



**Report to the Fish and Wildlife Health Committee
of the Association of Fish and Wildlife Agencies
from the USGS National Wildlife Health Center
March 2014**

The USGS National Wildlife Health Center provides national leadership to safeguard wildlife and ecosystem health through dynamic partnerships and exceptional science.

Wildlife Health Information Sharing Partnership – event reporting system (WHISPers)

The USGS National Wildlife Health Center (NWHC) is introducing a new online database for reporting wildlife health events that will be an easy and efficient way for wildlife professionals across North America to share disease event information, such as outbreak onset and ending date, general location, species involved, numbers involved, diagnoses, and laboratory and contact names. It is a partner-driven, web-based system for tracking basic information about historic and ongoing wildlife mortality and morbidity events. The primary goal of the system is to provide natural resource partners and the public with timely, accurate situational awareness regarding these events. The system also serves as a searchable archive of historic mortality and morbidity event data. Initially, the NWHC will populate this database with the wildlife mortality data the NWHC has maintained for several years (see http://www.nwhc.usgs.gov/publications/quarterly_reports/index.jsp); after the initial rollout, other wildlife professionals will be able to enter data that can be viewed by others. A prototype of the reporting system was demonstrated at the Association of Fish and Wildlife Agencies (AFWA) Fish and Wildlife Health Committee meeting in September 2013 and a Webex demonstration was given to partners to gather additional feedback. A handout of Frequently Asked Questions is available. **Contact:** Jonathan Sleeman, 608-270-2401, jsleeman@usgs.gov.

Wildlife Highlights

White-nose syndrome winter 2013/2014 summary

White-nose syndrome (WNS) has been confirmed in cave-hibernating bats in one new state (Arkansas) thus far during the 2013/2014 winter season. This represents a continued expansion of *Pseudogymnoascus* (formerly *Geomyces*) *destructans* distribution on the landscape. No evidence exists of geographic barriers preventing its spread. Since it was first recognized near Albany, New York in 2007, WNS has now been confirmed in 23 states and 5 Canadian provinces. Several additional counties in Missouri had confirmed cases of WNS as well as suspected cases this winter based on visible signs suggesting that the disease is now endemic throughout Missouri. Sites in several northeastern states —where WNS has been present the longest— continue to be occupied by bats although in much lower numbers than before the disease struck. Winter hibernacula survey data are being reviewed by state and federal management agencies to better understand the on-going impacts of WNS on bat populations in affected regions. Recent phylogenetic analyses have demonstrated the WNS fungus is more closely related to the genus *Pseudogymnoascus* rather than *Geomyces*. Thus the fungus has been reclassified as *P. destructans*. For the latest WNS updates, consult NWHC Wildlife Health Bulletins at: http://www.nwhc.usgs.gov/publications/wildlife_health_bulletins/index.jsp. Current NWHC bat submission guidelines are available at: http://www.nwhc.usgs.gov/disease_information/white-nose_syndrome/USGS_NWHC_Bat_WNS_submission_protocol.pdf. **Contact:** Anne Ballmann, 608-270-2445, aballmann@usgs.gov

Sylvatic plague vaccine for prairie dogs

Laboratory studies have 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*, the bacterium that causes sylvatic plague. The Sylvatic Plague Vaccine (SPV) Subcommittee, under the direction of the Executive Committee of the Black-footed Ferret Recovery Implementation Team, is continuing its work to complete development and delivery of the sylvatic plague vaccine as a management tool to combat plague in prairie dogs and promote the recovery of the black-footed ferret. Field trials completed in 2012 confirmed the safety of the vaccine in wild prairie dogs and non-target animals. Field studies to assess vaccine efficacy in free-ranging prairie dogs began in 2013. Vaccine and placebo baits were distributed in select prairie dog colonies in seven western states: Arizona, Colorado, Montana, South Dakota, Texas, Utah, and Wyoming. Prairie dogs were trapped and sampled to determine bait uptake. The field study will continue into 2015. **Contact:** Tonie Rocke, 608-270-2451, trocke@usgs.gov.

