Frank Jewel file

ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF GAME

JUNEAU, ALASKA

ALASKA DEPARTMENT OF FISH AND GAME
JUNEAU, ALASKA

STATE OF ALASKA
William A. Egan, Governor

DEPARTMENT OF FISH AND GAME
Walter Kirkness, Commissioner

DIVISION OF GAME
James W. Brooks, Director
Don H. Strode, Federal Aid Coordinator

DISEASE AND PARASITE REPORT

by

Kenneth A. Neiland, Leader

Volume IV
Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-6-R-4, Work Plan M

The subject matter contained within these reports is often fragmentary in nature and the findings may not be conclusive; consequently, permission to publish the contents is withheld pending permission of the Department of Fish and Game.

(Printed December 1963)

TABLE OF CONTENTS

WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO.: W-6-R-4 TITLE: Alaska Wildlife Investigations

WORK PLAN: M TITLE: Disease and Parasite Investigations

JOB NOS.: 1; 2; and 3

PERIOD COVERED: July 1, 1962 to June 30, 1963

ABSTRACT

Approximately 75 per cent of 422 vertebrate host specimens examined (excluding ungulates) were found to be parasitized by one or more of about 48 parasite species. While some of the parasitisms were relatively heavy, evidence of substantial pathology was not observed.

Selected organ samples from 32 moose taken during antlerless hunts in central Alaska revealed near saturation (93 per cent incidence) by the roundworm, Nematodirella. Incidence rates for this helminth of moose elsewhere in Alaska range from 26 to 38 per cent. All of the infections observed appeared to be moderate and without significant pathology.

An attempt to determine the effects of DDT on the welfare of game animals in southeastern Alaska will emphasize analysis of two preferred deer browse species for residual insecticide.

RECOMMENDATIONS

Except where populations of desirable commercial or game species are significantly low, reduction of numbers through harvest should be encouraged. While conclusive evidence of substantial pathology in the parasitisms observed is not a available, it is clear that parasite infections probably are not increasing the value of Alaskan wildlife. Accordingly any measure (e.g. reduction in host population density) which will tend to prevent or diminish transmission is beneficial. The above information should be made known to the sportsmen in an effective manner.

WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO.: W-6-R-4 TITLE: Alaska Wildlife Investigations

WORK PLAN: M TITLE: Disease and Parasite Investigations

JOB NOS.: 1; 2; and 3

PERIOD COVERED: July 1, 1962 to June 30, 1963

OBJECTIVES

To determine the incidence and distribution of parasites and other disease organisms in Alaskan fur and small game species, game birds and alternate host species; the degree to which parasitism may contribute to mortality, or lowered productivity or economic value in these species; the degree to which such parasitism may depreciate the value of the animals for use as food by humans.

To determine the incidence and distribution of parasites and other disease organisms among the major big game animals to Alaska and in alternate host species; the degree to which the welfare of big game herds may be affected by parasitism and disease, the extent that such factors may depreciate the value of these animals for use as food by humans and the importance of wild ungulates as reservoirs for disease and parasites of domestic animals.

To determine how much DDT will accumulate in the tissues of certain preferred deer browse and various animals species after a spruce budworm control project on Prince of Wales Island, Southeast Alaska.

TECHNIQUES

Active collections of non-big game species will be largely in conjunction with other investigations. Members of all the divisions of the department have been requested to send in any examples of natural mortality found to be in suitable condition

for examinations, particularly specimens of certain unusually valuable furbearers or other species for which little information is available. Such specimens are subjected to routine autopsy and analytical procedures.

Field work on ungulates, particularly specimen collections, is carried out whenever possible in cooperation with other departmental projects. Routine autopsy and laboratory procedures are employed. Some material is referred to other specialists for expert analysis.

A preliminary reconnaissance of the pesticide study area was made during early July 1962. Representative samples of two preferred deer-browse-species have been or will be collected before and at two intervals after the spray period in early June 1963. These will be sent to the Wisconsin Research Foundation for analysis of residual DDT. Samples of tissue from deer, seagulls, bald eagles, mink and various small mammals also will be collected as time permits.

