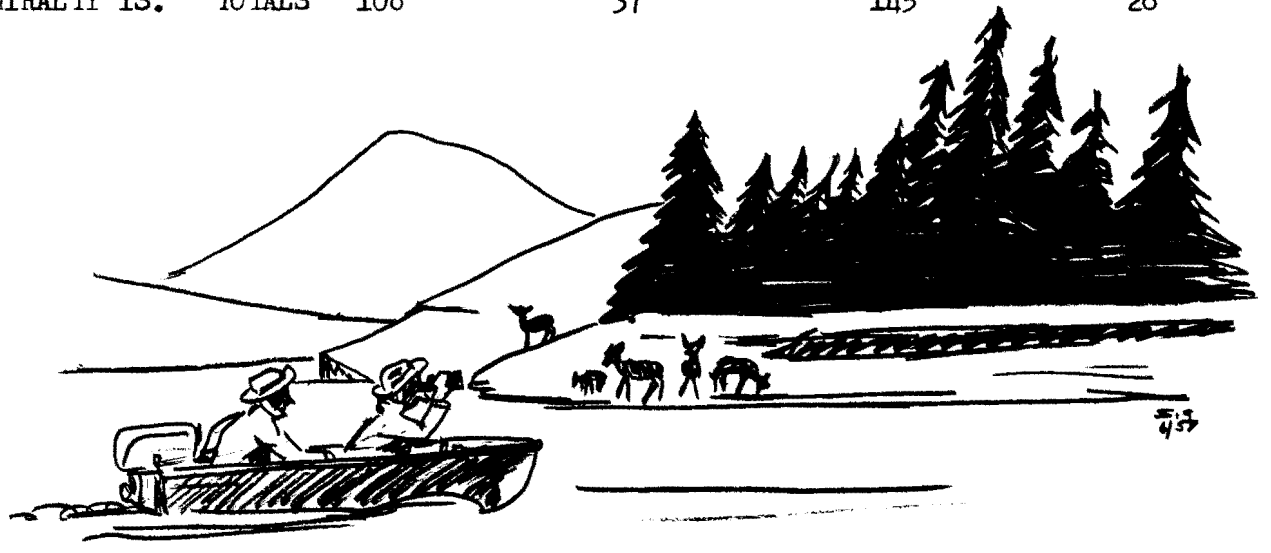


TABLE 2

FAWN:ADULT RATIOS
February - March 1957

LOCATION	DATE	ADULTS	FAWNS	TOTAL	% FAWNS OF TOTAL	% FAWNS TO ADULTS
LINDENBERG PENINSULA, KUP. IS.						
Wrangell Narrows	2/26	30	8	38	21	27
" "	2/28	18	4	22	18	22
" "	3/5	6	3	9	33	50
" "	3/11	33	11	44	25	33
" "	3/13	6	2	8	25	33
Wrangell Narrows	Totals	93	28	121	23	30
Duncan Canal	2/26	24	11	35	31	46
Frederick Sound	2/22	7	3	10	30	43
" "	3/6	6	2	8	25	33
" "	3/16	13	3	16	18	23
Frederick Sound	Totals	26	8	34	24	31
LINDENBERG PENINSULA	TOTALS	143	47	190	25	33
Kah Sheets Bay, Kup. Is.	2/28	11	2	13	15	18
Totem Bay, Kup. Is.	2/28	10	2	12	17	20
Mole Hbr., So. Admiralty Is.	3/12	28	7	35	20	25
SITKA-PERIL STRAITS						
Nakwasina Pass, Baranof Is.	3/14	9	2	11	18	22
Rodman Bay	3/14	17	3	20	15	18
Peril Straits	3/14	14	3	17	18	21
Ushk Bay	3/14	9	4	13	31	44
SITKA-PERIL STRAITS	TOTALS	49	12	61	20	24

TABLE 3 WINTER BEACH COUNTS OF DEER - SOUTHEAST ALASKA
January - March 1957

LOCATION	Approx. Mi. of Beach Checked	No. Deer	Av. No. Deer/Mile 1957	1956
KUPREANOF IS.				
Petersburg Cr.-Green Pt.	8	38	4.8	11.0
Green Pt.- Hood Pt.	10	21	2.1	5.7
Hood Pt.- Castle Is.	8	31	3.9	8.6
ADMIRALTY IS.				
Pybus Bay	48	135	2.8	8.8
Gambier Bay	50	167	3.3	1.2
Mole Harbor	8	35	4.4	7.9
DOUGLAS IS.				
Outer Pt.- Marmion Is.	20	175	8.8	5.3
TOTALS	152	602	4.0	7.0

Job No. 4 Sex and Age Composition and Physical Condition of deer in the Hunter Take

ABSTRACT

Does comprised 15 percent of the total legal harvest. Age class distribution within the kill indicates a shift from a high proportion of young animals to more old animals (stabilizing of population). The fawn loss of February and March of 1956 was reflected in age class distribution in the kill. Mitkof, Kupreanof and Kuiu Islands have the most rapidly increasing deer herds while deer populations in the Sitka-Peril Straits area are beginning to stabilize. A significantly large portion of older age does was represented in the kill, probably a result of differential sex mortality. Chronological variation in the deer harvest accounted for a higher proportion of young deer early in the season while the situation was reversed as large bucks moved to lower elevations as the season progressed. Hind foot measurements have proved to be the best indicatorsof herd welfare and range quality. Results of the hind foot measurements corroborate conditions indicated in the age class distribution. Chest girth measurements reflect fat accumulation and vary with sexual-physiological changes and seasonal-climatic fluctuations.

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 by other Fish and Wildlife Service personnel 480 deer jaws were collected from hunters during the 1956 legal harvest. Whenever practical, chest girth and hind foot measurements were taken along with information relative to the 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.

FINDINGS

Sex Breakdown of Kill: The sex breakdown of the total legal kill was 85 percent bucks and 15 percent does. There were 99 days of open season on bucks (Aug. 20 - Nov. 26) and 14 days of anterless season (Nov. 13 - 26).

Male Age Distribution: The age distribution of male deer killed throughout the season from areas throughout Southeast Alaska is shown in Table 1 in comparison with the age distribution for previous years (1953 - 56). The proportionate ratios of varying age deer represented in the kill for all of Southeast Alaska is shown graphically in Figure 1, while areawise breakdowns of these values are presented in Figures 3 and 4.

In comparing the 1956 age distribution of the kill with previous years (Figure 1) a gradual shifting of the balance of the population from a larger percentage of young animals ($1\frac{1}{2}$ and $2\frac{1}{2}$ age classes) in 1953 to more old animals ($3\frac{1}{2}$, $4\frac{1}{2}$ and $5\frac{1}{2}$+age classes) in 1956 becomes apparent. This is an opposite trend to that which is obtained through heavy hunting pressure on a stable herd. This trend apparently indicates a gradual reduction in the rate of population increase. Evaluation of age class ratios for one year or area is difficult; however, when compared with previous years or other areas, trends can be determined. It should be remembered that these ratios are proportionate representations of the legal harvest and some variation exists between them and the herd itself. The greatest difference occurs in the $1\frac{1}{2}$ year age class which is not equally sampled by the hunters. Indications are that approximately 50 percent of the $1\frac{1}{2}$ year deer do not have legal antlers (3 inches), although this varies from area to area with population pressure and the quality of the range.

A further breakdown of the age ratios reflects the welfare of the deer herds on an areawise basis (Figure 2). Comparison of the proportions of young deer ($1\frac{1}{2}$ and $2\frac{1}{2}$ age classes) for each area results in the following rating by decreasing representation in the herds: 1. Mitkof, Kupreanof and Kuiu Islands (54%), 2. Southern Admiralty Island (38%), 4. Wrangell, Etolin, Zarembo and Waronkofski Islands (32%), and 5. Sitka-Peril Straits (16%). The better herd welfare (i.e., continuing high rate of population increase) on the Mitkof, Kupreanof and Kuiu Island group is in direct contrast to the Sitka-Peril Straits area, with the very low proportion of young animals. Variation among the intermediate areas is not significant in view of the size of the samples.

Comparison of the age class representation by Wildlife Manangement Units in Figure 3 reflects the variation of the grouped areas.

