

**Alaska Department of Fish and Game  
Wildlife Restoration Grant**

**Grant Number:** AKW-20 Wildlife Restoration FY2017

**Project Number:** 18.74

**Project Title:** Wildlife Health and Disease Surveillance in Alaska

**Project Duration:** July 1, 2012 – June 30, 2017

**Report Due Date:** September 1, 2017

**PRINCIPAL INVESTIGATOR:** Kimberlee Beckmen

**COOPERATORS:** US Department of Agriculture/APHIS, Alaska Department of Environmental Conservation.

**WORK LOCATION:** Alaska, Statewide

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**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**

Objective 1: Perform duties of the attending veterinarian.

Provided advice, consultation, and services to Division staff and the public related to wildlife capture, disease, mortality, euthanasia, and zoonotic disease risk/diagnosis.

- Conducted training course in Chemical Immobilization of Wildlife for DWC staff and collaborators.
- Developed and updated drug dosing/capture protocols for ACUC Capture manual.
- Developed wildlife capture and handling protocols.
- Reviewed ACUC protocols for drug doses and veterinary procedures.

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- Trained DWC staff in the handling of Controlled Substances in accordance with changes in DEA regulations.
- Addressed public concerns about wildlife disease, parasites, and lesions in game meat, zoonotic diseases, and animal welfare. Responded to walk-ins, phone calls, e-mails, and public information requests. Provided updates for the Alaska Dept. of Fish and Game website on Wildlife Diseases and Parasites.
- Presented workshops for dog owners on protecting pets from wildlife disease risk and the recent tick invasion, removing pets from traps/snares, first aid and CPR on pets. Provided public outreach materials including FAQs on rabies, Tularemia, Q-fever and Avian Cholera.
- Continued to review staff training and supply preparations for responding to wildlife caused human morbidity and mortalities.
- Responded to a human fatality from a bear mauling. Conducted field investigation and forensic/diagnostic work on this case. Conducted diagnostic and forensic work ups on bears killed at another human fatality from mauling.
- Provided multiple training seminars in Animal Welfare Policy, Wildlife Diseases and Parasites, Drug Handling and Chemical Immobilization training via DWC Vimeo.
- Updated Drug/capture training and informational materials for the public on wildlife disease on the SharePoint website and the internet.
- Prepared capture and sampling supplies for free-ranging wildlife capture projects as well as supported or assisted biologists with captures and/or sample collection.
- Provided veterinary care and advice for husbandry for the captive animals at the Moose Research Center, the Alaska Wildlife Conservation Center, and Moose Mamas.
- Advised the DWC Permit office on disease testing requirements for the import and holding of wildlife.

Provide veterinary capture drugs/supplies to Division staff.

- Coordinated and completed > 6 veterinary drug/supply orders for Divisional staff and dispensed drugs/supplies throughout year.
- Conducted annual controlled substances inventory (~1100 individual vials of drugs) involving DWC staff that have been dispensed drugs (n = ~120 staff) throughout the state (n = 23 area offices).

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- Throughout the year, ordered, prescribed and dispensed drugs/supplies (> 2000 individual items), receive and process controlled substance use reports and individual capture records, and empty/partial vials for destruction.
- All data related to controlled substance procurement, dispensing, and use are entered into a drug tracking database.

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

OBJECTIVE 2: Conduct disease and parasite surveillance and monitor changes in disease patterns.

- **Passive pathogen surveillance:** Conducted post-mortem examinations on 188 accessions of 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.
  - Gross observations and morphometric (on carcasses) data recorded, diagnoses assigned when possible, and samples for ancillary diagnostic testing or research requests were collected. Whenever feasible, parasite identification and definitive diagnoses will be pursued through histopathology.
  - Monitored and recorded numerous public and department personnel reports regarding disease and parasites in wildlife. Callers, email correspondence as well as drop-ins occur throughout the year but questions are particularly heavy during the first months of the hunting season and during the calving periods.
- **Active pathogen surveillance:** As requested by biologists, there was a continuing investigation into the causes of neonate/fetal mortalities, animal found dead and capture mortalities, especially caribou, moose, and mountain goats.
- **Serosurveillance:** Serosurveillance was reduced in favor of swabs for PCR compared to previous years to only select cases such as animals that were to be translocated, moved or ongoing disease projects. Submitted 93 sera samples for *Brucella*; 81 sera for *Chlamydiophila*, *Coxiella*, and Parapox virus (contagious ecthyma) testing at the National Veterinary Services Lab.
- **Respiratory Pathogen Screen:** *Mycoplasma* surveillance was expanded after *M. bovis* was found in wood bison. Subsequently an apparently moose-specific *Mycoplasma* very similar to *M. conjunctivae* but distinct from *M. ovipneumoniae* as well as a unique Adenovirus were detected on diagnostic testing of two deceased orphan moose. Screening in free-ranging ungulates was expanded further and 265 samples were analyzed via PCR. Developed a new collaboration with USDA/WSU researchers to identify *Mycoplasma spp.* in wildlife via PCR and serology. Toward this effort, an inventory of remaining swab samples was conducted (>1000).
- **Caribou and Muskox Health Assessment:** Attended meeting with colleagues on the muskox/caribou *Erysipelothrix* project. Preliminary results were published.