Investigation of lead levels in eagles

While the use of lead shot for waterfowl hunting was prohibited in 1991, lead in shotgun pellets and rifle ammunition is still widely used for terrestrial hunting and bald eagle mortalities from lead poisoning are ongoing. The U.S. Fish and Wildlife Service (USFWS) together with the USGS National Wildlife Health Center (NWHC) designed an investigation to collect and submit eagle carcasses for gross examination and lead-level testing to assess trends in mortalities. Our primary objectives are to: 1) perform radiographic surveys on eagle carcasses to document the presence of ammunition or fractures; 2) conduct necropsies to document age, body condition, and gross lesions consistent with lead poisoning or other causes of death; 3) submit additional samples for toxicology, virology, microbiology, parasitology, and histology as warranted; and 4) send carcasses to the National Eagle Repository in Colorado. The NWHC conducted necropsies on 112 bald eagles and 1 golden eagle between October and November 2013. Samples were collected for lead levels, anticoagulants, stable isotope analysis, acetylcholinesterase, and West Nile virus. If warranted, samples were collected for histology, parasitology, and microbiology. Results of this study are pending and will be published in coordination with the USFWS. Data collected from this study will be used to support management decisions. **Contact:** LeAnn White, 608-270-2491, clwhite@usgs.gov

Disease Investigations

West Nile virus at the Great Salt Lake

Diagnostic evaluations on eared grebe (*Podiceps nigricollis*) and bald eagle (*Haliaeetus leucocephalus*) carcasses submitted to the USGS National Wildlife Health Center (NWHC) by the Utah Division of Wildlife Resources (UDWR) confirmed West Nile virus (WNV) to be the cause of death. These findings are consistent with the confirmation of WNV in a bald eagle from the same event by the Utah Veterinary Diagnostic Laboratory. These diagnoses were based on pathological findings, molecular testing (RT-PCR) and isolation of viable virus from most tissues. Extensive testing ruled out many other causes of death. Carcasses were negative for exposure to lead and organophosphate compounds; RT-PCR screening tests were negative for avian influenza and avian paramyxovirus-1 (Newcastle Disease virus); and no pathogenic bacteria such as *Pasteurella multocida* (causative agent of avian cholera) were isolated.

The event was first reported by the UDWR when sick and dead eared grebes were observed in a northern section of the Great Salt Lake (GSL) in mid-November 2013. Most birds were found dead or dying with clinical signs of drooping heads, lethargy, and inability to dive. At the time the event was reported, an estimated 2 million grebes were arriving during fall migration and were potentially at risk. UDWR estimates that between November 1 and December 31, 2013, up to 1 percent of the population has died (~10,000-20,000) during this mortality event. It is unclear if the entire 10,000-20,000 grebe mortality was due to WNV, and additional diagnostic evaluations on both eared grebes and bald eagles carcasses are in progress. The last significant eared grebe mortality event on the GSL was caused by avian cholera (*Pasteurella multocida*) and occurred during winter 2010 when an estimated 10,000 birds died. Grebes typically migrate from the GSL as food sources (brine shrimp) diminish and travel to the west coast of the United States to spend the remainder

of winter in coastal bays and estuaries of California, the Salton Sea of California and the Gulf of California in Mexico.

In early December, the UDWR again contacted the NWHC to report morbidity and mortality in bald eagles that was occurring in proximity to the GSL. The first bald eagle was brought to the Wildlife Rehabilitation Center of Northern Utah on December 1, 2013. To date, 54 eagles have been found sick or dead in 6 counties in Utah (Box Elder, Davis, Weber, Salt Lake, Tooele and Utah counties). Clinical signs in eagles include head tremors, paralysis of the wings and legs, formation of plaques at the back of the throat, and progressive seizures. The GSL is a major overwintering site for bald eagles, estimated at 750 to 1,250 birds annually. For more information, view the [Wildlife Health Bulletin](#) on this topic. **Contact:** Barbara Bodenstein, 608-270-2447, bbodenstein@usgs.gov.

