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- [Press Releases](#)
- [Online Submission and Review](#)
- [Author Video Guidelines \(JWDV\)](#)
- [Author Charges and Payment Information](#)
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- [BioOne Report](#)
- [Altmetrics](#)

JWD Supplements**JWD Aquatic Animal Articles****WDA Newsletter**

- [Current Issue](#)
- [Archive](#)

Proceedings of Conference Publications**Reports from the Field - Open Access**[Print this page](#)

Newsletter



April 2016

CONGRATULATIONS to the Scholarship and Research Recognition Award winners!

CONGRATULATIONS!



This year we had two Scholarship Awards to give out, and the winners are Jamie Rothenburger and Krista Jones.

The Research Award winner this year is Michelle Verant. The title of her research summary is "Defining the epidemiology of *Pseudogymnoascus destructans* within bat hibernacula to inform surveillance and management of bat white-nose syndrome". It will be a timely and informative talk for everyone this summer.

What's your diagnosis? Mountain lion cubs

Submitted by Mark L. Drew, DVM, Idaho Department of Fish and Game

In early January 2016, three, approximately 6 month old, mountain lion cubs, presumably siblings, were found in the backyard of a private residence in Pocatello, Idaho. The three cubs were captured by remote injection. They were determined to be in thin body condition, and likely orphaned from an adult female that was legally killed in the area in late December 2015. The siblings were in temporary housing for about 60 days before being transferred to permanent housing in North Carolina.

In preparation for transfer, the three cats were given physical examinations on March 3, 2016. Ambient conditions were approximately 40 F with melting snow on the premise. Food was withheld for 12 hours prior to anesthesia. One cub, a male, was observed by the caretaker to be more nervous than the other two and had abrasions on both sides of its face from rubbing on the wire of the enclosure when it was pacing. This cub (Male #1) was darted first, followed by the female (Female #1), and then the other male (Male #2). Each cub was anesthetized by remote darting (Dan-inject, 1.5 ml dart, 16 g 25 mm collared needle in a Dan-inject CO2 pistol) at 2-3 m distance. Each cub received Ketamine (120 mg, 200 mg/ml, Wildlife Pharmaceuticals, Fort Collins, CO) and Xylazine (30 mg, 100 mg/ml, Lloyd Laboratories, Shenandoah, IA). All three cubs were darted within 3 minutes of each other.

The female and Male #2 went through a routine induction of 3-5 minutes followed by a stable anesthesia period and recovery. Both were weighed (40 and 50lbs, respectively), bled by jugular venipuncture, and given Ivermectin (2 ml), Oxytetracycline (2.5 ml), and LRS (1L) SQ. At approximately 35-40 minutes after darting, both cubs were given Tolazoline (120 mg, 100 mg/ml, Lloyd Laboratories, Shenandoah, IA) IV and IM. The cubs were transferred to individual shipping crates; recovery to sternal recumbency and standing occurred in 5-10 minutes.

One cat, Male #1 had a very strange, violent, and protracted induction. Approximately 3 minutes after darting, he started to show typical drug effects, but then went into a series of jerky, spastic movements, jumping, summersaulting and running short distances within the enclosure. He finally went deep enough under anesthesia to enable snaring with a



catch pole and was given 2 doses of ketamine (50 mg) about 4 minutes apart to deepen the plane of anesthesia and allow handling. His respiratory and heart rates were high (60-80/min and 100-120/min, respectively), and his rectal temperature climbed to 109.3 F over 20-30 minutes. Alcohol was applied to his ears, paws, belly and groin and snow was packed into his groin and axillary areas; his rectal temperature decreased gradually over 10-15 minutes

to 104.3. The cub was then processed in the same manner as the other two cubs (sample collection and administration of fluids, ivermectin, and oxytetracycline). After Tolazaline administration, Male #1 began to show signs of Xylazine reversal, but sternal recumbency was not achieved until 20-30 minutes after the reversal.

