The mission of the Wildlife Disease Association is to acquire, disseminate, and apply knowledge of the health and diseases of wild animals in relation to their biology, conservation, and interactions with humans and domestic animals.

The Australasian section of the Wildlife Disease Association proudly supports:

The Australian Wildlife Health Network (AWHN)
The Australian Registry of Wildlife Health (ARWH)
The Australasian Section website [www.wda-aust.org](http://www.wda-aust.org) provides access to information on the section and its activities, including conference details, opportunities for grants, section awards and past newsletters. To access this site as a member use the generic username WDA-Aust and the password chytrid.

The international Wildlife Disease Association website can be found at [www.wildlifedisease.org](http://www.wildlifedisease.org). It provides information relating to the parent body of this section, including the details of its annual conference. It also provides the facility for new members to join the association and this section, and for current members to renew their membership and to update their contact details. Current members can access newsletters and other resources through this site by using their unique individual username and password. If you are not sure of these contact Kay Rose at wda@allenpress.com and she will assist you.

### Reports

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair’s report</td>
<td>4</td>
</tr>
<tr>
<td>Editorial report</td>
<td>5</td>
</tr>
<tr>
<td>Papua New Guinea national report</td>
<td>6</td>
</tr>
<tr>
<td>Northern Territory state report</td>
<td>7</td>
</tr>
<tr>
<td>South Australia report</td>
<td>9</td>
</tr>
<tr>
<td>Victoria report</td>
<td>9</td>
</tr>
<tr>
<td>Western Australia report</td>
<td>9</td>
</tr>
<tr>
<td>AWHN report</td>
<td>11</td>
</tr>
</tbody>
</table>

### Original Articles

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shearwater mortalities 2013 - Summary</td>
<td>13</td>
</tr>
<tr>
<td>ARWH case summary July - September 2013</td>
<td>14</td>
</tr>
</tbody>
</table>

### Locations

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
</tr>
</tbody>
</table>

### Contacts

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
</tr>
</tbody>
</table>
Dear WDA A members,

We had a wonderful annual conference in the Grampians in early October - great location, fantastic scientific presentations, 110 delegates, wonderful field trips and a memorable banquet. If only the weather had been kinder! Once again, on behalf of all members, I’d like to pass on an enormous thanks to our wonderful Conference committee - Jasmin Hufschmid, her team and of course Shirley and her family. During the conference we held a busy and productive AGM. Draft minutes will be sent out to members early in the New Year. Congratulations to Tim Portas the WDA A chair elect, Karrie Rose winner of the Barry Munday Award, and Bronwyn Fancourt winner of the Anne Martin student presentation award.

WDA parent body Executive Manager Dave Jessup attended the Grampians meeting. It was great to spend time with him, and he shared valuable insight into the Parent body perspective on many WDA matters. He was also great fun to be with and brought a whole new range of ideas and stories to our group.

We have been fortunate to be able to move the WDA A website to a new location – it will now be hosted under the parent body website by Allen Press. Work has been progressing over the past few months to move (with some upgrades) WDA A web pages into the new site. Although still a work in progress, both or our existing website and the new website are now active. We plan to officially announce the new website soon (along with the closure of the old site) but in the meantime check out http://www.wildlifedisease.org/wda/SECTIONS/Australasian.aspx

Exciting news! We have confirmed a venue for our 2015 WDA International Conference, which will be hosted by our Section. It will be held at Twin Waters Resort, Maroochydore, Qld in late July 2015. A Conference Organising Committee is being formed – contact Tim Portas, Chair of the Committee, if you would like to assist. We've decided to hold a small, low key conference on mainland east coast Australia for 2014 (allowing us to focus energy and resources on our big international conference in 2015). Andrew Peters and Jason Cummings are busy checking out venues around Sydney. Please contact them if you would like to assist with 2014.

Outcomes from the Grampians AGM included an agreement to continue our dialogue on WDA A and advocacy. An Advocacy working group was formed, please contact Andrea if you would like to get involved. More information will be sent out early next year. Pam Whiteley is also leading a second working group to plan liaison with our near neighbour countries – contact Pam for more information, and watch out for more emails and opportunities in 2014.

