Report to the Western Association of Fish and Wildlife Agencies from the USGS National Wildlife Health Center

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The following information is of a topical nature for wildlife management agencies and entities; many partners and collaborators are involved in gathering and researching the information herein.

Field Investigation Team Summaries: September 2009 to June 2010

California brown pelican mortality along the Pacific Coast (California, Oregon)

For the second consecutive winter, California brown pelicans were stranded along the Pacific coast. Reports of adult and juvenile pelicans being found in unusual places, emaciated, and weak were made along the western coast from southern California to northern Oregon. Rehabilitation centers, such as the International Bird Rescue and Rehabilitation Center in San Pedro, have cared for several hundred pelicans. A multi-agency effort to examine the causes of morbidity and mortality included California Department of Fish and Game, Sea World – San Diego, USGS-National Wildlife Health Center, and U.S. Fish and Wildlife Service. Preliminary diagnosis was emaciation due to food shortages of fish, such as anchovies and sardines, coupled with harsh winter weather. No infectious pathogens have been identified. The feathers of some affected birds were reported to have loss of waterproofing and research is ongoing to determine the cause of the soiled feathers.

Ocean conditions and marine fisheries can be significantly impacted by climate phenomenon such as El Niño events. The recent El Niño may have contributed to the reduction in forage fish and increased severity and number of winter storms observed along the western coast of the U.S. In 2009, pelicans remained in their northern range in Oregon during freezing temperatures, resulting in emaciated and frostbitten birds arriving in southern California. The California brown pelican was recently removed from the federal endangered species list because population levels had recovered. **Contact:** Krysten Schuler, National Wildlife Health Center, 608-270-2447, kschuler@usgs.gov

Lead toxicosis in geese (Louisiana)

In February 2010, the USGS-National Wildlife Health Center (NWHC) was contacted about a large avian mortality event, involving several hundred snow geese, occurring in Vermillion Parish, Louisiana. Field necropsies identified the presence of lead shot in the gizzards of some birds. The submitter from Louisiana was unaware of any recent reports of avian mortalities associated with lead poisoning in this area and NWHC's only record for avian lead poisoning in Vermillion Parish was from the 1930's. As a result, NWHC, in partnership with local U.S. Geological Survey, U.S. Fish and Wildlife Service, and Louisiana Department of Wildlife and Fisheries, conducted a field investigation to determine the extent of the mortality, species involved, and primary cause of death. When the die-off ended in late February 2010, total mortality was estimated to be approximately 600 geese, consisting primarily of snow geese and a few white-fronted geese. The primary cause of death for this mortality event was determined to be lead poisoning. NWHC is continuing to work with interested parties on potential management

recommendations. **Contact:** LeAnn White, National Wildlife Health Center, 608-270-2491, clwhite@usgs.gov

Pneumonia outbreaks in bighorn sheep across western states (Montana, Washington, Utah, Nevada)

Multiple herds of bighorn sheep (*Ovis canadensis*) in several states experienced mortality from pneumonia outbreaks during winter 2009-2010. Montana was the first to observe mortality in mid-November and at least four herds were affected from three different counties. Washington was next to report sick sheep in the Yakima River Canyon, primarily on the west side of the river. Sick sheep were observed coughing and had difficulty moving. Nevada also experienced mortality in two distinct herds, reported in mid-December. Utah had an outbreak in February where they eliminated a small herd to prevent transmission to a larger group nearby. Management activities this year included culling sick sheep to control outbreaks and prevent transmission to nearby herds and treatment with antibiotics. Pneumonia in bighorn sheep is often fatal and affects all age groups. Preliminary disease mortality estimates range from 50-80% of individuals within affected herds. The potential exists for surviving bighorn sheep to serve as carriers, and populations that experience outbreaks subsequently have low recruitment of lambs, as reported by South Dakota's Custer State Park. A variety of bacterial pathogens have previously been identified in the pneumonia-complex, including *Mycoplasma* spp., *Pasturella multocida*, *Pasturella trehalosi*, and *Mannheimia haemolytica*, in addition to respiratory viruses and lungworm infections. Pneumonia is a challenging issue for bighorn sheep managers because of the difficulty associated with identifying the disease agent, remote locations, and limited management options. This year was unique because of the large number of outbreaks and few indications of a potential source or cause. Further investigations are in progress. More information can be found in WAFWA's Wild Sheep Working Group Summary: Winter 2009-2010 Bighorn Sheep Die-offs (3/16/10) or http://www.wafwa.org/html/wswg.shtml. **Contact:** Krysten Schuler, National Wildlife Health Center, 608-270-2447, kschuler@usgs.gov

