

Newsletter of the Wildlife Disease Association



Members' Corner

2009 WDA International Conference

Ed Addison

The 58th Annual International Conference of the Wildlife Disease Association was held at the Semiahmoo Resort, near Blaine, Washington, USA, 2-7 August 2009. The resort was located overlooking the ocean on a long sand spit only meters south of the Canada-U.S. border.

There were 273 registrants for the conference, one of the largest number of attendees for WDA conferences. The participation of 27 registrants from Australia, Nationalist China, Korea, South Africa, United Arab Emirates, France, Switzerland, Sweden, Spain and the Netherlands enriched the diversity of topics presented. We recognize that it takes added effort to attend by those participants from outside of North America and greatly appreciated their presence!

Founding WDA member Dr. Robert Rausch and Dr. Virginia Rausch attended the conference for the second consecutive year. Coincidentally at the resort for dinner on the opening day of the conference was Dr. James Steele. Dr. Steele was an active WDA member until his retirement from the U.S. Public Health Service in 1971. Dr. Steele and his family joined us for our opening reception and

accepted an invitation from our president Charles van Riper to return and join us for our salmon barbecue picnic the following evening. We very much appreciated the participation of the Rausch and Steele families.

The science program included approximately 132 oral presentations and 40 poster presentations. The social program included a fine welcoming reception; an excellent barbecue salmon picnic on the edge of the beach; the traditional WDA auction to raise funds for student awards and activities; a half day of field excursions either whale watching, salmon fishing or river rafting; and our Thursday banquet.

Drs. Buffy Howerth and Dave Stallknecht were both presented with the WDA Distinguished Service Award in recognition to their long and productive service to the Association in a wide variety of capacities, including their soon to be completed five year term as co-editors of the *Journal of Wildlife Diseases*. The recipient of the 2009 WDA Emeritus Award was Dr. Milt Friend, in acknowledgement of his broad and continuing contributions in the field of wildlife health throughout the world, including being founding director of the U.S.G.S. National Wildlife Health Center in Madison, Wisconsin.

Sarah Hamer was the 2009 recipient of the WDA Student Research Recognition Award for her studies at Michigan State University on ecological aspects of the invasion of black-legged ticks and Lyme disease in the mid-western United States. Mark Ruder of the Southeastern Cooperative Wildlife Disease Study at the University of Georgia was

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Member's Corner

the recipient of the 2009 WDA Scholarship Award. As usual, there were many excellent poster and oral presentations by students. The Best Student Poster Award was presented to Jeffrey Lorch, University of Wisconsin-Madison with an honorable mention to Chelsea Himsworth, University of Saskatchewan. The Terry Amundson Award for the best student oral presentation was presented to Luis Cruz-Martinez, University of Minnesota with an honorable mention to Camilla Whittington, University of Sydney. The Duck Award, presented to a person who can make a silly mistake and is able to laugh at themselves was presented to Tom DeLiberto.

Joe Gaydos and Colin Gillin, co-chairs of the 2009 conference committee, selected the site for the conference and were outstanding in leading the organization of the conference. They received a great deal of volunteer support from Jordan Mencher, Damien Joly, Peregrine Wolff, Kristin Mansfield, Mark Drew, Kevin Keel, Terra Kelly, Dave Jessup, Mark Atkinson, Rob Bildfell, Brett Elkin, Felicia Nutter, Helen Schwantje, a number of student volunteers and others. We thank all of these folks and others who through their enthusiastic volunteer efforts so typical of the Wildlife Disease Association made this such a stimulating and enjoyable conference!



John Fischer and WDA Past President Charles van Riper present Dave Stallknecht and Buffy Howerth with the WDA Distinguished Service Award



Kevin Keel presents Sarah Hamer with the Student Research Recognition Award



Milt Friend is presented with the WDA Emeritus Award by Terry Creekmore and Charles van Riper



Luis Cruz-Martinez, Terry Amundson Presentation Award



Camilla Whittington, Honorable Mention Terry Amundsen Award



Mark Ruder, WDA Scholarship Award



Jeffrey Lorch, Best Student Poster Award



Chelsea Himsworth, Best Poster Honorable Mention

Nominations for 2010-2011 WDA Council

The WDA Nominations Committee is seeking nominees for two Council Members-at-Large (3 year term) and a Student member of Council (two year term) on the 2010-2011 WDA Council. Newly elected members of Council assume office at the end of the next annual conference following the election. The 2010 conference will be earlier than usual, occurring May 31- June 4, 2010 in Puerto Iguazú, Argentina. Similarly, the WDA election will be held earlier than usual during the winter of 2010.

Ideally Council Members-at-Large have a good understanding of the Association through their previous volunteer contributions. While experience gives Members-at-Large valuable perspectives that they can bring to the Council, numerous less experienced members have also been nominated and elected and have brought new and different ideas to Council.

If you have suggestions for WDA members as nominees for these positions, please submit your suggestions to the executive manager, Ed Addison, (ecolink@rogers.com) and include the following:

- Name of possible candidate.
- Name of sponsoring member.
- Name of second sponsoring member.
- Degrees earned; place and date
- Former professional positions held; place and date
- Present Position; title and location
- Member of WDA since...
- Previous WDA activities
- Affiliations with relevant professional and scientific societies
- Interests associated with mission of the WDA

Additionally, please have the nominee submit a personal agenda statement with an outline of personal goals for the WDA if elected.

Please submit by 15 November 2009.

Wildlife Middle East News

Ed Addison

Tom Bailey attended the 2009 international conference of the WDA in Blaine, Washington, USA in August. Tom is a long time member of the WDA and is

a falcon and wildlife veterinarian at the Dubai Falcon Hospital in Dubai, UAE. In addition to presenting a paper, Tom introduced us to "Wildlife Middle East News", a newsletter distributed electronically and in page print in both Arabic and English. For many of us this was our first exposure to Wildlife Middle East News [WME News] and we profile the publication here (page 7).

WME News has been published quarterly since June 2006. The Newsletter editorial team is comprised of Tom Bailey, Declan O'Donovan, Chris Lloyd and Theri Bailey, all from Dubai, UAE. The objective of the newsletter is to provide wildlife and environment resource information about the Middle East and surrounding areas to both professionals and the public. It is anticipated that the WME News will foster development of a network of professionals and others interested in wildlife of the Middle East. The content addresses a variety of wildlife topics, including disease issues. For example, in the June 2009 issue [Volume 4, Issue 1], is a report by Tom Bailey, Declan O'Donovan, Joerg Kinne and Ulrich Wernery entitled "Observations on Foot and Mouth Disease in Vaccinated and Unvaccinated Wildlife in the United Arab Emirates".

