

IDAHO DEPARTMENT OF FISH AND GAME

Rod Sando, Director

Project W-170-R-24

Job Progress Report



WILDLIFE HEALTH LABORATORY

Study V: Wildlife Surveys and Inventories

Job 1: Wildlife Laboratory

July 1, 1999 to June 30, 2000

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**PROGRESS REPORT
SURVEYS AND INVENTORIES**

STATE: Idaho **JOB TITLE:** Wildlife Laboratory
PROJECT: W-170-R-24
SUBPROJECT: Lab **STUDY NAME:** Wildlife Surveys and Inventories
STUDY: V
JOB: 1
PERIOD COVERED: July 1, 1999 to June 30, 2000

ABSTRACT

During the 1999-2000 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 processed approximately 2,285 teeth for age analysis including 245 ungulates, 492 bobcats, and 1,689 black bear. More than 1,200 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 20 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 149 animals to determine cause of death. The Enforcement Bureau submitted 16 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, Utah, and Washington) to assist these wildlife agencies in screening wildlife species for disease. WHL personnel are certified to run brucellosis testing and National Poultry Inspection Program testing on wildlife species. 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 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; National Biological Research Division, Montana; National Veterinary Services Laboratory, Iowa; Texas A&M University; and Wyoming Department of Game and Fish.

OBJECTIVE

The primary objective and first priority of the Wildlife Health Laboratory (WHL) has been to provide support for the wildlife management and research activities of the Idaho Department of Fish and Game (IDFG), Bureau of Wildlife. 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 major 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 1999-2000 the WHL received approximately 2,285 wildlife teeth. The regional offices submitted teeth from big game species including 94 mule deer and 151 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

Bobcat trappers were required to submit a lower jaw from each bobcat having a pelt tagged. These mandibles were boiled to allow extraction of canines for age and sex determination. By visual inspection the presence of milk teeth or an open-ended root canal indicated a juvenile cat. Those animals having a closed root canal were aged as adult cats. The lingual to buccal width of each canine was gauged to determine sex of the animal. Statistically, the female canines were those measuring less than 5.40 mm at maximum root width. Typical male canines measure 5.40 mm or greater. Pertinent data is entered onto computer files. A total of 492 teeth were evaluated by dental cementum analysis at Matson's Laboratory in Milltown, Montana. The information obtained will be analyzed to monitor efficacy of trapping regulations.

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, 1,689 teeth were submitted. Of those animals, 928 were harvested in fall 1999 and 620 were harvested in spring 2000. In addition, 141 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 basic objectives of the WHL is to establish baseline data on diseases in wildlife populations in order to determine what is "normal" for individual species and populations. Potential disease agents can be present in 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 1999-2000 project year, two 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. Baseline data was collected for two capture and transplant operations of bighorn sheep to Idaho, one as part of the Hells Canyon Initiative and the other into the Jim Sage Mountains.

During the 1999-2000 project year, WHL personnel processed 937 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), mycoplasma, and internal and external parasites (parasitology), serology and toxicology.

Necropsies

A total of 149 animals was necropsied during the project year 1999-2000. The species examined included moose; mule deer; bison; elk; upland game birds; Rocky Mountain, Desert, and California bighorn sheep; waterfowl; raptors; mountain lions; gulls; songbirds; mountain goats; and squirrels.

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 *Mannhiemia (Pasteurella) multocida*, *Mannhiemia (Pasteurella) haemolytica*, and *Mannhiemia (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.

Five female elk that were part of a large vaccine trial at the WHL were necropsied. All died of fractured necks sustained either shortly after arrival at the WHL or during handling operations.

The WHL, in conjunction with the Nevada Division of Wildlife, performed necropsies on several mule deer from Nevada from populations that were undergoing poor recruitment, diarrhea, and lameness. Results of the necropsies and WHL tests indicated that no infectious disease agents were identified; rather, the inciting cause appears to be a toxin or mineral deficiency. Further samples will be collected this winter.

FORENSIC TESTING

The forensic biologist handled 16 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 or meat evidence. The gender of blood, meat, or hair sample evidence was determined using DNA technology. Cause of death and X-ray analysis for presence of lead was also conducted.