White-nose syndrome range expansion in bats, 2009/2010 (CT, MA, NH, NJ, MD, NY, PA, TN, VA, VT, WV, Ontario, Quebec)

White-nose syndrome (WNS), a fungal infection of the skin in hibernating bats associated with unprecedented winter mortality in North American bat populations, was confirmed histologically on bats in two new states (Maryland, Tennessee) and two Canadian provinces (Ontario, Quebec) this past winter season. Affected states now total 11 since the disease was first recognized near Albany, New York, in winter 2007/2008, with more than 60 sites involved. Clinical signs of disease continue to occur at confirmed hibernacula in subsequent seasons. In addition, the fungus *Geomyces destructans*, the presumptive causative agent of WNS, has recently been identified on three new *Myotis* species (*M. grisescens*, *M. velifer*, and *M. austroriparius*) in Missouri, Oklahoma and Virginia, respectively, as well as on female little brown bats arriving at two separate maternity colonies in New Castle County, Delaware, in early May. Little to no mortality has been reported associated with this apparent westward expansion of the fungus and it remains to be seen if WNS will develop and manifest similarly in warmer, drier climate zones. Current estimates of bat population declines since the emergence of WNS are as high as 97% in some areas. The USGS National Wildlife Health Center, along with many partners, continues to play a primary role in WNS research. The Center distributes Wildlife Health Bulletins on new developments related to WNS and other wildlife health issues. These can be found at http://www.nwhc.usgs.gov/ **Contacts:** David Blehert, National Wildlife Health Center, 608-270-2466, dblehert@usgs.gov; Anne Ballmann, 608-270-2445, aballmann@usgs.gov

Mortality in Eurasian collared doves in Western states (AZ, MT): Eurasian collared doves have expanded their range across most of the southern and western U.S. since their introduction into the Caribbean Islands and Florida in the 1970s and 80s. During 2009, two mortality events involving Eurasian collared doves were reported to USGS National Wildlife Health Center (NWHC). The first

occurred in Arizona in October, and the second occurred in Montana in December – both events occurred at backyard feeders. In each event, 20 to 30 doves were found dead over a period of several days. Carcasses were submitted to NWHC for examination. Laboratory testing revealed that the doves were infected with an avian paramyxovirus. Further testing at the USDA National Veterinary Services Laboratory in Ames, Iowa, identified the virus as pigeon paramyxovirus-1. Although this virus is in the same family of avian paramyxoviruses as Newcastle Disease, pigeon paramyxovirus-1 is not considered to be a threat to poultry. Information was not available to determine if other avian species were involved in these disease outbreaks. Pigeon paramyxovirus has been observed previously in dove mortality events in Florida in 2001 and 2006. The 2009 events suggest a marked westward expansion of the disease. Surveillance for mortality outbreaks in Arizona and Montana were effective in identifying this new disease in free-ranging birds. **Contact:** Krysten Schuler, National Wildlife Health Center, 608-270-2447, kschuler@usgs.gov