At present, 1000 printed copies of WME News are distributed and there are over 6500 subscribers to the digital version. Subscriptions to the WME News are free although organizations requesting quantities of the newsletter in print form are encouraged to make a donation to cover the costs. To access and/or subscribe to the WME News, go to www.wmenews.com.

The most recently completed issue of WME News that came out in September includes an editorial and information on a Kuwait turtle conservation project; clinical fluorosis in captive gerenuk and bongo antelope; a field ornithology and botany course with birdlife international and the Royal Botanic Gardens Edinburgh in Iraqi Kurdistan; rat control in sensitive wildlife environments; encephalomyocarditis outbreak in a zoological collection in the UAE; red foxes in the Middle East; opportunistic wildlife trade in Yemen; a review of "Arthropod Fauna of the UAE Volume 2"; an update on fatal pollution and persecution of Rüppell's fox in central Saudi Arabia. Be sure to check out the WME News!

New Book Available

WDA members may be interested in a recent publication by Dr. Philip W. Ladds, titled *Pathology of Australian Native Wildlife*. Check out <http://www.publish.csiro.au/nid/21/pid/6013.htm> for details and be sure to look for an upcoming review of the book in the Journal of Wildlife Disease.

New Website Editor Wanted for the WDA

After 3 years of meritorious service as our website editor, Bridget Schuler is planning to 'retire' from the position in the summer of 2010. The Association seeks a person who may have experience in design or management of websites to serve as our volunteer website editor and in that position serve on the WDA Council. The person selected for the position could work as assistant website editor with Bridget to allow for a period of transition between editors.

If you might be interested in the job and wish to know more about it, Bridget [bridgetschuler@hotmail.com] is happy to discuss the job with you.

We would appreciate interested WDA members to provide their name to Ed Addison, the executive manager at ecolink@rogers.com.

WDA needs YOU:

Consider becoming the website editor, a council member at large, or student council member. Students this is your opportunity to begin contributing to your profession!

2009-2010 WDA Officers and Council Members

We had many new officers and members of council begin their terms at the annual conference. Here are your newly elected and returning leaders.

President: Lynn Creekmore
Vice-President: Dolores Gavier-Widén
Treasurer: Laurie Baeten
Secretary: Pauline Nol
Past President: Charles van Riper III

Council Members At Large:

Thierry Work, Samantha Gibbs,
Wayne Boardman, Christine Kreuder Johnson
Kristin Mansfield, Colin Gillin

Student Council Member: Terra Kelly

Section Chairs

Australasian Section: Jenny McLelland
European Section: Paul Duff
Nordic Section: Erik Ågren
Wildlife Veterinarian Section: Jonathan Sleeman

Student News

Colorado State University, Student WDA Chapter

Christy Wyckoff

In early October the newly formed Colorado State University Student Chapter of the WDA hosted their inaugural speaker, Dr. Peter Hudson from Pennsylvania State University. Dr. Hudson gave a dynamic and entertaining talk on research he has been involved with ranging from disease transmission ecology, pathogen super-spreaders and wildlife disease ecology in the field. The event was well-attended by students, faculty, and researchers from throughout the Fort Collins community and northern Colorado. The CSU Student Chapter of the WDA looks forward to their next two speakers, Dr. Paul Cross on November 10th, and Dr. Stephanie Shwiff on December 1st.

Please check our website for further information.

www.csuwda.colostate.edu



Wildlife disease ecologist, Peter Hudson, spoke for the Colorado State University student WDA chapter, October 2009.

Section News

Nordic Section News

Bjørnar Ytrehus—Editor

Opening of Danish Center for Wildlife Health

Anne Sofie Hammer, Danish Center for Wildlife Health

In August 2009 the opening of a Danish Center for Wildlife Health was revealed to the Danish Public. The Danish National Center for Wildlife Health is a cross-disciplinary and cross-institutional corporation dedicated to research in wildlife diseases and surveillance of the health status of Danish wildlife populations. The center is a corporation between the National Veterinary Institute, the Danish Environmental Research and the Danish Forestry Agency (under the Environmental Ministry).

Increased Mortality Among Seagulls and Suspected Trichomonas-Infection Among Garden Birds in Denmark

Anne Sofie Hammer

On the west coast of Denmark there have been increased mortalities among seagulls during the summer. The cause remains unknown, but investigations are still ongoing. In the southern part of Zealand there have been increased mortalities among garden birds. Trichomonas-infection is suspected to be the cause, but this has yet to be confirmed by diagnostic investigations.

Pedicle Fly-Strike in Roe Deer in Sweden

Erik Ågren, National Veterinary Institute (SVA), Sweden

Several occurrences of myiasis, fly-strike, affecting the pedicles of roe deer (*Capreolus capreolus*) bucks in Sweden have been reported in late summer (August-September). Myriads of maggots have been found in circumferential skin ulcerations surrounding the pedicles and antlers, exposing the underlying skull bone. Four bucks have been submitted to the National Veterinary Institute in Uppsala, Sweden. Three bucks were found within a limited area, one was found dead, a second was euthanized when found terminally ill, and the third shot during hunting. All four bucks were mature animals in their prime, with large pedicles and trophy sized antlers. There are recent reports of at least another four bucks with the same condition, from other counties in Sweden. The reason for this new condition to present itself in several deer in different locations, and within a short time span, is not yet clear. The maggots have been identified in three cases as blow-flies (family *Calliphoridae*) that

normally only initiate fly-strikes in tissues with some kind of lesion.

New Parasite Findings in Wildlife in Sweden

Erik Ågren

The first positive case of trichinellosis in Brown bear (*Ursus arctos*) in Sweden was found in September 2009, during routine trichinella-examination of submitted muscle tissue samples from a hunter-killed bear from northern Sweden. Further species identification of the muscle nematodes found in the bear is pending. *Trichinella* sp. parasites are in Sweden regularly found in lynx (*Lynx lynx*) and red fox (*Vulpes vulpes*), and more seldom in the grey wolf (*Canis lupus*), and rarely in wolverines (*Gulo gulo*) and wild boar (*Sus scrofa*).

After several years of being limited to one single island off the west coast of Sweden, Koster island, French heartworm (*Angiostrongylus vasorum*) in red fox (*Vulpes vulpes*) has been identified in a yearling fox found dead on mainland Sweden, in the southern county of Skåne. As heart worms have not previously been found in Swedish wildlife or in the dog population, discussions on regular deworming of pets will most likely be warranted.