Development of techniques to use DNA technology to match samples, such as evidence from a gut pile and seized, frozen meat, was completed. The DNA matching test is now being offered for mule deer cases and will soon be followed by DNA matching tests for cases involving white-tailed deer, elk, and bear.

RESEARCH ACTIVITIES

Animal research has continued at the WHL with numerous projects 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.

The research project to identify bighorn sheep that have a gene for natural resistance (Nramp) to *Pasteurella* spp. infection is entering its final phase. The study involves using molecular DNA procedures to identify animals that carry the resistant form of a gene called Nramp. DNA samples from 400 individuals have been collected and 250 samples have been analyzed, in part from collaboration with the Hells Canyon Initiative. Three Nramp alleles were identified that comprise the Nramp gene in bighorn sheep. Each bighorn sheep subspecies appears to have a unique Nramp allele profile. For example, only allele 3 has been identified in California bighorn sheep, while Desert bighorn sheep have three allele profiles (3% allele 2, 48% allele 1, 50% allele 3). Our final objective is to identify living captive bighorn sheep with the different alleles, obtain blood samples and conduct a killing assay to determine if any of the alleles are protective against pasteurellosis under laboratory conditions.

A research project was carried out to determine if the progeny of adult bison cows vaccinated with RB51 experienced reproductive problems or maintained RB51 during their first calving. The project was done at the WHL in collaboration with the USGS Biological Resources Division. The initial pregnancy rate was low, with only 7 of 11 animals calving. One calf was stillborn. The data collected will be prepared for submission to a peer-reviewed journal.

A multiple-year study to assess the efficacy and safety of *Brucella abortus* Strain 19 vaccine in elk was initiated in spring 1999. A total of 90 female were captured from herds with no known brucellosis exposure and brought to the WHL in 1999 and 2000. Half of the animals were vaccinated with Strain 19, the other half are controls. The animals captured in 1999 will be bred in

fall 2000 and challenged in March 2001. The animals captured in 2000 will be bred and challenged in fall 2001 and spring 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 sage grouse population estimates using noninvasive marking techniques and the determination of species purity of wild turkey populations throughout Idaho.

ANIMAL RESTRAINT AND DRUG USE CLASSES

The 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 recertification of personnel is required every two years. Over 100 IDFG personnel were certified through 3 training classes in 1999-2000.

ANIMAL CARE

The WHL personnel are responsible for providing care to the animals kept at the WHL. For the project year 1999-2000, the WHL personnel cared for the following animals:

DEER	1 mule deer
ELK	135
BISON	26
BIGHORN SHEEP	7 Rocky Mountain Bighorn Sheep

LIAISON WITH OTHER AGENCIES

The WHL has worked with other state, federal, and private organizations on wildlife health issues. The 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 Cooperative). 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

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

Peer-reviewed Publications

- Cassirer, E. F., K. M. Rudolph, P. Fowler, V. L. Coggins, D. L. Hunter, and M. W. Miller. 2001. Evaluation of ewe vaccination as a tool for increasing bighorn lamb survival following pasteurellosis epizootics. *Journal of Wildlife Disease* 37: *In press*.
- Hunter, D. L., L. M. Cowan, K. M. Rudolph, and A. C. S. Ward. 1998. Transmission of *Pasteurella haemolytica* between free-ranging bighorn and domestic sheep. *Journal of Wildlife Disease*. *In reviews*.
- Rudolph, K. M., D. L. Hunter, W. J. Foreyt, E. F. Cassirer, and A. C. S. Ward. 1998. Sharing of *Pasteurella* spp. between free-ranging bighorn and feral goats. *Journal of Wildlife Disease*. *In review*.
- Ward, A. C. S., M. D. Jaworski, D. L. Hunter, P. L. Benolkin, M. P. Dobel, J. B. Jeffress, G. A. Tanner. 1998. Evaluation of *Pasteurella* isolates from bighorn and domestic sheep on range conditions. *Journal of Wildlife Disease*. *In Press*.

Presentations at Scientific Meetings

- Drew, M. L. 2000. Brucellosis in elk from eastern Idaho. Wildlife Disease Association Annual Meeting, Jackson, Wyoming.
- Drew, M. L. 1999. The current status of brucellosis in elk in Idaho. US Animal Health Association Annual Meeting, San Diego, CA.
- Rudolph, K. M. 2000. Genetics of natural disease resistance in bighorn sheep. Wildlife Disease Association Annual Meeting, Jackson, Wyoming.