The cubs were transported to an airport approximately 2 hours away to await a flight the following morning. Approximately 1.5-2 hours after leaving the temporary facility, Male #1 became lethargic with shallow respirations, which progressed to respiratory arrest and death. The carcass was taken to the Idaho Department of Fish and Game Wildlife Health Laboratory for necropsy.

At necropsy, the carcass weighed 49 lb and was in good body condition. There was normal winter hair coat with fading spots. A small dart puncture wound was present on the cranial aspect of the left hip. There is an elongated skin tent, suggesting 5-6% dehydration. The overall body condition was judged to be excellent with excellent fat depots. All organs were grossly normal except for the liver and lungs. The lungs were dark red and swollen with rib imprints, bilaterally. There was extensive fluid in the parenchyma and airways on cut section and bloody fluid in the trachea and major bronchi. The liver was swollen with rounded edges.

There was a small dart wound in the skin over the cranial aspect of the right hip with a small 1.5 cm diameter bruise around the needle site. The needle tract entered the epaxial muscles to the level of the spinal processes. There were small bruises on the pin bones. Several pockets of clear fluid were present under the skin on the right side of the carcass. The blood vessels under the skin on the thorax and abdomen were prominent and engorged. The dentition was normal for a 6 month old mountain lion with double canines in both upper and lower arcades. There is a significant volume of bloody fluid in the oral and nasal cavities.

Samples of heart, lung, liver, spleen, kidney, muscle, trachea, and brain were collected and placed in 10% buffered formalin. Lung was collected for bacteriology and virology. Whole blood was submitted for a CBC, and serum was submitted for serum biochemistry and serology.

See the end of this newsletter for the final diagnosis!

Wildlife Veterinary Section Elections

Submitted by Anne Justice-Allen Chair Wildlife Veterinary Section



The Wildlife Veterinary Section will be holding an election for officers from April 15th to May 15th. Section members will be receiving a link for a Survey Monkey next week. The candidate statements are located on the section webpage

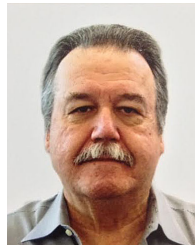
<http://www.wildlifedisease.org/wda/SECTIONS/WildlifeVeterinary.aspx>

The slate of candidates includes:

Chairperson	Anne Justice-Allen
Treasurer	Nancy Boedeker
Secretary	Mike Sorum, Ginger Stout
Student Rep	Claire Butkus, Andreas Eleftheriou
Newsletter	Nina Schoch

We are also asking the membership to approve section bylaws (located on the same section website listed above).

Welcome Daniel Mulcahy, new editor of the Journal of Wildlife Diseases



Dan obtained his Ph.D. degree in 1977 from Oregon State University working on Infectious Pancreatic Necrosis of fish. Then he joined the U.S. Fish and Wildlife Service doing research on viral and bacterial diseases of fish for ten years. Dan joined the National Wildlife Health Center to supervise their research branch working largely on avian diseases. Leaving government employment, he then attended the University of Wisconsin's School of Veterinary Medicine, gaining his D.V.M. degree in 1992. Dan rejoined the federal government after moving to Alaska, and worked for the U.S. Geological Survey as a wildlife veterinarian until his retirement in 2016. Dan has published more than 90 journal publications dealing with fish, birds, and mammals (including marine mammals). He is also a veteran, having served in the U.S. Army.

The Disease Ecology Group in Mexico

Gerardo Suzán, Co-Chair of the Latin American Section (WDA-LA)



Disease ecology has been growing as an emergent discipline for the last 10 years in Mexico, and it is becoming a critical transdisciplinary science to understand ecological, evolutionary, and

anthropogenic drivers for infectious dynamics and disease emergence in all ecosystems. The Faculty of Veterinary Medicine (FVM) at the National Autonomous University of Mexico has been a crucial institution consolidating this discipline, building academic networks and promoting transdisciplinary, inter-institutional, and science-based health and conservation projects.

