ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
Juneau, AK 99811-5526

Alaska Department of Fish and Game
Wildlife Restoration Grant

Grant Number: W-33 **Segment Number:** 9

Project Number: 18.74

Project Title: Wildlife Health and Disease Surveillance in Alaska

Project Duration: July 1, 2010 – June 30, 2011

Report Due Date: September 1, 2011

PRINCIPAL INVESTIGATOR: Kimberlee Beckmen

COOPERATORS: US Department of Agriculture, Alaska Department of Environmental Conservation, University of Alaska Fairbanks, National Marine Fisheries Service, National Marine Mammal Laboratory, Alaska Department of Health and Human Services, US Fish and Wildlife Service, The North Slope Borough, University of Calgary, The Norwegian School of Veterinary Science.

WORK LOCATION: Alaska, Statewide

I. PROGRESS ON PROJECT OBJECTIVES DURING LAST SEGMENT

OBJECTIVE: Document, evaluate, and monitor the incidence of diseases in free-ranging wildlife as well as the potential impacts of disease on wildlife populations in Alaska. Ensure animal welfare considerations in the capture and handling of wildlife by the Division for research or management purposes.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB/ACTIVITY 1: Maintain the Chronic Wasting Disease Surveillance Program.

- Supervised technician in Anchorage and performed necropsies on target (cervids that have signs consistent with CWD, are found dead unexplained or are hit by vehicle). Samples collected from 55 cervids [Moose (n=41), Sitka black-tailed deer (n=1), and caribou (n=13)] were tested for CWD at Colorado State Veterinary Diagnostic Lab, all were negative. Sample analysis and a portion of the technician salary was covered under a cooperative agreement with USDA.

Federal funds were used to pay for salaries other than the above portion of the Anchorage technician's salary; Dr. Beckmen's salary, a technician's salary, a college intern's salary and other expenses are included.

JOB/ACTIVITY 2: Maintain the blood, serum and tissue banks.

- Accessioned 444 blood / serum samples from new individuals [moose (n=112), plains bison (n=18), brown bear (n=43), wolf (n=34), muskox (n=11), and caribou (n=226, representing 13 herds)]. Other tissues, such as fecal samples or swabs for bacterial or viral culture were also collected/archived for the majority of the above samples.
- Organized and updated the inventory for ~ 35,000 individual archived vials of older blood and serum samples.
- Accessioned frozen and fixed tissues for 170 new pathology cases (see details under Job 3).
- More than 1200 samples were accessed to outside investigators and graduate students, including: University of Alaska Fairbanks (UAF) Museum of the North, UAF Institute of Arctic Biology, Colorado State University, University of California – Davis, University of Calgary, Hedmark University College (Norwegian School of Veterinary Science), Haartman Institute- Finland, US National Parasite Collections and Animal Research Laboratories/USDA, Southeast Cooperative Wildlife Disease Study, who are working on collaborative projects with ADFG.

Federal funds were used to pay for salaries, supplies and services on this task.

JOB/ACTIVITY 3: Conduct disease and parasite surveillance and monitor changes in disease patterns.

- Conducted post-mortem examinations on 170 cases on tissues, parasites, or whole carcasses presented by the public, as well as incidental takes such as road-kill, capture mortalities of other investigators, and animals found dead.
  - Mammalian Cases: 150 total (91 hoofstock, 34 terrestrial carnivores, 5 marine mammals, 10 small mammals, 5 captive wood bison and 5 domestics).
  - Other Cases: 2 reptiles, 1 amphibian, and 17 birds.
  - Gross diagnoses assigned when possible, and parasite identification or histopathological diagnoses pursued on unusual cases or those with lesions of concern (n=95 cases).
  - Identified 3 cases of cyanide poisoning in moose due to chokecherry ingestion.