Sea star mortality on the West Coast

Beginning in June 2013, sea stars along the west coast, from Alaska to Southern California, have been dying from unknown causes. The USGS National Wildlife Health Center is collaborating with scientists from multiple entities to learn more about this mortality event, coordinate a response, conduct necropsies, and uncover the cause. Collaborators include the Monterey Bay, Seattle, and Vancouver, B.C. Aquaria; University of California–Santa Cruz and UC Davis/SeaDoc Society; Wildlife Conservation Society; Western Washington University; Cornell University; Roger Williams University; and a veterinary pathologist from Northwest ZooPath. The die-off is affecting various sea star species in wild and captive populations; the two species affected most are *Pisaster ochraceus* (purple sea star or ochre starfish) and *Pycnopodia helianthoides* (sunflower sea star). For more information, view the [Wildlife Health Bulletin](#) on this topic.

Contact: Barbara Bodenstein, 608-270-2447, bbodenstein@usgs.gov

Avian cholera in seabirds in Alaska

Large numbers of sick and dead seabirds were observed washing ashore along the northern coast of Saint Lawrence Island, Alaska, in late November 2013. Citizens of Gambell and Savoonga, the two tribal villages that are about 40 miles apart on this remote 100-mile long island in the Bering Sea, reported these birds immediately to the University of Alaska's [Marine Advisory Program](#) stationed in Nome. Villagers were able to collect some specimens from the initial die-off, including a thick-billed murre, a Northern fulmar, and a crested auklet. These specimens were then sent to the [National Wildlife Health Center](#) for diagnostic necropsy and ancillary testing to determine cause of death.

Avian cholera (*Pasteurella multocida*) was diagnosed based on routine bacterial cultures of liver and characteristic lesions in all bird specimens submitted. Testing for avian influenza was negative. Prior to this event, avian cholera has not been reported in Alaska. The closest avian cholera outbreaks reported in the past decade involved common eiders and snow geese in Nunavut and Northwest Territories, Canada.

Affected birds were reported to be swimming in circles with heads laid over their backs, “throwing one wing in the air” and subsequently dying. The weather in this area at the time was unseasonably mild with many recent southerly storms and freeze/thaw cycles. Average temperatures were in the mid 40's and the sea remained ice-free, whereas sea ice normally would be forming by October. The two Alaska Native communities on Saint Lawrence Island rely almost exclusively on the subsistence harvest of many marine species, including birds, for food. Many seabirds use this area of the Bering Sea as a staging area during migration and it is an overwintering area for eiders, including the world's population of spectacled eiders. For more information, view the [Wildlife Health Bulletin](#) on this topic. **Contact:** Barbara Bodenstein, 608-270-2447, bbodenstein@usgs.gov

Investigation of snake fungal disease (SFD) east of the Mississippi River

Since 2006, the number of reports of skin infections in wild snakes in certain parts of the eastern United States has increased. Laboratory testing has implicated a fungal pathogen, *Ophidiomyces ophiodiicola* (formerly *Chrysosporium ophiodiicola*) although a direct causal relationship between certain species of fungi and SFD has not been definitively demonstrated. The disease has been documented in 14 states, including AL, FL, IL, MA, MI, MN, NH, NJ, NY, OH, SC, TN, VA, and WI. With support from a recently awarded Competitive State Wildlife Grant, NWHC scientists are collaborating with the U.S. Fish and Wildlife Service, numerous state agencies, organizations, researchers, and other key stakeholders to investigate this potentially emerging disease and to learn more about its impacts on snake populations. For more information, visit http://www.nwhc.usgs.gov/disease_information/other_diseases/snake_fungal_disease.jsp. **Contact:** Anne Ballmann, 608-270-2445, aballmann@usgs.gov