The FVM has incorporated different disciplines related to conservation and wildlife disciplines in its curricula since 1958 and in 1995 the Ethology and Wildlife department was established. Since then, it has received diverse national and international awards and has established cooperative national and international consortiums with many institutions in Mexico, the U.S., United Kingdom, France, and other countries in Central and South America.

As a result of intensive transdisciplinary work at the department, along with enthusiastic graduate students and collaborative scientists from other disciplines and institutions, the Disease Ecology Group (DEG) was established and began systematic research in 2007. Research has been developed in terrestrial and aquatic ecosystems in several vertebrate species with an *in situ* approach and under different temporal and spatial scales of analysis. Parallel to this initiative, and with the intention of becoming a leading group on both disease ecology and conservation medicine in Mexico, the Mexican Association for Conservation Medicine (KALAANKAB) was also founded in May of 2008. KALAANKAB www.kalaankab.org, is a non-profit non-governmental organization that promotes transdisciplinary scientific collaboration in disease ecology and conservation medicine. The organization has experience in hosting one international conference in Mexico City (2008), and 4 international congresses: Veracruz (2009), Queretaro (2011), Yucatan (2013), and Tabasco (2015). The Disease Ecology Group (DEG) (through KALAANKAB) will host the 66th Annual International Wildlife Disease Association (WDA) Conference in San Cristobal de las Casas, Chiapas in 2017. This meeting will be held jointly with the 3rd WDA Latin American Section Biennial Conference, and the 5th International Congress of Disease Ecology (KALAANKAB).

The DEG is composed of scientists, graduate students, and undergraduate students. Since 2011, more than 25 graduate international and national students have obtained their degree; some graduates have become professors, other have continued with doctoral and postdoctoral studies in Mexico and abroad, and more than 30 papers have been published in high-impact journals.

Our logo represents the complicated network in which all biotic interactions, including infectious diseases are connected, showing that health cannot be studied under one discipline and one temporal and spatial approach.

Sensitive to the global environmental crisis, including global warming, habitat loss and fragmentation, species diversity loss, habitat degradation and pollution and other environmental issues caused by human-induced change, the DEG is focuses on the identification of all factors favoring emergence and persistence of infectious and non-infectious diseases affecting biodiversity and ecosystem services that sustain life on Earth. The DEG has worked intensively with different wildlife veterinarians and conservation initiatives in Latin America including continued collaboration with the WDA Latin American section.

You can find more information at <http://www.eefmvz.net/grupo.html> or contact us at gerardosuz@gmail.com with Gerardo Suzán or at ecologiaenfermedades@googlegroups.com.



Endowment for JWD is growing!

Submitted by Joe Gaydos, Chair Endowment Committee

Endowing the production of *Journal of Wildlife Diseases* (JWD) and its free electronic distribution in the 2/3rds of nations with lower per capita GDP is the largest project the WDA has ever undertaken. The goal is to raise \$2.5 million by 2020. The endowment effort started in 2012 and surpassed the halfway point in 2015.

Last fall, an anonymous donor pledged to match all donations made between September 1, 2015 and January 30, 2016 and other income up to \$9,100. Thanks to the generosity of WDA members we were able to raise \$10,322 for the endowment. With the \$9,100 match, that means we raised \$19,422 for the endowment last fall. Thank you to everybody that donated!

Recognizing the importance of the endowment for the long-term future of the JWD and the WDA, the WDA Council is being asked to approve using funds from WDA's invested reserve to match this \$19,422. When matched, the endowment will really grow by \$38,844.

Even more good news is that the 2015 WDA Conference yielded revenue of almost \$20,000 that also will go to the endowment.

