

IDAHO DEPARTMENT OF FISH AND GAME

Steven M. Huffaker, Director

Project W-179-R-1

Job Progress Report



WILDLIFE HEALTH LABORATORY

Study I, Job 1

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**PROGRESS REPORT
SURVEYS AND INVENTORIES**

STATE: Idaho **JOB TITLE:** Wildlife Laboratory
PROJECT: W-179-R-1
SUBPROJECT: Lab **STUDY NAME:** Wildlife Surveys and Inventories
STUDY: I
JOB: 1
PERIOD COVERED: July 1, 2001 to June 30, 2002

ABSTRACT

During the 2001-2002 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. The WHL along with the Bureau of Wildlife (BOW) processed approximately 1,899 teeth for age analysis including 105 ungulates, and 1,794 black bear. More than 1,580 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 348 animals to determine cause of death. The Enforcement Bureau submitted 27 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 three animal restraint and drug handling courses for biologists and officers of IDFG, in addition to personnel from the US Department of Agriculture, Animal Plant Health Inspection Service, Wildlife Services; 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, 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 2001-2002, the WHL received approximately 1,899 wildlife teeth. The regional offices submitted teeth from big game species including 35 mule deer and 70 white-tailed deer. 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 is a storage facility for BOW. The nongame program processes jaws, enters data, and submits samples to Matson's Laboratory for bobcat aging information.

Black Bear Tooth Processing

The IDFG elected to continue compiling relevant information for black bear management. Black bear hunters were required to present a skull for collection of a premolar, and a mortality report form was completed. Bear teeth collected during the spring and fall seasons were received at the WHL. Identifying numbers were recorded on the database file along with date of kill and sex of animal. The statewide sample of teeth was shipped to Matson's Laboratory for dental cementum analysis to determine age of each animal. From the statewide bear harvest, 1,794 teeth were submitted. Of those animals, 872 were harvested in fall 2001 and 922 were harvested in spring 2002. In addition, 32 teeth were obtained from animals marked with tetracycline for a biomarker analysis for population enumeration. Age information is forwarded to each region submitting teeth, and used by Wildlife personnel to assess age structure of the population.

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 what 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 2001-2002 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. Approximately 110 elk were trapped and tested for Brucellosis in two locations in eastern Idaho. Seronegative elk were translocated from Rainey Creek to Dry Canyon. However, two of these animals were found to be seropositive on supplemental testing. One of these animals was killed and tissues collected for *Brucella* spp. culture and serology. In April 2002, a cattle herd in eastern Idaho was found to be seropositive for Brucellosis. Culture of these cattle revealed the same biovar of *Brucella abortus* that had been found on a seropositive elk from the same facility. The cattle herd (consisting of 81 head) was killed in June 2002.

Baseline data was collected from bighorn sheep that were part of two capture and transplant operations into Idaho. A group of 20 sheep were brought to Hells Canyon in Idaho from the Missouri Breaks area of Montana. The second operation was collection of baseline data from 51 sheep in the Owhyee Mountains and Snake River Canyons in southwestern Idaho.

Chronic Wasting Disease (CWD) has been an important topic nationwide this project year. The WHL conducts an annual chronic wasting disease surveillance program. During the 2001-2002 project year, Department personnel collected 139 brain samples from elk, moose, mule deer, and white-tailed deer. These samples were collected from necropsies performed at the WHL, or from hunter check stations and road kills throughout the state of Idaho. During the upcoming project year, the WHL plans to continue the surveillance program and increase the number of samples collected by instituting a voluntary sample collection program at hunter check stations throughout the state.

During the 2001-2002 project year, WHL personnel processed 1,585 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 348 animals necropsied during the project year 2001-2002. 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, bobcat, beaver, geese, 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*. Eight samples were obtained from hunter-killed animals to augment the database on pneumonia in the Hells Canyon area. In addition, a significant mortality event in Nevada was investigated; the final diagnosis was capture myopathy.

A three-year vaccination trial to test the efficacy of *Brucella abortus* strain 19 vaccine in elk was completed in 2002. Ninety female elk that were pregnant, were challenged with *Brucella abortus* 2308. Abortions and birth events were monitored. All fetuses, calves, and cows were necropsied and cultured for Brucellosis. The culture data and vaccine efficacy data will be available in fall 2002.

FORENSIC TESTING

The forensic biologist handled 27 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 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. We now have state-of-the-art technology to enable the lab to do matching tests for all big game species. 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.

Data collection for the research project to identify bighorn sheep that have a gene for natural resistance (Nramp) to *Pasteurella* spp. infection has been completed. A collection of over 900 bighorn sheep DNA samples resides at the lab. Over 350 bighorn sheep samples have been tested for the Nramp gene. Results are pending from a killing assay conducted at Texas A&M University to determine if any of the alleles are protective against pasteurellosis under laboratory conditions. Final analysis of the data, research paper(s) and a final project report will be completed this fall.