Female Age Distribution: The sample of female deer jaws was small (36) and the information derived from them necessarily limited, however, the significance of the female age distribution of any herd is of unquestionable value in obtaining a knowledge of herd potential. Information from male jaws is frequently misleading particularly when viewed alone and without supporting data. Age ratios of female deer represented in the kill are shown in Table 2 with bar graph comparisons of the 1955 and 1956 values in Figure 4. Perhaps the most valuable information obtained from the female age data is the indication of a high proportion of old does in the population ($5\frac{1}{2}$ years and older). Within the male component of the population the $5\frac{1}{2}$ years and older deer generally make up the smallest age group while among the females they are one of the largest age groups. The only possible explanation for this sex variation in the older age group, assuming a nearly equal sex ratio at birth and unbiased sampling, is through differential sex mortality. Some of this differential mortality may result from removal of bucks through hunting, however, in few areas is harvest of bucks sufficient to explain this wide divergence. It is believed that the greater and longer growth requirements of male deer with less time available for building fat reserves accounts for heavier male losses from birth throughout the period of body growth. Also the annual period of greatest physiological drain among male deer, the rut, occurs at the onset of the critical winter period. Female deer undergo their greatest

physiological drain when food is abundant in late spring and summer, during lactation.

Fawn losses, such as occured in the late winter of 1956 and are reflected in the decreased 1½ year group of 1956, are readily absorbed in a population with several age groups of producing females. This can be more simply explained in the truism; "The greater the number of age groups in a population the shorter will be the duration of the effect of the loss of one annual increment." However, the accumulation of several years' fawn losses will result in a reduction of a large portion of producing does.

Chronological Age Distribution: Age distribution of male deer varied considerably throughout the hunting season. Table 3 and Figure 5 show how, during the beginning of the season, a large percentage of young deer were killed and as the season continued the ratio of young to old deer killed reversed itself. This is explained by the increased availability of young deer at the beginning of the season when few deer are killed and older bucks remain at higher elevations. As the season progressed snow and frosts on the mountains and the onset of the rut brought the larger bucks to lower elevations already occupied by does and young stock.

Hind Foot and Chest Girth: The hind foot and chest girth measurements are recorded in Tables 4, 5 and 6. The hind foot measurement has proved the simplest of the two measurements to obtain accurately, being less subject to variation through misunderstanding by cooperators. Also, in adult deer 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, however, is useful in reflecting the progression of the rut and also is a good indicator of summer and fall physical recovery among large bucks (i.e., weight gained during the period of vegetative growth). However, one good or poor growing season can result in chest girth measurements in which the cumulative effect of range trend is completely masked. Adipose deposition in adult males (i.e., chest girth), rather than an indicator of range quality, perhaps more nearly reflects the length and auspiciousness of the growing season.

Evaluation of the nutritive state or index of condition of deer as outlined by Bandy, et al. for captive, experimentally fed deer in British Columbia has not proved practical for hunter-harvested deer under Alaskan conditions (Bandy, et al. 1956, "A Method for the Assessment of the Nutritional Status of Wild Ungulates", Can. Jour. Zool., 34: 48-52). The chest girth variations in adult male deer which accompany the rut, the period of greatest hunter harvest, preclude correlation of weights based on hind foot and chest girth measurements except among young, actively growing deer.

Chest girth measurements among bucks reflected a gradual weight increase through the season until the onset of the rut. Percent increase appeared to be greatest among young deer and decreased with age. Young deer which utilize for growth almost all food energy metabolized, above that required for body maintenance, do not start to put on fat until the

end of summer. Old deer that have attained full body growth start to develop fat reserves early in the summer. Consequently, accumulation of fat, which is directly reflected in chest girth 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.

A comparison of hind foot measurements in Table 4 and Figure 6 shows their direct correlation to herd welfare, and indirectly, range conditions. Deer from Mitkof, Kupreanof and Kuiu Islands averaged larger than the Southeast Alaska average while the over-populated and range-deteriorated Sitka-Peril Straits area produced deer smaller than average. This information is a further corroboration of data obtained from browse studies, winter mortality surveys and composition counts. Generally the largest deer can be traced to areas having an abundance of high quality forage during the period of summer growth. Further south these conditions are usually associated with cut-over or burnt-over areas. Here in Alaska, where logging has only recently become extensive, low plants available to deer receive maximum sunlight on well drained sites under alpine conditions. Consequently, highly nutritious food is abundant on alpine areas where the plants are above the growth-limiting effects of the dense rain forest. Our largest deer come from areas where a high proportion of the land is above timberline. Altitudinal variation is also important as another aspect of deer nutrition as it allows the animals to follow the recession of the snowline from the winter range, at sea level, onto the alpine summer range. Deer in such areas are able to feed on the highly nutritious new plant growth at the edge of the receding snowline for a much longer period than deer confined to areas of low elevation the year around. Plants are most highly nutritious during this initial phase of growth, losing forage quality with maturity.

In the comparison of hind foot and chest girth measurements it should be born in mind that there is a definite distinction between maximum body weight and attainment of maximum body size. The physiological requirements for growth are far greater and more varied than those required for maintaining top physical condition after growth is attained. For example, a given range which will allow an adult deer to recover from the winter and build up sufficient fat reserves to see it through the next winter may not be of high enough quality to allow a new born fawn to fulfill it's growth potential. Summer feed is rarely insufficient for fat accumulation in adults, however, growth requirements of young deer are frequently not met on over-stocked and poor quality ranges.

RECOMMENDATIONS

Liberal harvest should be continued in an attempt to control the deer herds in those areas where indications of range deterioration and poor herd welfare are apparent (Sitka-Peril Straits). Also heavy harvest is essential on the areas experiencing rapid population increase (Mitkof, Kupreanof and Kuiu Is.and Southern Admiralty Is.) in order to maintain these herds in a productive state. Increased take of does through a lengthened antlerless season is necessary to achieve an adequate season. Focusing of

hunting pressure to trouble spots can be increased through additional zoning of regulations.

Relaxation of controls on predators will be necessary in those areas where adequate control of the herds cannot be accomplished through hunter harvest.

Continuation of the collection of information from hunter-killed deer, which is perhaps the most valuable single tool of management, offers a relatively simple and accurate method to maintain an insight into population welfare. In the future it is planned to place additional effort on securing adequate samples of hind foot and chest girth measurements and to secure dressed weights from hunter-killed deer.

