IDAHO DEPARTMENT OF FISH AND GAME

Steven M. Huffaker, Director

Project W-179-R-2

Progress Report

WILDLIFE HEALTH LABORATORY

Study I, Job 1

July 1, 2002 to June 30, 2003

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PROGRESS REPORT

GRANT NUMBER: W-179-R
SEGMENT NUMBER: 2
GRANT TITLE: Wildlife Health Laboratory
AGREEMENT PERIOD: July 1, 2002 to June 30, 2003

ABSTRACT

During the 2002 - 2003 project year, the Idaho Department of Fish and Game's (IDFG) Wildlife Health Laboratory (WHL) in Caldwell, Idaho was actively involved in the collection of biological data in support of wildlife management within the state and in research projects concerning various aspects of wildlife health. More than 2,165 biological samples from a variety of wildlife species were collected and analyzed for serology, complete blood counts, serum chemistries, bacteriology, virology, parasitology, and toxicology. These samples represented over 30 species of animals including bighorn sheep, mule deer, moose, elk, black bear, mountain lion, wild turkey, waterfowl, raptors, and other birds. Necropsies were performed on 202 animals to determine cause of death. The Enforcement Bureau submitted 24 cases to the Forensics Laboratory. Several papers and abstracts were submitted for publication, including papers written and submitted in conjunction with individuals at the Caine Veterinary Teaching and Research Center and the Hells Canyon Initiative. Biological samples were collected from wildlife in several states (Nevada, Montana, Oregon, Colorado, Utah, and Washington) to assist these wildlife agencies in screening wildlife species for disease. WHL personnel offered five animal restraint and drug handling courses for biologists and officers of IDFG, in addition to personnel from the Idaho Department of Agriculture, and other state wildlife and law enforcement agencies. WHL personnel were involved in disease investigations and multi-agency research projects with the University of Idaho; Oregon Department of Fish and Wildlife; Washington Department of Fish and Wildlife; U.S. Department of Agriculture, Animal and Plant Health Inspection Service; U.S. Geological Survey, Biological Resources Division, Montana; National Veterinary Services Laboratory, Iowa; Texas A&M University; U.S. Forest Service; U.S. Bureau of Land Management; and Wyoming Department of Game and Fish.

OBJECTIVE

The primary objective and first priority of the WHL has been to provide support for the wildlife management and research activities of the IDFG, Bureau of Wildlife (BOW), and forensics for the Bureau of Enforcement. Monitoring of all wildlife populations for disease and disease exposure is the major function of the WHL in these activities. Directing and implementing wildlife health and disease research are secondary objectives of the WHL. The WHL services provided have management and research applications; therefore, data obtained from WHL analyses are reported to the wildlife managers, researchers, and other state and federal agencies. Information is disseminated on disease issues in the western states by active participation in the Western Wildlife Health Cooperative. In addition, the WHL houses the forensic lab biologist

and supports the Bureau of Enforcement through casework requiring expertise with DNA techniques and equipment.

WILDLIFE TOOTH AGING

During 2002 - 2003, the WHL received approximately 178 wildlife teeth. The regional offices submitted teeth from big game species including 173 mule deer and 5 miscellaneous species that were necropsied at the WHL. The WHL received the batches of teeth for entry into a dBase file containing Big Game Mortality Report form numbers, or other identifying numbers. Additional information recorded included species, IDFG region, sex, and kill date of animal. All teeth were sent to Matson's Laboratory, Milltown, Montana, for dental cementum analysis to determine age of each specimen. Age information was reported to the regions, allowing respective research and management biologists to analyze age structure of the population. All age information was also stored at the WHL to assist big game hunters requesting the age of the animal they harvested.

Bobcat Jaw and Tooth Collections

The WHL makes storage and workspace available to the BOW. The nongame program processes jaws, enters data, and submits samples to Matson's Laboratory for bobcat aging information.

DISEASE DATA COLLECTION

Biological Samples

One of the primary objectives of the WHL is to establish baseline data on diseases in wildlife populations to determine background disease exposure for individual species and populations. Disease agents can be present in individuals or within a population without showing any significant signs of disease. As environmental and population conditions change with time, the significance of these organisms and agents can shift and these agents can become pathogens of concern to wildlife biologists. Factors that influence disease processes including trace mineral levels, stress, loss of habitat, and human interactions must also be considered in situations involving any disease process. Our objective is to establish baseline data on the various wildlife populations in Idaho and to monitor the health of these populations, through time, with continued sampling and analyses.

During the 2002 - 2003 project year, several important wildlife health issues were investigated. The presence of Brucellosis in elk in eastern Idaho was monitored and a variety of management options were discussed to deal with this disease. Because of low snow accumulation in eastern Idaho, no trapping of elk was done in eastern Idaho in the project year.

