



2007 Yellowstone Wildlife Health Program Report

Yellowstone National Park

Program Summary

Much of the interest in disease ecology and wildlife health has been prompted by the recent emergence, or resurgence, of many parasites that move between livestock, wildlife, and/or humans. Wildlife and their parasites do not recognize political or jurisdictional boundaries and, as a result, national parks are affected.

Wildlife diseases are important because of their impact on both the natural ecosystem and human health. Wildlife, domestic animals and humans share a large and increasing number of infectious diseases. The continued globalization of society, human population growth, and associated landscape changes, will multiply opportunities for contact between wildlife, domestic animals, and humans, facilitating emerging infectious diseases (EID). Arrows in Figure 1. depict some of the key factors promoting infectious diseases that threaten desired population levels and long-term survival of some species.

In response, Yellowstone National Park signed a Memorandum of Understanding with Montana State University and the University of California–Davis School of Veterinary Medicine Wildlife Health Center to establish the Yellowstone Wildlife Health Program. This program is focused on understanding and addressing priority wildlife disease and ecosystem health problems at Yellowstone National Park.

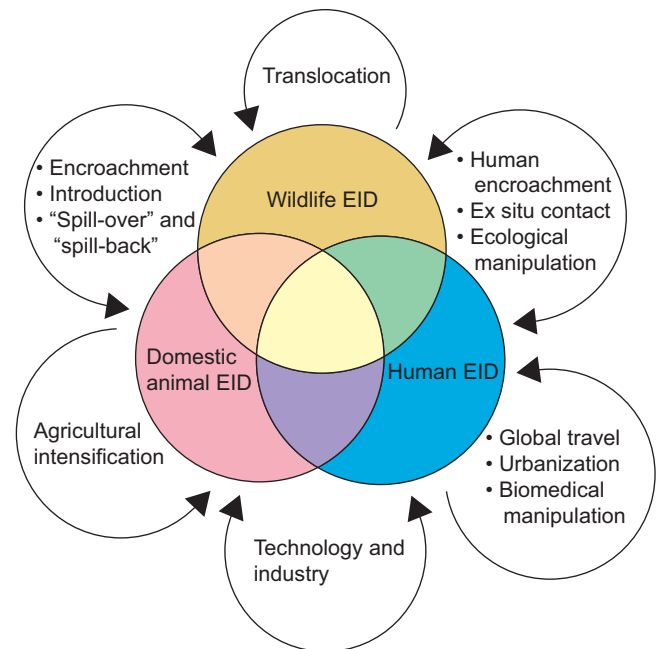


Figure 1. Reprinted with permission from Dazsak et al. (2000).

The Yellowstone Wildlife Health Program combines expertise from several disciplines to address existing and potential diseases in the park. As Yellowstone National Park is home to one of the most intact remaining wildlife ecosystems, it is fitting that the park should serve as a proving ground for the problem-oriented, basic, and applied disease research that will be necessary to conserve these wildlife resources for future generations. This report highlights the Yellowstone Wildlife Health Program projects and initiatives undertaken in 2007.

JUNE 2007 ORGANIZATIONAL WORKSHOP

On June 6th and 7th, 2007, a variety of participants were invited to participate in the Yellowstone Wildlife Health Program Workshop at the Montana State University campus in Bozeman, Montana. The stage for workshop productivity was set by excellent speakers on general wildlife health issues and the problems faced within the region and specifically within the Greater Yellowstone Area. The process included a series of working groups and plenary sessions convened to build the foundation for a wildlife health program for Yellowstone National Park that addresses the highest priority ecosystem health research and monitoring needs and to form the basis of the Yellowstone Wildlife Health Program Five-year Strategic Plan.

OCTOBER 2007 BRUCELLOSIS WORKSHOP



Group photo courtesy of UC–Davis.

At the June Yellowstone Wildlife Health Program workshop, the team of invited science experts identified brucellosis as one of the Park’s highest priority ecosystem health research and monitoring needs for the coming years. To address this priority, a multidisciplinary team was assembled and met in Davis, California from October 3-5, 2007, to devise an overarching plan to tackle meaningful brucellosis questions in Yellowstone National Park. This meeting catalyzed UC Davis, in collaboration with experts and institutions from across the country, to put forward major proposals to the United States Department of Agriculture and the National Science Foundation for grant funding consideration.