Morbillivirus outbreak in Atlantic bottlenose dolphins

The National Oceanic and Atmospheric Administration (NOAA) and collaborating scientists have identified dolphin morbillivirus (Family Paramyxoviridae) as the cause of a mass die-off of Atlantic bottlenose dolphins (*Tursiops truncatus*). Mortality began in early July 2013 along coastal New York and gradually reached as far south as Brevard County, Florida. Mortality is ongoing and since January 2014, over 1,000 dolphins have died, which is more than eight times the expected mortality for this species along the Atlantic Coast. All age classes have been involved with the majority of animals washing ashore dead or dying shortly after stranding with lesions on the skin, mouth, joints or lungs. Four distinct populations of bottlenose dolphins occur along the United States Atlantic Coast with some overlap of seasonal range; it remains under investigation whether individuals from one or more of these populations are affected, although morbillivirus has been confirmed or suspected in dead dolphins tested from New York to Florida. Population impacts from the current mortality event are not yet known; however, a previous morbillivirus epizootic event (1987-1988) involving Atlantic bottlenose dolphins resulted in an estimated 50% reduction of coastal migratory populations. Testing for this virus is underway in other cetacean species that have sporadically stranded and/or died within the affected area during this same period. The bacterium *Brucella* sp. has also been detected in a small number of dolphins from this die-off. It is unclear if this infection may be contributing to the debilitation of some animals. For more information on this investigation, visit <http://www.nmfs.noaa.gov/pr/health/mmume/midatldolphins2013.html> **Contact:** Anne Ballmann, 608-270-2445, aballmann@usgs.gov

Dove mortalities in Texas

Biologists at Texas Parks and Wildlife Department received multiple reports of dove mortality events from several counties (e.g., Midland, Ector, Lubbock, Harris) in Texas beginning in September 2013. Over 1,000 doves were estimated to have died at various locations across the state over a couple of months. The majority of early mortality reports involved white-winged doves (*Zenaidura macroura*) but later reports also included several hundred dead Eurasian collared doves (*Streptopelia decaocto*). Several white-winged doves, Eurasian collared doves, and a single Inca dove (*Columbina inca*) were submitted to the USGS National Wildlife Health Center for diagnostic evaluation. Pigeon paramyxovirus (PPMV) was detected in the Eurasian collared doves, which is the second year in a row that this virus has been detected in this species in northwestern Texas (Midland County 2012, Lubbock County 2013). PPMV is a member of the Avian paramyxovirus-1 group of viruses (viruses to which Newcastle Disease virus also belongs) and some strains can be virulent to poultry. PPMV outbreaks in Eurasian collared doves have been previously documented in Florida, Arizona, and Montana. PPMV was not detected in the other examined doves species from northwestern Texas in 2012 or 2013. The major finding for white-winged doves submitted from Midland County in 2013 was poisoning with strychnine and the cause of death for the single submitted Inca dove is still under investigation. **Contact:** LeAnn White, 608-270-2491, clwhite@usgs.gov

Acanthocephaliasis mortality in Gull-billed terns (California)

Gull-billed terns (*Gelochelidon nilotica vanrossemei*) were submitted to the USGS National Wildlife Health

Center by refuge staff at the San Diego Bay National Wildlife Refuge in May 2013 as a result of a mortality event involving 70 breeding adults and chicks. Clinical signs included head tilt, difficulty breathing, and ataxia. No other birds, including waterfowl, skimmers, or other tern and gull species, using this nesting area appeared affected. There was no evidence of trauma and birds were in fair body condition with mild to moderate lack of pectoral musculature, suggestive of poor nutritional status. All terns had shrimp-like crustaceans present in the proventriculus and gizzard that were later identified as mole crabs (*Emerita analoga*), one of the most abundant invertebrates living on sandy beaches along the Pacific coast from Alaska to Baja California. In addition, the birds had moderate to heavy presence of intestinal parasites, identified as the acanthocephalan *Profilicollis altmani*, within the intestines as well as protruding through the intestinal walls into the abdominal cavity causing associated peritonitis. Brain cholinesterase levels were within normal limits for common terns indicating these birds were not recently exposed to organophosphate or carbamate compounds. Routine bacterial cultures of liver and lung revealed no pathogenic organisms.

Acanthocephalans can infect all vertebrates, with ducks, geese and swans most commonly affected. Epizootic mortality events involving this parasite may occur and usually correspond to food shortages and/or periods of high stress (migration and breeding). Mole crabs are a common intermediate host and can have very high concentrations of the parasite. Contact: Barbara Bodenstein, 608-270-2447, bbodenstein@usgs.gov

Suspected carbamate poisoning in songbirds (Wisconsin)

The U.S. Fish and Wildlife Service received reports of more than 60 dead songbirds at a private residence in Juneau County, Wisconsin in mid-April 2013. The primary affected species were fox sparrows (*Passerella iliaca*; FOSP) and dark-eyed juncos (*Junco hyemalis*; DEJU). Although there were bird feeders in the yard, the majority of the birds were observed under the resident's cedar trees. Four specimens (2 DEJU and 2 FOSP) from this event were examined at the USGS National Wildlife Health Center. All four had significant brain cholinesterase inhibition and results from follow-up tests were suggestive of carbamate poisoning as the cause of this mortality event.

