

# Preparation of Manuscripts on Serologic Surveys of Alaska Wildlife for Microbial Pathogens

Research Final Report  
1 July 2001 – 30 June 2002

Randall Zarnke

Alaska Department of Fish and Game  
Division of Wildlife Conservation



ADF&G

Federal Aid in Wildlife Restoration  
Grant W-27-5  
Project 18.72  
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# **STATE OF ALASKA**

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**FEDERAL AID  
FINAL RESEARCH REPORT**

ALASKA DEPARTMENT OF FISH AND GAME  
DIVISION OF WILDLIFE CONSERVATION  
PO Box 25526  
Juneau, AK 99802-5526

**PROJECT TITLE:** Preparation of manuscripts on serologic surveys of Alaska wildlife for microbial pathogens

**PRINCIPAL INVESTIGATOR:** Randall L Zarnke

**COOPERATORS:** None

**FEDERAL AID GRANT PROGRAM:** Wildlife Restoration

**GRANT AND SEGMENT NR.:** W-27-5

**PROJECT NR.:** 18.72

**WORK LOCATION:** Statewide

**STATE:** Alaska

**PERIOD:** 1 July 2001–30 June 2002

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**I. PROBLEM OR NEED THAT PROMPTED THIS RESEARCH**

Diseases and parasites negatively impact wildlife populations. In this respect, diseases are not unlike other factors such as predation, overharvest, or adverse weather conditions. In many populations, we have only an incomplete understanding of the identity, pathogenicity, prevalence, seasonality, age-specificity, sex-specificity, or other parameters of such diseases. Because of our lack of understanding of these parameters, both from limited data ADF&G has collected in the past and literature currently available on various wildlife diseases, we cannot properly assess the effects of the diseases on population dynamics of wild animals. A more complete understanding of wildlife diseases and their effects upon populations would enable wildlife managers to make more well-informed decisions on matters such as population growth and allowable harvest. In addition, this increased knowledge might allow human intervention into the disease process with resultant healthier individuals and populations.

**II REVIEW OF PRIOR RESEARCH AND STUDIES IN PROGRESS ON THE PROBLEM OR THE NEED**

Serologic surveys of varying degrees of sophistication have been conducted by ADF&G since the early 1960s. In the early days these surveys were limited in scope, consisting of tests for 1 or 2 diseases in 1 or 2 host species. Since the late 1970s, however, the surveys have been expanded to where they now include up to 30 diseases and 23 potential host species. Such a framework provides for a meaningful health profile of Alaska's wildlife.

From 1970 through 2000, surveys have included approximately 18,000 samples consisting of 4000 caribou, 3000 moose, 2000 grizzly bears, 600 Dall sheep, 1000 bison, 1000 wolves, 150 black bears, 600 walruses, 2000 other marine mammals, and lesser numbers of muskoxen, deer, polar bears, mountain goats, red foxes, ravens, arctic foxes, snowshoe hares, and other species. Some of these data have already been reported by us in the scientific literature including, but not limited to, the following:

OSTERHAUS ADME, J GROEN, P DEVRIES, FGCM UYTDEHAAG, B KLINGEBORN, AND R ZARNKE. 1988. Canine distemper virus in seals. *Nature* 335:403–404.

ZARNKE RL AND WB BALLARD. 1987. Serologic survey for selected microbial pathogens of wolves in Alaska, 1975–1982. *Journal of Wildlife Diseases* 23(1):77–85.

——— AND GA ERICKSON. 1990. Serum antibody prevalence of parainfluenza 3 virus in a free-ranging bison (*Bison bison*) herd from Alaska. *Journal of Wildlife Diseases* 26(3):416–419.

——— AND MB EVANS. 1989. Serologic survey for infectious canine hepatitis virus in grizzly bears (*Ursus arctos*) from Alaska, 1973–1987. *Journal of Wildlife Diseases* 25(4):568–573.

——— AND S ROSENDAL. 1989. Serologic survey for *Mycoplasma ovipneumoniae* in free-ranging Dall sheep (*Ovis dalli*) in Alaska. *Journal of Wildlife Diseases* 25(4):612–613.

———, CH CALISHER, AND J KERSCHNER. 1983. Serologic evidence of arbovirus infections in humans and wild animals in Alaska. *Journal of Wildlife Diseases* 19(3):175–179.

———, JK MORTON, AND PJ MANNING. 1990. Serologic survey for *Actinobacillus capsulatus* in free-ranging snowshoe hares (*Lepus americanus*) from Alaska and Alberta. *Journal of Wildlife Diseases* 26(4):518–521.

———, RA DIETERICH, KA NEILAND, AND G RANGLACK. 1983. Serologic and experimental investigations of contagious ecthyma in Alaska. *Journal of Wildlife Diseases* 19(3):170–174.

### **III FINDINGS RELATED TO THE OBJECTIVES AND TO PROBLEM OR NEED**

OBJECTIVE 1: The primary objective of this project will be to prepare 4 scientific manuscripts based on data collected in previous Alaska Federal Aid wildlife disease projects, including the last one, Study 18.71.