CHRONIC WASTING DISEASE WORKSHOP



NPS Photo. Healthy bull elk.

Chronic wasting disease (CWD) is a contagious, fatal disease of deer, elk, and moose for which there is no vaccine or known treatment. The disease is spreading towards the park where there are large concentrations of deer and elk. With support from Yellowstone Wildlife Health Program, the park held a CWD workshop in August 2007 to help develop a management plan. USGS National Wildlife Health Center staff provided Yellowstone park staff with training to expand surveillance for CWD and implement disease management actions to reduce or stabilize its prevalence in deer and elk, while ensuring park resources and values are not harmed.

GREATER YELLOWSTONE NETWORK VITAL SIGNS



NPS photo. Land birds, like this blue grouse, are one of the network's vital signs.

The NPS Greater Yellowstone Network (GRYN) Vital Signs Monitoring Program is housed at Montana State university and conducts long-term, integrated ecological monitoring at Yellowstone National Park, Grand Teton National Park and Bighorn Canyon National Recreation Area. In 2002, the GRYN program identified vertebrate disease as an important indicator of biological integrity and resource condition.

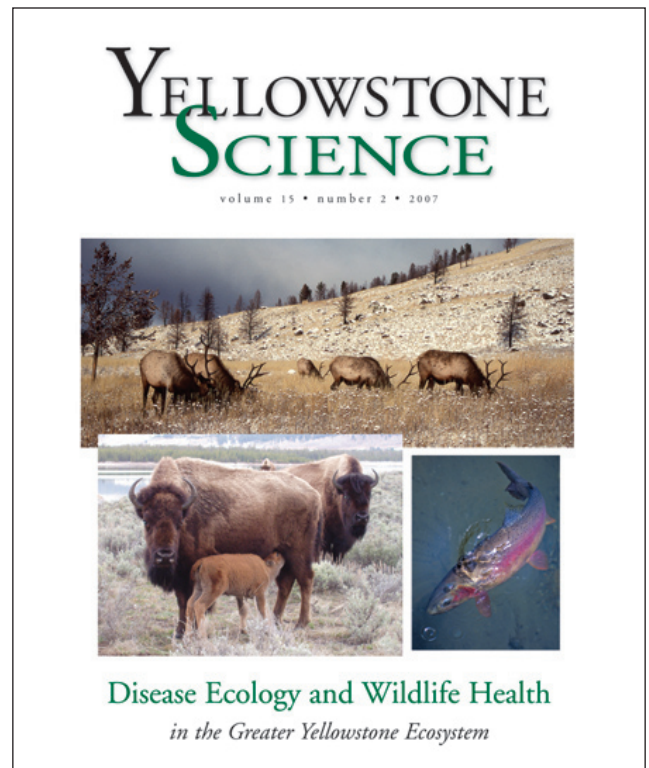
In the spirit of cooperation, the GRYN helped plan and execute the June 2007 Yellowstone Wildlife Health Program workshop held to identify wildlife health research and monitoring priorities in Yellowstone National Park. The GRYN played a key role in designing the workshop using the principles and practices employed through their Vital Signs monitoring program to solicit expert input and recommendations for a monitoring program within the park.

YELLOWSTONE SCIENCE

In this issue of Yellowstone Science, we highlighted some of the disease issues in the Greater Yellowstone Ecosystem. We reviewed brucellosis in bison, whirling disease in cutthroat trout, chytrid fungus in amphibians, distemper and mange in wolves, and chronic wasting disease in elk and mule deer.

The work detailed in this issue was the beginning of the Yellowstone Wildlife Health Program, the first program of its kind in the U.S. National Park System.

We extend our thanks to Dr. Paul C. Cross, Wildlife Disease Ecologist of the US Geological Survey, Northern Rockies Science Center at Montana State University who served as a distinguished and articulate guest editor.