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The original ADFG Muskox health assessment manuscript was published in the Journal Wildlife Diseases.

- **Canine Distemper viruses in Alaskan Canids:** Collaborators with the Wildlife Conservation Society, Cornell University and USGS presented preliminary results at the Wildlife Disease Society conference.
- ***Brucella* spp.:** Routine surveillance for *Brucella* in live captured wildlife (93 samples) were submitted and tested by the Department of Environmental Conservation or submitted to diagnostic laboratories as listed in the serosurveillance section. Manuscript to be submitted to the journal Diseases of Aquatic organisms on *Brucella* in Bearded seals was drafted. Manuscript on *Brucella* testing from bears was published in the Journal of Wildlife Diseases.
- **Parapoxvirus:** Dr. Morten Tryland, of the Section of Arctic Veterinary Medicine of the Norwegian School of Veterinary Science in Tromsø, Norway submitted a manuscript that was accepted for publication.
- **Zoonotic fecal parasites of ungulates:** We continue to monitor for pathogenic strains of *Cryptosporidium* and *Giardia*. Eighteen fecal samples from 6 species were tested for *Cryptosporidium* and *Giardia* and the isolates sequenced Colorado State University in order to assess the prevalence and potential risk factors with this zoonotic parasite.
- **Enhanced Rabies Surveillance:** Using the Direct Rapid Immunoassay Test (DRIT) we tested 153 samples of mammalian brain tissue from 14 species for rabies. The majority were bats, followed by wolves and foxes. Positive and indeterminate samples were sent to the CDC in Atlanta for confirmation. The Section of Epidemiology and Office of the State Veterinarian were apprised of results. Some of the supplies and staff salary was funded through RSA's with USDA funds.
- ***Trichinella*:** USDA collaborators continue analysis of masseter muscle and tongue samples collected at necropsy or during predator control operations for *Trichinella* prevalence and determining genotypes (6 samples).
- **Bat health:** A cooperative project proposal was signed with UAF collaborator Dr. M. Murphy, "Determination of causes of Morbidity and Mortality in Bats of Alaska". Aim 1: Determine general patterns of disease in bats utilizing archived histological specimens and routine histological stains and microscopy. Aim 2: Determine viral contribution to respiratory lesions in bats. Sick and dead bats that were received by ADFG were necropsied and sampled for this project. Previous pathology records of all bats necropsied in the past decade were shared. Twenty-three bats were necropsied and sampled for the study.
- **Zoonotic Disease Risk Assessments:** Established a data sharing agreement with the Alaska Native Health Consortium and University of Alaska Fairbanks to

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estimate the seroprevalences of *Coxiella* and *Toxoplasma* in 228 caribou sera. Some raw results were received.

- Accessioned 243 blood / serum samples.
- Inventoried walk in freezer, 60 totes with over 1000 tissue samples.
- Inventoried 3 shelves in ultralow freezers, 160 cryoboxes of >10,000 vials of sera/blood/swabs or tissue.
- Accessioned frozen and/or fixed tissues for 188 new pathology cases
- More than 1500 samples were distributed to research collaborators, DWC and non-DWC investigators as well as graduate students to fulfill requests for tissue, blood, serum or carcasses. Research colleagues and investigators from the following institutions were represented: University of Alaska Fairbanks: Museum of the North, Department of Veterinary Medicine, Institute of Arctic Biology Wildlife Toxicology Lab as well as Colorado State University, University of Calgary, Norwegian School of Veterinary Science, US National Parasite Collections and Animal Research Laboratories/USDA, US Fish and Wildlife Service, Washington State University/USDA, Wyoming Veterinary Diagnostic lab.
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Federal funds were used to pay for salaries, supplies, travel, and services on this task.

