

**IDAHO DEPARTMENT OF FISH AND GAME**

**Rod Sando, Director**

**Project W-170-R-25**

**Job Progress Report**



**WILDLIFE HEALTH LABORATORY**

Study V: Wildlife Surveys and Inventories

Job 1: Wildlife Laboratory

July 1, 2000 to June 30, 2001

By:

Mark Drew, D. V. M.

Karen Rudolph, Ph.D.

Julia Mulholland

Mary Ann Clemens

Catherine Clemens

August 2001

Boise, Idaho

Findings in this report are preliminary in nature and not for publication without permission of the Director of the Idaho Department of Fish and Game.

The Idaho Department of Fish and Game adheres to all applicable state and federal laws and regulations related to discrimination on the basis of race, color, national origin, age, sex, or handicap. If you feel you have been discriminated against in any program, activity, or facility of the Idaho Department of Fish and Game, or if you desire further information, please write to: Idaho Department of Fish and Game, 600 S. Walnut, Box 25, Boise, ID 83707; OR the Office of Human Resources, U.S. Fish and Wildlife Service, Department of the Interior, Washington, DC 20240.

## TABLE OF CONTENTS

ABSTRACT .....	1
OBJECTIVE .....	1
WILDLIFE TOOTH AGING .....	2
Black Bear Tooth Processing.....	2
DISEASE DATA COLLECTION .....	2
Biological Samples .....	2
Necropsies.....	3
FORENSIC TESTING.....	4
RESEARCH ACTIVITIES.....	4
ANIMAL RESTRAINT AND DRUG USE CLASSES .....	5
ANIMAL CARE.....	5
LIAISON WITH OTHER AGENCIES .....	5
ABSTRACTS AND PUBLICATIONS .....	5
Peer-reviewed Publications.....	6
Presentations at Scientific Meetings.....	6

**PROGRESS REPORT  
SURVEYS AND INVENTORIES**

**STATE:** Idaho                      **JOB TITLE:** Wildlife Laboratory  
**PROJECT:** W-170-R-25  
**SUBPROJECT:** Lab                      **STUDY NAME:** Wildlife Surveys and Inventories  
**STUDY:** V  
**JOB:** 1  
**PERIOD COVERED:** July 1, 2000 to June 30, 2001

**ABSTRACT**

During the 2000-2001 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 submitted approximately 1,982 teeth for age analysis including 259 ungulates, 33 grizzly bear and 1,690 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 198 animals to determine cause of death. The Enforcement Bureau submitted 21 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 including Nevada, Oregon 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. WHL personnel were involved in disease investigations and multi-agency research projects with 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 Game and Fish Department.

**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 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 investigations are major objectives of the WHL. Laboratory services provided have management and research applications; therefore, data obtained from lab 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 laboratory biologist and supports the Bureau of Enforcement through casework requiring expertise with DNA techniques and equipment.

## **WILDLIFE TOOTH AGING**

During 2000-2001 the WHL received approximately 1,982 wildlife teeth. The regional offices submitted teeth from big game species including 179 mule deer and 79 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 in 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.

### **Black Bear Tooth Processing**

The IDFG compiled 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, 1,690 teeth were submitted. Of those animals, 851 were harvested in fall 2000 and 839 were harvested in spring 2001. In addition, 33 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 2000-2001 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 one capture and transplant

operation of bighorn sheep to Idaho into the Jim Sage Mountains and one capture and transplant operation of mountain goats from the Seven Devils area. An extensive survey of bighorn sheep diseases was completed in the Salmon River drainage, in collaboration with the Clearwater, Upper Snake and Salmon regions. Field support was provided to the mule deer ecology project throughout the state. Peregrine falcons were monitored and banded in the Southwest region and nest remains were collected.

During the 2000-2001 project year, more than 50 brain samples were collected for a Chronic Wasting Disease (CWD) study. The samples were from mule deer, white-tailed deer and elk. As part of a statewide effort, the regional officers were given collection kits and took samples from animals that either died of natural causes or were victims of road kill. The samples will be submitted to the Wyoming Game and Fish laboratory for CWD testing.

During the 2000-2001 project year, WHL personnel processed 963 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) and toxicology.

### **Necropsies**

A total of 198 animals were necropsied during the project year 2000-2001. 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 *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.

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 laboratory 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 21 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 blood, meat, or hair sample evidence was determined using DNA technology. The DNA matching test was offered for the first time this year for mule deer cases. This test uses DNA technology to match samples, such as evidence from a gut pile and seized, frozen meat. We are in the process of acquiring 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

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.

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 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 females 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 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**

The WHL personnel are responsible for instructing and certifying wildlife biologists and conservation officers in capture techniques using both physical and chemical restraint. These classes are required to use controlled drugs, and re-certification of personnel is required every two years. Over 80 IDFG personnel were certified through three training classes in 2000-2001.

## **ANIMAL CARE**

The WHL personnel are responsible for providing care to the animals kept at the WHL. For the project year 2000-2001, the WHL personnel cared for the following animals:

DEER	1 mule deer
ELK	135
BISON	26
BIGHORN SHEEP	8 Rocky Mountain bighorn sheep

## **LIAISON WITH OTHER AGENCIES**

The WHL has worked with other state, federal, and private organizations on wildlife health issues. Laboratory 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. WHL personnel wrote the Bighorn Sheep Health Testing Protocol for the WWHC.

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 in monitoring disease outbreaks.

