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DEER REPORT

by  
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Volume XI  
Project Progress Report  
Federal Aid in Wildlife Restoration  
Project W-17-2, Jobs 2.1R, 2.2R, 2.4R, 14.1R and 14.2R  
Project W-17-3, Jobs 2.1R, 2.2R, and 2.4R (1st Half)

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# JOB PROGRESS REPORT (RESEARCH)

State: Alaska

Cooperators: Harry R. Merriam

Project Nos: W-17-2      Project Title: Big Game Investigations  
W-17-3

Job Nos.:    2.1R      Job Title: Effects of Clearcut Logging on Deer Habitat.

              2.2R      Effects of the Herbicide 2-4-D on Deer Food Species.

              2.4R      Browse Production on Alaskan Deer Ranges.

              14.1R      Wolf-Deer Relationships

              14.2R      Wolf Census Technique

Period Covered: July 1, 1969 to December 31, 1970

## SUMMARY

Snow depths beneath a forest canopy are only about one-half those on open clearcut areas.

The herbicide 2-4-D, applied at the rate of two pounds per acre, resulted in a total kill of the deer browse species Vaccinium ovalifolium. Application of 2-4-D had little noticeable effect on other deer food species.

Browse production of V. ovalifolium was measured on good and poor deer winter range. Average production on good range was 317 pounds per acre and on poor range 44 pounds per acre.

The deer population on Coronation Island has remained at a low level for four years. Only one wolf has been present on the 30 square-mile island for the past three years. Deer range, which evidenced severe over-use in 1960, has shown a progressive increase in forb and shrub cover.

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## BACKGROUND

The Sitka black-tailed deer (Odocoileus hemionus sitkensis) is the most popular big game species for most resident hunters in Southeast Alaska, Prince William Sound and Kodiak Island. Throughout most of its range in Alaska, hunting pressure is so light that it has little impact on total population. It is therefore difficult to manipulate populations or to actually manage deer except in a few isolated instances. Natural factors, primarily winter weather conditions and predation in some areas, are the primary limiting factors on most deer herds. Research efforts have been concentrated on determining effects of habitat changes in order to obtain information useful for future management purposes. During most of the report period the principal investigator was assigned to other duties and little time was available for research programs.

## OBJECTIVES

To determine effects of clearcut logging on abundance, composition, and availability of deer food species.

To determine effects of 2-4-D on deer food species.

To determine the volume per acre produced on good, fair and poor deer range.

To determine basic relationships between deer and wolves and the value of predators in the ecological system.

To develop a technique applicable for censusing wolves in Southeast Alaska.

#### PROCEDURES

A literature review was made of plant successional stages following logging and the influence of logging on deer habitat. A statistical evaluation was made of proposed sample sizes and sampling techniques for vegetative cover of logged areas. Snow depth measurements were made on cutover and forested lands.

A photo record was compiled on plots in the Nakwasina River drainage on Baranof Island where cutover lands had been sprayed with the herbicide 2-4-D to control red alder (Alnus rubra) growth. Observations were recorded of condition of deer food species after spraying.

Samples of the browse species Vaccinium ovalifolium were obtained from control areas and sites fertilized with 400 pounds per acre of bio-urea (46% N) in the vicinity of Thomas Bay. Growth rates were measured and proximate analyses conducted. Plots were established in the Falls Creek drainage (Mitkof Island) and treated with 200, 400 and 800 pounds per acre of bio-urea (46% N). A literature review was made on effects of fertilizers on mammals and aquatic species.

Samples of the deer browse species were collected from areas of dense and sparse cover to determine parameters of browse production on deer range.

Field observations were made of wolf and deer abundance on Coronation Island, and wolf scats were collected for food content analysis. Changes in vegetative cover were recorded.

No work was accomplished on the wolf census technique due to difficulties in obtaining technical assistance. A literature review was made of use of recordings in wildlife censusing.

#### FINDINGS

##### Deer - Logging Study

The only field data collections during the report period consisted of snow depth measurements on cutover and forested areas. Measurements were taken at about 100 feet of elevation on Mitkof Island in the vicinity of Blind River. Very little snow was present during the winter of 1969-70 and measurements had little meaning. As reported in Project No. W-17-1, snow depths beneath a forest canopy are about one-third to one-half those found on open cuts. Snow depth data are presented in Table 1.

Table 1. Average snow depths beneath forest canopy and cutover lands during months of November through March.

Ave. Snow Depth In Inches	<u>MONTH</u>						
	<u>Nov.</u>		<u>Dec.</u>		<u>Jan.</u>	<u>Feb.</u>	<u>March</u>
	1969	1970	1969	1970	1969	1969	1969
Forest	T <sup>x</sup>	2"	T	9"	T	T	T
Cutover	4"	6"	T	20"	3"	T	2"

<sup>x</sup> Trace

#### Effects of 2-4-D

In June, 1968, the U.S. Forest Service treated a timber cutover in the Nakwasina River drainage (Baranof Island) with two pounds per acre of the herbicide 2-4-D to control red alder in order to release conifer reproduction. Ten milacre plots were established within the spray zone to evaluate effects of 2-4-D on deer food species. These plots have been checked at least once annually and a photographic record compiled of vegetative changes. During this report period the plots were checked in October, 1969 and in July, 1970. Previous data are reported in Project No. W-17-1.