OBJECTIVE 3: Assess the nutritional trace minerals status of Dall's sheep, moose and caribou.

- Analyzed available tissue samples from four species for heavy metals.
- Submitted 17 bone samples from these species for fat, calcium and phosphorus analysis. Twenty-five blood, serum, liver, muscle, and/or kidney were analyzed for trace element screening, conducted at the Wyoming State Veterinary Laboratory.

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

OBJECTIVE 4: Review literature; prepare annual progress reports, a final report, and manuscripts for publication in refereed literature.

- Progress report generated for Federal Aid.

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- Quarterly reports of rabies surveillance testing prepared jointly with USDA/WS for the Office of the State Veterinarian (DEC) and Section of Epidemiology (HSS).
- Presented an oral summary report of research projects and disease surveillance at meetings.
- Co-authored manuscripts were drafted, prepared for submission or submitted for review (*accepted and published listed in V. Publications section*).

**Co-authored papers and posters presented (presenter underlined) at meetings or conferences:**

***Brucella* infections in phocids versus otariids in Alaska.** NYMO INGEBJØRG HELENA<sup>1</sup>, LARSEN ANETT KRISTIN<sup>1</sup>, RØDVEN ROLF<sup>2</sup>, TRYLAND MORTEN<sup>1</sup>, FOSTER GEOFF<sup>3</sup>, BECKMEN KIMBERLEE<sup>4</sup>, QUAKENBUSH LORI<sup>4</sup>, GODFROID JACQUES<sup>1</sup>. <sup>1</sup>UiT-The Arctic University of Norway, Department of Arctic and Marine Biology, Research Group of Arctic Infection Biology, P.box 6050 Langnes, Tromsø, NORWAY; <sup>2</sup>Department of Natural resources and rural development, Norwegian Institute for bioeconomy research, P.box 115, 1431 Ås, NORWAY; <sup>3</sup>SAC Consulting Veterinary Services, Drummondhill, Stratherrick Road, Inverness IV10 8SP, SCOTLAND; <sup>4</sup>Alaska Dept. of Fish and Game, Division of Wildlife Conservation, 1300 College Road, Fairbanks, 99701 Alaska, USA. 12<sup>th</sup> Conference of the European Wildlife Disease Association, Berlin 2016.

**Disease Complexity in a Declining Alaskan Muskox (*Ovibos moschatus*) Population.**

Josephine A. Afema,<sup>1</sup> Kimberlee B. Beckmen,<sup>2,5</sup> Stephen M. Arthur,<sup>2,4</sup> Kathy Burek Huntington,<sup>3</sup> and Jonna A. K. Mazet<sup>1</sup>

<sup>1</sup>Wildlife Health Center, One Health Institute, School of Veterinary Medicine, University of California, 1089 Veterinary Medicine Drive, Davis, CA 95616, USA

<sup>2</sup>Alaska Department of Fish and Game, Division of Wildlife Conservation, 1300 College Road, Fairbanks, AK 99701, USA

<sup>3</sup>Alaska Veterinary Pathology Services, 23834 The Clearing Dr., Eagle River, AK 99577, USA

<sup>4</sup>U.S. Fish and Wildlife Service, Arctic National Wildlife Refuge, 101 12th Avenue, Room 236, Fairbanks, AK 99701, USA. Muskox Health and Ecology Symposium, November 10-11, 2016, Calgary Canada

**Is *Erysipelothrix rhusiopathiae*, a zoonotic bacterium and recent cause of mortality in muskoxen, new to the Arctic?**

Fabien Mavrot, Angeline McIntyre, Karin Orsel, Layne Adams, Kimberlee Beckmen, Marsha Branigan, Sylvia Checkley, Christine Cuyler, Tracy Davison, Brett Elkin, Wendy Hutchins, Lisa-Marie Leclerc, Nora Navarro-Gonzalez, Angie Schneider, Matilde Tomaselli, Susan Kutz. Muskox Health and Ecology Symposium, November 10-11, 2016, Calgary Canada

**Arterial blood-gas evaluation before and after intranasal oxygen supplementation in chemically immobilized arctic ungulates.**

Lian M<sup>1</sup>, Evans A<sup>1</sup>, Bjørck S<sup>2</sup>, Esteruelas N<sup>1</sup>, Beckmen K<sup>3</sup>, Jones K<sup>1</sup>, Angel M<sup>1</sup>, Stenbacka F<sup>4</sup>, Bentzen T<sup>3</sup>, Demma D<sup>5</sup>, Ericsson G<sup>4</sup>, Tryland M<sup>6</sup>, dasNeves C<sup>7</sup>, Os Ø<sup>8</sup>, Aanes R<sup>9</sup>, Andersen R<sup>10</sup>, Strand O<sup>10</sup> & Arnemo J<sup>1</sup>