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 5 received a sham vaccine (sterile water and adjuvant) in June 2002. Blood samples will be collected monthly for 4 months and every 2 months thereafter; samples will be tested for antibody titers to GnRH.

Animals will be exposed to a male from July through September. Animals will be observed daily for signs of estrus. Animals will be pregnancy tested (palpation, ultrasound, and pregnancy specific protein B) in November. Calving will be monitored in the spring and summer of 2003.

Two projects on liver flukes in bison were conducted during the 2001-2002 project year. Twelve bison at the WHL were used in these projects. Six adult male bison were inoculated orally with 1,000 metacercariae of *Fascioloides magna*. Three adult male bison were used as controls. In conjunction with this project, a pharmacokinetic study was done to test the efficacy of triclabendazole in bison for control of liver flukes. Three months after inoculation with metacercaria, the bison were treated orally with triclabendazole at a dose of 40 mg/kg. The 4 controls were given a placebo. Blood was drawn at the time of treatment, 8 hours, 72 hours, and 168 hours after treatment to determine the level of the drug in the blood. Final data on intensity of infection and effectiveness of triclabendazole is expected in fall of 2002.

A second project was done using *Fasciola hepatica* in which four bison were given 1,000 metacercariae of *F. hepatica* and two bison were used as controls. Final data on intensity of infection is expected in fall of 2002.

Three bison were sampled as part of a pasteurilla study. Bison blood was tested to determine if bison white blood cells were susceptible to disruptive activity of *Pasteurella* spp. leukotoxin.

A three year study to assess the efficacy and safety of *Brucella abortus* Strain 19 vaccine in elk was completed in 2002. A total of 106 female calves were captured from herds with no known Brucellosis exposure at INEEL and Montana and transported to the WHL in 1999 and 2000. Half of the animals were vaccinated with *Brucella abortus* Strain 19, the other half were controls. All animals were bred in fall of 2001 and pregnancy tested in January 2002. A total of 90 animals were pregnant. These animals were challenged with *Brucella abortus* 2308 in spring of 2002. Final data on abortion rate, calving rate, vaccine efficacy and culture data will be available in fall 2002.

Additional molecular DNA projects have been considered for analysis at the WHL to compliment research projects carried out by wildlife research biologists within IDFG. These include determination of black bear and mountain lion population estimates using noninvasive marking techniques and the determination of species purity of wild turkey populations throughout Idaho. A state-of-the-art piece of DNA sequencing equipment has been purchased to carry out future analyses.

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 40 IDFG personnel were certified through 3 training classes in 2001-2002. This year, the WHL also offered the course to outside agencies which included US Fish and Wildlife Services, US Forest Service, 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 2001-2002, WHL personnel cared for the following animals:

| | |
|---------------|-----|
| ELK | 135 |
| BISON | 26 |
| BIGHORN SHEEP | 26 |

In December 2001, the WHL received 12 Rocky mountain bighorn sheep (3 adult rams, 3 adult ewes, and 6 lambs) from the Colorado Division of Wildlife. These sheep will be included in existing and upcoming research projects here at the WHL. In addition, 6 lambs were born at the WHL in spring 2002.

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*.
- Woods, L. W., H. D. Lehmkuhl, P. K. Swift, P. H. Chiu, R. S. Hanley, R. W. Nordhausen, M. H. Stillian, and M. L. Drew. 2001. Experimental adenovirus hemorrhagic disease in white-tailed deer fawns. *Journal of Wildlife Diseases* 37: 153-158.
- Drew, Mark L., V. N. Bleich, S. Torres, and R. G. Sasser. 2001. Early pregnancy detection in mountain sheep using a pregnancy-specific protein B assay. *Wildlife Society Bulletin* 29: 1182-1185.
- 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*

Presentations at Scientific Meetings

- Drew, Mark L., M. Scott, and A. Ward. 2001. Health Surveillance of Rocky Mountain bighorn sheep (*Ovis canadensis*) in Idaho: The aftermath of an outbreak of pneumonia. *Wildlife Disease Association Annual Meeting*. Pilanesburg National Park, South Africa.
- Dixon, D. M., K. M. Rudolph, M. L. Kinsel, L. M. Cowan, D. L. Hunter, and A. C. S. Ward. 2002. Viability of Air-borne *Pasteurella* spp. *Biennial Symposium of the Northern Wild Sheep and Goat Council*, April 2002.
- Rudolph, K. M., T. Hosch-Hebdon, and D. E. Toweill. 2002. Genetic Resistance to Disease in Wild Sheep. *Biennial Symposium of the Northern Wild Sheep and Goat Council*, April 2002.

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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.