Carbamate compounds are found in a variety of pesticides approved for application in agricultural and residential land uses. Although these chemicals are considered short-lived in the environment (lasting days instead of months or years) they have also been associated with wild bird deaths throughout the United States. The toxicity of carbamate compounds is due to their ability to disrupt the nervous system of invertebrates and vertebrates through inhibition of cholinesterase enzymes. Once an area contaminated by a pesticide is identified it is important to not only prevent access of the area by additional birds, but also to pick up and properly dispose of carcasses to prevent secondary toxicity in scavengers. Contact: LeAnn White, USGS National Wildlife Health Center, 608-270-2491, clwhite@usgs.gov

Eustrongyloides mortality in juvenile great egrets (Florida)

The Florida Fish & Wildlife Commission investigated mortality of juvenile great egrets at a large active urban rookery (>1,000 birds) in Jacksonville, Florida. Mortality was first reported July 23, 2013, at which time biologists observed 71 great egrets (*Ardea alba*) and 5 juvenile black-crowned night-herons (*Nycticorax nycticorax*) dead; sick individuals were on the ground and exhibited incoordination. None of the adults on site were affected. According to local residents, the die-off began approximately four weeks earlier and had occurred in previous years following harsh weather.

The USGS National Wildlife Health Center received three freshly dead egrets for evaluation; two were emaciated while the third bird was in good nutritional condition. All three juveniles had evidence of disseminated helminth parasite infection observed at necropsy. Various trematode, nematode, cestode and acanthocephalan parasites were identified; the most notable being nematodes of the genus *Eustrongylides*. Similar findings were reported in specimens examined by the Southeastern Cooperative Wildlife Disease Study. Mortality from *Eustrongylides* sp. infection occurs from penetration of the parasite through the

stomach wall resulting in secondary peritonitis. Young wading birds are most commonly affected, although infections have also been reported in birds of prey from consuming infected fish, amphibians, or snakes that serve as either secondary intermediate hosts or transport hosts in the parasite's complex life cycle. Major mortality events attributed to Eustrongylidosis have been reported sporadically in Texas, Louisiana, Florida, Virginia, Delaware, South Carolina, and Indiana over the past three decades. Contact: Anne Ballmann, USGS National Wildlife Health Center, 608-270-2445, aballmann@usgs.gov

Amphibian mortality surveillance in the northeastern United States

A regional, two-year surveillance project is underway in Maryland, New Jersey, Delaware, Pennsylvania and Virginia to better understand the geographic distribution and cause(s) of juvenile mortality among wild amphibians. Biologist Scott Smith, with the Maryland Department of Natural Resources, is the study coordinator. Other collaborating partners include Towson University (Maryland), Montclair State University (New Jersey), USGS-Patuxent Wildlife Research Center (Maryland), New Jersey Division of Fish and Wildlife, Delaware Division of Fish and Wildlife, Pennsylvania Fish and Boat Commission, Virginia Department of Game and Inland Fisheries, Conserve Wildlife Foundation (New Jersey), and the Smithsonian Conservation Biology Institute (Washington, DC).

The USGS National Wildlife Health Center provides diagnostic evaluation of specimens associated with current or suspected amphibian die-offs at select study sites for the surveillance project. Thus far, ranavirus infections have been identified at 8 of 65 locations (2 in Delaware; 6 in Maryland) surveyed in 3 states. Evaluation of morbidity and mortality at two additional study sites in New Jersey is pending, as are some non-study sites in Maryland that also reported amphibian die-offs in 2013. Wood frog tadpoles (*Rana sylvatica*) are most frequently involved in the die-offs which can also include spring peepers (*Pseudacris crucifer*), green frogs (*Rana clamitans*), American toads (*Bufo americanus*), eastern spadefoot toads (*Leptobrachium* sp.) and/or spotted salamanders (*Ambystoma maculatum*). Field signs include abnormal swimming behavior, hemorrhages on the ventral surface, swollen appearance, and mass mortality or lack of live amphibians. Mortality estimates range from a few individuals to thousands based on spring 2013 egg mass counts at some sites. Ranavirus-associated mortality among amphibians occurs rapidly, potentially decimating an entire season's recruits within 1-2 weeks at affected locations. This can be easily missed if sites are only visited once during the spring. Population level impacts at locations with recurrent seasonal mortality can be significant. Contact: Anne Ballmann, USGS National Wildlife Health Center, 608-270-2445, aballmann@usgs.gov