- Serosurveillance: Submitted samples for over 7200 serologic tests; once completed, test results entered into the DWC Serology Database. An additional 3600 results produced in previous years were also entered into the database.
- A health assessment of the Western Arctic Caribou herd (n=10) was continued during annual capture operations.
- An investigation into neonate/fetal mortalities was conducted for the Teshekpuk (n= 12) and Mulchatna (n=2) caribou herds and muskox (n=5).
- Mentored a high school student research project that documented microfilaria found in moose, and led to the identification of a species not previously found in Alaskan moose. This work was presented at the Alaska Statewide High School Science Symposium, and the student took the top prize in the competition, continuing on to the National Science Symposium.

- Sampled three MRC moose calves to serve as controls/comparison for tests run on animals reared through our orphan moose calf program. Developed rational disease testing /release criteria for moose calf release.
- Rabies Surveillance: Our staff received training (provided by the Center for Disease Control) in the DRIT method of rabies testing. We tested 32 red fox (identifying 2 positives) and 3 arctic fox (identifying 2 positives) during this segment. We assisted in ~200 red fox necropsies conducted at the University of Alaska Fairbanks, accounting for a large portion of the ~300 brainstem samples we have prepared to be tested via this method during the next fiscal year.
- Steller Sea Lion serum chemistry validation tests conducted on a VetScan
- Monitored and recorded numerous public and department personnel reports regarding disease and parasites in wildlife.
- Identified four parasite infections and diseases not previously recognized in Alaskan wildlife.

Federal funds were used to pay for salaries, supplies and services on this task.

JOB/ACTIVITY 4: Monitor levels of environment contaminants in species of concern.

- Analyzed tissues from caribou, muskox and moose for heavy metals.
- Collected samples from Steller sealions during capture trip and marine mammals at necropsy for contaminants monitoring
- Collaborative studies of mercury in wolves and marine mammals.

JOB/ACTIVITY 5: Assess the nutritional trace mineral status of Dall's sheep, moose and caribou.

- Submitted blood, serum, liver, muscle, and/or kidney samples from Dall's sheep (n=21), moose (n=60), and caribou (n=111) for trace element screening, conducted at the Wyoming State Veterinary Laboratory.
- Nearly 2200 results generated from these analyses were entered into the DWC Clinical Pathology database.

Federal funds were used to pay for salaries, supplies and services on this task.

JOB/ACTIVITY 6: Review literature; prepare annual progress reports, a final report, and manuscripts for publication in refereed literature.

- Progress reports generated for Federal Aid and CWD Surveillance Program.
- Presented an oral summary report of research projects and disease surveillance at the Region III staff meeting.
- Co-authored manuscripts were drafted, prepared for submission or submitted for review *(accepted and published listed in V. Publications section*).
    A. *Submitted:* **Cervid Herpes Virus 2 (CvHV2) is endemic in Alaskan caribou and reindeer,** A. L. Evans[1,2,*], C. G. das Neves[1], G. F. Finstad[3], **K. B. Beckmen[4],** E. Sjerve[5], I. H. Nymo[1], M. Tryland[1]
    [1]Section of Arctic Veterinary Medicine, Norwegian School of Veterinary Science, Stakkevollveien 23, N-9010 Tromsø, Norway. alinaevans@gmail.com. 0047 4162 7539.
    [2]Faculty of Forestry and Wildlife Management, Hedmark University College, Campus Evenstad NO-2418 Elverum, Norway

[3]University of Alaska Fairbanks, Reindeer Research Program. Box 757200, Fairbanks Alaska 99775. USA.
[4]Alaska Department of Fish & Game, Division of Wildlife Conservation, 1300 College Road, Fairbanks AK 99701. USA.
[5]Centre for Epidemiology and Biostatistics, Norwegian School of Veterinary Science, P.O.Box 8146, NO-0033 Oslo, Norway.