Baseline data was collected from bighorn sheep that were part of two capture or capture-and-transplant operations in Idaho. A total of 50 Rocky Mountain sheep were caught in Hells Canyon for routine sampling and marking. Sheep were caught in Idaho, Washington, and Oregon. A capture-and-transplant operation in the Owyhee canyons in southern Idaho was done

and 13 California sheep were transplanted from the Bruneau/Jarbidge and East Fork of the Owyhee to the Cache Peak area of Unit 55.

Chronic Wasting Disease (CWD) has been an important topic nationwide this project year. During the 2002 - 2003 project year, Department personnel collected 680 brain samples from elk, mule deer, and white-tailed deer. These samples were collected primarily from hunter check stations and some road kills or necropsies throughout the state of Idaho. During the upcoming project year, the WHL plans to continue the surveillance program at hunter check stations throughout the state.

During the 2002 - 2003 project year, WHL personnel processed more than 2,165 biological samples from wildlife throughout the state. Samples were collected for complete blood count (hematology), serology, serum chemistry, viral and bacterial isolation (virology and bacteriology), mycoplasmosis and internal and external parasites (parasitology), and toxicology.

Necropsies

There were a total of 202 animals necropsied during the project year 2002 - 2003. The species examined included: mule deer, moose, turkey, rocky mountain bighorn sheep, elk, bison, sage grouse, peregrine falcon, red fox, white-tailed deer, mountain lion, mourning dove, skunk, black bear, pigeon, red-tailed hawk, owl, pronghorn antelope, bobcat, beaver, goose, quail, crow, mountain goat, bat, wolverine, leopard frog, raccoon, pine siskin, jackrabbit, cottontail, and pheasant.

Necropsy results on songbirds indicated diseases associated with bird feeders including Salmonellosis and Trichomoniasis. Waterfowl mortality diagnosed by the WHL included botulism, organophosphate intoxication, and feed impaction.

The most common cause of bighorn sheep mortality diagnosed by the WHL was acute bronchopneumonia caused by *Pasteurella multocida*, *Mannheimia (Pasteurella) haemolytica*, and *Mannheimia* (*Pasteurella) trehalosi*. Other mortality factors identified included gunshot (poaching) and predation.

FORENSIC TESTING

The forensic biologist handled 24 cases submitted by conservation officers throughout the state. Forensic testing can be done for all big game animals to determine family and species identification of blood and meat evidence. The gender of all big game animals was determined on samples of blood, meat, and hair using DNA technology. The DNA matching test was used to determine if mule deer samples, such as those from a gut pile, and seized, frozen meat, are from the same individual. State-of-the-art technology was used to initiate development of other big game matching analyses, including elk, bear, and bighorn sheep. Cause of death and X-ray analysis for presence of lead was also conducted.

RESEARCH ACTIVITIES

Research continues to be an important objective of the WHL. Numerous projects are in-progress or in various stages of completion. Currently, all research projects that use live animals must follow the protocols and Animal Care and Use Guidelines of the University of Idaho. Five projects are currently active at the WHL.

A contraception study on female bison was started in June 2002 at the WHL. Six individually identified adult female bison received GnRH vaccine intramuscularly and five received a sham vaccine (sterile water and adjuvant) in June 2002. Blood samples were to be collected monthly for four months and every two months thereafter. Samples were tested for antibody titers to GnRH at the USDA VS lab in Fort Collins, Colorado. All cows were exposed to a male from September to November. One cow died of retroperitoneal hemorrhage after handling. At present, three of the control cows have calved.

A study to evaluate serum and liver copper levels in bighorn sheep was approved, but not completed. This study protocol will be reevaluated in the upcoming project year and initiated if funding sources are identified.

A project encompassing long term monitoring of bighorn sheep that have had contact with domestic livestock will be completed by July 2003. A total of 12 sheep that had some level of contact with domestic livestock were captured over a three-year period. All sheep were sampled on the day of arrival and at regular intervals for up to three years to determine if disease agents from the domestic livestock were present and the persistence of these agents. Data analysis will be done in summer 2003.

A project to determine risk factors for disease in bighorn sheep was started. A 30-year dataset from a herd of bighorn from Lostine, Oregon was obtained and the data entered into an access database. Data are currently being evaluated via a risk analysis technique at the University of California-Davis. Results are expected to be completed by fall 2003.

A disease survey of domestic goats (pack goats and herd goats) in the Hells Canyon area was done to try to obtain data on the health profile of goats under different management conditions and to delineate any potential disease concerns for bighorn sheep. A total of 100 animals are to be sampled and data analysis will be done in fall 2003.

An ongoing project to determine the epidemiology of Brucellosis within the elk and bison housed at the WHL is on-going. After completion of the strain-19 vaccine trial in elk at the WHL in July 2002, a small number of elk and bison seroconverted to Brucellosis. One animal was culture positive to the same strain of Brucellosis used in the elk vaccine trial. Efforts to determine how the bacteria went from the vaccine trial elk to resident bison and elk is on-going.

Additional molecular DNA projects are being considered for analysis at the WHL, including determination of black bear and mountain lion population estimates using noninvasive marking techniques.