Leading causes of avian mortality in the United States during 2013

During 2013, 138 avian morbidity and mortality events were investigated by or reported to the USGS National Wildlife Health Center. More than 63,000 birds were estimated to be affected during these events. There were more epizootic events reported from the Pacific flyway (56) than any other flyway in 2013 (Mississippi = 32, Central = 26, Atlantic = 24). The estimated avian mortality was also higher in the Pacific flyway (46,361 birds) than any other flyway (Mississippi = 8,790, Central = 6,171, Atlantic = 1,757).

Infectious disease was responsible for 83% (52,275/63,079) of avian deaths during 2013. Avian botulism (types C and E) was associated with 11,433 bird mortalities and was the cause of more epizootic events (24/138) than any other cause of death during 2013. Over 60% (7,000/11,433) of the mortality attributed to botulism occurred during an event in northern California and involved mallards (*Anas platyrhynchos*), white-face ibis (*Plegadis chihi*), green-winged teal (*Anas carolinensis*), northern pintails (*Anas acuta*), and western grebes (*Aechmophorus occidentalis*). Although West Nile virus was responsible for the largest number of avian mortalities (20,160) during 2013, the majority of mortality associated with this disease occurred at a single event in Utah that involved primarily eared grebes (*Podiceps nigricollis*). Avian cholera was the third leading cause of death and caused the third highest number of avian epizootic events (17) during 2013. Although various waterfowl including redhead (*Aythya Americana*), canvasback (*Aythya valisineria*) and

ruddy ducks (*Oxyura jamaicensis*) were affected during these events, the highest mortality due to avian cholera occurred in eared grebes and snow geese (*Chen caerulescens*). There also continued to be several avian morbidity and mortality events associated with human activities, including several hundred deaths attributed to lead poisoning (species included trumpeter swans [*Cygnus buccinators*], Canada geese [*Branta canadensis*, 516 deaths due to pesticides, insecticides, and other toxicants (primarily Eurasian collared doves [*Streptopelia decaocto*], European starlings [*Sturnus vulgaris*], and red-winged blackbirds [*Agelaius phoeniceus*]), and 34 deaths (primarily sandhill cranes [*Grus Canadensis*]) due to electrocution following a weather event (dense fog).

To view NWHC Quarterly Wildlife Mortality Reports, please visit:

http://www.nwhc.usgs.gov/publications/quarterly_reports/index.jsp

Recent NWHC Publications of Interest

[Trichinosis](#). 2013, Foreyt, W. J.; Edited by Abbott, R. C.; van Riper, C., USGS Circular: 1388

[Acute pasteurellosis in wild big brown bats \(*Eptesicus fuscus*\)](#). 2014. Blehert, D. S., Maluping, R. P., Green, D. E., Berlowski-Zier, B. M., Ballmann, A. E., Langenberg, J. A. Journal of Wildlife Diseases 50(1): 136-199.

[Humic substances interfere with detection of pathogenic prion protein](#). 2014. Smith, C. B., Booth, C. J., Wadzinski, T. J., Legname, G., Chappell, R., Johnson, C. J., Pedersen, J. A. Soil Biology and Biochemistry 68: 309-316.

[Has the time come for big science in wildlife health?](#) 2013. Sleeman, J. M. EcoHealth 10: 335-338

[Tumors in sea turtles: the insidious menace of fibropapillomatosis](#). 2013. Work, T. M., Balazs, G. H. The Wildlife Professional: 44-47.