Momentum is growing and we are seeking corporate and organizational support for the endowment as well as grant funding. For these efforts, it is important that we show that the WDA membership supports the endowment. There's no stronger way to show that an organization supports an endowment than by having at least half of its membership funding it. If you haven't yet made a contribution to the JWD endowment, please do so. Even small gifts are important!

USGS National Wildlife Health Center Quarterly Wildlife Mortality Report

October 2015 to December 2015



Written and compiled by members of the U.S. Geological Survey National Wildlife Health Center - Wildlife Epidemiology & Emerging Diseases Branch.

Mouse predation on adult nesting albatrosses on Sand Island, Midway Atoll National Wildlife Refuge

During the annual albatross census in late December 2015 at [Midway Atoll National Wildlife Refuge](#), counters observed a small and highly localized cluster of Laysan albatrosses (*Phoebastria immutabilis*) with wounds on the back of their necks. Close observation of the wounds and canvassing the entire area for evidence of incipient species (e.g., rats) or new behavioral interactions among existing species did not result in an obvious culprit. A monitoring program was implemented and revealed that the severity of wounds, number of impacted birds, and geographical area affected increased dramatically between December 23, 2015 and January 5, 2016. Based on consultation with wildlife biologists and wildlife health experts in Honolulu, it was suspected that resident mice were causing the damage. On January 5, U.S. Fish and Wildlife Service

(USFWS) staff and volunteers deployed baited live traps and trail cameras to further investigate the cause of the neck and back wounds. Camera footage revealed that mice were repeatedly entering and staying in the feathers on the backs of nesting albatrosses for prolonged periods of time. Albatrosses on camera showed signs of agitation that included frequently standing up off their egg, shifting position on the nest, and repeated preening. A higher than normal level of adult mortality has been observed in this area, with the majority of fresh carcasses displaying open wounds to their back and/or neck. Additionally, nest failure due to abandonment was nearly twice the rate typically observed. Six fresh albatross carcasses were sent to the U. S. Geological Survey's National Wildlife Health Center Honolulu Field Station on January 6 for necropsy. Results revealed that the birds were in excellent body condition with no obvious cause of death other than the wounds. Study of the wound sites confirmed rodent chewing. Similar findings were noted during necropsies of 24 additional birds performed on site by USFWS staff. Photographic evidence, coupled with necropsy findings, led to the conclusion that the bites occurred before death. Based on camera evidence and individuals found in the live traps, it was confirmed that the mice involved are house mice (*Mus musculus*), a species long-established on Sand Island, Midway Atoll. By January 20, two additional areas, located 400 m and 1000 m northeast of the original site, were discovered with dead and live bitten Laysan albatrosses. As of February 29, 2016, over 480 albatrosses have been observed with bites and 42 have been found dead in a 17,500 m² area. Histology of birds with mouse bites indicated they are dying from sepsis. Article contributed by Meg Duhr-Schultz, U.S. Fish & Wildlife Service.

Laysan albatross (*Phoebastria immutabilis*) with wound caused by house mouse (*Mus musculus*), Midway Atoll National Wildlife Refuge, January 2016. Photo by Dr. Thierry Work, USGS National Wildlife Health Center Honolulu Field Station.

***Batrachochytrium salamandrivorans* update**

Amphibian populations worldwide face multiple serious threats, including chytridiomycosis caused by *Batrachochytrium dendrobatidis* (Bd). A new chytrid fungus, *Batrachochytrium salamandrivorans* (Bsal), was recently discovered in association with severe mortality in



European fire salamanders (*Salamandra salamandra*). Bsal likely originated from Asian salamander hosts and is believed to have been transported to Europe via international trade of salamanders for pets. The Bsal fungus has not been detected to date in the United States.