Prepared by: David R. Klein, Wildlife Mgt. Biologist

Approved by: Robert F. Scott, Supervisor, Game Restoration

Date: June 30, 1957

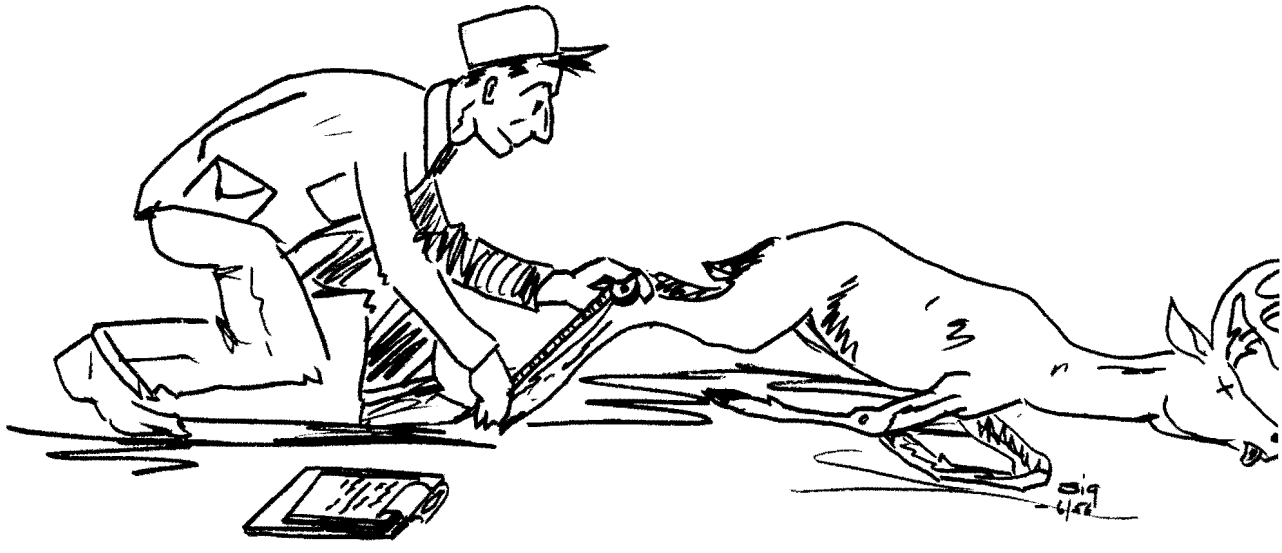


TABLE 1

AGE GROUPS BY PERCENT OF MALE DEER REPRESENTED IN THE 1956 LEGAL HARVEST BY LOCATION OF KILL - Aug. 20 - Nov. 26

Location	1½	2½	3½	4½	5½ plus	No. Jaws
Management Unit #1	12	26	29	23	9	65
Cleveland Peninsula	15	15	27	27	15	26
Revilla, Gravina, Annette Is.	9	32	32	18	9	22
Management Unit #2	17	33	17	33	0	6
Management Unit #3	13	38	31	14	2	220
Wrangell Narrows	15	43	26	14	0	104
Mitkof, Kupreanof & Kuiu Is.	13	41	29	14	2	195
Wrangell, Etolin, Zarembo, & Woronkofski Is.	16	16	52	12	4	25
Management Unit #4	1	23	40	20	14	152
Peril Straits to Sitka	0	16	42	18	23	83
Southern Admiralty Island	0	38	31	25	3	32
Average for all Southeast	9	31	34	18	7	443

TABLE 2

AGE GROUPS BY PERCENT OF FEMALE DEER REPRESENTED IN THE 1956 LEGAL HARVEST, SOUTHEAST ALASKA Aug. 20 - Nov. 26

6 Mo.	1½ yrs.	2½ yrs.	3½ yrs.	4½ yrs.	5½ plus yrs.	No. Jaws
0	8	33	19	17	22	36

TABLE 3 CHRONOLOGICAL AGE DISTRIBUTION IN MALE DEER IN THE 1956 HARVEST, SOUTHEAST ALASKA

DATE OF KILL	1½ Years Percent	1½ Years No. Samples	2½ Years Percent	2½ Years No. Samples	3½ Years Percent	3½ Years No. Samples	4½ Years Percent	4½ Years No. Samples	5½ plus Years Percent	5½ plus Years No. Samples	Percent of Total Kill
Aug.20-Sept.2	40	4	60	6							2
Sept.3-Sept.16	10	1	40	4	20	2	30	3			2
Sept.17-Sept.30	14	1	14	1	14	1	57	4			1
Oct.1-Oct.14	17	1	17	1	33	2	33	2			1
Oct.15-Oct.28	6	4	37	23	31	19	21	13	5	3	13
Oct.29-Nov.12	9	15	34	58	40	69	13	22	5	8	37
Nov.13-Nov.26	9	14	28	45	35	57	19	31	10	16	43*

*Includes antlerless deer

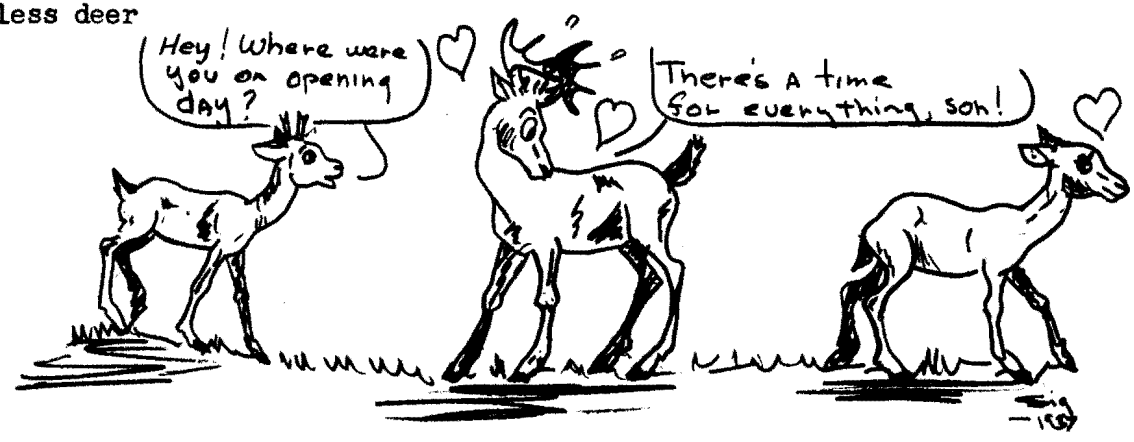


TABLE 5 HIND FOOT MEASUREMENTS OF MALE DEER IN THE 1956 HARVEST, SOUTHEAST ALASKA
(In Inches)

LOCATION	6 Months Aver-age	No. Samples	1½ Years Aver-age	No. Samples	2½ Years Aver-age	No. Samples	3½ Years Aver-age	No. Samples	4½ Years Aver-age	No. Samples	5½ + Years Aver-age	No. Samples
Ketchikan vicinity & Cleveland Peninsula					15.75	1	16.85	5	16.75	4	17.50	2
ALL OF UNIT #1					16.50	2	16.88	6	17.42	6	17.50	2
ALL OF UNIT #2 Prince of Wales Is.			17.00	1	16.50	2	16.75	1	17.00	2		
Wrangell Narrows	14.50	1	16.68	7	16.98	14	17.39	14	17.50	3		
Mitkof, Kupreanof & Kuiu Is.	14.00	2	16.69	13	17.06	22	17.36	26	17.46	7	17.00	2
ALL OF UNIT #3	14.00	2	16.52	15	17.02	23	17.29	33	17.53	8	17.00	2
So. Admiralty Is.					16.94	9	17.60	5	17.33	3		
Peril Straits to Sitka Area					16.50	2	16.98	14	16.95	5	17.38	8
ALL OF UNIT #4	14.00	1	16.50	2	16.81	20	17.11	29	17.14	11	17.22	9
ALL OF S.E. ALASKA	14.00	3	16.54	18	16.89	47	17.17	69	17.31	27	17.23	13

TABLE 5 CHEST GIRTH MEASUREMENTS OF MALE DEER IN THE 1956 HARVEST, SOUTHEAST ALASKA
(In inches)

LOCATION	6 Months Aver- age	No. Samples	1½ Years Aver- age	No. Samples	2½ Years Aver- age	No. Samples	3½ Years Aver- age	No. Samples	4½ Years Aver- age	No. Samples	5½ + Years Aver- age	No. Samples
Ketchikan vicinity & Cleveland Peninsula			39.75	1	34.30	5	37.00	9	38.25	4	39.00	3
ALL OF UNIT #1			34.38	2	34.14	7	37.05	11	39.63	8	39.00	3
ALL OF UNIT #2 Prince of Wales Is.			30.00	1	34.75	2	35.00	1	41.50	2		
Wrangell Narrows	26.00	1	32.75	7	35.02	14	38.27	13	37.95	5		
Mitkof, Kupreanof & Kuiu Is.	24.88	2	33.54	13	36.05	26	38.59	29	39.28	10	41.38	4
ALL OF UNIT #3	24.86	2	33.37	15	35.87	27	38.63	36	39.07	11	41.38	4
So. Admiralty Is.					37.00	9	39.64	7	41.63	4		
Peril Straits to Sitka Area					35.38	2	37.50	15	39.53	8	39.70	11
ALL OF UNIT #4	25.00	1	35.50	2	36.29	20	38.43	34	39.92	15	39.70	11
ALL OF S.E. ALASKA	24.92	3	35.28	20	35.76	56	38.29	82	39.68	36	39.96	18

TABLE 6 CHEST GIRTH AND HIND FOOT MEASUREMENTS OF FEMALE DEER IN THE 1956 HARVEST, SOUTHEAST ALASKA

LOCATION	6 Months Aver- age	No. Samples	1½ Years Aver- age	No. Samples	2½ Years Aver- age	No. Samples	3½ Years Aver- age	No. Samples	4½ Years Aver- age	No. Samples	5½ + Years Aver- age	No. Samples
CHEST GIRTH												
ALL S.E. ALASKA			36.00	1	33.75	5	36.33	3	34.00	2	34.50	3
HIND FOOT												
ALL S.E. ALASKA			16.00	1	15.88	4	16.25	3	16.50	1	16.50	1

FIGURE 1 AGE OF HUNTER-KILLED MALE DEER IN SOUTHEAST ALASKA, 1953 - 1956

(Data from Table 1)