B. *Prepared for submission:* **Experimental Treatment of Dog Louse Infestation in Interior Alaskan Wolf Packs,** Craig L. Gardner, **Kimberlee Beckmen,** Nathan Pamperin, Patty Del Vecchio

C. *Submitted to Journal of Wildlife Diseases:* **Evaluation Of *Trichodectes Canis* Detection Methods in Alaska Gray Wolves,** Theresa M. Woldstad,[1] **Kimberlee B. Beckmen,[2,3]** Kimberly N. Dullen,[2] and Kris J. Hundertmark[1]
[1] University of Alaska Fairbanks, Department of Biology and Wildlife, 902 North Koyukuk Drive, Fairbanks, Alaska, 99775-7000, USA
[2] Alaska Department of Fish and Game, 1300 College Road, Fairbanks, Alaska 99701-1551, USA
[3] Corresponding author (email: kimberlee.beckmen@alaska.gov)

D. *Submitted to Journal of Wildlife Diseases:* **Distribution Of *Trichodectes Canis* within Alaska: An Invasive Ectoparasite of Gray Wolves?**, Theresa M. Woldstad,[1] **Kimberlee B. Beckmen,[2]** Craig L. Gardner,[2] and Kris J. Hundertmark[1,3]
[1] University of Alaska Fairbanks, Department of Biology and Wildlife, 902 North Koyukuk Drive, Fairbanks, Alaska, 99775-7000, USA
[2] Alaska Department of Fish and Game, 1300 College Road, Fairbanks, Alaska 99701-1551, USA
[3] Corresponding author (email: kimberlee.beckmen@alaska.gov)

E. *Prepared for submission:* **Ecotoxicoparasitology of Intestinal Helminths in Mercury Dynamics of Alaskan Gray Wolves (*Canis Lupus*)**
Ashley K. Mcgrew[1], Todd M. O'hara[2], **Kimberlee B. Beckmen[3]**, Maggie Castellini[2], Craig A. Stricker[4], Mo D. Salman[5], And Lora R. Ballweber[1]
[1]Department of Microbiology, Immunology, and Pathology, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, Fort Collins, CO
[2]Wildlife Toxicology Laboratory, University of Alaska Fairbanks, AK
[3]Division of Wildlife Conservation, Alaska Department of Fish & Game, 1300 College Road, Fairbanks, AK 99701
[4]U. S. Geological Survey – Stable Isotope Laboratory, Denver Federal Center, Denver, CO 80225, USA

F. *Drafted:* **Contemporary Parasite Faunas of North American Arctic Ungulate and Emerging Issues**, In alphabetical order only: S. Kutz, J. Ducrocq, **K. Beckmen**, D. Colwell, B. Hoar, E. Hoberg, G. Verocai.

G. *Submitted Parasitology International:* **Molecular identification of *Taenia* spp. in wolves (*Canis lupus*), brown bears (*Ursus arctos*) and cervids from North Europe and Alaska**, Antti Lavikainen[a,*], Sauli Laaksonen[b], **Kimberlee Beckmen**[c], Antti Oksanen[d], Marja Isomursu[d], Seppo Meri[a,e]
[a]*Department of Bacteriology and Immunology, Haartman Institute, University of Helsinki, Finland*
[b]*Faculty of Veterinary Medicine, University of Helsinki, Finland*
[c]*Alaska Department of Fish & Game, Division of Wildlife Conservation, Fairbanks, Alaska, United States*
[d]*Fish and Wildlife Health Research Unit, Finnish Food Safety Authority Evira, Oulu, Finland*
[e]*Helsinki University Central Hospital Laboratory, Finland*

H. Submitted to Journal of Parasitology: **Toxoplasmosis in wildlife in the United States: prevalence of antibodies, isolation of viable *Toxoplasma gondii,* and reports of new genetic types**, J. P. Dubey[a,*], G. V. Velmurugan[a], C. Chellaiah[a], T. A. Felix, M. Yabsley[b], N. J. Thomas[c], **K. B. Beckmen[d], D**. Ruid[e], W. Paul[f], J. Hart[f], P.A. Fair[g], W. E. McFee[g] O. C. H. Kwok[a], L. Ferreira[a], and C. Su[h], et al
[a]*United States Department of Agriculture, Agricultural Research Service, Animal and Natural Resources Institute, Animal Parasitic Diseases Laboratory, Building 1001, Beltsville, MD, 20705-2350. USA*
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[*]*United States Department of Agriculture, Animal Plant Health Inspection Service, Wildlife Services, Lakewood, CO 80228, USA*[g] *National Oceanic and Atmospheric Administration, NOS Center for Coastal Environmental Health and Biomolecular Research, Charleston, SC 29412-9110, USA*
[h]*Department of Microbiology, The University of Tennessee, Knoxville, Tennessee 37996-0845 USA*