Scientists at the USGS National Wildlife Health Center (NWHC) recently

published a risk analysis illuminating the threat posed by Bsal to amphibians in the United States. The analysis ([Richgels et al. 2016. Royal Society Open Science](#)) utilizes spatial data on imports and pet trade establishments, salamander species diversity, and characteristics of Bsal ecology to identify high-risk geographic areas with both a high likelihood of introduction and severe consequences for local salamanders. This risk assessment has supported the U.S. Fish and Wildlife Service interim rule, published in [The Federal Register](#), which declared 201 species of salamanders from 20 genera as "injurious amphibians" because of their potential to carry Bsal infections. Under this interim rule, both importation into the United States and interstate transportation between States, the District of Columbia, the Commonwealth of Puerto Rico, or any territory or possession of the United States of any live or dead specimen, including parts, of these 20 genera of salamanders are prohibited, except by permit for zoological, educational, medical, or scientific purposes.

The NWHC-led risk assessment is also being used to guide an intensive Bsal surveillance effort in collaboration with the USGS Amphibian Monitoring and Research Initiative (ARMI). The NWHC plans to test samples from up to 10,000 wild salamanders collected throughout the United States during 2016 for presence of Bsal. In pilot work, the NWHC and ARMI tested over 500 salamander swabs from 37 sites on the West Coast, Gulf Coast, and Mid-Atlantic in 2015 and detected no Bsal. The NWHC continues to provide epidemiologic investigation and diagnostic services for wildlife mortality and morbidity events, and possesses a diagnostic permit to receive salamander species listed in the USFWS interim rule.

White-nose syndrome Winter 2015/2016 update

To date, white-nose syndrome (WNS) has been confirmed in bats from 27 states and five Canadian provinces within the eastern half of North America (Minnesota announced confirmation of WNS in St. Louis County in March 2016). *Pseudogymnoascus destructans* (Pd), the fungus that causes WNS, has also been detected in Mississippi, Nebraska, and Oklahoma, although no clinically-affected bats have been reported from these states. North American bat species confirmed positive for WNS include little brown bat (*Myotis lucifugus*), northern long-eared bat (*M. septentrionalis*), Indiana bat (*M. sodalis*), gray bat (*M. grisescens*), eastern small-footed bat (*M. lebeii*), tri-colored bat (*Perimyotis subflavus*), and big brown bat (*Eptesicus fuscus*). Of note, Pd has been detected in the hibernaculum environment and on bats from multiple sites across China (Hoyt et al. 2016. [Emerging Infectious Diseases](#)).

The USGS National Wildlife Health Center (NWHC) continues to lead a 3-year surveillance project designed to assist State and Federal wildlife agencies nationwide with early detection of Pd in new areas, and to address specific research priorities identified by partners in conjunction with the [White-Nose Syndrome National Plan](#). During the first two years of the project swabs from more than 2,100 bats, representing 16 North American species, and 580 environmental substrates from 110 hibernacula in 23 states were returned to the NWHC for analysis. This project has resulted in the detection of Pd at 16 hibernacula of previously unknown Pd status in six states, including nine sites where there was no physical or behavioral evidence of WNS observed in the bat population. Nearly all detections of Pd originated from swabs collected from bats rather than from environmental substrates collected inside of hibernacula. Information on biotic and abiotic factors continues to be collected at all hibernacula surveyed to assess the potential importance of various parameters in contributing to presence of Pd.

Partners are reminded that the NWHC continues to provide diagnostic and epidemiological assistance to investigate unusual bat mortality events. Federal, State, or Tribal agencies wishing to participate in the expanded national Pd surveillance strategy should contact Dr. Anne Ballmann at the NWHC (608-270-2445, aballmann@usgs.gov).

Snowy owl mortalities in Wisconsin

Between mid-November 2015 and the end of January 2016, 10 snowy owl (*Bubo scandiacus*) carcasses collected in Wisconsin were submitted to the USGS National Wildlife Health Center (NWHC). All were juvenile birds suffering from advanced emaciation. Although multiple etiologies were detected, including *Salmonella* sp., *Aspergillus* sp., *Escherichia coli*, organophosphate exposure, and trauma, the cause of death in the majority of birds was determined to be multiorgan failure secondary to emaciation.

