IDAHO DEPARTMENT OF FISH AND GAME

Steven M. Huffaker, Director

Project W-179-R-4

Progress Report

WILDLIFE HEALTH LABORATORY

Study I, Job 1

July 1, 2004 to June 30, 2005

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IDAHO DEPARTMENT OF FISH AND GAME

GRANT NUMBER: W-179-R
SEGMENT NUMBER: 4
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ABSTRACT

During the 2004-2005 project year, 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 3,064 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 45 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 284 animals to determine cause of death. IDFG's Bureau of Enforcement submitted 25 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 5 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 WHL is to provide support for wildlife management and research activities of IDFG's Bureau of Wildlife and forensics for the Bureau of Enforcement. Monitoring of all wildlife populations for disease and disease exposure is the major function of WHL in these activities. Directing and implementing wildlife health and disease research are secondary objectives of WHL. The services provided by WHL have management and research applications; therefore, data obtained from WHL analyses are reported to wildlife managers, researchers, and other state and federal agencies. Information is disseminated on disease issues in western states by active participation in the Western Wildlife Health Cooperative. In addition, WHL houses the forensic lab biologist and supports the Bureau of Enforcement through casework requiring expertise with DNA techniques and equipment.

DISEASE DATA COLLECTION

Biological Samples and Animal Capture

One of the primary objectives of WHL is to establish baseline data on diseases and disease exposure in wildlife 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 pathogens change. 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 various wildlife populations in Idaho and to monitor the health of these populations, through time, with continued sampling and analyses.

During the 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, only a small amount of elk trapping was done in the project year. A total of 34 elk were captured and tested; 2 elk tested sero-positive. Two thousand fifteen hunter sample kits were sent out to hunters in southeastern Idaho to detect Brucellosis prevalence in the elk population. None were positive of the 250 kits that hunters returned for testing.

Fifteen California bighorn sheep were captured in Oregon during December 2004 and released in the Albion Mountains of south-central Idaho. Eleven bighorns (2 rams, 8 ewes, 1 female lamb) were captured from Oregon's Diablo herd near Paisley on 1 December and released southeast of Cache Peak on 2 December. Four additional California bighorns (1 ram, 3 ewes) were captured from the Deschutes herd near Condon, Oregon, on 3 December and were released at the same the same site on 4 December. In addition, 20 California bighorn sheep (3 rams, 16 ewes, 1 male lamb) were captured in the Calico Mountains near Gerlach, Nevada. These animals were also released into Idaho's Albion Mountains in Unit 55.

In addition, 62 Rocky Mountain bighorn sheep (4 rams, 50 ewes, 1 male lamb, 7 female lambs) were captured from Montana's Sun River herd near Augusta, Montana, on 7-8 January and released into Idaho's Lost River Range on 8-9 January. All bighorns were subjected to routine sampling and identification with ear tags; most were also equipped with radio collars so their movements could be tracked.

Chronic Wasting Disease (CWD) has been an important topic nationwide this project year. During the 2004-2005 project year, Department personnel collected 1,314 brain and lymph node 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, WHL plans to continue the surveillance program at hunter check stations throughout the state. This surveillance is partially funded by a cooperative agreement with USDA-APHIS-VS.

During the project year, WHL personnel processed more than 3,064 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.

In 2005, 103 pronghorn antelope were captured in central Utah and transplanted to 3 regions in Idaho (Southwest, Southeast, Upper Snake) to supplement existing pronghorn populations. All antelope were given a long-acting tranquilizer prior to shipment with the result that only 3 mortalities occurred during transport. Animal monitoring is ongoing.

A total of 65 wild turkeys were trapped in northern Idaho for transport to Utah. Background disease surveillance indicated exposure of a significant number of these birds to *Mycoplasma gallopavonis* was isolated and likely was the cause of the serological responses on the initial testing of these birds.

Necropsies

There were a total of 284 animals necropsied during the project year. The species examined included: barn owl, crow, robin, raccoon, bighorn sheep, red-tailed hawk, sage-grouse, cottontail rabbit, mule deer, ground squirrel, fox, English starling, elk, white-tailed deer, osprey, kestrel, hawk, moose, great horned owl, duck, mink, golden eagle, squirrel, parakeet, domestic sheep, river otter, black bear, magpie, swan, skunk, Canada geese, Stellar's jay, flammulated owl, beaver, antelope, coyote, turkey, ticks, mountain lion, siskin, finch, mourning dove and screech owl.

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

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

FORENSIC TESTING

The forensic biologist handled 25 cases submitted by conservation officers throughout the state. We have nearly accomplished our goal of providing a full service forensic DNA testing program for IDFG. Family and species identification of blood and meat evidence is available for all big game animals. Gender determination using DNA technology is available for all big game animals on submitted evidence samples of blood, meat, hair, bone, and antler. Individual identification (or the DNA matching test) is now available for blood, meat, hair, bone, and antler samples from mule deer, white-tailed deer, elk, and black bear. We are currently developing the last big game individual identification test for moose to be available in fall 2005. Cause of death and X-ray analysis for presence of lead was also conducted.

RESEARCH ACTIVITIES

All research projects involving captive wildlife at WHL was discontinued as of 31 March 2004. All animals involved in research projects or on site were either terminated or sent to other research facilities. No further live animal research will be done on site.

Research continues to be an important objective of WHL. Numerous projects are in progress or in various stages of completion.