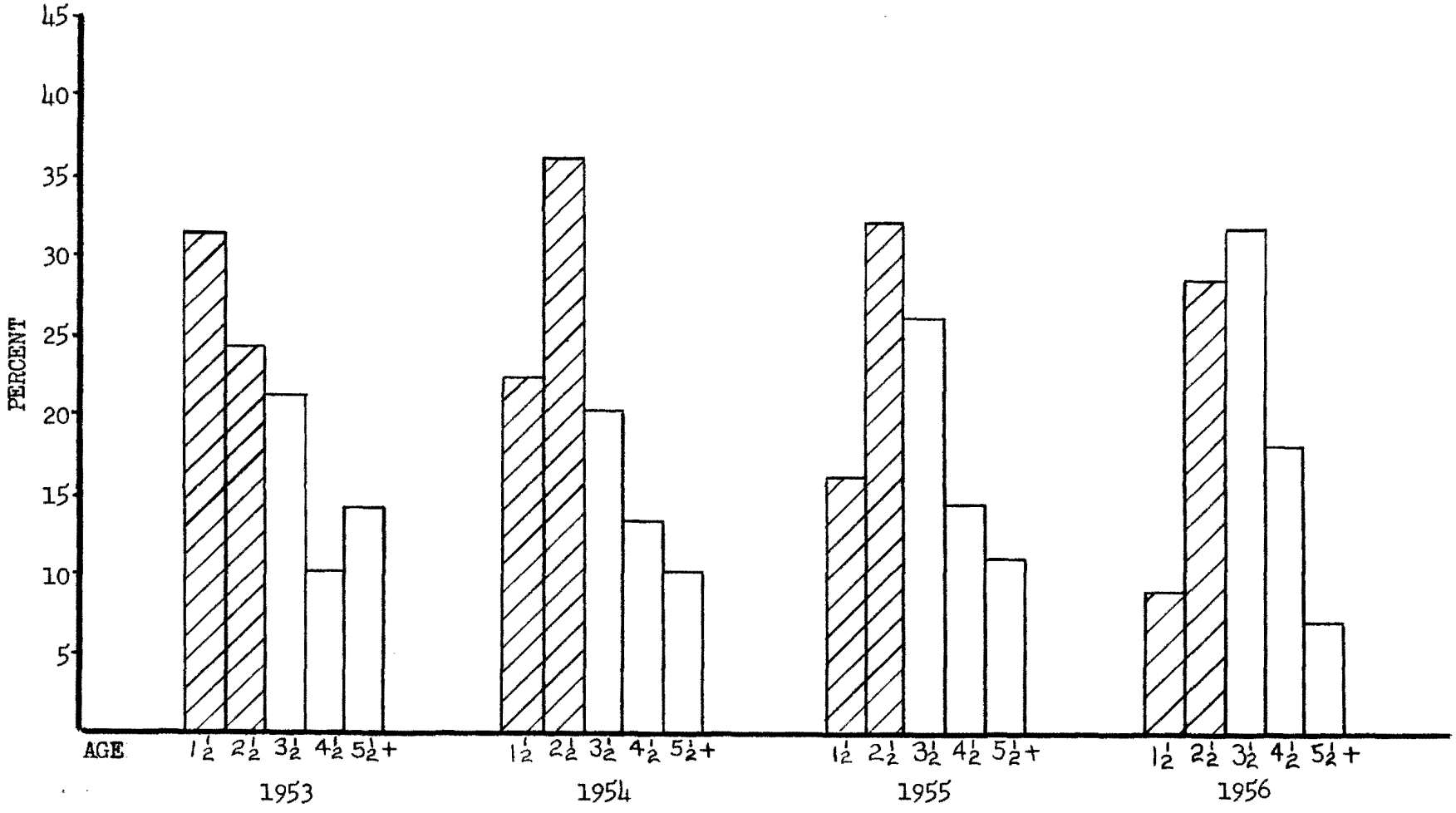


FIGURE 2 COMPARISON OF AGE DISTRIBUTIONS OF MALE DEER FROM VARIOUS AREAS IN SOUTHEAST ALASKA AS REPRESENTED IN THE 1956 LEGAL HARVEST

(Data from Table 1)

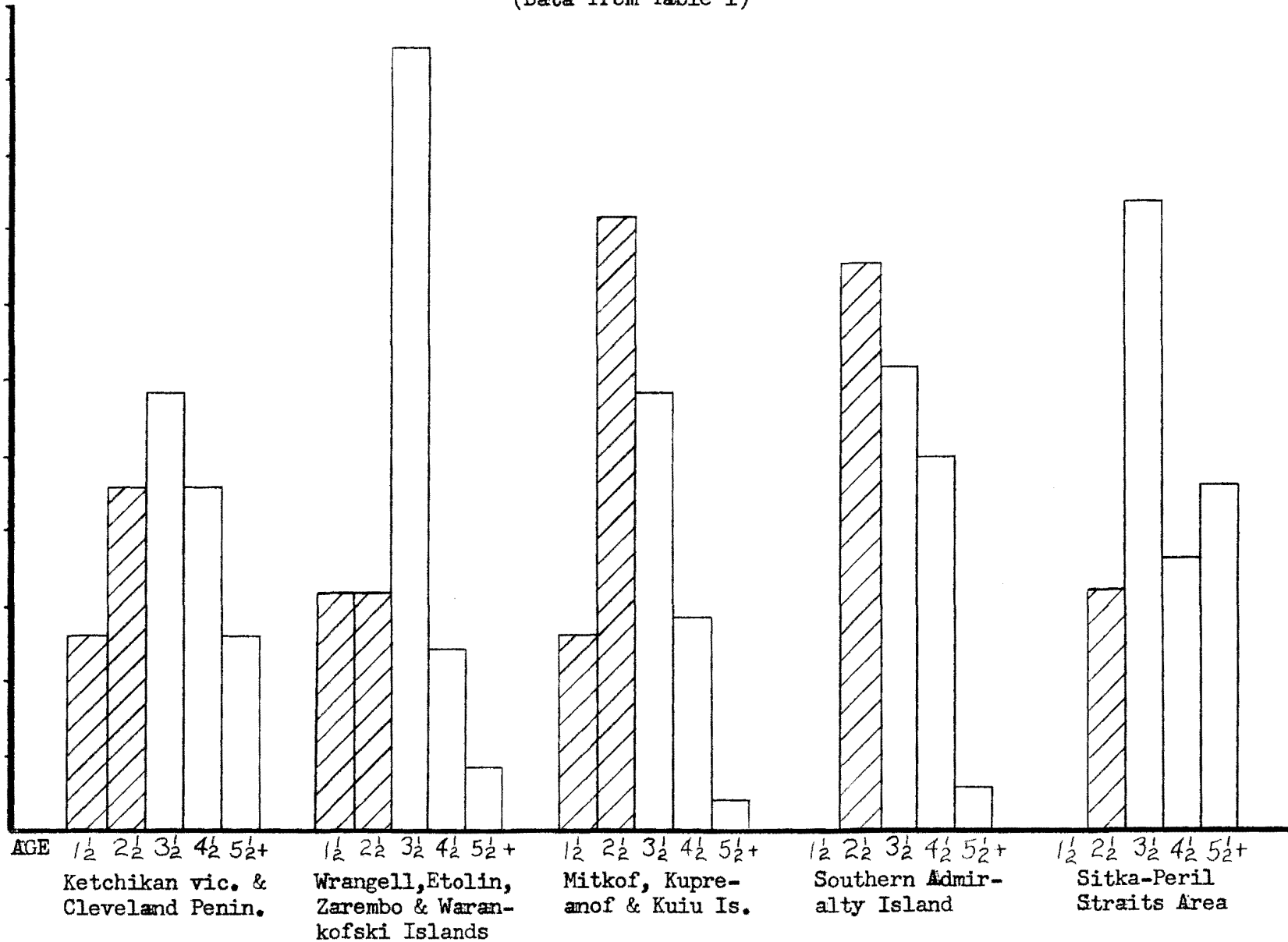


FIGURE 3 AREAWISE COMPARISON OF AGE DISTRIBUTION OF MALE DEER KILLED IN MANAGEMENT UNITS 1, 3, & 4 DURING THE 1956 LEGAL HARVEST

(Data from Table 1)