- **Co-authored papers and posters presented at meetings:**
  - **A.** 55th Annual Meeting American Association of Veterinary Parasitologists – Atlanta, GA – 31 Jul - 2 Aug, 2010. Presented by A Linton. **Toxicant-Parasite Interactions: The Role of Macroparasites In Mercury Dynamics Within The Gastrointestinal Tract Of Mammalian Hosts.**
  - **B.** XIIth International Congress of Parasitology (ICOPA), Melbourne, Australia, August 15th to August 20th, 2010. Toxicant-Parasite Interactions

in Alaskan Grey Wolves: Presented by A Linton. **The Role of Intestinal Macroparasites in the Uptake & Biotransformation of Mercury (Hg)**.

C. Annual meeting of the Alaska Chapter of the Wildlife Society, Juneau AK, April 5-7. Presented by Kimberlee Beckmen: 1. **Mass Mortality Event of Moose From Consumption of Toxic Ornamentals. 2. Remotely-Delivered Chemical Immobilization of Adult Female Steller Sea Lions (*Eumetopias Jubatus*) For Physiological Sampling And Satellite Telemetry Attachment. 3. Prevention of Remote Dart-Delivery System and Net-Gun Capture Related Morbidity and Mortality**

D. 13th Northern Furbearer Conference in Whitehorse, Yukon, Canada, 12–14 April 2011. Presented by Craig Gardner. **Management of Dog Louse Infestation of Wolves in Interior Alaska.**

E. Joint Annual Conferences of the American Association Of Zoo Veterinarians and American Association of Wildlife Veterinarians, South Padre Island, Texas, October 23-29, 2010. Presented by Kimberlee Beckmen. 1. **Ceruloplasmin and Copper Status in Free-Ranging Alaskan Caribou (*Rangifer tarandus tarandus.* 2. Stress Levels During Chemical vs. Manual Restraint in Wood Bison (*Bison Bison Athabascae*) as Indicated by Blood Lactate and Glucose.**

Federal funds were used to support salary and expenses this task.

JOB/ACTIVITY 7: Perform duties of the attending veterinarian.

- Provided advice, consultation, and services to Division staff related to wildlife capture, disease, mortality, euthanasia, and zoonotic disease risk/diagnosis.
  - Provided training seminars in Animal Welfare, Wildlife Diseases, and Handling of Controlled Substances to DWC employees.
  - Assisted in laboratory instruction during the Safe Capture course attended by numerous DWC biologists and technicians.
  - Prepared capture and sampling supplies for 26 capture events (including moose, caribou, Steller sea lion, plains bison, muskox, and wolf) and dedicated 24 personnel days to assisting biologists with captures and/or sample collection.
  - Received continuing education in anesthesia and analgesia, and relay new/relevant topics to staff.
  - Prepared capture mortality summary statistics by species and capture methods used over past two calendar years.
  - Participated in a Steller sealion field capture to assess a new drug combination. Took blood samples, biopsies and performed clinical assessments.

- Provide veterinary drugs/supplies to Division staff.
  - Completed 6 veterinary drug/supply orders for Divisional staff and dispensed drugs/supplies throughout year.

- Conducted annual controlled substances inventory (2000+ individual vials of drugs), involving all staff that have been dispensed drugs (n=87 staff) throughout the entire state (n=23 area offices).
- Throughout the year, dispense drugs/supplies, receive and process controlled substance use reports and empty or partial vials for destruction.
- All data related to controlled substance order, dispensing, and use are entered into a drug tracking database.

- Address public concerns about wildlife disease, parasites, and lesions in game meat, zoonotic disease, and animal welfare. Attended to on a case by case basis (walk-ins, phone calls, e-mails, and public information requests).