The first findings of the lungworm *Aelurostrongylus falciformis* in the Eurasian badger (*Meles meles*) has been reported in Sweden during 2009. This lungworm was previously reported from Norway, in 2007. Preliminary results from a small survey of road-killed and hunter-killed badgers show that the parasite seems to be fairly prevalent, but does not necessarily cause overt disease or lesions.

Further Spread of Finch Trichomoniasis in Finland, Sweden and Norway

Kjell Handeland, National Veterinary Institute (NVI), Norway, Aleksija S. Neimanis (SVA), Marja Isomursu, Finnish Food Safety Authority Evira, Finland and Erik Ågren (SVA)

Since 2005, trichomoniasis has been identified as an emerging disease in wild finches in the United Kingdom (Pennycott *et al.*, 2005; Lawson *et al.*, 2006). In 2008, trichomonas epidemics also occurred in finches in southern Fennoscandia (Neimanis *et al.*, in press), and a further spread has been seen in 2009. In Norway, the outbreaks recorded in 2008 were

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restricted to the southeastern part of the country, ranging from the Swedish border to 10°10' E, and from 59°05'N to 60°10' N. By September 2009, the Norwegian epidemic area extended to 8°20' E, and 58°15'N to 63°30' N. In Sweden, the 2008 outbreaks occurred throughout southern and middle parts of the country. This year's confirmed cases in Sweden have been found between 60° 44' N and 56°25' N, and 12°52' and 18°42' E, with reports of dying greenfinches as far north as 65°51' N. In Finland, the 2008 epidemic was restricted to the south-western corner of the country, with northern and eastern limit of 60°27'N and 23°50'E. Since May 2009, new outbreaks have been reported from further north and east, mostly following the Baltic coastline. By September 2009, the northern and eastern limits of disease in Finland are 65°00'N and 26°28'E.

The disease occurs on private feeding stations from late spring and throughout autumn. The great majority of birds affected are greenfinches (*Carduelis chloris*). Affected birds have difficulties in swallowing food and water. Regurgitated food and water from affected birds are considered an important means of parasite transmission. At necropsy, birds normally are in a poor nutritional condition and show necrotizing ingluvitis, esophagitis and/or oropharyngitis. Viable trichomonads with morphology consistent with *Trichomonas gallinae* can be demonstrated, and cultured, from the mouth and esophagus of freshly dead birds. Collaborative work with British colleagues is underway to investigate the molecular epidemiology of the *Trichomonas* strains involved.

References

- Lawson B., A. Cunningham, J. Chantrey, et al. 2006. Epidemic finch mortality. *Veterinary Record*. 159:367.
- Neimanis A.S., K. Handeland, M. Isomursu, et al. First report of epizootic trichomoniasis in wild finches (Family Fringillidae) in southern Fennoscandia. *Avian Diseases*, (in press).
- Pennycott T., B. Lawson, A. Cunningham, et al. 2005. Necrotic ingluvitis in wild finches. *Veterinary Record* 157:360.

Toxicosis in Norwegian Birds

Bjørnar Ytrehus and Turid Vikøren, NVI

Malicious poisoning is often suspected when raptors and/or carrion birds are found dead in Norway, and indeed, there may still be incidents where people deliberately and illegally place toxicants in carcasses in order to kill such birds. This summer, one of three Common Ravens (*Corvus corax*) found near by a sheep carcass in

May (but submitted in July) where found to be intoxicated with the organophosphorous pesticide parathion. In two juvenile Golden Eagles (*Aquila chrysaetos*) and a Common Raven found on sheep carcasses in two separate locations in the same district, however, no toxicants could be isolated from either birds or carcasses, in spite of a thorough screening. Poisoning could although not be ruled out, as toxicants could have been metabolized both in the live bird and/or as a part of the postmortem decomposition. In two Rooks (*Corvus frugilegius*) that were observed to drop dead from the tree they sat in, the organophosphorous pesticide diazinone was found.

Australasian Section News

Kimberly Vinette Herrin, Taronga Zoo, Australia

Wildlife Cases from Taronga Wildlife Hospital:

July- August 2009, 6 Barn Owls from Sydney and the Central Coast presented for necropsy. In addition, 3 Barn Owls admitted to the Hospital were successfully treated, rehabilitated and released. No consistent cause of morbidity or mortality was found. This sudden increase may reflect an increase in population density.

Swamp Wallaby found dead in Garigal National Park (Terrey Hills) was submitted for necropsy. Traumatic wounds over the thorax were consistent with a canid predator, based on inter-canine tooth distance.

Green Turtle (adult - 50 years+, female, 110 kg) found at Tuncurry Beach near Forster. No gastrointestinal blockage or marine debris found on x-rays. She responded favourably to fluid and antibiotic treatment. Large sea turtles live in colder water and will spend winters off coast of Sydney.

Greater Glider (adult, male) found caught in barbed-wire fence at Lake Macquarie with severe injuries to its gliding membrane and is not releasable. This is the first greater glider admitted to TWH. This species are obligate folivores eating only eucalyptus leaves.

Sugar Glider (adult, female) with 2 almost furred pouch young found at Winmalee. Mother's tail was traumatically severed. Tail wound has been sutured and pouch young are viable.

White-bellied Sea-eagle (sub-adult, female) rescued in January with suspected poisoning in Nowra but release attempts failed. She was presented to TWH for examination 9 months after she came into care. She will be used in a bird show if flight can be recovered.

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Powerful Owls – 3 fledgling chicks were presented to TWH. All are receiving supportive treatment and are recovering.

Fluttering Shearwaters – 2 birds found weak and dehydrated at Manly and Double Bay. Poor waterproofing and feather damage present. Third adult found thin and dehydrated in middle of road at Manly. Treated, banded and released 5km offshore.

Red-footed Booby (adult) found on rocks at Eden on the south coast. This is the furthest south a Booby (tropical species) has been recorded. The care giver suspected the bird had been oiled due to black faeces (present when seabirds have not eaten and have empty gastrointestinal tract) and tubed with paraffin oil for 3 days. The bird preened and contaminated its feathers destroying the waterproofing. This bird remains anorexic and in intensive care.

Peregrine Falcon admitted from wildlife rescue group in the Hunter Valley for repair of a fractured right wing. The fracture has healed. The Falcon is now able to fly and has been quarantined prior to being transferred for flight training and release to the wild.