An exciting initiative has been the launch of a new WDA A award, honouring a long standing member of WDA A Australasia who has made an outstanding contribution to the Section – our recipient was Dave Spratt, with the new award now carrying his name in recognition of his services. Congratulations to Dave for all his very significant and ongoing support huge efforts. Read more at http://www.wildlifedisease.org/SECTIONS/Australasian/GrantsandAwards/OtherAwards.aspx

Once again, huge thanks to the executive and other office bearers who have worked very very hard over the past 12 months. I think we all deserve a well earned break over Christmas! Wishing you all the best for the summer season! Don't forget to renew your WDA membership – a much streamlined process now! Health and happiness to all in 2014.

Andrea Reiss andrea@zooaquarium.org.au
EDITORIAL REPORT

Thanks so much for all the contributions to this the last WDA-A newsletter for 2013. It’s great that so many are able to contribute after such a busy year. A special thanks to Andrew for his great publishing skills.

A few words about the conference in the Grampians. In my opinion it was the best ever (well of the ones I have attended) – thanks to Jaz, Bevo and Pam and all the students and other folk who helped out. Why? Well it was the biggest ever – over 110 participated, students were there in force contributing greatly, the setting was glorious, the craic as stimulating and interesting as ever, the food wonderful as only Shirl and team can do, the numerous talks inspiring and thought provoking and old friendships rekindled and new ones formed.

We managed to gather the WDA-A brains trust together for a photo which I hope you enjoy and Schultz was again attracting attention with his new adornment because he hasn’t much up top these days – hair that is. Chris provided a photo from his archives with the backside of a certain Mr Rich trying to extricate the conference bus from a boggy road.

We love these old photos and would love to highlight some in future newsletters – so if you have some photos from past conferences, you could digitise them and send to me to be included in the next installment.

It only remains for me to wish you a merry Christmas and a year ahead full of sharing and learning. To quote, one of the world’s most esteemed leaders, Nelson Mandela who this week sadly passed away “Education is the most powerful weapon which you can use to change the world.”

Wayne Boardman 13/12/13

The photograph dates from 1997 when the WDA meeting was held on Flinders Island; organised by Tim McManus. Tim did a great job, but unfortunately the day we were planned to do a trip up to the other end of the island for a picnic the weather was dreadful. It rained solidly and the bus windows completely fogged up.

At the picnic site the bus became bogged, requiring some heavy work to dig it out. The photograph shows Brian Rich filling in the hole. I can’t identify the other person in the photo. Also the bus seems to be missing its side mirror. From memory, I think the mirror had been lost earlier going through a gate.

Photo and caption courtesy of Chris Bunn
Papua New Guinea national report

January 20th will see the arrival in Sydney of four wildlife health interns (Biological Science Masters and Honours degree graduates) from Papua New Guinea. Each of the interns already has considerable biology and ecology training and experience in Papua New Guinea, but little exposure to animal health issues. The program for the travellers includes a field trip where capture and sampling techniques for wildlife will be taught, training in traditional parasitology and virology diagnostics and molecular techniques such as PCR and sequencing, and exposure to various aspects of Australia’s wildlife health capacity. If you are able to provide an interesting perspective or experience for these interns (who will be based in Wagga Wagga for three months), please get in touch.

Andrew Peters

Papua New Guinea national report

We calculated the photo represents approximately 525 years of combined wildlife disease knowledge and experience that has influenced generations’ of wildlife veterinarians.

We owe you a massive debt of gratitude for all you have done for the Wildlife Disease Association.