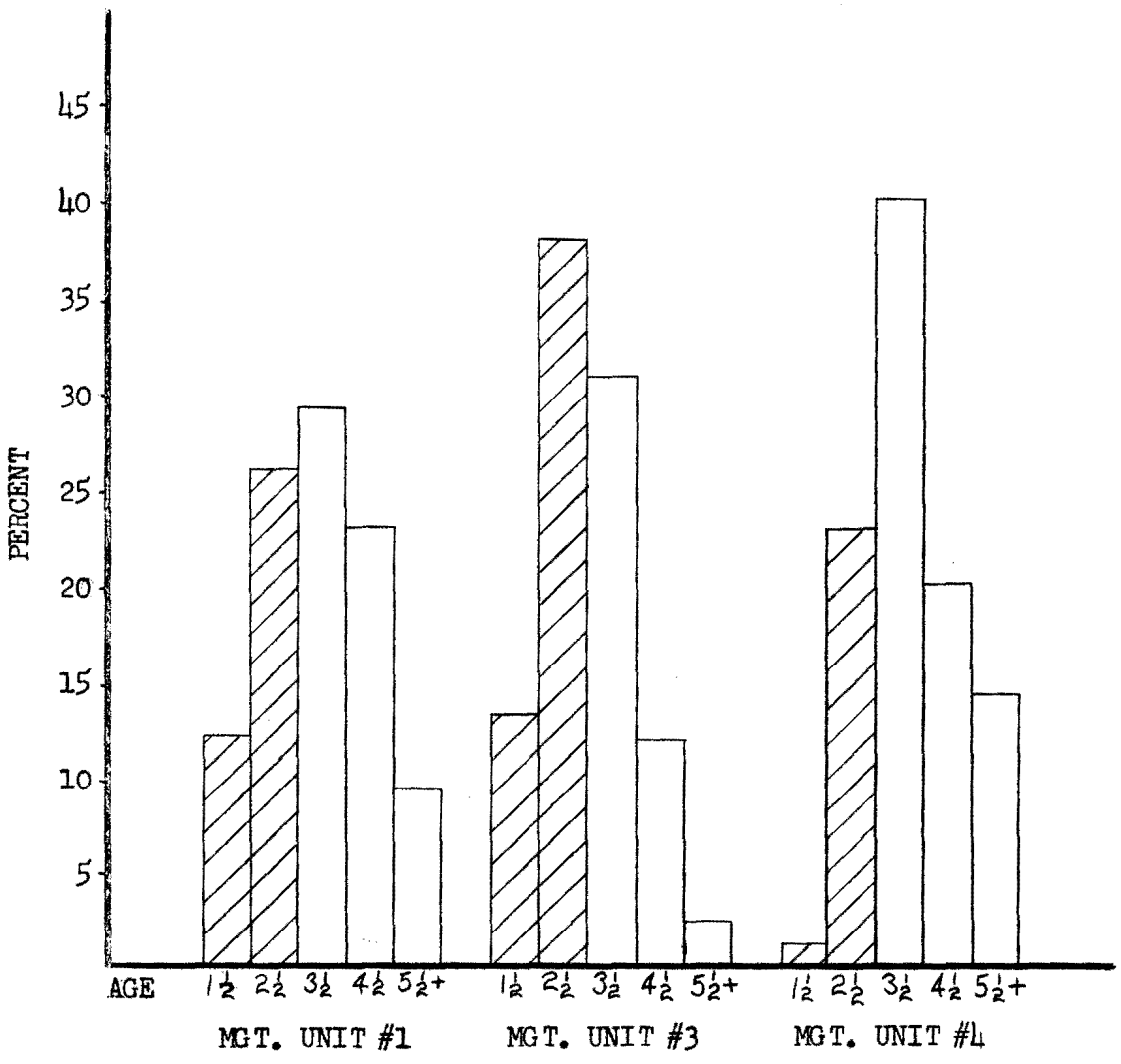


FIGURE 4 AGE DISTRIBUTION OF FEMALE DEER KILLED IN THE 1955 & 1956 LEGAL HARVESTS, S. E. ALASKA

(Data from Table 2)

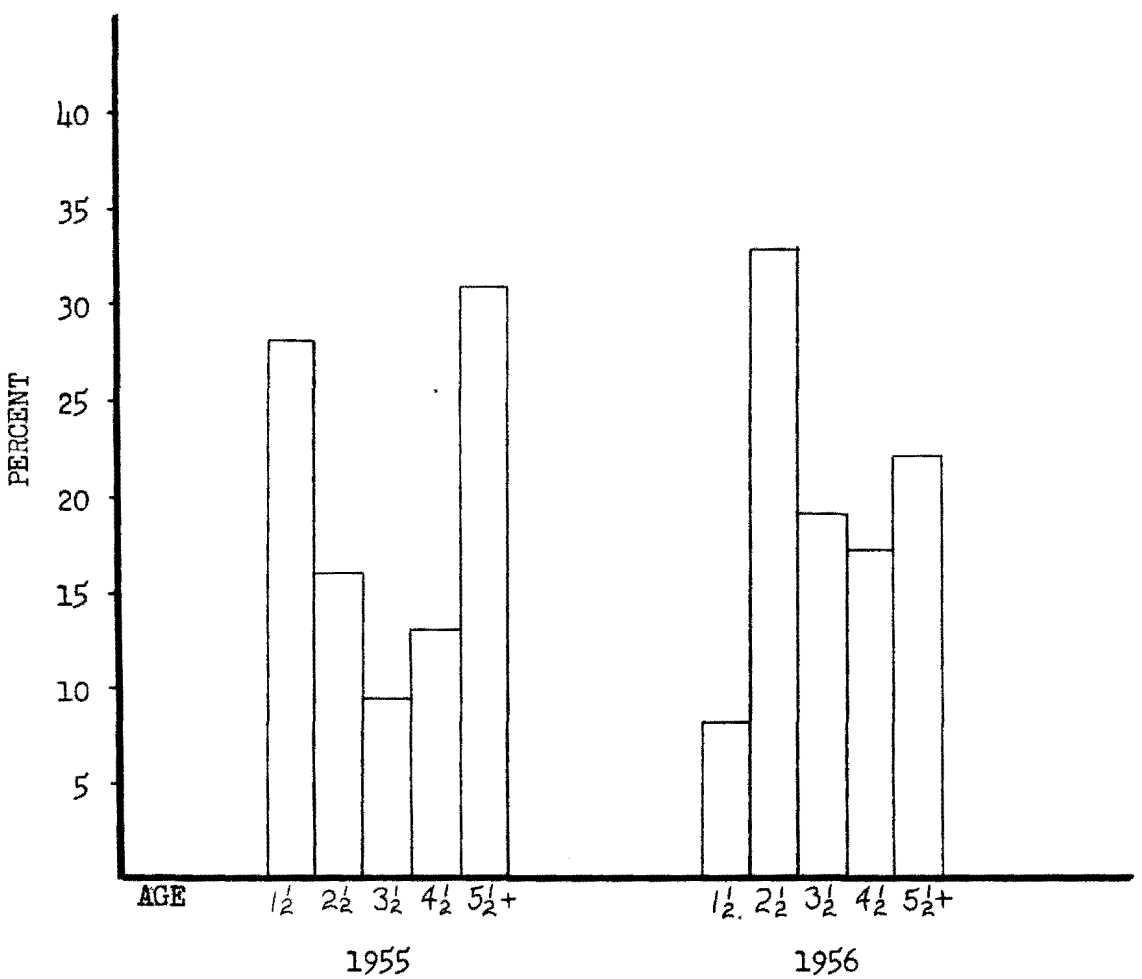


FIGURE 5 CHRONOLOGICAL AGE DISTRIBUTION OF MALE DEER IN THE 1956 LEGAL HARVEST, S. E. ALASKA

(Data from Table 3)