Wildlife Middle East News:

A New Initiative to Raise the Awareness of Environmental and Conservation Issues Affecting Wildlife in the Middle East

Tom Bailey¹, Declan O'Donovan², Chris Lloyd³ and Theri Bailey⁴

Affiliation: ¹Dubai Falcon Hospital, PO Box 23919, Dubai, United Arab Emirates, ²Wadi Al Safa Wildlife Centre, PO Box 27875, Dubai, United Arab Emirates, ³Nad Al Shiba Vet Hospital, PO Box 116345, Dubai, United Arab Emirates, ⁴Zayed University, Dubai, United Arab Emirates

Summary:

There are great pressures on the environment and wildlife throughout the Middle East. The rapid pace of economic development, the fragility of the natural ecosystems and low population densities are factors making many indigenous species vulnerable to extinction. The authors describe an information newsletter they have established in the Middle East which is contributing to the development of a network between zoo and wildlife professionals working in the Middle East and aims to be the premier source of regional information on zoo and wildlife management, husbandry and care.

Introduction:

Wildlife Middle East News is a high quality information

resource on the wildlife and environment of the Middle East and surrounding region. Our printed newsletter and on-line resources are not only available for professionals working with wildlife, they are for anyone who is interested in or concerned about the wildlife and environment of the Middle East. We believe that our newsletter will contribute to the development of a network between wildlife professionals and enthusiasts throughout the Middle East region.

Objectives of Wildlife Middle East News:

- Raise awareness of environmental and conservation issues affecting wildlife in the Middle East.
- Distribute information to enable better management and welfare of wildlife.
- Provide a central contact point for practical advice and information on wildlife management in the region.

When Was Wildlife Middle East News Established?

In March 2006 after attending a regional conservation workshop it became apparent to the four editors that there was a real and urgent need for an independent source of technical information on wildlife management in the Middle East. It was also clear that any information should be distributed in Arabic and English.

Why Was Wildlife Middle East News Established?

We want to show that it is possible for people with an interest and passion for wildlife to make a small difference, even in their spare time. In so many countries it is often grassroots organizations that make a real difference with respect to social and environmental issues. This is because the power of human enthusiasm is such an important, but often overlooked resource. The danger of waiting for government agencies to 'do something' is that we could still be waiting long after the wildlife has disappeared and the deserts of the Arabian peninsula have become either a big dustbin or building site.

What are the Issues Affecting Wildlife In The Middle East?

There are great pressures on the environment and wildlife throughout the Middle East. The rapid pace of economic development, the fragility of the natural ecosystems and low population densities are factors making many indigenous species vulnerable to extinction. The expansion of human populations and the increasing contact between domestic and wild animals has also increased disease transmission between wild and domestic species, including humans. Some govern-

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ments have recognized the need to tackle these conservation issues and over the last 10-15 years a number of projects working with both captive and free-living wildlife have been established in the region. In addition to these publicly funded projects there are many privately funded zoological collections, large commercial breeding projects for falcons and houbara bustards and an ever-increasing number of 'exotic' animals kept as pets by the rapidly expanding population of the region.

The Middle East also has great importance as a migration route and wintering area for a large proportion of northern Palearctic birds. In this sensitive area, habitat degradation, oil spills, pesticide use, and infectious disease outbreaks have the potential to cause immense impacts on free-living and captive wildlife populations. In some cases wildlife species, e.g. waterfowl, may carry diseases such as the highly pathogenic avian influenza virus that can cause great economic impact to domestic poultry industries, cause disease in other birds such as falcons, as well as being highly dangerous to humans. There are a number of factors that hinder the ability of the veterinarians, biologists and wildlife managers working in the region to improve the care and husbandry of the species that they look after. Some of these factors are presented in Table 1.

Table 1. Factors hindering the husbandry and care of wildlife in the Middle East.

- No easily available sources of practical and relevant information on the husbandry, capture and handling techniques, preventive medicine and nutrition for many species.
- Little information available that is relevant to the region.
- Poor communication and interaction between organizations and personnel such as wildlife managers and veterinary professionals working in the region.
- Insufficient regional training opportunities for veterinarians and wildlife managers who are often working in isolated situations in a specialist field.
- Poor awareness of wildlife management and health issues by regional government departments and agencies charged with the management of reserves and captive collections.
- No central contact point for advice, references, recruitment, equipment and food sourcing.

About Wildlife Middle East News

Wildlife Middle East News is produced as a dual language (English-Arabic) quality newsletter and is published quarterly. Wildlife Middle East News contains papers, reports, letters and announcements submitted by

veterinarians, biologists, and other animal care professionals working with captive and free-living wildlife in the Middle East region.

The newsletter is distributed to biology departments and libraries of institutes of higher education, agricultural and environmental agencies, conservation groups, wildlife projects, zoos, zoologists, vets working with wild animals, vet hospitals involved in wildlife medicine, municipality vets, and pet shops. A PDF format newsletter is e-mailed to a wider circulation of interested readers within and beyond the region. At the time of writing we have a circulation approaching 2,000 individuals and institutions in the region and throughout the world.

Contributing to Wildlife Middle East News

We are interested to hear from individuals, institutions, zoos and conservation projects working with wildlife within the Middle East region or with wildlife species from the Middle East managed outside the region. If you have interesting findings, news or observations please submit or request further information from the editors.

The newsletter publishes articles with an emphasis on practical, useful and relevant material. Categories are listed in Table 2.

Table 2. Wildlife Middle East News Categories for Articles.

- Conservation education & environmental awareness.
- Husbandry & nutrition.
- Design of zoological facilities.
- Capture and translocation techniques.
- Wildlife diseases and preventive medicine
- Products, book reviews & research.
- Summaries of recent literature on Arabian animals.
- Letters, news and events.

Contact us at:

<http://wmenews.com>

Editors@wmenews.com



Wildlife Middle East



National Wildlife Health Center's Quarterly Wildlife Mortality Report

<http://www.nwhc.usgs.gov>

Ranavirus confirmed in amphibians from several states (MA, TN, WY)

Several states had confirmed amphibian cases of ranavirus in the spring of 2009. The affected species included wood frogs, tiger salamanders, and marbled salamanders. The submitters from all 3 locations reported observations of amphibians with characteristic skin ulcerations or lesions. The infected tiger salamanders were collected from a reservoir in WY. The infected wood frog tadpoles were from a MA vernal pond that had previously experienced a ranavirus-associated mortality event in 2000 and 2001 resulting in a loss of >95% of the wood frog tadpoles and spotted salamander during those years. The ranavirus-infected marbled salamanders collected this spring were from a TN pond where ranavirus-infected amphibians also were recorded in 1999 and 2000 and amphibians with chytrid fungal infections were documented in 2001.