Stats – combined experience 525 years, n=13, Mean 40.38 years ± 6.74

Back row: Prof Colin Wilks (Melbourne, 1968 – 45 years), Dr Colin Pinney (Sydney, c 1980 – 33 years), Ass Prof David Phalen (Cornell, 1983 – 30 years), Dr David Schultz (Sydney, 1966 – 47 years) Dr David Obendorf (Melbourne, 1977 – 36 years), Prof Ian Beveridge (Melbourne, 1970 – 43 years)

Front row: Dr Dave Jessup (estimated 1980 – 33 years), Dr Pam Whiteley (Melbourne, 1975 – 38 years), Dr Teri Bellamy (Sydney, c 1980 – 33 years), Dr David Spratt (Toronto, 1965 – 48 years) , Dr Janeen Samuel (Queensland, 1969 – 44 years), Dr Chris Bunn (Melbourne, 1967 – 46 years), Ass Prof Maurice Alley (Sydney, 1963 – 50 years)
Northern Territory

Since the last WDA-A Newsletter the NT has gone from ‘no elected representative’ to being co-represented by Dr Cathy Shilton, Senior Veterinary Pathologist at Berrimah Veterinary Laboratories, and Jemima Amery-Gale, a veterinarian at The Ark Animal Hospital and relief veterinarian for The Territory Wildlife Park. In this time we have also increased our number of members from 2 to 3 – a 50% increase! Two of these members attended the Third Annual Sea Turtle Health and Rehabilitation Workshop, hosted by the Sea Turtle Foundation and James Cook University in Townsville in July, and have been able to apply some of the tips learnt to a floating obstructed Green Turtle brought to The Ark Animal Hospital in October by Rachel Groom, who continues her marine megafauna survey work in NT waters with the Larrakia rangers. These two members were also lucky enough to attend the fantastic Wildlife, Emerging and Emergency Diseases workshop run by the Australian Wildlife Health Network in Sydney in August, which was particularly useful with regards to our northern location and proximity to possible exotic disease incursion points, and hence the importance of vigilant surveillance. Pertinent to this all three NT WDA members have been continuing to enter all interesting and unusual wildlife cases into eWHIS as part of the AWHN’s Zoo Based Wildlife Disease Surveillance Pilot Project.

In other news our president Andrea Reiss gave a comprehensive update on the findings thus far of the first two surveys (Cobourg Peninsula in July and Bathurst Island in September) of the investigation into the potential role of disease in the alarming and dramatic declines of small to medium sized terrestrial mammal species in northern Australia at the WDA Australasian Section Conference in the Grampians in September-October. The research is part of a two-year study that commenced this year, funded by the National Environment Research Program, and a collaborative effort between the Northern Territory Department of Land Resource Management, Conservation Medicine Program of Murdoch University, James Cook University and Charles Darwin University, with Berrimah Veterinary Laboratories assisting with sample logistics. The field trips have thus far been aimed at trapping key species, conducting physical examinations, and obtaining faecal and blood samples for baseline health data and storage for possible future targeted disease testing. There are more surveys upcoming in January and February of the New year, and we wait with anticipation for the information the results may reveal.

In sadder news we have just received notice that the Prison Wildlife Program is in grave danger of being discontinued when the Darwin Correctional Centre moves to its new facility. This unique wildlife rehabilitation program was started up seven years ago as a joint initiative of Wildlife Rescue Darwin and the Darwin Correctional Centre, and is the only positive story to ever come out of the Darwin prison. This win-win set-up has seen both orphaned and injured wildlife and their prisoner carers being rehabilitated side by side as prisoners express their tenderness and are given a purpose in life for their time in the low security section of the prison, while the wildlife get a committed carer with enough time on their hands for the demands of long-term rehab. In addition the fantastic Prison Harvest component of this program has been successfully breeding live food to feed to wildlife while being rehabilitated and sell to wildlife carers and pet owners to help cover the costs of the program. While this news is very disappointing for the staff of The Ark Animal Hospital and devastating for the prisoners involved, we will be doing all we can to encourage the reversal of this short-sighted NT Government decision.