The NWHC is a partner in [Project SNOWstorm](#), a collaborative endeavor between numerous State and Federal agencies, academia, and non-governmental organizations that was originally conceived by the Maryland Department of Natural Resources. Formed in the wake of the historic snowy owl irruption of 2013-14, the goal of this project is to expand knowledge regarding the ecology of wintering snowy owls.

Snowy owls are native to Arctic regions of North America and Eurasia. They nest in the summer primarily north of 60 degrees north latitude. Their primary food source is small mammals, but they are also known to prey upon multiple bird species, including waterfowl, gulls, shorebirds, songbirds, and other raptors. Some individuals overwinter on the breeding grounds, but many birds migrate farther south in response to reduced prey availability during winter months. Irruptions, or larger than normal winter migrations of snowy owls into more southern latitudes, occur periodically in apparent response to resource shortages and may also reflect higher than normal reproductive success the previous summer. The extreme irruption that occurred in the winter of 2013-14 is thought to be the largest migratory event of snowy owls in the Northeast and Great Lakes regions in a century. Smaller scale irruptions subsequently occurred during the winters of 2014-15 and 2015-16.

To view, search, and download historic and ongoing wildlife morbidity and mortality event records nationwide visit the Wildlife Health Information Sharing Partnership event reporting system (WHISPers) online database: <http://www.nwhc.usgs.gov/whispers/>.

To request diagnostic services or report wildlife mortality:
<http://www.nwhc.usgs.gov/services/>

Answer to “What’s your diagnosis?”

(Continued from the second article above by Mark Drew)

Preliminary Diagnosis: pulmonary edema and congestion, possible malignant hyperthermia syndrome

On histology, the lung showed acute pulmonary congestion and edema manifested by the engorgement of alveolar capillaries and the flooding of alveoli with pink staining serous fluid throughout the lung, but there was no concomitant inflammatory reaction. No significant lesions were found in the brain, liver, skeletal muscle, trachea, spleen, heart and kidneys. No significant pathogens were found on bacteriology of the lung and the lung was negative for FECV/FIP, FIV, Calicivirus, FHV and Panleukopenia virus. The pleura fluid was negative for FeLV. The cub was also negative for FeLV, FIV, and FIP on serology. The CBC had significant changes with an elevated RBC, Hb, PCV and lymphocytes. Levels of ALP, AST, CK, albumin, P, bicarbonate, and K, and the anion gap were extremely elevated. The amylase level was low.

Final Diagnosis: open, pulmonary edema, possible malignant hyperthermia syndrome

It is unclear what caused the abnormal reaction to the anesthetic drugs in this mountain lion cub. It is possible that the pulmonary edema was present prior to anesthesia and the dramatic behavior was related to hypoxia and the animal struggling to maintain adequate oxygenation. It is also possible that the animal had an acute allergic or anaphylactic event in response to the anesthetic drugs, but the other two cubs anesthetized with the same drugs from the same bottles had typical responses to the drugs.

Because this cub had such an unusual response to the anesthetic drugs, and was also known to be the most excitable of the three siblings, the clinical picture fits an episode of malignant hyperthermia. The marked dehydration (elevated RBC, Hb, and PCV) and the very elevated CPK, K, P and anion gap relative to the two siblings are suggestive of malignant hyperthermia as seen in domestic cats, pigs, and humans.

In these species, extreme muscle rigidity can exacerbate the hyperthermia and fluid build-up in the lungs and can result in decompensation leading to the pulmonary edema and congestion. In addition, the muscle rigidity can inhibit blood flow which can lead to impaired respiratory function, renal failure and death.

Malignant hyperthermia syndrome is a rare condition, possibly with a genetic predisposition, but is very difficult to treat without extensive patient support to control the pulmonary edema and the muscle rigidity, resulting in a relatively high mortality rate in affected patients.