Chytrid fungal infections in Leopard frogs (NY)

Chytridiomycosis, an epidermal infection caused by the pathogenic chytrid fungus, *Batrachochytrium dendrobatidis*, was detected in a wild population of southern leopard frogs from NY. The affected site was thoroughly surveyed this spring and researchers are confident that all the affected frogs were collected at that time. Clinical signs of chytridiomycosis include loss of righting reflex, lethargy, abnormal postures (e.g., frogs spreading legs away from body), and discolored or sloughing skin. Since chytrid fungus is most likely spread by direct contact between individuals or contact with infected water, frogs should not be moved from one area to another and should only be handled when necessary with clean equipment (gloves, sample bags, etc).

Large mortality of Brandt's cormorants around San Francisco (CA)

Beginning in mid-April 2009, natural resource agencies, including National Oceanic and Atmospheric Administration (NOAA), California Department of Fish and Game (DFG), and U.S. Fish and Wildlife Service (USFWS) began receiving reports of dead and dying cormorants and other coastal birds in the Bay area. Dead Brandt's cormorants were found at a nesting colony on Alcatraz Island, and more were recovered on the coast from San Francisco Bay south to Monterey. In addition, dozens of sick cormorants were recovered by several local wildlife rehabilitation centers. Sick birds were found to be extremely emaciated. Brandt's cormorants and Western grebes were the primary species affected. Necropsy results from Brandt's Cormorants sent to the USGS National Wildlife Center showed severe emaciation. Tests for domoic acid, a natural marine algae toxin fatal to birds, were negative, as were tests for Newcastle disease, avian influenza and West Nile virus. Researchers speculate that a strong upwelling may have displaced a large amount of water and prey offshore. Since cormorants are near-shore feeders their prey base, including anchovies and juvenile sardines, may have been placed beyond their feeding range. Common murrelets, another near-shore feeder, were observed to have declined nesting success. Other seabirds that feed further offshore did not appear to be affected. The die-off ended by late June and a final mortality estimate is being generated, but thousands of birds were thought to be affected. Local USFWS biologists have noted that this pattern is similar to those observed during past El Niño events.

Bat mortality at summer roosts (CT, IN, NJ, CO, WA, TX, OR, UT)

The USGS - National Wildlife Health Center (NWHC) is investigating cases of higher than normal bat mortality at roost sites from multiple states this summer. Other states: MA, NH, and WI, have received similar reports from the public and may reflect an increased awareness and population monitoring due to publicity of bat white-nose syndrome (WNS) winter mortality. In several cases, both adults and young pups are affected. Species involved primarily are Big brown and Little brown bats in the eastern and central U.S., while Townsend's big-eared, Brazilian free-tailed, Rafinesque's big-eared, and Western long-eared bats from western states have been submitted for examination. As observed in summer 2008, some bats are roosting on outside walls during daylight hours and increased numbers of individuals are observed beneath maternity roosts. Anecdotal reports from several areas in the eastern

News from the Field

US indicate a reduction in colony size compared to previous summers. Emaciation is a frequent finding although trauma, predation, and rabies have been identified as cause of death in several cases. During summer surveys in areas confirmed to have WNS, collected bats with evidence of moderate wing damage are being closely examined for the presence of *Geomyces destructans*, the fungus causing skin damage seen with this devastating disease. Thus far, however, there has been no evidence to support a link between these summer mortalities and WNS.

Bog turtle mortality investigation in the eastern US (MA, NY, NJ)

Increased mortality of bog turtles has been observed in several Northeastern populations undergoing long-term tracking studies this past spring. Field observations of some live turtles found evidence of skin discoloration at various locations on the body including the head, neck, and digits. In some cases, claws appear to be oozing or have sloughed. The National Wildlife Health Center is assisting with the disease investigation of possible causes for this morbidity and mortality. A lack of fresh, intact specimens to compare among sites experiencing mortality has been challenging. Diagnostic tests are underway and no consistent finding has been identified.

The Quarterly Mortality Report represents the most current information available to the USGS National Wildlife Health Center at the time of publication. We encourage researchers to contact us to acquire data directly. External request forms for mortality information can be obtained from Jennifer Bradsby at 608-270-2443 or email: jbradsby@usgs.gov.

Quarterly Wildlife Mortality Report April 2009 to June 2009

State	Location	Dates	Species	Mortality	Diagnosis	Labsite
AK	Fairbanks and Galena	04/01/09-05/15/09	Boreal Owl Great Gray Owl	17	Emaciation	NW
AR	Hot Springs Village	04/16/09-06/15/09	Eastern Bluebird Brown-headed Nuthatch Carolina Chickadee	200	Parasitism: Simuliidae	NW
CA	San Francisco Bay	04/15/09-06/20/09	Brandt's Cormorant Western Grebe California Sea Lion	1,000 (e)	Emaciation: starvation	CFG, NW
CT	Multiple Counties	06/18/09-ongoing	Big Brown Bat	25 (e)	Open: emaciation	NW
FL	Miami	06/15/09-06/18/09	Muscovy Duck	16 (e)	Botulism type C	NW
ID	Coeur d'Alene River	02/15/09-05/01/09	Tundra (Whistling) Swan	150 (e)	Lead poisoning suspect	NON
ID	Hailey	04/01/09-04/15/09	Pine Siskin	30 (e)	Salmonellosis	ID
ID	Boise	04/07/09-04/27/09	Mallard	20	Undetermined	NW
IL	Lincoln Park Zoo	06/10/09-06/17/09	Wood Duck Mallard Rock Dove	16	Botulism type C	NW, UIL
IL	Port Louisa NWR	04/26/09-05/10/09	Red-Eared Slider Turtle	15 (e)	Pneumonia	NW