The herbicide 2-4-D appears to be quite selective. Some plant species were totally killed while others evidenced little effect. The most significant effect was total killing of Vaccinium ovalifolium (blueberry) which is the most important winter browse species utilized by deer. Most ground forbs were not noticeably effected by the herbicide. Table 2 lists the plant species of the area utilized by deer and their condition in October, 1970, more than two years after spraying with 2-4-D.

Table 2. Effects of 2-4-D on plant species utilized by deer.

Plant Species	Effects
Blueberry ( <u>Vaccinium ovalifolium</u> )	Total kill
Devil's Club ( <u>Oplopanax horridus</u> )	Total kill
Elderberry ( <u>Sambucus racemosa</u> )	Top kill, but resprouting
Goldthread ( <u>Coptis spp.</u> )	Discoloration (dark)
Ground Dogwood ( <u>Cornus canadensis</u> )	Discoloration (dark)
Rusty Menziesia ( <u>Menziesia ferruginea</u> )	Total kill
Salmonberry ( <u>Rubus spectabilis</u> )	No effect
Trailing Bramble ( <u>Rubus pedatus</u> )	No effect

Of the species which were completely killed by 2-4-D, only blueberry is used extensively by deer. No resprouting was noted on blueberry plants which had total top kill; however some plants which did not have complete spray coverage showed new growth at the base.

Herbicides have been used in many areas to improve deer range. After top kill, many deer browse species evidence increased production through resprouting. This does not appear to be true with blueberry. In actual practice, herbicides would normally not be applied to good deer range. Application is confined to areas which support dense stands of young alder with very little ground cover beneath the canopy. If reasonable care is taken to limit application to such sites, there should be little impact on total deer habitat.

#### Browse Production on Alaskan Deer Ranges

In October and November, 1970, samples of the deer browse species Vaccinium ovalifolium were obtained from deer habitat showing good and poor browse production to aid in estimating the number of deer winter range in Alaska is capable of supporting. Five 2-milacre plots were established in each range type and the annual growth clipped from all V. ovalifolium plants on each plot. Table 3 gives the wet and dry weights for each plot. Average browse production on good range was 317 pounds per acre (dry weight) and on poor range 44 pounds per acre (dry weight).

Table 3. Browse production on good and poor deer range (2-milacre plots).

<u>Good Range</u>		
Plot No.	Wet Weight (GM)	Air Dry Weight (GM)
1	480	230
2	632	325
3	458	221
4	712	363
5	<u>590</u>	<u>303</u>
Total	2872	1442
Ave. Weight	574 GM	288 GM

Table 3. Continued.

<u>Poor Range</u>		
Plot No.	Wet Weight (GM)	Air Dry Weight (GM)
1	79	40
2	64	33
3	92	51
4	55	31
5	<u>81</u>	<u>43</u>
Total	371	198
Ave. Weight	74 GM	40 GM

A great number of variables are involved. For example, good browse production does not necessarily indicate the range is used by deer and poor browse production may be a result of high deer use on the range. The samples were obtained from only two areas and would differ on other sites. Also, it is not possible to assume that the measured browse production is available to deer on winter range. The measurements do provide some idea of the number of deer good and poor range is capable of supporting without over-utilization of browse species.

Studies of other areas by Palmer (1944), Brown (1961) and Dietz (1962) have shown daily maintenance requirements to be about three pounds of browse (dry weight) per hundred-weight of deer. Previous studies in Alaska (Merriam, 1968) indicate the browse species V. ovalifolium can sustain use of approximately 60 percent of its annual growth. Taking these factors into consideration, and assuming deer use of winter range is about 150 days (November through March), the good range sample could support about 270 deer per square mile and the poor range 37 deer per square mile. This is assuming that the browse is available to deer throughout the winter period which is not usually the case because of snow cover.

#### Wolf - Deer Relationships

Previous data on this study are summarized in the Project No. W-17-1 report. Ten days were spent on Coronation Island in June and July, 1970. The primary object was to assess wolf and deer population levels. During the ten day period, much of the island, and all of the major beach areas, were covered on foot. No fresh deer tracks were observed; however some browse use was noted and one deer pellet group located. No wolves were observed, but fresh tracks of a single wolf were seen at several locations on the island. The deer population on this 30 square mile island appears to have reached the low level of abundance where a single wolf is capable of controlling increase. Only one wolf has been on the island since 1968, but the deer population has shown no increase. In 1970, there was a noticeable increase in forb and shrub

species. In 1960, the island showed extreme use by deer. It has taken ten years for plant species to recover to the point where the island can again support a reasonable deer population. In 1971, final measurements will be made of plant abundance and the wolf will be removed from the island.

This study has shown that wolves can control deer populations on small islands, that vegetative species, particularly browse, are slow to reestablish after over-use and that predator abundance reaches a balance with prey abundance.

#### Wolf Census Technique

Activity on this study was confined to literature review. Difficulties were encountered obtaining the services of qualified electronics technicians at the time when surveys were scheduled.

#### LITERATURE CITED

- Brown, E.R. 1961. The black-tailed deer of Washington. Biol. Bull. No. 13. Washington State Game Department.
- Dietz, D.R., R.H. Udall and L.E. Yeager. 1962. Chemical composition and digestibility by mule deer of selected forage species. Bull. No. 14, Colorado Game and Fish Dept.
- Merriam, H.K. 1968. Deer Report. Alaska Fed. Aide in Wildl. Restoration Rpt., Proj. W-15-R-2 and W-15-R-3, Work Plan J.
- Palmer, L.J. 1944. Food requirements of some Alaskan game animals. J. Mammal., 25: 49-54.

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