[Unique characteristics of the trachea of the juvenile leatherback turtle facilitate feeding, diving and endothermy](#). 2014. Davenport, J., Jones, T. T., Work, T. M., Balazs, G. H. Journal of Experimental Marine Biology and Ecology 450: 40-46.

[Immunological evaluation of captive green sea turtle \(*Chelonia mydas*\) with ulcerative dermatitis](#). 2013. Muñoz, F. A., Estrada-Parra, S., Romero-Rojas, A., Gonzalez-Ballesteros, E., Work, T. M., Villaseñor-Gaona, H., Estrada-Garcia, I. Journal of Zoo and Wildlife Medicine 44(4): 837-844.

[Wildlife mortality investigation and disease research: contributions of the USGS National Wildlife Health Center to endangered species management and recovery](#). 2014. Brand, C. J. EcoHealth: Online First.

[SemantEco: a semantically powered modular architecture for integrating distributed environmental and ecological data](#). 2013. Patton, E. W., Seyed, P., Wang, P., Fu, L., Dein, F. J., Bristol, R. S., McGuinness, D. L. Future Generation Computer Systems: Online First.

[Toxicity of Pb-contaminated soil to Japanese quail \(*Coturnix japonica*\) and the use of the blood-dietary Pb slope in risk assessment](#). 2014. Beyer, W. N., Chen, Y., Henry, P., May, T., Mosby, D., Rattner, B. A., Shearn-Bochsler, V. I., Sprague, D., Weber, J. Integrated Environmental Assessment and Management 10(1): 22-29.

[Ocean warming and acidification have complex interactive effects on the dynamics of a marine fungal disease.](#) 2014. Williams, G. J., Price, N. N., Ushijima, B., Aeby, G. S., Callahan, S., Davy, S. K., Gove, J. M., Johnson, M. D., Knapp, I. S., Shore-Maggio, A., Smith, J. E., Videau, P., Work, T. M. *Proceedings B of the Royal Society* 281(1778): 1471-2954.

[Lectins stain cells differentially in the coral, *Montipora capitata*.](#) 2014. Work, T. M., Farah, Y. *Journal of Invertebrate Pathology*: Online First.

[A rapid field test for sylvatic plague exposure in wild animals.](#) 2014. Abbott, R. C., Hudak, R., Mondesire, R., Baeten, L. A., Russell, R. E., Rocke, T. E. *Journal of Wildlife Diseases*: Online First.

[Season and application rates affect vaccine bait consumption by prairie dogs in Colorado and Utah, USA.](#) 2014. Tripp, D. W., Rocke, T. E., Streich, S. P., Brown, N. L., Fernandez, J. R., Miller, M. W. *Journal of Wildlife Diseases*: Online First.

[USGS National Wildlife Health Center Quarterly Mortality Report-April 2013 to June 2013.](#) 2013. Buckner, J. L., Ballmann, A. E., Bodenstein, B. L., White, C. L. *Newsletter for the Wildlife Disease Association*: October 2013: 7-9.

[USGS National Wildlife Health Center Quarterly Mortality Report-July 2013 to September 2013.](#) 2014. Buckner, J. L., Ballmann, A. E., Bodenstein, B. L., White, C. L. *Newsletter for the Wildlife Disease Association*: January 2014: 6-7.

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Examination of live Asian swamp eels (*Monopterus spp*) from selected ethnic food markets in the USA and wild populations in Florida and New Jersey for advanced third-stage larvae of *Gnathostoma spinigerum* (Nematoda: Gnathostomatidae). 2014. Cole, R., Choudhury, A., Nico, L.G., Griffin, K.M. *Emerging infectious Diseases*: March 2014 (in press).

USGS Wildlife Health Information on Twitter

The USGS National Wildlife Health Center has created a USGS Wildlife Health Twitter account: @USGSWILDLIFE. Tweets will highlight USGS efforts in the field of wildlife health by posting news articles that mention the work of USGS scientists involved with wildlife disease; links to journal articles that contain the scholarly work of USGS wildlife specialists; USGS Wildlife Health Bulletins and media releases; news concerning outbreaks of wildlife diseases, such as avian influenza; and news from the various USGS Science Centers that specialize in wildlife health. Go to <http://twitter.com/USGSWILDLIFE> and follow us!