News from the Field

IN	Indiana Dunes National Lakeshore	05/15/09-05/30/09	Central Newt	7* (e)	Infection: <i>Amphibocystidium viridescens</i>	NW
MA	Berkshire County	06/01/09-ongoing	Bog Turtle	4	Open	NW, TU
MA	Jeremy Point	05/06/09-05/30/09	Common Eider	60 (e)	Emaciation	NW
MA	Monomoy NWR	06/24/09-07/13/09	Common Tern	12	Predation	NW
MA	Hampshire County	05/17/09-05/31/09	Wood Frog	5,000 (e)	Viral Infection: Ranavirus	NW
MI	Sleeping Bear Dunes National Lakeshore	06/22/09-ongoing	Ring-billed Gull Double-crested Cormorant Piping Plover Herring Gull Common Merganser	128 (e)	Botulism type E	NW
MN	Brooklyn Park	05/28/09-06/12/09	Mallard Canada Goose	13	Botulism type C	NW
MN	Lake Winnibigoshish	04/30/09-05/10/09	Lesser Scaup American Coot	200 (e)	Parasitism: <i>Cyathocotyle bushiensis</i>	NW
MT	Rattlesnake Lake	04/10/09-05/15/09	Lesser Scaup Tundra (Whistling) Swan American Wigeon Gadwall Redhead Duck	30 (e)	Parasitism: <i>Cyathocotyle bushiensis</i> , <i>Sphaeridiotrema globulus</i>	NW
ND	Audubon NWR	05/14/09-05/28/09	Ring-billed Gull	30 (e)	Aspergillosis, Trauma	NW
ND	J Clark Salyer NWR	05/27/09-06/18/09	Franklin's Gull	100 (e)	Predation, Aspergillosis	NW
ND	Upper Souris NWR	06/14/09-06/15/09	American White Pelican	9	Undetermined	NW
NM	La Cienega	04/09/09-05/01/09	Unidentified Rabbit	3 (e)	Tularemia, Sylvatic Plague	UNK
NV	Clark County	06/01/09-06/09/09	Eared Grebe	45 (e)	Emaciation	NW
NY	Putnam and Richmond Counties	04/09/09-04/13/09	Southern Leopard Frog	4	Fungal Infection: Chytrid	NW, OT
NY	Queens	06/14/09-06/15/09	Canada Goose	15 (e)	Undetermined	COR
OH	Columbus	06/15/09-06/17/09	Canada Goose	12 (e)	Emaciation: starvation	NW
OH	Cuyahoga River	06/25/09-06/26/09	Ring-billed Gull	550 (e)	Toxicosis: Oil, unidentified	NON
OH	Bedford	06/08/09-06/15/09	Common Grackle	5	Undetermined	NW
OR	La Grande	05/01/09-05/04/09	Barn Owl	8	Emaciation: starvation	NW
TN	Great Smoky Mountains NP	05/15/09-06/15/09	Spotted Salamander Marbled Salamander Wood Frog Spring Peeper Frog	8	Viral Infection: Ranavirus	NW, OT

News from the Field

VA	Winchester	06/15/09-06/18/09	European Starling	15	Toxicosis suspect	NW
WY	Powder River Basin	06/01/09-06/16/09	Tiger Salamander	15 (e)	Viral Infection: Ranavirus	NW

Updates

MI	Multiple Counties	02/14/09-05/10/09	Pine Siskin	300 (e)	Salmonellosis	MI
			Common Redpoll			
			American Goldfinch			
			Northern Cardinal			
			Evening Grosbeak			
OR	Summer Lake Wildlife Area & Lakeview	05/27/08-06/18/08	American White Pelican	21	Emaciation: starvation suspect	NW

(e) = estimate, *morbidity, not mortality, (s) = suspect; diagnosis is not finalized, but field signs and historic patterns indicate the disease.

California Fish and Game (CFG), Cornell University (COR), Idaho Wildlife Health Laboratory (ID), Michigan Department of Natural Resources (MI), No diagnostics

Pursued (NON), USGS National Wildlife Health Center (NW), Other (OT), Tufts University (TU), University of Illinois (UIL), Unknown (UNK).

Written and compiled by: Anne Ballmann / LeAnn White - Eastern US, Krysten Schuler - Western US, Jennifer Bradsby - Biological Technician

To report mortality or receive information about this report, please contact the USGS National Wildlife Health Center,
6006 Schroeder Road, Madison, WI, 53711

The Quarterly Wildlife Mortality Report is available at <http://www.nwhc.usgs.gov>

To view new and ongoing wildlife mortality events nationwide visit http://www.nwhc.usgs.gov/mortality_events/ongoing.jsp

Species

Avian:

American Coot (*Fulica americana*); American Goldfinch (*Carduelis tristis*); American White Pelican (*Pelecanus erythrorhynchos*); American Wigeon (*Anas americana*); Barn Owl (*Tyto alba*); Boreal Owl (*Aegolius funereus*); Brandt's Cormorant (*Phalacrocorax penicillatus*); Brown-Headed Nuthatch (*Sitta pusilla*); Canada Goose (*Branta canadensis*); Carolina Chickadee (*Poecile carolinensis*); Common Eider (*Somateria mollissima*); Common Grackle (*Quiscalus quiscula*); Common Merganser (*Mergus merganser*); Common Redpoll (*Carduelis flammea*); Common Tern (*Sterna hirundo*); Double-Crested Cormorant (*Phalacrocorax auritus*); Eared Grebe (*Podiceps nigricollis*); Eastern Bluebird (*Sialia sialis*); European Starling (*Sturnus vulgaris*); Evening Grosbeak (*Coccothraustes vespertinus*); Franklin's Gull (*Larus pipixcan*); Gadwall (*Anas strepera*); Great Gray Owl (*Strix nebulosa*); Herring Gull (*Larus argentatus*); Lesser Scaup (*Aythya affinis*); Mallard (*Anas platyrhynchos*); Muscovy Duck (*Cairina moschata*); Northern Cardinal (*Cardinalis cardinalis*); Pine Siskin (*Carduelis pinus*); Piping Plover (*Charadrius melodus*); Redhead Duck (*Aythya americana*); Ring-billed Gull (*Larus delawarensis*); Rock Dove (*Columba livia*); Tundra Swan (*Cygnus columbianus*); Western Grebe (*Aechmophorus occidentalis*); Wood Duck (*Aix sponsa*)

Mammalian:

Big Brown Bat (*Eptesicus fuscus*); California Sea Lion (*Zalophus californianus*); Rabbit (*Sylvilagus spp.*)

Amphibian:

Central Newt (*Notophthalmus viridescens louisianensis*); Marbled Salamander (*Ambystoma opacum*); Southern Leopard Frog (*Rana sphenoccephala*); Spotted Salamander (*Ambystoma maculatum*); Spring Peeper Frog (*Pseudacris crucifer*); Tiger Salamander (*Ambystoma tigrinum*); Wood Frog (*Rana sylvatica*)

Reptile:

Bog Turtle (*Glyptemys muhlenbergii*); Red-Eared Slider (*Chrysemys scripta elegans*)

Training and Education

Unique Courses Offered in South Africa



Eko Tracks offers intensive courses designed for students in veterinary science where you will meet and interact with wildlife veterinarians in South Africa. Learn about the crucial role of veterinarians in the growing wildlife industry by participating in game capture operations, field and lab work. This course focuses on wildlife veterinary science, wildlife diseases and medicine, capture and care of wild animals, breeding of rare species, wildlife rehabilitation, ecosystems and biodiversity conservation.