FINDINGS

The Parasitism of Alaskan Fish, Birds and Mammals

The data derived from the examination of 422 host specimens are summarized in Table 1. These data are discussed below at greater length under the appropriate host-group categories.

Fish: As expected, a considerable variation in the quality and quantity of parasitic infections has been observed in salmonid species from various areas. The most heavily infected fish examined to date have been rainbows from the Tebay Lakes system (Neiland, 1962). Lake trout from the Summit-Paxson Lake system are relatively lightly parasitized as are Dolly Varden from Lake Eva, Chichagof Island. In no instance did the observed parasitisms appear to substantially lower the value of the host species for culinary or sporting purposes. On the other hand, larval stages of helminths which normally mature in homoiotherms were common in southeastern Dolly Varden (e.g. Phocanema sp. and Corynosoma spp.) and in central Alaskan whitefish and grayling (e.g. Diphyllobothrium spp). Whether these helminths in the areas studied have an appreciable effect on the welfare of desirable host-species is unknown.

Birds: Examination of fecal samples from a small sample of upland game birds did not reveal coccidial infections. Because coccidia are common in game birds elsewhere and may be

Table 1. Incidence of parasitism in Alaskan animals, exclusive of ungulates.*

Host Species	Number Examined	Number Parasite Species	Incidence of one or more species	
			Positive	Negative
Fish:				
Isurus nasus	1	2	1	-
Prosopium cylindraceus	7	2	5	2
Salmo qairdnerii	78	7	78	-
Salvelinus malma	100	6	67	33
S. namaycush	60	4	55	5
Thymallus signifer	3	2	3	-
Birds:				
Bonasa umbellus	1**	-	-	1
Canachites c. canadensis	1	1	1	-
Haliaeetus leucocephalus	1	-	-	1
Lagopus lagopus	6**	-	-	6
L. Mutus	6	1	1	5
Mammals:				
Furbearers:				
Callorhinus ursinus	1	1	1	-
Castor canadensis	1	-	-	1
Enhydra lutris	17	3	13	4
Euarctos americanus	2	2	2	-
Lepus americanus	1	1	1	-
Lutra canadensis	2	-	-	2
Lynx canadensis	60	3	59	1
Mustela vison	51	2	11	40
Phoca vitulina	1	1	1	-
Miscellaneous:				
Canis familiaris	19	4	15	4
Erethizon dorsatum	1	2	1	-
Peromyscus maniculatus	1	1	1	-
Phocaena vomerina	1	3	1	-
TOTAL:	422	48	317	105

*Since in many instances complete carcasses were not available for examination, the data on the various host species may not be comparable.

**Only fecal pellets available.

severe parasites of domestic species, further work should be done on Alaskan host species.

Furbearers: The data accumulated on southeastern mink during the past year is consistent with that from previous years. It appears that at least throughout the inside beach environment of southeastern Alaska, mink are only occasionally and lightly parasitized. Examination of a small number of gut samples from Aleutian Sea Otter revealed a continuing, moderate to heavy infestation by two common helminths, which however, did not appear to involve substantial pathology. The common occurence of one or more species of Taenia in central Alaskan lynx is presumably related to the high snowshoe hare populations. Since the lynx invariably had moderate to heavy concentrations of visceral fat, it does not appear that they were suffering any substantial nutritional problems because of the relatively heavy parasitisms observed.

Data on other furbearers is too gragmentary at this time to warrant further consideration.

Wild Ungulates: During the past year our efforts have been directed toward the caribou. The occurrence of two potentially serious diseases (i.e. brucellosis and necrobacillosis) in the Arctic and Nelchina herds has been demonstrated. The data on these and other potential pathogens is reviewed in the Caribou Segment Report. The data on other ungulates, except moose, is too fragmentary to warrant consideration at this time.