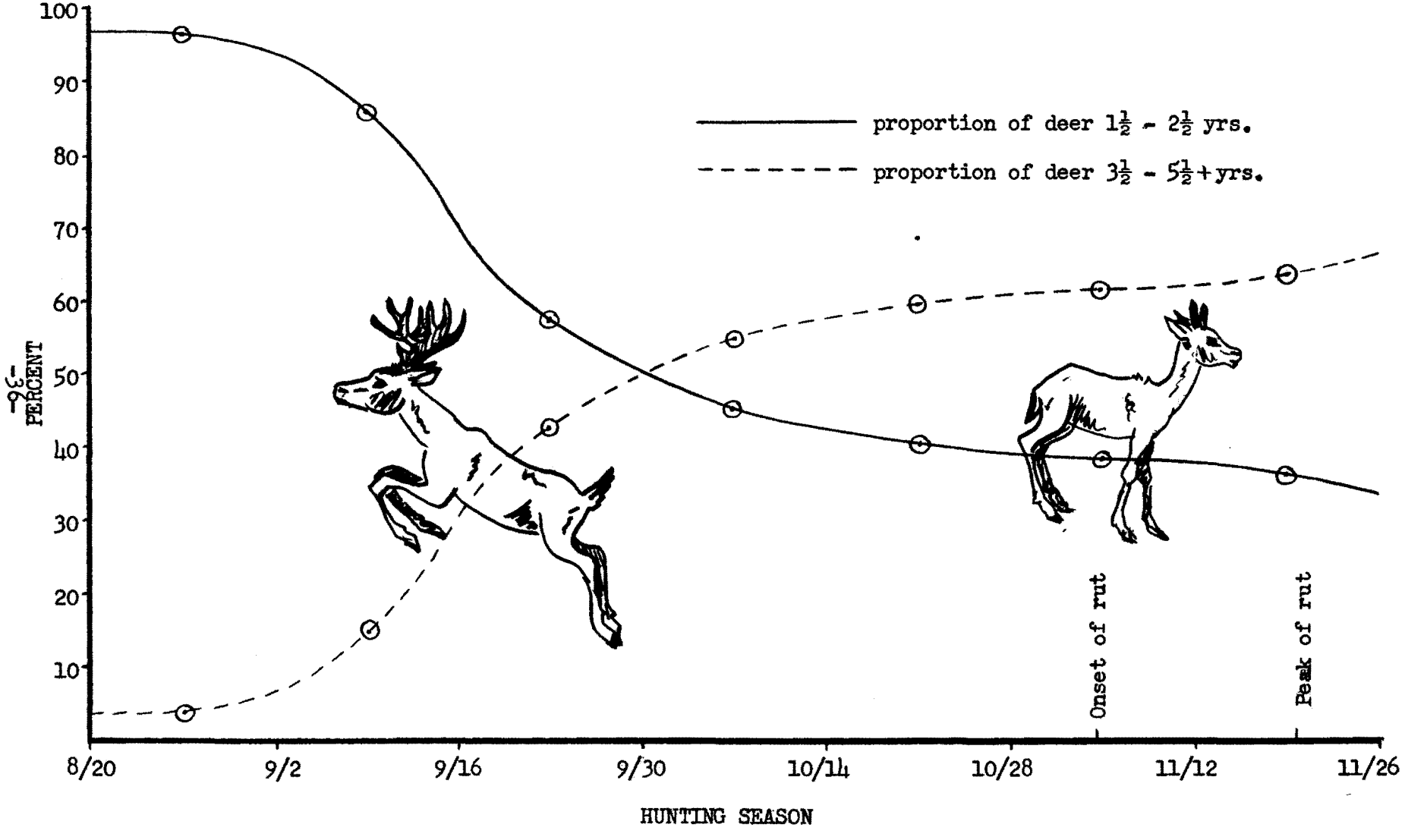
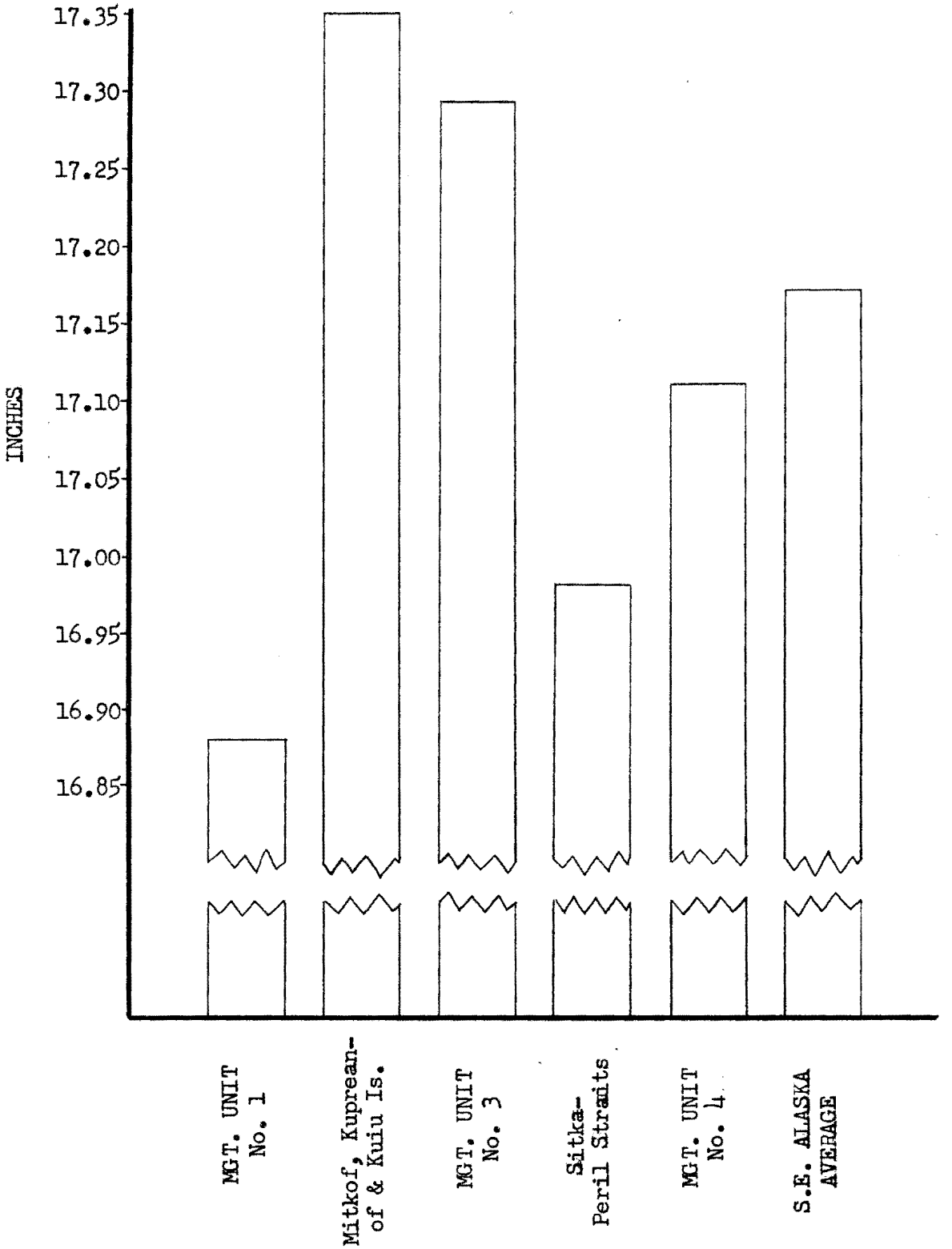


FIGURE 6 AREAWISE COMPARISON OF HIND FOOT MEASUREMENTS FROM HUNTER-KILLED MALE DEER OF THE $3\frac{1}{2}$ YEAR AGE CLASS, S. E. ALASKA

(Data from Table 4)



Job No. 5 Survey of Natural Mortality

ABSTRACT

In Southeast Alaska the observed death rate from accidental causes was 0.1 deer per mile of beach and the loss from starvation was negligible. In the Prince William Sound area winter mortality was also light.

OBJECTIVES

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

TECHNIQUES USED

Winter mortality beach transects were walked and mortality recorded in Southeast Alaska as outlined in Job Completion Report #2. In the Prince William Sound area mortality surveys were conducted in a similar manner in conjunction with the browse inventory.

FINDINGS

Southeast Alaska: Mortality surveys in Southeast Alaska were restricted to the permanent beach transects established for that purpose. Approximately 15 miles of beach were walked and only three dead deer were found. Two of these were accidental deaths (drowning) and the other, a fawn, apparently died of starvation. The death rate from accidental causes was 0.1 deer per mile of beach and the loss from starvation was negligible in comparison to previous years. In view of this dearth of dead deer it was not practicable to search additional area to secure a sufficient sample of winter-lost deer to permit sex and age breakdowns of the mortality.