- Performed the duties of the Attending Veterinarian for the DWC Animal Care and Use Committee. Provided training to new staff on the Animal Welfare Policy. Consulted on the development of new protocols, reviewed protocols submitted to the committee. Conducted research facility inspections. Responded to all personnel calls and reports of capture related morbidities and mortalities.

Federal funds were used to pay for salaries, supplies and services on this task.

IV. SIGNIFICANT DEVIATIONS AND/OR ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

- Wood Bison Restoration Project: Investigations into five wood bison deaths led to numerous discussions regarding disease and parasite issues
- Orphan moose raising and testing protocols were developed, orphan moose were examined, monitored and health checks provided. Sick or injured calves were examined and euthanized/necropsied as appropriate.
- Frequent monitoring of wildlife disease related reports via the internet and electronic newsletter as well as notifications of outbreaks were conducted. In addition, meetings (phone as well as in person) related to urgent zoonotic, human health or agricultural disease issues were attended.

V. PUBLICATIONS

- *In Press- Journal of Wildlife Diseases*: **AEROBIC ORAL AND RECTAL BACTERIA OF FREE-RANGING STELLER SEA LION PUPS AND JUVENILES (*EUMETOPIAS JUBATUS*) IN ALASKA,** Sebastian E. Carrasco[1,6], Kathleen A. Burek[2], **Kimberlee B. Beckmen**[3], J. Lindsay Oaks [4], Margaret A. Davis[4], Katherine N.K. Baker[5], Jonna A.K. Mazet[1]

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  [2]Alaska Veterinary Pathology Services, 23834 The Clearing Dr., Eagle River, Alaska 99577, USA

  [3] Alaska Department of Fish and Game, 1300 College Road, Fairbanks, Alaska 99701, USA

[4] Washington Animal Disease Diagnostic Laboratory, College of Veterinary Medicine, Washington State University, Pullman, Washington 99164, USA
[5]Field Disease Investigation Unit, Department of Veterinary Clinical Sciences, College of Veterinary Medicine, Washington State University, Washington 99164, USA

- *In Press -J. Wildl. Manage.:* **Effects of Predator Treatments, Individual Traits, and Environment on Moose Survival in Alaska,** MARK A. KEECH, MARK S. LINDBERG, RODNEY D. BOERTJE, PATRICK VALKENBURG, BRIAN D. TARAS, TOBY A. BOUDREAU, **KIMBERLEE B. BECKMEN.**
- **Cadmium, Copper, Iron, and Zinc Concentrations in Kidneys of GreyWolves, Canis lupus, from Alaska, Idaho, Montana (USA) and the Northwest Territories (Canada).** 2010. S. R. Hoffmann • S. A. Blunck • K. N. Petersen • E. M. Jones • J. C. Koval •R. Misek • J. A. Frick • H. D. Cluff • C. A. Sime • M. McNay • **K. B. Beckman** • M. W. Atkinson • M. Drew • M. D. Collinge • E. E. Bangs • R. G. Harper. Bull. Environ. Contam. Toxicol 85:481-485. (Appendix 2)

VI. RECOMMENDATIONS FOR THIS PROJECT

Disease surveillance and veterinary activities have continued to steadily increased in scope and intensity over the course of this performance period. To continue to provide wildlife veterinary services at the level currently expected, staffing levels and funding must be increased as well as a decrease in some duties. Federal funding of CWD surveillance will end after the next segment so we will not longer be able to maintain any CWD surveillance of free-ranging cervids in Alaska. The WBII in support of the CWD sampling and disease monitoring in southcentral left the position and there is not currently a biologist or technician in Region II or IV that is available to take up the tasks. These deficiencies will need to be mitigated by other funding sources including Federal Aid. Additional field and captive studies testing the effects of diseases and parasites on wildlife health are needed to understand the role of these factors on populations so they can be manipulated as needed for research and management purposes.

Prepared by: Kimberlee Beckmen, M.S., D.V.M., Ph.D.

Date: 8/29/2011
Attachments: Appendix 1: abstracts. Appendix 2: Reprints