<sup>1</sup>Department of Forestry and Wildlife Management, Faculty of

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Applied Ecology and Agricultural Sciences, Hedmark University College, Campus Evenstad, Elverum, Norway, <sup>2</sup>Moose Garden, Östersund, Sweden, <sup>3</sup>Alaska Department of Fish and Game, Fairbanks, AK, USA, <sup>4</sup>Department of Wildlife, Fish, and Environmental Studies (Vilt, fisk och miljö) Faculty of Forest Sciences (Skogsvetenskapliga fakulteten) Swedish University of Agricultural Sciences (SLU), Umeå, Sweden, <sup>5</sup>Alaska Department of Fish and Game, Palmer, AK, USA, <sup>6</sup>Arctic Infection Biology, Department of Arctic and Marine Biology, UiT – Arctic University of Norway, Tromsø, Norway, <sup>7</sup>Section of Arctic Veterinary Medicine, Department of Food Safety and Infection Biology, Norwegian School of Veterinary Science, Tromsø, Norway, <sup>8</sup>Veterinærconsult AS, Dramm, Norwegian Institute for Nature Research, Trondheim, Norway.  
American College of Veterinary Anesthesia and Analgesia Annual Meeting, 19th September, 2015, Washington DC, USA

**Ticks parasitizing dogs, cats, humans and wild vertebrates in Alaska: invasion potential — Kimberlee Beckmen**, Alaska Department of Fish and Game, Division of Wildlife Conservation. 2016 Alaska Invasive Species Workshop. October 25-27, Fairbanks.

Comparison of the use of an Electronic Control Device to chemical restraint for short term capture and release in reindeer (*Rangifer tarandus tarandus*). Kimberlee B. Beckmen, Camilla Lieske, Larry Lewis. 65<sup>th</sup> International Conference of the Wildlife Disease Association, July 31-Aug 5, 2016, Cortland NY.

**Health Management During Prolonged Confinement in Wood Bison (*Bison athabasca*): A veterinary perspective.** Kimberlee B. Beckmen, Robert F. Gerlach, Camilla Lieske, Tom Seaton. 65<sup>th</sup> International Conference of the Wildlife Disease Association, July 31-Aug 5, 2016, Cortland NY.

**Removal of lipid from serum increases coherence between brucellosis rapid agglutination tests and ELISA in Alaskan grizzly bears (*Ursus arctos horribilis*) and Kodiak brown bears (*Ursus arctos middendorffi*).** Jacques Godfroid ([jacques.godfroid@uit.no](mailto:jacques.godfroid@uit.no))<sup>1</sup>, Kimberlee Beckmen ([kimberlee.beckmen@alaska.gov](mailto:kimberlee.beckmen@alaska.gov))<sup>2</sup>, Ingebjørg Helena Nymo ([ingebjorg.h.nymo@uit.no](mailto:ingebjorg.h.nymo@uit.no))<sup>1,3</sup>.

<sup>1</sup>UiT – The Arctic University of Norway, Research group for Arctic Infection Biology, Postboks 6050 Langnes, N-9010 Tromsø, Norway. <sup>2</sup>Alaska Department of Fish and Game, 1300 College Road, Fairbanks, AK 99701-1551, USA. 65<sup>th</sup> International Conference of the Wildlife Disease Association, July 31-Aug 5, 2016, Cortland NY.

**Comparison of the use of a Conducted Electrical Weapon to chemical restraint for short term capture and release in reindeer (*Rangifer tarandus tarandus*)** Kimberlee B. Beckmen, Camilla Lieske, Larry Lewis. Meeting of the Alaska Chapter of the Wildlife Society. Fairbanks AK.

**Health Impacts of Nutritional Deficiencies in Wood Bison.** Kimberlee B. Beckmen, Robert F. Gerlach, Camilla Lieske, Tom Seaton. Meeting of the Alaska Chapter of the Wildlife Society. Fairbanks AK.

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

OBJECTIVE 5: MAINTAIN A MINIMAL CHRONIC WASTING DISEASE SURVEILLANCE PROGRAM.

- Fifty-five ungulates were sampled for CWD and tested negative at CSU:  
4 caribou, 5 SBT deer, 2 elk, 43 moose, 1 mule deer
- ~20 staff were trained in how to collect CWD samples from moose heads.