Avian cholera in geese and ducks (TX)
During December 2009, avian cholera mortalities were documented in Hartley and Moore Counties, Texas. The mortality events occurred at three locations, all within 30 miles of each other. Several duck and geese species were affected: mallards, American wigeon, Canada geese, snow geese, and Ross's geese. The final combined mortality from these sites was estimated to be close to 3,000 birds. Avian cholera occurred previously in two of these sites in the mid-1990s. Cholera outbreaks have occur at any time of the year, but seasonal patterns can often been seen in areas where the disease has become established. In Texas, the majority of avian cholera outbreaks usually occur in the winter (approximately November through March). **Contact:** Krysten Schuler, National Wildlife Health Center, 608-270-2447, kschuler@usgs.gov

Request for Wildlife Mortality and Morbidity Event Reporting (All States)
The USGS-National Wildlife Health Center Quarterly Wildlife Mortality Report, published in the Wildlife Disease Association's newsletter, is intended to inform wildlife professionals of wildlife events of interest. The authors kindly request that investigations of recent die-offs of mammals, birds, amphibians, and reptiles be submitted for inclusion in this report. Credit will be given to appropriate diagnostic laboratories. The report can also be found online at http://www.nwhc.usgs.gov/mortality_events/ongoing.jsp.

Additional Disease Investigations Research

Oral baits and biomarkers for plague vaccine delivery to prairie dogs: Recent laboratory studies demonstrated that oral vaccination of prairie dogs against plague using raccoon pox-vectored vaccine is feasible, resulting in significant protection against challenge with *Yersinia pestis*. However, before field application is considered, a delivery bait that is palatable to prairie dogs, resistant to environmental conditions, and capable of maintaining vaccine titer must be selected, along with an appropriate biomarker to evaluate uptake by animals. We evaluated three bait formulations to determine the most palatable to prairie dogs, tested vaccine stability in baits held at 3 different temperatures, and confirmed that ingestion of the preferred bait formulation with vaccine resulted in immunization. In addition, a field study with baits incorporated with a biomarker confirmed bait uptake in > 90% of prairie dogs after an application rate of 4 baits per active burrow. These results further validate the feasibility of oral vaccination of prairie dogs against plague and provide all the critical elements needed to move forward with registration of the vaccine and eventual field trails. **Contact**: Tonie Rocke, National Wildlife Health Center, 608-270-2451, trocke@usgs.gov

H5N1 highly pathogenic avian influenza surveillance (U.S.): The Federal, State and Tribal partnership formed to develop and implement the National Interagency Early Detection System for Highly

Pathogenic H5N1 Avian Influenza in Wild Migratory Birds continues into its fifth year of surveillance. Birds have been tested from all 50 states and 6 freely-associated states and territories. Surveillance has focused on waterfowl, shorebirds, gulls and terns and a total of 284 species have been sampled. In the 2009 sampling year (April 1, 2009 – March 31, 2010), cooperating agencies collected and analyzed over 19,395 wild bird samples and the highly pathogenic avian influenza H5N1 virus was **not** detected. Of these, 651 tested positive for avian influenza based on molecular screening; 31 were H5 positive, but none were H5N1. No highly pathogenic avian influenza viruses have been detected so far. In the current 2010 sampling year (April 1, 2010 – March 31, 2011), 2,692 birds have been tested and no H5N1 has been detected. **Contact:** Scott Wright, National Wildlife Health Center, 608-270-2460, swright@usgs.gov

Remediation of CWD-contaminated sites: Anecdotal, epidemiological and controlled field experiments have all indicated that prions are stable in the environment and in soil. A goal of our research program is to identify and characterize biotic and abiotic means of degrading prions in the environment. We have found that certain lichens, common fungi-algae symbiotic organisms, contain a potent anti-prion activity that could influence CWD persistence on the landscape. Additionally, we have found that the common oxidative soil mineral birnessite (MnO2) is capable of degrading prions in *in vitro* experiments. We are pursuing each of these lines of study to try to achieve practical means of remediating CWD-contaminated sites. **Contact:** Bryan Richards, National Wildlife Health Center, 608-270-2485, brichards@usgs.gov

THANK YOU

The NWHC thanks all the state, federal and tribal agencies who worked with us the past year. We are at your service to provide technical support, field investigation assistance and diagnostic capabilities.

Field Investigations Team

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