### **IV MANAGEMENT IMPLICATIONS**

Results of this project will enable ADF&G to provide information in the form of manuscripts to the *Journal of Wildlife Diseases* based on data collected in previous Alaska Federal Aid projects.

**V SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN FOR LAST SEGMENT PERIOD ONLY (if not reported in previous performance report)**

JOB 1 Prepare the following 4 manuscripts for publication in the Journal of Wildlife Diseases:

(1) Serologic survey for bovine respiratory viruses in caribou from Alaska and the Yukon Territory

*Status:* This paper has been ready to go for 2 years. One of the coauthors is the editor for *Journal of Wildlife Diseases* and has not had time to work on the paper.

(2) Prevalence of the nematode *Soboliphyme baturini* in marten (*Martes americana*) populations from three regions of Alaska, 1990–1998

*Status:* The paper was submitted but referees wanted a simpler statistical analysis. The paper is being revised.

(3) Geographic pattern of serum antibody prevalence for *Brucella* spp. in caribou, grizzly bears, and wolves from Alaska, 1975–1998

*Status:* The paper was submitted, but referees again wanted a simpler statistical analysis so it is being revised.

(4) Serologic survey of lynx (*Felis lynx*) from northwestern North America for evidence of exposure to eight selected disease agents

*Status:* This paper has not yet been submitted but will be shortly.

**VI ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THE LAST SEGMENT PERIOD, IF NOT REPORTED PREVIOUSLY**

None.

**VII PUBLICATIONS**

SEROLOGIC SURVEY FOR BOVINE RESPIRATORY GROUP VIRUSES IN CARIBOU FROM ALASKA AND THE YUKON TERRITORY

RANDALL L. ZARNKE,<sup>1,3</sup> JAY M. VER HOEF,<sup>1</sup> AND E. S. WILLIAMS<sup>2</sup>

<sup>1</sup>1300 College Road, Fairbanks, Alaska 99701-1599, USA

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<sup>3</sup>Corresponding author (email: randy\_zarnke@fishgame.state.ak.us)

**ABSTRACT:** Blood samples were collected from 3,359 free-ranging caribou (Rangifer tarandus) in Alaska and the Yukon Territory. Sera were tested for evidence of exposure to four respiratory viruses (infectious bovine rhinotracheitis, bovine viral diarrhea, parainfluenza 3, and respiratory syncytial virus) by means of a serum neutralization method. Herd-specific antibody prevalences ranged from 0 to 19%. Prevalences for each of

the viruses were higher in northern herds. No explanation is apparent for either the cause or the effect of this pattern of exposure.

#### PREVALENCE OF THE NEMATODE SOBOLIPHYME BATURINI IN MARTEN (MARTES AMERICANA) POPULATIONS FROM THREE REGIONS OF ALASKA, 1990–1998

RANDALL L. ZARNKE,<sup>1,4</sup> JACK WHITMAN,<sup>2</sup> RODNEY W. FLYNN,<sup>3</sup> AND JAY M. VER HOEF<sup>1</sup>

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**ABSTRACT:** Marten (Martes americana) carcasses were collected from trappers in three regions of Alaska. Stomachs were examined for the nematode parasite Soboliphyme baturini. Both prevalence and intensity of infection exhibited an increase from north to south. Prevalence was higher in adults (compared to juveniles) from the two mainland study areas. Prevalences in these two age cohorts were similar for the Southeast region. There were no sex-specific differences in prevalence. No pathologic changes were observed in the gastrointestinal tract. Impact of the parasite on either individual animals or populations appeared to be minimal.

#### GEOGRAPHIC PATTERN OF SERUM ANTIBODY PREVALENCE FOR BRUCELLA SPP. IN CARIBOU, GRIZZLY BEARS, AND WOLVES FROM ALASKA, 1975–1998

RANDALL L ZARNKE, JAY M VER HOEF, AND ROBERT A DELONG  
1300 College Road, Fairbanks, Alaska 99701-1599, USA

**ABSTRACT:** Blood samples were collected from 2,635 caribou (Rangifer tarandus groenlandicus), 1,238 grizzly bears (Ursus arctos), and 930 wolves (Canis lupus) from throughout mainland Alaska during 1975–1998. Sera were tested for evidence of exposure to Brucella spp. Serum antibody prevalences were highest in the northwestern region of the state. In any specific area, prevalences for caribou and wolves were of a similar magnitude, whereas prevalence for bears in the same area was two to three times higher.

### **VIII RESEARCH EVALUATION AND RECOMMENDATIONS**

None.

### **IX PROJECT COSTS FROM LAST SEGMENT PERIOD ONLY**

FEDERAL AID SHARE \$53.6 + STATE SHARE \$17.9 = TOTAL \$71.5

### **X APPENDIX**

None.

*(Signature not available)*

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