Prince William Sound: In the Prince William Sound area winter mortality was also light. Only one kill of the current winter was found (a fawn dying from starvation), however, the exposed beaches of the islands of Prince William Sound are washed by frequent storms which preclude the accumulation of deer carcasses except within the timber fringe. The mild, open winter of Southeast Alaska was also common to Prince William Sound and is reflected in the light mortality there.

RECOMMENDATIONS

The collection of natural mortality information should be continued on an annual basis. Accumulation and recording of all available information on the diseases and parasites of black-tailed deer in Alaska should be undertaken.

Prepared by: David R. Klein, Wildlife Mgt. Biologist

Approved by: Robert F. Scott, Supervisor, Game Restoration

Date: June 30, 1957

A $3\frac{1}{2}$ year old buck that drowned after breaking through the ice in a tidal slough. Male deer are particularly susceptible to natural mortality in early winter when the rut, which is accompanied by increased travel and lowered physical condition, coincides with hazardous ice conditions. (Petersburg Creek. Kupreanof Island, 12/13/56).

One of seventeen browse enclosures constructed throughout the S. E. Alaska deer range as an aid to studies of range trend and utilization. (Enclosure 11, Nakwasina Passage, 4/29/56).

ABSTRACT

Browse inventories in Southeast Alaska showed a decrease in degree of utilization from 86 percent in 1956 to 44 percent in 1957. Prince William Sound inventories also showed a low degree of utilization (54%) with greatest use on Montague Island (83%) and decreasing northeastward (Green Is. 79%, Hinchinbrook Is. 45% and Hawkins Is. 28%).

OBJECTIVES

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

TECHNIQUES USED

Browse studies were made in Southeast Alaska and the Prince William Sound area. Browse enclosure plots were checked and reinforced to better withstand the damaging effects of snows. Plots damaged by windfall were repaired and one new plot was established on Mitkof Island (see Compl. Rep. Job No. 2). Browse inventory transects were walked in Southeast Alaska after the period of winter utilization by deer. A trip to Prince William Sound in April permitted browse surveys to be conducted there.

Southeast Alaska: The eighteen permanent line intercept transects, established in 1956, were walked 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. One additional transect was established on Mitkof Island.

Prince William Sound: Browse conditions were surveyed by use of one-half mile line intercept transects in each of the areas visited. The method used was the same as employed in Southeast Alaska.

FINDINGS

Southeast Alaska: Information obtained from the browse inventory transects in Southeast Alaska is tabulated in Table 1. In all areas checked the degree of utilization of Vaccinium was less than during 1956 when deep snows in February and March forced the deer to use the narrow winter range adjacent to the beach. In most cases degree of use was less than half as great as in 1956 and the average utilization for all Southeast Alaska dropped from 86 to 44 percent. This significantly reduced utilization in the winter concentration areas was a product of the open winter which allowed wide dispersal of the deer onto "transitional" ranges. Such ranges, which lie at intermediate elevations between the typical summer and winter ranges, are normally deeply snow covered from December through March. Although deer populations have continued to increase over the early 1956 level the general effect of the past open winter on the

ranges has been a reduction in population pressure through the diffusion of deer onto much larger areas. There should be considerable recovery of previously over-utilized browse plants during the current growing season.

The density figures for browse plants on the ranges inventoried show some increase over 1956, however, the reason for this is not clearly understood. During 1957 the browse inventory was made approximately two weeks later than in 1956; it is quite likely that the initiation of plant growth at this later date in 1957 resulted in the higher apparent density value. Also some sampling error may exist.

Plant vigor, represented on a scale of three in Table 1, showed no significant variation from the 1956 values.

Prince William Sound: Browse inventory figures for Prince William Sound are shown in Table 2. Browse utilization on the deer islands of Prince William Sound was relatively light. Average utilization for all areas checked was 54 percent a substantially lower figure than the 60-75 percent estimated as optimum for Southeast Alaska conditions (Job #2, Browse Inventory Transects). While utilization on Montague Island was relatively high (83%), in view of the light snow accumulation during the winter, browse use decreased on the other islands to the northeast. This uniform decrease in browse utilization from the outer islands, with more maritime influence, to the more continental climate of the coastal islands corresponds somewhat to conditions in Southeast Alaska. On the islands receiving the ameliorating maritime influence deer populations are more directly controlled by the range than on the coastal islands where winter weather conditions are more severe. Deer on the maritime islands generally undergo extreme population fluctuations while on the coastal islands the populations are more nearly stabilized through moderately heavy annual winter losses. The net result is larger, healthier deer on the coastal islands but they are fewer in number.

The relatively light utilization of browse plants on the deer islands of Prince William Sound during the past winter was somewhat of a novelty for that area. Evidence of previous over-browsing is evident in most areas. It is common to see extensive areas of "hedged" Vaccinium and on favorable exposures on Montague and Green Islands "hedged" Menziesia furruginea and a "browse line" on mountain hemlock (Tsuga mertensiana) occur. The depressed timberline on these islands, which accounts for the abundance of mountain hemlock at sea level, also results in a reduced total forested area. Consequently, winter range, which is dependent upon timber cover for shelter from excessive snow accumulation, occupies considerably less area in proportion to the total land area than in Southeast Alaska.

Unfortunately, a capacity herd previously stabilized by the available winter range will respond to the stimulus of an open winter (temporary removal of controls) and will increase beyond the normal carrying capacity of the winter range. Such a condition can only result in ultimate loss of both deer and browse plants. In view of the past mild winter and the existing threat to the winter range through over-population maximum attainable harvest should be encouraged in Prince William Sound and most

areas of Southeast Alaska where capacity or near capacity herds now exist.

These annual browse surveys should be continued as they directly reflect population pressure and trends in winter range conditions. Environment or habitat is the key to the welfare and abundance of deer as with every other species. Winter range, which is an integral component of the environment, is of indisputable value and can be lost through overcropping.

Classification of the extent and quality of summer range should be undertaken through correlation of field studies, Forest Service timber surveys and examination of aerial photos and type maps. Evaluation of deer growth potential as a product of summer range should be undertaken for the important deer islands.

Prepared by: David R. Klein, Wildlife Mgt. Biologist

Approved by: Robert F. Scott, Supervisor, Game Restoration

Date: June 30, 1957

TABLE 1 Browse Inventory of Southeast Alaska Deer Range
April 18 - May 14, 1957

Area	Degree of Utilization % 1956	1957	Plants/1000 sq.ft.density	Vigor (Scale of 3)
KETCHIKAN	71	26	72	2.3
George Inlet, Revilla Island	89	23	58	2.2
Gravina Island	60	15	78	2.5
Helm Bay (East Side)	45	15	82	2.3
Helm Bay (West Side)	88	49	69	2.3
PETERSBURG-WRANGELL	87	54	50	2.1
Onslow Island	96	17	22	2.6
Whale Pass, P. of W. Island	58	20	58	2.1
Zarembo Island	99	92	3	2.0
Duncal Canal, Kup. Island	87	63	35	2.4
Wrangell Narrows, Kup. Island	98	82	77	2.0
Fivemile Creek, Kup. Island	95	59	75	1.9
Big John Bay, Kup. Island	77	47	50	1.9
Blind River, Mitkof Island		54	81	1.6
JUNEAU-SITKA	95	41	39	2.5
Pybus Bay, Admiralty Island	93	23	8	2.4
Gambier Bay, Admiralty Island	91	44	25	2.5
Mole Harbor, Admiralty Island	99	51	51	2.2
Point Hilda, Douglas Island	89	24	60	2.6
Deadman Reach, Baranof Island	95	63	52	2.6
Rodgers Point, Chichagof Island	98	51	44	2.6
Nakwasina Passage, Baranof Island	98	35	34	2.3
AVERAGE FOR ALL AREAS	86	44	51	2.3

TABLE 2 Browse Inventory of Prince William Sound Deer Range
April 7 - 13, 1957

Area	Degree of Utilization %	Plants/1000 sq.ft.density	Vigor (Scale of 3)
MONTAGUE ISLAND	83	67	2.0
Macleod Harbor	88	80	1.7
Hanning Bay	100	100	2.0
Port Chalmers	55	93	2.0
Stockdale Harbor	85	30	2.0
Rocky Bay	70	65	1.5
Zaikof Bay	87	93	1.7
Zaikof Point (outside)	95	9	3.0
GREEN ISLAND	79	85	2.8
HINCHINBROOK ISLAND	45	90	2.1
Port Etches	30	83	2.0
Constantine Harbor	20	75	2.5
Juanda Bay	70	100	2.0
Shelter Bay	20	100	2.0
Johnstone Point	60	80	3.0
Anderson Bay	30	80	2.0
Double Bay	37	100	1.7
Yelper Bay	60	90	2.0
Fish Bay	80	100	2.0
HAWKINS ISLAND	28	54	1.6
Hawkins Cutoff	50	80	2.0
Makaka Point	30	80	1.0
Canoe Pass	33	93	1.7
Cedar Cove	20	10	1.0
Windy Bay	17	53	1.7
Mud Bay	20	10	2.0
AVERAGE FOR ALL AREAS	54	73	2.0

Partial recovery of blueberry browse through root sprouting after die-back from over-browsing in the winters of 1945-50. The vigor of these plants is still low. (Kupreanof Island, 12/13/56).