## **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(1):49-57.

Call, D. R., M. Jacoby, K. M. Rudolph, G. L. Bolgos, C. T. Robbins, D. G. Remick. 2000. Detecting Wildlife Orthologues for Tumor Necrosis Factor (TNF) and Interleukin-6 (IL-6). *Northwest Science* 74(4):340-344.

Hunter, D. L., L. M. Cowan, K. M. Rudolph, and A. C. S. Ward. 2000. Transmission of *Pasteurella haemolytica* between free-ranging bighorn and domestic sheep. *Journal of Wildlife Disease*. *In review*

Rudolph, K. M., D. L. Hunter, W. J. Foreyt, E. F. Cassirer, and A. C. S. Ward. 2000. Sharing of *Pasteurella* spp. between free-ranging bighorn and feral goats. *Journal of Wildlife Disease*. *In review*.

### **Presentations at Scientific Meetings**

Drew, M. L. 2000. Brucellosis in elk from eastern Idaho. Wildlife Disease Association Annual Meeting, Jackson, Wyoming.

Drew, M. L. 2000. Update on brucellosis in elk in Idaho. US Animal Health Association Annual Meeting, Birmingham, Alabama.

Rudolph, K. M. 2000. Genetics of natural disease resistance in bighorn sheep. Wildlife Disease Association Annual Meeting, Jackson, Wyoming.

Submitted by:

*Mark Drew, D. V. M.*

Wildlife Veterinarian

Approved by:

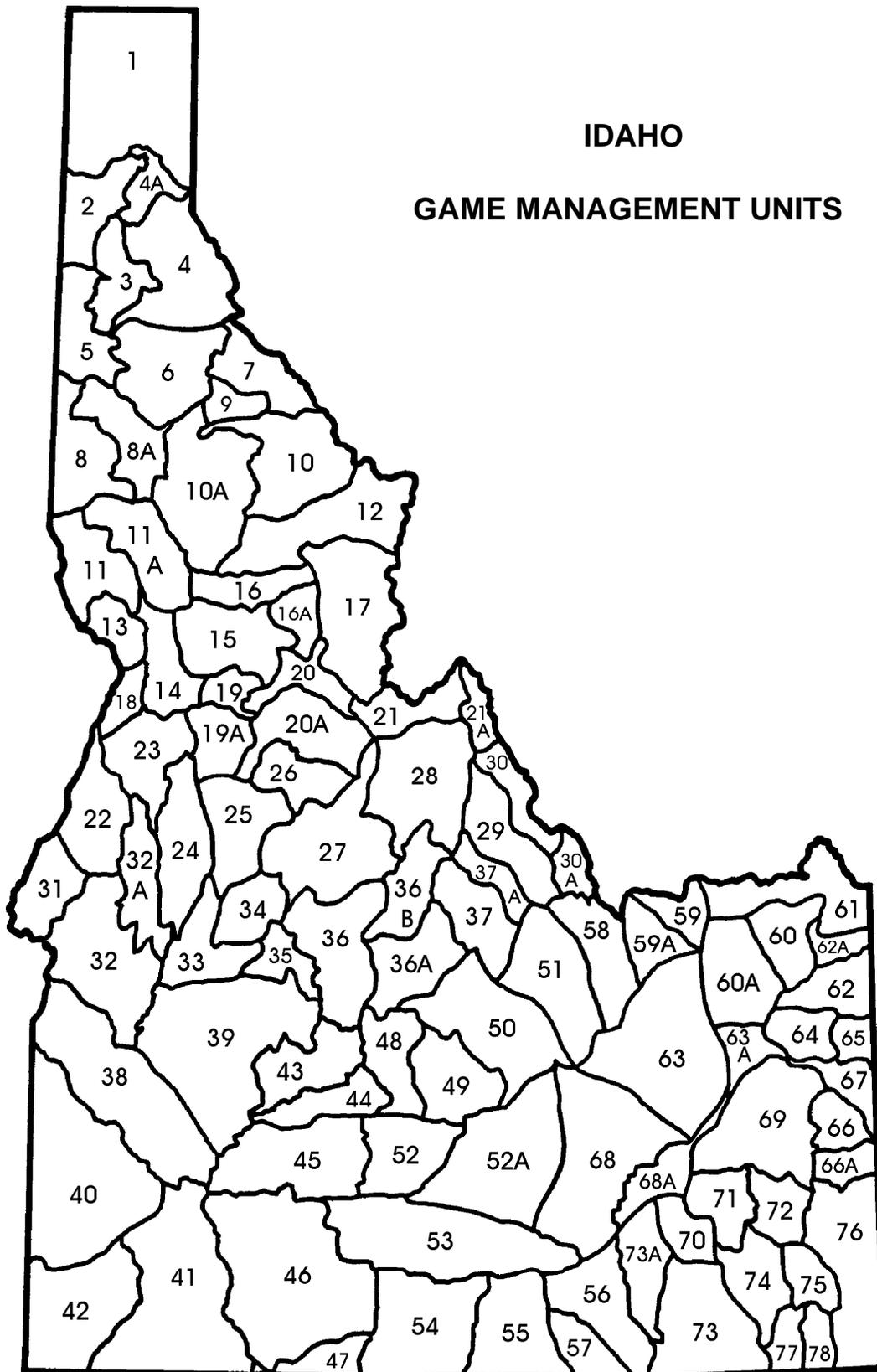
IDAHO DEPARTMENT OF FISH AND GAME

*Wayne Melquist*

Wayne Melquist  
State Nongame Wildlife Manager  
Federal Aid Coordinator

*Steven M. Huffaker*

Steven M. Huffaker, Chief  
Bureau of Wildlife



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.