A Cervid Health Task Force steering committee was appointed and met once. The two primary objectives identified by the committee for the task force to address were increasing CWD surveillance and creating a systematic Moose Winter Tick surveillance program.

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

**III. COSTS INCURRED DURING THIS SEGMENT**

**Not applicable**

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

- 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.
  - Monitor Promed and Wildlife Health Alerts listservs for disease outbreaks and infectious disease discoveries pertinent to Alaskan wildlife and zoonotic disease risks or introductions of exotic (non-endemic) disease. Alert or report pertinent issues to DWC staff via an email list.
  - Attend remotely and presented at the Animal Determinants of Emerging Disease Seminar Series “Zoonoses” rounds.
  - Participate as a member of the Wildlife Health Committee of AFWA, WAFWA, the Alaska One Health Group, Marine Mammal Health MAP Data committee, and other subcommittees related to wildlife health and zoonotic disease. Report pertinent issues to DWC staff.
  - Attended the Wildlife Disease Association meeting, July 2017, to obtain continuing education credits required for maintenance of Alaska veterinary licensure.
  - Edited and updated the AFWA “Best Practices for Management and Use of Controlled Substances for Fish and Wildlife Management Agencies”



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- Attended UAF Department of Veterinary Medicine staff meetings. Taught labs on veterinary anatomy and pathology to the veterinary class.
- Worked with the UAF DVM program pathologist for the benefit of shared research, teaching and disease surveillance goals.
- Trained 2 college interns who are primarily involved with assisting in necropsy, processing blood/tissues samples, archiving/inventory/shipment of samples and preparing field supplies.

Federal funds were used to pay for salaries, supplies, services, and some travel costs for this work.

## V. PUBLICATIONS

### **Published:**

Durden, L.A., **Beckmen, K.B.**, Gerlach, R.F. 2016. New Records of Ticks (Acari: Ixodidae) from Dogs, Cats, Humans, and some Wildlife Vertebrates in Alaska: Invasions Potential. *Journal of Medical Entomology* 2016:1-5 Open Access

Simard, A.-A., Kutz, S., Ducrocq, J., **Beckmen, K.**, Broderur, V., Campbell, M., Croft, B., Cuyler, C., Davidson, T., Elkin, B., Giroux, T., Kelly, A., Russell, D., Taillon, J., Veitch, A., Cote, S.D. 2016. Variation in intensity and prevalence of macroparasites in migratory caribou: a quasi-circumpolar study. *Can.J.Zool.* 94: 607-617

Godfroid, J., **Beckmen, K.**, Nymo, I.H. 2016. Removal of Lipid from Serum Increases Coherence between Brucellosis Rapid Agglutination Test and Enzyme-linked Immunosorbent Assay in Bears in Alaska, USA. *Journal of Wildlife Diseases* 52(4): 912-915

Afema, J.A., **Beckmen, K.B.**, Arthur, S.M., Burek Huntington, K.A. and Mazet, J.A.K. 2017. Disease Complexity in a Declining Alaskan Muskox (*Ovibos moschatus*) Population. *Journal of Wildlife Diseases* 53(2):pp. 311-329.

### **In Press:**

Lian M, Evans AE, **Beckmen K.B.**, Caulkett NA, Arnemo JM. Restraint and immobilization. In: Tryland M, Kutz S, Oksanen A, eds. Reindeer and caribou. Health and disease. Boca Raton, FL, USA: Taylor & Francis, 2017.

Lian, Marianne, Shawn Johnson, Thomas Gelatt, Todd M O'Hara, **Kimberlee B Beckmen**, and Lorrie D Rea. Field anesthesia of juvenile Steller sea lions (*Eumetopias jubatus*) captured using an underwater capture technique. *Marine Mammal Science*

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Yanagida, Tetsuya, Antti Lavikainen, Eric P. Hoberg, Sergey Konyaev, Marcello Otake Sato, Akira Ito, **Beckmen, K. B.**, Minoru Nakao. Specific status of *Echinococcus canadensis* (Cestoda: Taeniidae) inferred from nuclear and mitochondrial gene sequences. International Journal of Parasitology August 2017

**Submitted, in review:**

Tryland, M., **Beckmen, K.B.**, Burek-Huntington, K.A., Breines, E.M., Klein, J. Orf virus in Alaskan, mountain goat, Dall's sheep, muskoxen, caribou and Sitka black-tailed deer – a zoonotic risk for hunters and game management people. Acta Veterinaria Scandinavica

O'Hara, Todd M., Megan Templeton, J. Maggie Castellini, Randall Wells, **Kimberlee Beckmen**, Jim Berner. Use of Blood Soaked Cellulose Filter Paper for Measuring C and N Stable Isotopes. Journal of Wildlife Diseases

**Manuscripts drafted:**

Lieske, C. L., **Beckmen, K.B.**, Lewis, L.L. Physiological Responses in Reindeer to Application of a Conducted Electrical Weapon. Submitted and rejected from the Journal of Wildlife Diseases. Reformatting/revising for submission to Human-Wildlife Interactions.