WOLF DISEASE ECOLOGY

Since wolf population recovery in Yellowstone National Park began in 1995, there have been only two years of population decline. In 1999, the population declined about 10% and in 2005 it declined about 30%. Analysis of wolf blood serum indicated that both of these years had high seroprevalence for canine distemper and that all years had high seroprevalence for canine parvovirus and canine adenovirus. These results make it clear that disease can affect the park's wolf population.

With partial support of the Yellowstone Wildlife Health Program, the park entered into a collaborative relationship with the University of Minnesota and Dr. L. David Mech. A graduate project was designed to specifically examine these issues. Emily AlMBERG is heading up this study and we have expanded our scope of work to include sampling from captured wolves and to collect a sample of scats from trails and homesites in order to increase our knowledge of diseases affecting wolves in Yellowstone National Park.



NPS photo. Emily AlMBERG with a wolf from the Yellowstone Delta Pack.

MANGE DETECTED IN YELLOWSTONE WOLVES



NPS photo. Wolf with skin and fur symptomatic of Mange.

Mange was first detected in Yellowstone National Park in 2005, in a pack that denned at the edge of the park in the extreme northwest corner. Sarcoptic mange is a highly contagious skin disease caused by mites that burrow into the skin and create tunnels where females lay eggs. Most infested animals suffer from loss of hair and develop scabs while severe cases affect the entire body and can lead to starvation, poor body condition or death. In 2007, a captured Pelican Valley wolf was diagnosed with a severe case of mange and later died, probably from mange-related effects. Five other wolves on the northern range were observed with mange within a year. Two of these wolves declined in health and became habituated to humans. Non-lethal adverse hazing was conducted—causing both animals to leave park headquarters and the surrounding developed area. One eventually disappeared and the other was removed, due to severe mange, by the state of Montana on lands adjacent to the park.

BRUCELLOSIS IMMUNOLOGY



With support from the Yellowstone Wildlife Health Program, the park initiated a pilot study with Montana State University to evaluate the bison immune system and understand how nutritional condition affects a bison's defense against brucellosis infection. During winter 2007–2008, blood was collected in the field from radio-collared adult female bison to determine pregnancy, diagnose brucellosis infection, and assess immune status. These bison will be resampled to develop a profile of bison immune status. This information will help the park and interagency partners better understand this disease and aid in developing an efficient vaccination program for brucellosis in bison.

NPS photo. Bison blood samples are tested. Inset: *Brucella abortus*

WILDLIFE HEALTH BIBLIOGRAPHY

During the winter of 2007-2008, the Yellowstone Wildlife Health Program took the lead to develop and organize an annotated wildlife health bibliography for the park. This bibliography assembles research dating from 1891 and includes the entire history of wildlife health research at the park.

The bibliography is presented in a format that is easily accessible and searchable, containing nearly 350 citations. The entire bibliography will be available at the Yellowstone Wildlife Health Program website and will be maintained and updated as new, relevant research becomes available.



NPS photo. YWHP staff member, Briana Rogers

BRUCELLOSIS TRANSMISSION BETWEEN ELK & BISON

Through the Yellowstone Wildlife Health Program, the park is working with several new partners to implement research to better understand the ecological determinants of transmission of brucellosis within and between bison and elk populations in Yellowstone National Park and the associated risk to livestock populations neighboring the park. There is much debate about “*who infects who*” and this question is key to long-term conservation of the park’s bison and elk while steps are taken to reduce occurrence of this disease.



NPS photo. Inset: NPS photo by Dan Stahler

BIGHORN SHEEP HEALTH SURVEILLANCE



NPS photo

The park initiated new and exciting discussions with various agencies and universities regarding a Yellowstone Wildlife Health Program project that would assess the health of the northern Yellowstone bighorn sheep meta-population (inside and outside the park), and develop a long-term surveillance program that would be implemented after study completion.

This project is envisioned as a collaboration of the Yellowstone Wildlife Health Program partners, with guidance from the well-respected Northern Yellowstone Cooperative Wildlife Working Group. The group is comprised of resource managers and biologists from the Montana Fish, Wildlife, & Parks, National Park Service (Yellowstone National Park), U.S. Forest Service (Gallatin National Forest), and U.S. Geological Survey-Northern Rocky Mountain Science Center, Bozeman.