To find out more visit www.ekotracks.com. Eko Tracks is booking study abroad trips now. To apply, please print the application form from the website and mail or fax it to the office of Eko Tracks.

Graduate Position in Wildlife Disease Studies University of Wyoming

The Department of Veterinary Sciences at the University of Wyoming is seeking a PhD student to pursue a research program examining the population-level effects of chronic wasting disease (CWD) on free-ranging mule deer populations within the CWD-endemic zone of central Wyoming. Full position description can be found on the WDA website.

Please contact Dr. Cornish (tcornish@uwyo.edu) with questions, either by email or by telephone (307) 742-6638. Review of applicants will begin immediately and continue until a suitable candidate is identified.

Post-Doctoral Fellow/Research Associate University of Wisconsin-Madison

This position will focus on epidemiological models for chronic wasting disease (CWD) in white-tailed deer populations in Wisconsin and Illinois. Research will combine computer simulation and maximum likelihood estimation of alternative epidemiological models of CWD. A Ph.D. in Ecology, Biology, Wildlife Ecology, Zoology or related discipline with strong biological emphasis and applied modeling experience in disease epidemiology and/or population dynamics desired. Closes: 15 October 2009 or when filled.

Candidates should send a formal letter of interest, curriculum vitae, transcripts, and 3 references to: Michael D. Samuel, Department of Wildlife Ecology, 204 Russell Lab, 1630 Linden Drive, University of Wisconsin, Madison, WI 53706. Please see WDA website for full information.

Residency - Veterinary Medicine Zoological Pathology Program University of Illinois

Residency Training in Zoo and Wildlife Pathology. The 3-year program will provide training and experience to prepare the resident for a career in zoo, wildlife, avian, or aquatic animal pathology, and eligibility for the certification examination in anatomic pathology of the American College of Veterinary Pathologists (ACVP). The program also offers the potential for MS or Ph.D. opportunities. Starting stipend is \$36,000. Applications should be received by November 16, 2009 to receive fullest consideration. Anticipated start date is on or about August 1, 2010. See WDA website for full information.

Interested applicants should submit a resume, veterinary college transcripts, letter of career goals, and three letters of reference to: Dr. Michael Kinsel, Chair, Zoo Resident Search Committee, LUMC Bldg 101 Rm 0745, 2160 S First Ave, Maywood, IL 60153, phone: 708-216-1185, Fax: 708-216-5934, or email: mkin-sel@illinois.edu.

Fellowship/PhD in Biomedical Research University of Alaska-Fairbanks or Anchorage

The University of Alaska INBRE (IDEA Network of Biomedical Research Excellence) is recruiting quality Ph.D. students in the areas of Infectious Disease, Toxicology, Bioinformatics, and Molecular/Cellular Biomedical Science. Funding guaranteed for up to 4 years. An [Application](#) cover page, NIH Biosketch, GRE scores, college transcript with GPA, and 2 letters of reference from faculty members are required. For more information, please visit the [INBRE website](#) or contact Alaska INBRE at inbre@alaska.edu.



Employment

Associate Veterinarian Gladys Porter Zoo Brownsville, Texas

Entry level zoo/wildlife veterinarian position available. Live the best of two worlds. Maintain a high quality of veterinary interest as the part-time associate for a renowned and diverse zoo collection (1300 individuals of 330 species) that includes great apes, large cats, white rhino, hoof stock, aviaries, aquarium and extensive herpetarium. Also provide assistance in sea turtle medicine, wild bird rehabilitation, and other indigenous and marine wildlife projects. On the other side maintain a high quality of life as a part-time small animal clinician with several interested local practices to make your own schedule.

The qualified candidate must have a demonstrate interest in zoo and wildlife medicine, possess a DVM/VMD degree from an accredited institution, and be able to obtain a Texas license. Preference will be given to candidates with at least 1-2 years veterinary practice experience. Candidate must be able to work outdoors in all weather conditions and to lift 50 pounds.

For full position description see the WDA website or contact: Dr. Thomas deMaar tdemaar@gpz.org

Wildlife Health Specialist - Parasitologist

Canadian Cooperative Wildlife Health Centre, Alberta Regional Centre & University of Calgary Faculty of Veterinary Medicine (UCVM)

The Canadian Cooperative Wildlife Health Centre (CCWHC), in partnership with the University of Calgary Faculty of Veterinary Medicine (UCVM), is seeking applicants for the position of Wildlife Health Specialist for the Alberta Regional Centre of the CCWHC.

The successful candidate is expected to interact extensively with CCWHC stakeholders in Alberta and elsewhere to identify and respond to their wildlife disease information and expertise needs, as well as to coordinate and deliver short courses and develop educational materials on wildlife health as needed. The candidate will act as a liaison between stakeholders in Alberta and other CCWHC Regional Centres and will work with Alberta Sustainable Resource Development, Parks and Protected Areas, and other relevant agencies to facilitate implementation of national wildlife disease surveillance programs. The candidate will be expected to build expertise in the diagnosis, surveillance, and research

study design and implementation as it relates to wildlife parasitology. For a full position description please see the WDA website, visit the websites www.vet.ucalgary.ca and <http://www.ccwhc.ca> or contact Dr. Susan Kutz directly: skutz@ucalgary.ca or 1-403-210-3824.

Wildlife Veterinarians Wanted United Arab Emirates

Two veterinarians are needed for positions in the United Arab Emirates, Abu Dhabi. Full-time positions are available for enthusiastic individuals with excellent work ethic. The positions are located in a new well equipped clinic in the Abu Dhabi Emirate. Work will include working with different wild animal collections. You will need a minimum of five years experience and it is preferred to have some experience working with large animals (antelope and/or wild cat species). A competitive salary and other benefits including insurance and annual flight tickets home are part of the package. All interested applicants are welcome. Please send resumes to:

ingrid_stirnemann@habituuae.com

Deadline: 21 Nov 09

Language - must be fluent in English

Assistant Professor of Disease Ecology

University of Notre Dame

Seeking faculty candidates who use integrative approaches to study mechanisms that influence disease transmission and/or dynamics. Candidates with cross-disciplinary interests in areas of infectious disease ecology including epidemiology, theoretical modeling, ecological processes, or evolutionary pathways that influence disease pathogens or their vectors are encouraged to apply. For the full job posting, please visit the WDA website or <http://biology.nd.edu> and <http://science.nd.edu>. Qualified individuals should send a cover letter, CV, statements of research and teaching interests, and 3 letters of reference to: disease9@nd.edu.