The Marine WildWatch program, coordinated by Carol Palmer of the Northern Territory Dept. of Land Resource Management, has resulted in numerous sea turtle post-mortem submissions over the past few years, and has greatly enhanced surveillance for diseases in these species. Also through this program, a dugong necropsy revealed death due to intestinal perforation and peritonitis originating from an intra-abdominal stingray barb. Darwin Harbour surveillance by the program has resulted in recent photographs of skin lesions in live Australian snubfin dolphins (Orcaella heinsohni) suggestive of lobomycosis (infection with the fungus Lacazia loboi), which has yet to be diagnosed in this species in Australia. Efforts are underway to confirm the diagnosis using a bow and arrow remote biopsy system.
Cane toads (*Rhinella marina*) “invaded” the Northern Territory in 1984, reaching the rural area around Darwin in 2005. Since 2005, a group of researchers associated with Dr. Rick Shine of the University of Sydney, and based at Fogg Dam on the outskirts of Darwin, have been studying the toad invasion. Ongoing research studies have included ecological impacts of cane toads on native fauna, surveillance for diseases and ecoinmunology of toads, interactions among parasites of cane toads and native frogs, and possible local control measures, including an effective technique to selectively bait and trap cane toad tadpoles.

Researchers at the Charles Darwin University (CDU) Research Institute for the Environment and Livelihoods are involved in several projects that combine information on wildlife ecology, epidemiology and disease occurrence, particularly as it relates to the Northern Territory. A recent collaboration between Dr. Clive McMahon of CDU and researchers in South Australia involved modelling the dynamics of a potential tuberculosis incursion in feral swamp buffalo (*Bubalus bubalis*). Another collaboration modelling multi-species disease management is underway between Dr. McMahon and collaborators in Tasmania. Agile Wallabies (*Macropus agilis*) in the Northern Territory periodically suffer from sarcoptic mange, with the perception being that severe disease occurrence is related to overpopulation. Dr. Miguel Bedoya Perez of CDU has started a project funded by Meat and Livestock Australia aimed at quantifying the effects high density wallabies have on improved pastures and how these effects might be mitigated. This project may also be of relevance to inform aspects of diseases dynamics, such as mange, in wallaby populations.

Wildlife submissions to the Northern Territory Government Berrimah Veterinary Laboratories this year included waterfowl from sewage ponds with suspected botulism (a fairly common occurrence) and native doves and pigeons with trichomoniasis or salmonellosis. There were continued reports of black kites (*Milvus migrans*) being found dead in areas of congregation in and around Darwin. Diagnoses in the few birds that were submitted for necropsy included spinal trauma and trichomoniasis, with additional cases of the latter disease also being reported by wildlife carers and vets. Numerous cases of trichomoniasis in black kites were also diagnosed in Queensland by Dr. Anita Gordon of Biosecurity Queensland.

Dr. Andrew Peters of Charles Sturt University is an avian Trichomonas expert who may assist with molecular analysis of samples from the kites to confirm the agent as *Trichomonas gallinae*. There is no clear association between the kite cases and doves (the usual carriers of *Trichomonas gallinae*), and an intriguing possibility is that a strain of the parasite has become host adapted to kites. In all submitted wild birds, avian influenza virus infection was excluded, as was pigeon paramyxovirus in the pigeons and doves. Australian bat Lyssavirus exclusions to inform human post-exposure prophylaxis were down this year over previous years, a trend that is hopefully not due to a lack of awareness or a reluctance to euthanise and submit the bats for testing. There have been numerous submissions of sea turtles with various primarily non-infectious conditions (trauma-related, obstipation, etc.). There was a recent interesting case of a free-ranging Northern brown bandicoot (*Isoodon macrourus*) with severe suppurative polyarthritis, pneumonia and splenic abscessation due to *Streptococcus equi* subspecies *zooepidemicus*. Interestingly, the gender of this bandicoot was unclear - it had neither testes nor penis, no pouch and no grossly discernible ovaries, although there was a structure resembling a median vaginal caeca and two thin cords running either side of the urethra that were presumably lateral vaginae. Photo courtesy of Jemima Amery-Gale.
brown bandicoot (*Isoodon macrouras*) with suppurative polyarthritis, pneumonia and splenic abscessation due to *Streptococcus equi* subspecies *zooepidemicus*.