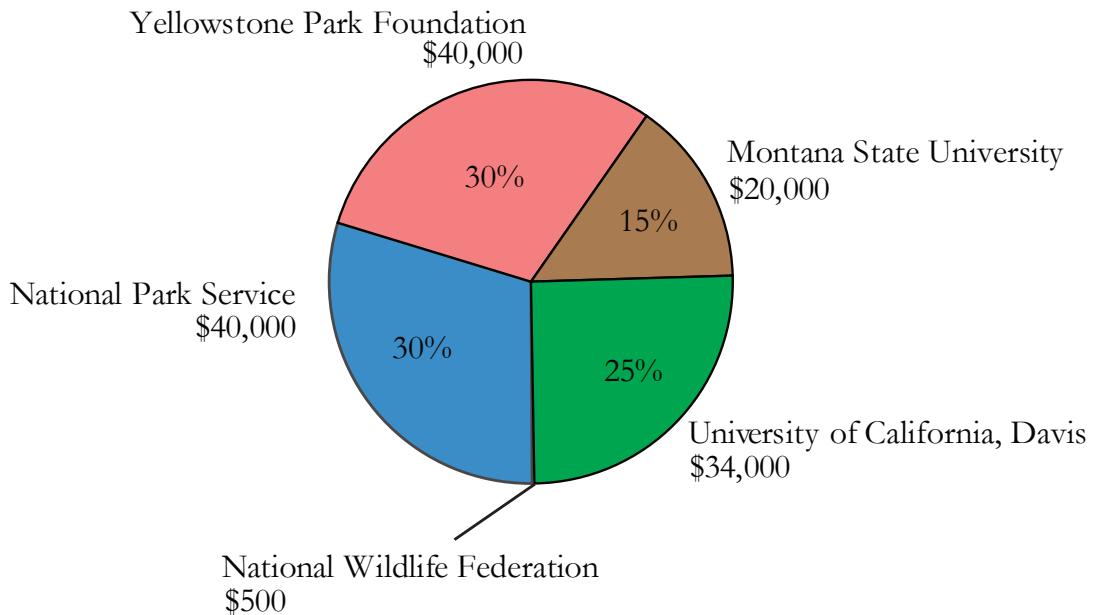
YELLOWSTONE PARK FOUNDATION FUNDRAISING



With a mission to fund projects and programs that protect, preserve, and enhance Yellowstone National Park, the Yellowstone Park Foundation is pleased to support the Yellowstone Wildlife Health Program so that “good science informs good management.” Project leader, Dr. Glenn Plumb, proposed the Yellowstone Wildlife Health Program to the Yellowstone Park Foundation in May 2006. Requesting \$200,000 over five years, a grant from the Yellowstone Park Foundation would provide the seed money to institutionalize this partnership.

In February 2007, Friends of Yellowstone—Ann Trammell, Gene Carlton, and Anne and Charles Duncan—hosted a reception for Dr. Plumb in Houston, Texas. Contributions generated from this event, as well as generous grants from the Perkins-Prothro Foundation, the Anne & C.W. Duncan Jr. Foundation, the Tapeats Fund, Gulf Winds International, Inc., and other individuals, corporations and foundations, successfully met the fundraising goal in September 2007.

2007 PROGRAM FUNDING BY SOURCE—\$134,500





Montana State University
www.montana.edu

Office of the Provost

Office of the Vice President for Research

Big Sky Institute
www.bsi.montana.edu



University of California, Davis, School of Veterinary Medicine
www.vetmed.ucdavis.edu

Office of the Dean

Wildlife Health Center
www.vetmed.ucdavis.edu/whc

Center for Animal Disease Modeling and Surveillance
www.cadms.ucdavis.edu



National Park Service
www.nps.gov

Yellowstone National Park
www.nps.gov/yell

Greater Yellowstone Inventory and Monitoring Network
<http://science.nature.nps.gov/im/units/gryn/>

Rocky Mountains Cooperative Ecosystem Studies Unit
www.forestry.umt.edu/research/cesu



Yellowstone Park Foundation
www.ywfp.org

For more information, visit:
YELLOWSTONE WILDLIFE HEALTH PROGRAM
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