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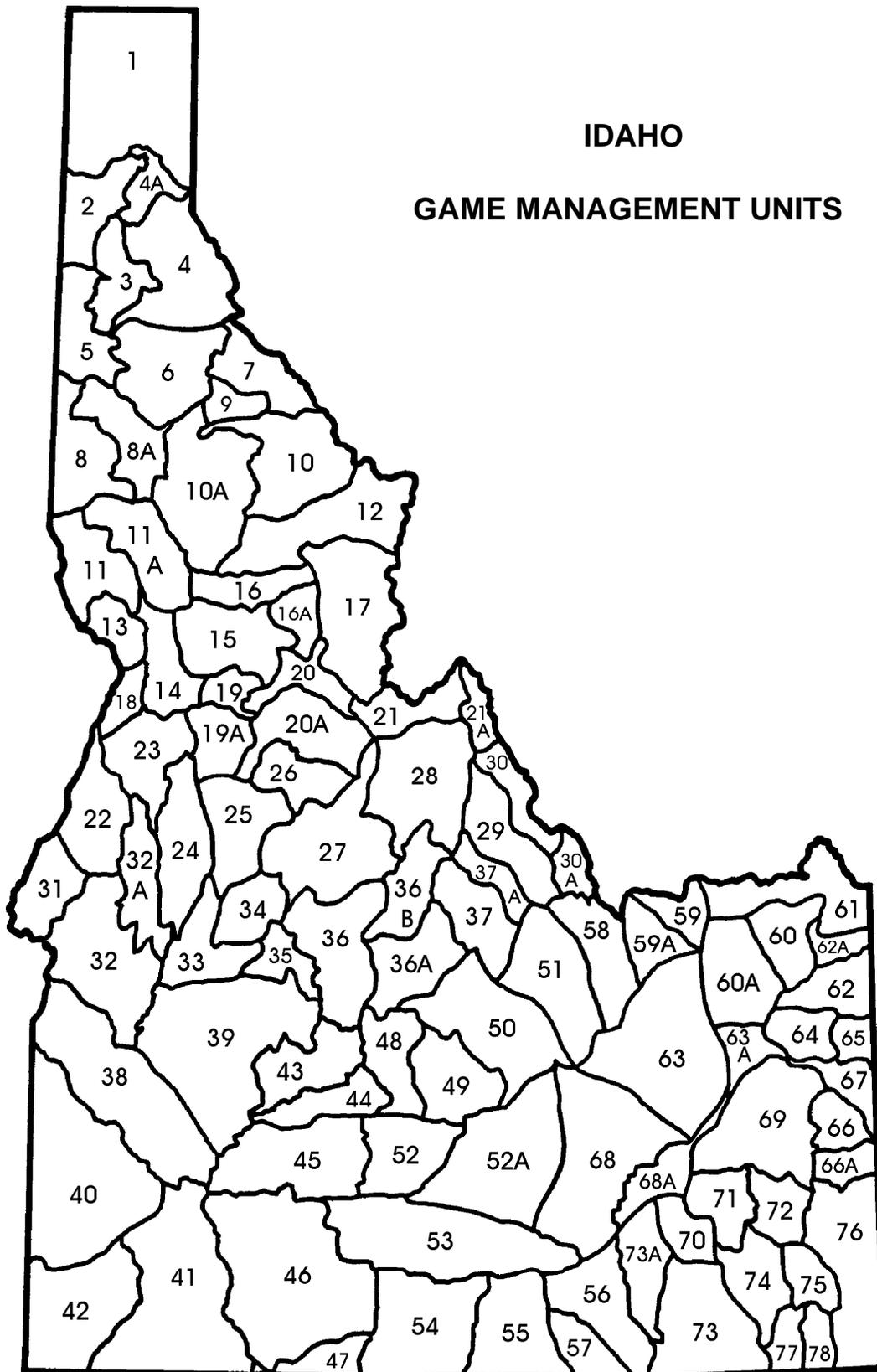
IDAHO DEPARTMENT OF FISH AND GAME

Wayne Melquist

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Tom Parker, Acting Chief
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IDAHO

GAME MANAGEMENT UNITS

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.