Foster, G, Nymo, I.H., Kovacs, K.M., **Beckmen, K.B.**, Brownlow, A.C., Baily, J.L., Dagleish, M.P., Muchowski, J., Perrett, L.L., Tryland, M., Lydersen, C., Godfroid, J. , McGovern, B., Whatmore, A. M., First isolation of *Brucella pinnipedialis* and detection of *Brucella* antibodies from bearded seals (*Erignathus baratus*). Submitted to Disease of Aquatic Organisms August 2017

Nymo, I.H., Rødven, R., Larsen, A.K., Tryland, M., Quakenbush, L., **Beckmen, K.**, Godfroid, J. Anti-Brucella antibodies in Alaskan true seals and eared seals- two different stories. Formatted for Frontiers in Veterinary Science.

R. Stimmelmayer, G.M. Ylitalo, G. Sheffield, **K.B. Beckmen**, K.A. Burek-Huntington, V. Metcalf, and T. K. Rowles. Oil fouling in subsistence-harvested ringed (*Phoca hispida*) and spotted seals (*Phoca largha*) from the Bering Strait region, Alaska: Polycyclic aromatic hydrocarbon bile and tissue levels and pathological findings. Submitted to Journal of Wildlife Diseases and rejected.

## **VI. RECOMMENDATIONS FOR THIS PROJECT**

Disease surveillance and veterinary activities have continued to steadily increase in scope and intensity over the course of this performance period. To continue to provide wildlife veterinary services at the level currently expected by Alaskans (and demanded by DWC personnel), veterinary staffing levels and funding for wildlife disease surveillance must be increased as well as a decrease in some less critical tasks. The division director has approved the assembly of a Cervid Health and Disease Surveillance Task Force which will require additional DWC staff support as well as this program. Federal funding of

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CWD surveillance is no longer available, so we will no longer be able to maintain a significant level of CWD surveillance of free-ranging cervids in Alaska unless allocated additional funding and staff. A full-time capture veterinarian as well as a veterinary technician stationed in Anchorage or Palmer, and a Collections Manager in Fairbanks would allow the program to fulfill the demands for service. Alternatively, to a collections manager, the serum and tissue archives could be transferred and administered by the University of Alaska Museum of the North if supported with funding by ADFG. The dedicated assistance of a biometrician or statistician is critical to analyze, appropriately interpret and report the comprehensive, complicated data generated through these surveillance programs. Consultations with colleagues with wildlife epidemiologic expertise are needed to advance the understanding of the role of these potential pathogens on Alaska's wildlife populations and determine if and when there is a need for intervention, mitigation or further study and monitoring for wildlife disease management purposes.

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

**Date: 8/24/2017**

**Attachments: 3 PDFS of publications**

Note: The three publications attached to the submitted Federal Aid report are copyrighted journal articles that may also be located via the Division of Wildlife Conservation Publications Database. Citations to the articles and the DOI websites that may provide access to the PDFs are as follows:

Afema, J. A., K. B. Beckmen, S. M. Arthur, K. Burek Huntington, and J. A. K. Mazet. 2017. Disease complexity in a declining Alaskan muskox (*Ovibos moschatus*) population. *Journal of Wildlife Diseases* 53(2):311-329. doi:10.7589/2016-02-035

Durden, L. A., K. B. Beckmen, and R. F. Gerlach. 2016. New records of ticks (Acari: Ixodidae) from dogs, cats, humans, and some wild vertebrates in Alaska: Invasion potential. *Journal of Medical Entomology* 53(6):1391-1395. doi:10.1093/jme/tjw128

Godfroid, J., K. Beckmen, and I. H. Nymo. 2016. Removal of lipid from serum increases coherence between Brucellosis rapid agglutination test and enzyme-linked immunosorbent assay in bears in Alaska, USA. *Journal of Wildlife Diseases* 52(4):912-915. doi.org/10.7589/2015-11-298