Please note: WDA has adopted a new format for educational and job position advertisements. A brief description will be published in the newsletter and a full description will be posted on the WDA website at www.wildlifedisease.org. Please send brief (100 words or less) position description and contact information to Jenny Powers at Jenny.Powers@nps.gov. Send full position description to Bridget Schuler at bridgetschuler@hotmail.com

Meetings and Conferences

Wildlife and Aquatic Animal Medicine Club 16th Annual Symposium

University of California—Davis

23 January 2010—New Directions in Zoo and Wildlife Health

24 January 2010—Modern Approaches to Fish Medicine

Symposium will be held at the UC Davis School of Veterinary Medicine. CE credits will be available.

Details and Registration available soon at:

<http://www.vetmed.ucdavis.edu/Clubs/WAAM/default.html>



Wildlife Conservation, Health, and Disease Management—A Post Millennium Approach International Conference *Madras Veterinary College, Tamil Nadu Veterinary and Animal Sciences University Tamil Nadu, India*

The Department of Wildlife Science is proud to announce an International Conference on Wildlife Conservation, Health, and Disease Management 3-5 February 2010.

Abstracts are currently being accepted and will be open until 15 December 2009.

Please contact Dr. M.G. Jayathangaraj, PhD at dptwildlifescience@gmail.com or mgjayathangaraj@yahoo.com.

Visit <http://www.tanuvas.ac.in> for more conference information and registration application.

First National Conservation Medicine Symposium in Chile

The theme of the conference is “200 Years since Darwin” and will be held the 30th of November through the 1st of December 2009 at the Andres Bello Salon in Santiago, Chile. For more information, please visit <http://mdc.unab.cl>. Or inquire at medconservacion@unab.cl

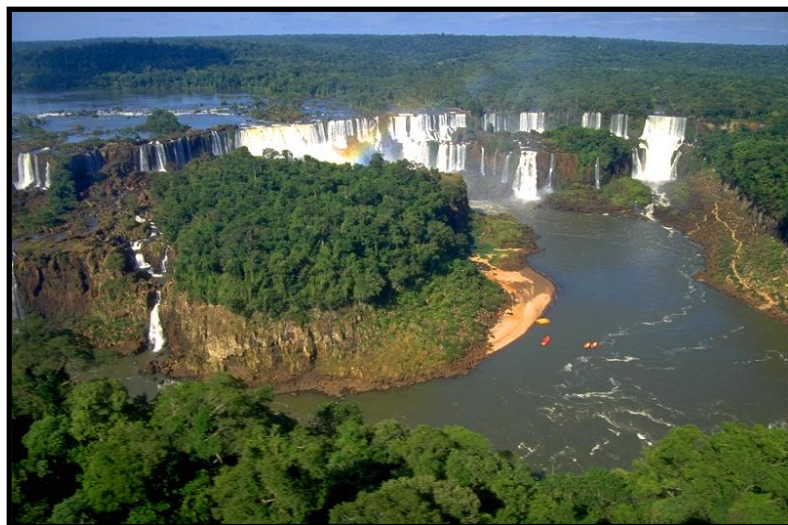


Meetings and Conferences

WDA International Meeting 2010: Argentina!

A perfect mixture of wild nature and cultural heritage awaits you. For the first time, a WDA International Meeting will take place in South America. In 2010, the meeting will be held in the heart of Iguazú National Park, Misiones, Argentina. So save the date for May 30th-June 4th 2010, and be prepared to enjoy one of the most amazing natural settings, with spectacular waterfalls surrounded by the most biodiverse rainforest of Argentina.

The venue will be the brand new 5-star Amerian hotel (http://www.amerian.com/index.php?page=vista_hotel_principal.php&id=9), strategically located right in front of the confluence of Rivers Iguazú and Paraná, a point where three countries converge. From Argentina, not too far from the international airport and the waterfalls, you will be able to see Brazil and Paraguay, just across the river. Make sure you save some time to enjoy the amazing activities this great location has to offer.



Aerial view of Iguazu Falls: A UNESCO World Heritage Site, and one of the Seven Wonders of the World.

The Mexican Association for Conservation Medicine (KALAANKAB) Announces the First Congress on Disease Ecology and Conservation Medicine

The conference will take place in the Puerto de Veracruz from the 4-6 of November, 2009. The Congress is open to the scientific community at large, and topics to be discussed include:

- Emerging and re-emerging diseases in terrestrial and marine ecosystems
- The relationship between habitat loss, fragmentation, climate change and disease dynamics

For more information, please visit:
<http://www.kalaankab.org/> or e-mail

kalaankab@gmail.org

or

congreso.kalaankab@gmail.com



Meetings and Conferences

Joint Conference

Australasian Section Wildlife Disease Association

and

Wildlife Society of the New Zealand Veterinary Association

10 – 16 December 2009

in the Catlins, South Otago, New Zealand



The conference will be convened amongst the picturesque surrounds at 'Woodstock Lodge' in the nature-lovers paradise of the Catlins. See www.woodstocklodge.co.nz

The Catlins is an internationally renowned wilderness area with natural features that will compliment the conference programme well. Viewing of a number of threatened endemic species will be possible during the conference with New Zealand sea lions and yellow-eyed penguins having population concentrations in this region. Other features of the Catlins include old growth coastal forest remnants, the Catlins River valley, a fossilized forest of geological interest, an abundance of native passerine species – tuis, fantails, bell birds and many wild southern beaches. Websites of interest about the region include: <http://www.catlins.org.nz/> and <http://www.catlins-nz.com/>

We look forward to preparing a top quality six day conference programme. In keeping with the traditional programme for both associations, the conference will be structured as follows:

Joint WDA - Wildlife Society of the NZVA 10-13 December

WDA only 14-16 December

The first three days will have a strong New Zealand focus in line with the Wildlife Society's past programmes, with a broader Australasian focus for the remainder of the programme.

Registration forms and the call for papers, along with all additional conference information will be posted on the following websites in the coming months, as well as email updates:

New Zealand Wildlife Health Centre	http://wildlife.massey.ac.nz
Wildlife Disease Association Australasia	http://www.wda-aust.org/
Wildlife Disease Association	http://www.wildlifedisease.org/
Wildlife Society of the NZVA	http://www.nzva.org.nz/sibs/wildlife/

Keep an eye on the websites for 'Early-bird' registration deals. For any further enquiries, please contact Kerri Morgan (K.J.Morgan@massey.ac.nz) or Helen McConnell (H.M.McConnell@massey.ac.nz).

We look forward to seeing you in December.

Kerri Morgan, Brett Gartrell and Helen McConnell

Conference co-conveners

New Zealand Wildlife Health Centre

Massey University

Palmerston North

New Zealand