Fires are uncommon in humid S. E. Alaska, however, this old burn on Duke Island resulted in the loss of valuable organic soil and return to the immediate post-glacial stage of plant succession. This area's potential for deer production has been greatly reduced. (1/28/57).

Job No. 7 Evaluation of Hunter Harvest

ABSTRACT

Eighty percent of the harvest was obtained during the last four weeks of the season. The percent kill of does was lower in those areas where hunter success was highest. Hunter success varied from 83 percent at Petersburg to 64 percent at Juneau. The percent of kill of does varied from 22 percent in Sitka to 3 percent in Ketchikan and averaged 15 percent. Seventy-three percent of the total kill was obtained in management units 3 and 4. The estimated total kill by licensed hunters was 4,630 while the total estimated legal kill including take by non-licensed hunters and natives was 7,780.

OBJECTIVES

To secure information relative to the total hunter kill, area and chronological distribution of the kill, and hunter success.

TECHNIQUES USED

Hunter deer harvest information for the 1956 deer season was obtained from samples of deer jaws collected, post-season hunter interviews and questionnaires from a selected hunter sample.

The post-season hunter interviews were made in Juneau, Sitka, Petersburg, Wrangell and Ketchikan. The following questions were asked of all males of high school age or older encountered in the towns visited until the desired sample of hunters was obtained: Did you hunt deer in 1956? How many did you kill and of what sex were they? How many days did you hunt? Were the jaws collected from your deer? In what area did you hunt? Total kill for the towns was determined by using the following proportion:

$$\frac{\text{Jaws collected from interviewed hunters}}{\text{Total jaws collected from the town}} = \frac{\text{No. deer killed by interviewed hunters}}{\text{Total deer kill for the town (the unknown)}}$$

The hunter questionnaires, which were sent out to a selected sample of license buyers after the close of the season, were used to determine the total kill of deer for Southeast Alaska and the areawise breakdown of the kill.

FINDINGS

The chronological distribution of the kill is shown in Figure 1. Eighty percent of the total harvest was obtained during the last four weeks of the season. It is obvious from the total kill curve in Figure 1 that season manipulation as a management tool in controlling harvest will

be effective only during the latter part of the season (Oct. 15 - Nov. 26). The first two months of such a season, while ineffective in bringing about the desired harvest, stimulate considerable recreation.

The results of the post-season hunter interviews are presented in Table 1. The higher hunter success and heavier kill in the central, Petersburg-Wrangell area, is consistent with the high deer population there. Of particular interest is the fact that the percent kill of does was lower in those areas where hunter success was highest. This resulted from hunters in the areas of high deer population showing more selectivety in shooting bucks.

The total deer kill for southeast Alaska and the areawise breakdown of the kill determined through the post-season hunter questionnaires are presented below:

Areawise Distribution of the Deer Harvest

	Management Unit				
	1	2	3	4	5
Percent of Total Kill	13	12	36	37	1

Estimate of Total Deer Harvest

Total kill by licensed resident hunters & trappers - - 4,630
(from hunter questionnaires)

Total estimated legal kill (including take by nonresidents hunters under 16 years of age and natives) - - 7,780

RECOMMENDATIONS

Season manipulation is an effective management tool and should be utilized to obtain the effect desired. A long early season, while ineffective in accomplishing a harvest, furnishes considerable recreation. From mid-October through early December is the critical period during which an effective harvest can be obtained. To obtain a significant harvest of does it is necessary to open the season considerably in advance of the rut. During the rut does are seclusive and bucks travel incessantly.

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

Prepared by: David R. Klein, Wildlife Mgt. Biologist

Approved by: Robert F. Scott, Supervisor, Game Restoration

Date: June 30, 1957

TABLE 1 THE DEER HARVEST AND HUNTER SUCCESS IN THE 1956 DEER SEASON SOUTHEAST ALASKA
(Estimates based on 450 hunter interviews)

	Juneau	Sitka	Petersburg	Wrangell	Ketchikan
Total Hunter Kill	700	600	1000	800	600
Total Kill of Does	150	130	150	100	20
Percent Kill of Does	21	22	15	12	3
Percent Successful Hunters	64	71	83	81	72
Average No. Deer Per Hunter	1.2	1.3	1.7	1.7	1.3
Average No. Days Hunted Per Hunter	6.0	6.8	5.8	5.3	4.1
Hunters Killing 3 Bucks (%)	10	8	21	24	20
Hunters Killing 2 Bucks & 1 Doe (%)	6	12	10	11	3
Hunters Killing 2 Bucks (%)	9	11	14	12	12
Hunters Killing 1 Buck & 1 Doe (%)	10	7	8	7	1
Hunters Killing 1 Buck (%)	21	24	23	25	36
Hunters Killing 1 Doe (%)	8	9	5	3	1
No. Hunters Checked	100	100	100	75	75

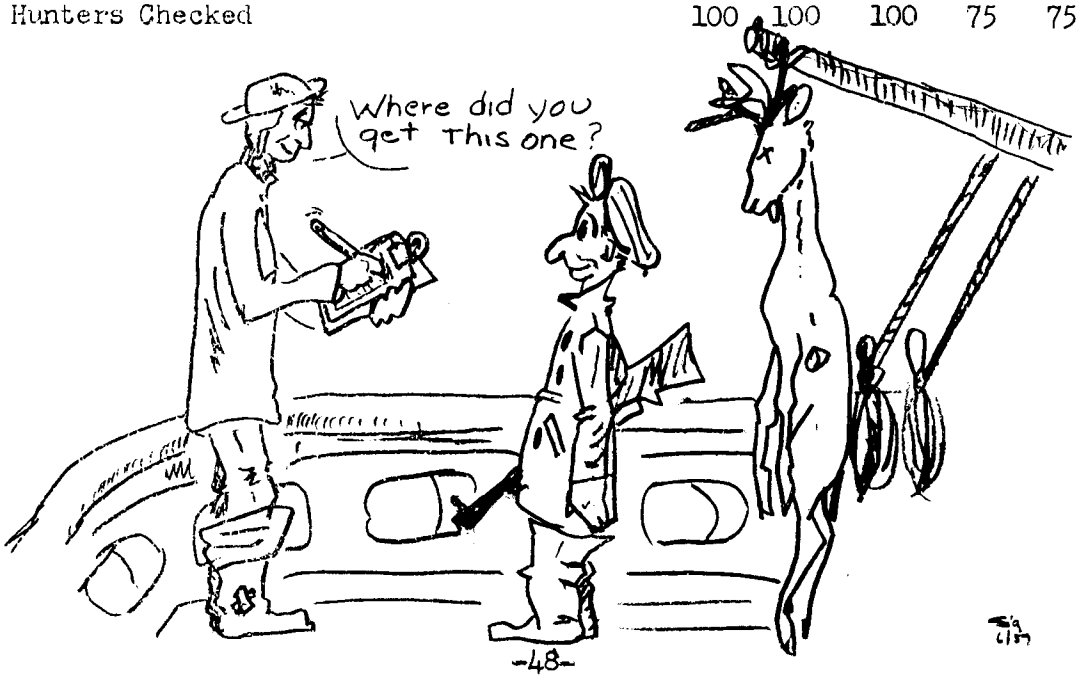


FIGURE 1 CHRONOLOGICAL DISTRIBUTION OF THE TOTAL 1956 DEER HARVEST, S. E. ALASKA

(Data from Table 3, Job No. 4)