The incidence of some of the more important moose helminths observed during the past season is recorded in Table 2. The incidence rates of Nematodirella sp. are particularly interesting. Neiland (1960-61) reported incidence rates of 26-38 per cent in moose from the Kenai Peninsula and Matanuska Valley. An overall incidence rate of approximately 93 per cent for central Alaskan moose, even allowing for some decrease in rate with larger sample size, suggests that various epidemiological factors involved in transmission of this parasite are considerably more favorable in this central Alaskan area than in the other areas studied. Evidently opportunities for transmission are frequent enough to result in near saturation of the host population. Under circumstances such as these there would be little likelihood of an already weakened animal escaping the debilitating effects of a parasite burden. Unfortunately it is impossible to interpret with any degree of certainty the true significance of the above data. Without appropriate

Table 2. Incidence of some helminths in moose examined during 1962-63.

Locality	Helminth Species			
	Moniezia sp.	Echinococcus sp.	Dictyocaulus sp.	Nematodirella sp.
Nenana Rd.	1/14	-	-	13/13
Big Delta	0/18	0/18	0/18	16/18
Yakutat	0/3	0/3	0/3	1/3
TOTAL	1/35	0/21	0/21	30/34

experimental observations or extensive, detailed data derived from the examination of fresh, natural mortalities, we can only offer reasonable speculations based upon information available from domestic animal research.

It is also of interest that there is no apparent relationship between the helminth faunas of moose and bison in the Big Delta area. Examples of comparable organ samples from moose and bison from this area revealed that:

1) About 65 per cent of the bison had lungworms (Dictyocaulus sp.), but none had intestinal worms (Neiland, 1963) while

2) About 93 per cent of the moose had intestinal worms (Nematodirella sp.), but none had lungworms (Table 2). Evidently the parasite species involved are highly host specific.

It is evident that Alaskan moose may be infected by a variety of parasites. In some instances the infections may be both very common and seemingly severe. Some of the species (e. g. Dictyocaulus, Nematodirella, Paramphistomum, Setaria) are known or suspected pathogens of ungulate species elsewhere. Accordingly it is evident that a satisfactory understanding of the biology of moose must include more extensive and detailed information on these and other possible pathogens as yet unrecognized.

Miscellaneous: The presence of a heavy infection of Echinococcus granulosus in one of the nineteen domestic dogs from the Matanuska Valley is particularly interesting. It has been demonstrated (Neiland, 1960-61) that approximately 25% (including all age classes) of the moose taken during the first antlerless moose hunt in the Matanuska Valley were infected by hydatid cysts. At that time it was suggested that the numerous free-running farm dogs present in the Valley probably were primarily responsible for the relatively high incidence of hydatid cysts in the moose. While the present observation does not prove the above hypothesis, the data are entirely consistent with it. In summary of this situation, we can say that we now know that the domestic dog is the most numerous free-running canine in the Valley (at least two productive dens are known) and that they do carry the infection. How many dog owners in that area may carry the infection is indeed, an interesting speculation.

Toxicity Effects of Insecticides on Alaskan Birds and Mammals

During July 1962, the area in which the first spruce budworm control effort in Alaska will be made was visited. A reconaissance of the area (Polk Inlet, Prince of Wales Island) revealed that deer populations were too low to provide adequate samples for a residue study based upon only deer. Accordingly, the emphasis of the field work was shifted to preferred deer-browse species and sampling was postponed until the immediate spray period scheduled for mid-June 1963. In addition to deer-browse species (Vaccinium and Cornus) specimens of deer, sea-gulls, bald eagles, mink and various small mammals will also be taken for DDT residue analysis both before and after spraying. Because of the timing of the spraying there are no data to report at this time.

LITERATURE CITED

Neiland, K. A. 1962. Preliminary observations on Philonemiasis and Crepidostomiasis in Alaskan Fresh-Water Fish. Inform. Leaflet #16, Alaska Dept. Fish and Game. 5 pp.

Neiland, K. A. 1960-61. Alaska Wildlife Investigations. Parasite and Disease Investigations. 28 pp. Fed. Aid Wildl. Restor. Project W-6-R-2.

Neiland, K. A. 1963. Alaska Wildlife Investigations, Disease and Parasite Investigations. 30 pp. Fed. Aid Wildl. Restor. Project W-6-R-3.

SUBMITTED BY:

Kenneth A. Neiland
Game Biologist

APPROVED BY:

Don H. Strode
Federal Aid Coordinator

James H. Brooks
Director, Division of Game