A contraception study on female bison was started in June 2002 at 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 were collected monthly for 4 months and every 2 months thereafter. Samples were tested for antibody titers to GnRH at the USDA VS, Collins, Colorado. All cows were exposed to a male from September to November. The vaccine appears to be effective in preventing pregnancy for up to 2 years and appears to be safe if administered to pregnant cows.

A project to investigate the epidemiological factors of disease in bighorn sheep and conduct a risk analysis was begun in 2003. A 30-year dataset from a herd of bighorn from Lostine, Oregon, was compiled into an Access database. Data analysis was completed at the University of California-Davis.

WHL cooperated on statewide research projects in mule deer ecology, predator-ungulate ecology, moose recruitment, and bighorn sheep survival. The animals were radio-collared, ear-tagged, measured, evaluated, and sampled depending on the circumstances. This entailed capture by net-gunning, darting, and mugging on drive-net operations. Areas of study included all regions except the Panhandle Region.

A project to evaluate resident animals at WHL as sentinels for Brucellosis in light of seroconversion of several bison and elk to Brucellosis during a vaccine trial using Strain 19 was completed in March 2004. Data analysis is ongoing.

A project to investigate the species composition, population levels, and distribution of gnats (*Culicoides* spp.) in the Clearwater valley of central Idaho was started in 2004. A second field season is being done in 2005. At present, 8 species of *Culicoides* spp. were identified by personnel at Montana State University in Bozeman, including the species believed to be responsible for transmission of EHD and BT in white-tailed deer and domestic sheep, respectively. Population peaks were found in July, August, and September. Further analysis will be done after completion of the 2005 field season.

A pilot project to evaluate the potential impact of West Nile Virus (WNV) on raptor species in southwestern Idaho was initiated in spring and summer 2005. Oral swabs and blood are being collected from a variety of raptor species and will be tested for the presence of WNV in cooperation with USGS Raptor Research Unit at Boise State University and USGS National Wildlife Health Laboratory in Madison, Wisconsin.

CHEMICAL IMMOBILIZATION TRAINING

WHL personnel are responsible for instructing and certifying biologists and conservation officers in capture techniques using chemical restraint. Certification is required for IDFG personnel to use controlled substances and recertification is required every 2 years. Over 70 IDFG personnel were certified through 4 training classes in spring 2005. This year, WHL also offered the course to outside agencies which included Idaho State Department of Agriculture and several law enforcement agencies.

LIAISON WITH OTHER AGENCIES

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

A WHL veterinarian represented IDFG on the Western Wildlife Health Committee of the Western Association of Fish and Wildlife Agencies. 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 United States.

WHL is also involved with the U.S. Animal Health Association. Membership is maintained on the Captive Wildlife Committee, Brucellosis Committee, and 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 WHL direct and collaborate on research projects on wildlife health. In addition, WHL has worked cooperatively with the National and Idaho Chapter of the Foundation of North American Wild Sheep. 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. WHL personnel presented information on CWD and the Idaho CWD Surveillance Program to the Idaho Academy of Science.

Peer-reviewed Publications

DREW, M. L., V. N. BLEICH, S. TORRES, AND J. N. WEYHAUSEN. Theoretical reproductive performance for desert mountain sheep in California. In preparation.

DREW, M. L., AND R. ETTER. 2005. Brucellosis in elk (*Cervus elaphus*) in eastern Idaho. Journal of Wildlife Diseases: in review.

DREW, M. L., B. HARGIS, AND K. PIERCE. Paratyphoid infection of the ovary in an ostrich. In preparation.

DREW, M. L., AND G. C. WEISER. Long term monitoring of BHS in contact with domestic livestock. In preparation.

DREW, M. L., AND G. C. WEISER. Disease survey of domestic goats and their potential relationship to disease in BHS. In preparation.

MILLER, L. A., J. C. RHYAN, AND M. L. DREW. 2004. Contraception of bison by GnRH vaccine: A possible means of decreasing transmission of Brucellosis. Journal of Wildlife Diseases 40:725-730.

ROFFE, T., L. C. JONES, K. COFFIN, M. L. DREW, S. J. SWEENEY, S. D. HAGIUS, P. H. ELZER, AND D. DAVIS. 2004. Efficacy of single calf hood vaccination of elk with *Brucella abortus* Strain 19. Journal of Wildlife Management 68:830-836.

RUDOLPH, K. M., D. L. HUNTER, W. J. FOREYT, E. F. CASSIRER, R. B. RIMLER, AND A. C. S. WARD. 2003. Sharing of *Pasteurella* spp. between free-ranging bighorn sheep and feral goats. Journal of Wildlife Diseases 39(4):897-903.

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. 2004, *submitted.*

SACCO, R. E., W. R. WATERS, K. M. RUDOLPH, M. L. DREW. 2004. Differential NO production by monocyte-derived macrophages isolated from O*vis Canadensis* and *O. aries.* Developmental and Comparative Immunology, *submitted.*

WEISER, G. C., D. L. MILLER, J. RHYAN, AND M. L. DREW. Antibiotic effects on bighorn bacterial flora. In preparation.

Presentations at Scientific Meetings

DREW, M. L., AND D. STALLKNECHT. Concurrent Epizootic Hemorrhagic Disease and Bluetongue in white-tailed deer and livestock in Idaho, 2003. Wildlife Disease Association 2004 Annual Meeting, San Diego, California, USA.

DREW, M. L., T. ROFFE, K. EYRE, AND M. K. TINKER. Over the fence and through the weeds: The spread of *Brucella abortus* in a captive wildlife facility. Wildlife Disease Association 2005 Annual Meeting, San Diego, California, USA.

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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.