ANIMAL RESTRAINT AND DRUG USE CLASSES

WHL personnel are responsible for instructing and certifying biologists and conservation officers in capture techniques using both physical and chemical restraint. These classes are required to use the controlled drugs, and re-certification of personnel is required every two years. Over 70 IDFG personnel were certified through five training classes in 2002 - 2003. This year, the WHL also offered the course to outside agencies which included the Idaho State Department of Agriculture and several law enforcement agencies.

ANIMAL CARE

WHL personnel are responsible for providing care to the animals kept at the WHL. For the project year 2002 - 2003, WHL personnel cared for the following animals:

ELK	30
BISON	26
BIGHORN SHEEP	26

LIAISON WITH OTHER AGENCIES

The WHL has worked with other state, federal, and private organizations on wildlife health issues. WHL personnel are on the Technical Advisory Committee for the Greater Yellowstone Interagency Brucellosis Committee. This committee is a multidisciplinary task force of state and federal agencies dedicated to eradicating the disease in the Greater Yellowstone area bison and elk.

There was WHL representation on the International Association of Fish and Wildlife Agencies' Wildlife Disease Committee (Western Wildlife Health Committee). This representation is to help keep state wildlife directors informed of disease issues in wildlife and to coordinate disease surveillance and dissemination of current disease problems in the western USA.

The WHL is also involved with the U. S. Animal Health Association. Membership is maintained on the Captive Wildlife Committee, the Brucellosis Committee, and the Wildlife Disease Committee. These committees help to keep federal and state regulatory agencies informed of wildlife issues and their relationship with livestock diseases.

Strong affiliations are also in place with the University of Idaho, Washington State University, Boise State University, and Texas A&M. These affiliations help the WHL direct and collaborate on research projects as they pertain to wildlife health. In addition, the WHL has worked cooperatively with the National and Idaho Chapter of the Foundation of North American Wild

Sheep (FNAWS). WHL personnel also work with the Peregrine Fund and its activities in monitoring birds and nest sites.

ABSTRACTS AND PUBLICATIONS

WHL personnel collaborated on several publications and presented abstracts at scientific meetings during the project year.

Peer-reviewed Publications

Hunter, D. L., L. M. Cowan, K. M. Rudolph, and A. C. S. Ward. 2002. Transmission of *Pasteurella haemolytica* between free-ranging bighorn and domestic sheep. *In preparation*.

Rudolph, K. M., D. L. Hunter, W. J. Foreyt, E. F. Cassirer, and A. C. S. Ward. 2002. Sharing of *Pasteurella* spp. between free-ranging bighorn sheep and feral goats. Journal of Wildlife Diseases, *submitted*.

Rudolph, K. M., D. L. Hunter, R. B. Rimler, E. F. Cassirer, W. J. Foreyt, W. J. DeLong and A. C. S. Ward. 2003. Micro-organisms associated with a bighorn sheep pneumonia epizootic in Hells Canyon, USA. 2003. *In preparation*.

Drew, Mark L., T. Kreeger, K. Waldrup, C. Macintosh. Pharmacokinetics of ceftiofur in red deer delivered by intramuscular and ballistic implant routes. Journal of Veterinary Pharmacology and Therapeutics: *in review*

Drew, Mark L., L. Johnson, D. Pugh, A. Craigmill. Pharmacokinetics of ceftiofur in alpacas and llamas. Journal of Veterinary Pharmacology and Therapeutics: *in review*

Drew, Mark L., V. N. Bleich, S. Torres, and J. N. Weyhausen. Theoretical reproductive performance for desert mountain sheep in California. *In preparation.*

Drew, Mark L., B. Hargis, and K. Pierce. Paratyphoid infection of the ovary in an ostrich. *In preparation.*

Drew, Mark L., R. Etter. Brucellosis in elk (*Cervus elaphus*) in eastern Idaho. *In preparation.*

Presentations at Scientific Meetings

Drew, Mark L. and A. Ward. 2002. Long-term monitoring of bighorn sheep that have had contact with domestic livestock. Wildlife Disease Association Annual Meeting. Arcata, California.

Drew, Mark L. and W. Foryet. 2002. *Eleophora schnederii* in moose from Idaho. Wildlife Disease Association Annual Meeting. Arcata, California.

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FEDERAL AID IN WILDLIFE RESTORATION

The Federal Aid in Wildlife Restoration Program consists of funds from a 10% to 11% manufacturer's excise tax collected from the sale of handguns, sporting rifles, shotguns, ammunition, and archery equipment. The Federal Aid program then allots the funds back to states through a formula based on each state's geographic area and the number of paid hunting license holders in the state. The Idaho Department of Fish and Game uses the funds to help restore, conserve, manage, and enhance wild birds and mammals for the public benefit. These funds are also used to educate hunters to develop the skills, knowledge, and attitudes necessary to be responsible, ethical hunters. Seventy-five percent of the funds for this project are from Federal Aid. The other 25% comes from license-generated funds.