Cathy Shilton  cathy.shilton@nt.gov.au
Jemima Amery-Gale  jamerygale@gmail.com

**SOUTH AUSTRALIA STATE REPORT**

The regent parrot recovery team has been active in the SA Riverland with 35 parrots trapped at the time of writing, for banding and health and disease screening, and 3 solar powered satellite transmitters deployed thus far. It will be interesting to see the resulting data from these transmitters compared to that previously achieved.

Adelaide's colony of grey-headed flying foxes roosting in Botanic Park adjacent to Adelaide Zoo continues to attract attention. Pupping season is well underway and we have already had a smattering of mortalities. Last year the vast majority of juvenile bats likely perished in the Adelaide heat; the local bat care network is preparing for a busy time again this summer.

And the Adelaide Uni vet school welcomes back pathologist Lucy Woolford from maternity leave. Motherhood certainly seems to be agreeing with her.

David McLelland  dmclelland@zoossa.com.au

**VICTORIA STATE REPORT**

The 2013 WDA-Australasia Annual Conference was a great success in Victoria at the Grampians Retreat this year – thanks to everyone for coming along!

On the disease front, we've also been seeing the short-tailed shearwater (*P. tenuirostris*) mortality event occurring along the Victorian coastline over the past couple of months, with thousands of dead birds being reported. Please contact Pam Whiteley if you require any more specific information about the known extent of this event, or if you have any submissions of dead water birds that require facilitation.

Sampling of koalas (*P. cinereus*) for a range of conditions, primarily retrovirus and chlamydia, has been continuing over the past few months, as have investigations into Sarcoptic mange in koalas and Phalaris staggers in eastern grey kangaroos (*M. giganteus)*.

(And no, I haven't finished my PhD yet, so now you won't need to ask!)

Clare Death  dclare@unimelb.edu.au

**WESTERN AUSTRALIA STATE REPORT**

**INTO THE FOREST … A STEP TOWARDS FURTHER UNDERSTANDING BAUDIN'S BLACK COCKATOOS**

In September 2012, in an effort to further understand the movements of the elusive Baudin's black cockatoo, researchers from Murdoch University, in collaboration with the Department of Parks and Wildlife, carried out a pilot study to satellite track two of these birds. Recently, Carnaby's black cockatoos have been tracked on the Swan Coastal Plain by PhD student Christine Groom, however as yet no telemetry research on Baudin's black cockatoos has been carried out. Because of the differences in habitat and behaviour between the two white-tailed black cockatoo species, the aim of this study was to investigate the viability of satellite tracking Baudin's black cockatoos, which can migrate into heavily forested areas of the state.

Two female Baudin's black cockatoos that had been found injured in the wild and treated and rehabilitated at Perth Zoo and Kaarakin Black Cockatoo Conservation Centre, were fitted with tail-mounted satellite transmitters by Dr Kristin Warren and Dr Anna Le Souëf from Murdoch University. The birds were then released together several days later next to a wild flock of Baudin's black cockatoos in Kelmscott.

According to their satellite transmissions, the
two birds remained at the release site for several days in close proximity to one other. One of the birds then flew south, (returning to the site she was originally found injured), then joined other Baudin’s in a southern migration to Beela (140km south-east of Perth), covering about 250km from the release site. This southern migration was possibly associated with seasonal flock movements to breeding areas. Once she reached Beela, this cockatoo continued to transmit from the area for some time. Ground truthing revealed that there were a large number of all three species of black cockatoos in the Beela area, as well as a large amount of food in the form of flowering Marri trees, and dams close by. In short, it was a little patch of cockatoo heaven! Although the bird was not directly visualised again, from the nature of her transmissions on the ground using a radio receiver, it appeared she was moving around with a flock of other birds. After 5 months of transmissions, this bird went off the air. The battery of this transmitter was not expected to last longer than this, so it's likely that the transmissions stopped as a result of the battery going flat.

Several weeks after their release, the second cockatoo moved south from Kelmscott to Cardup (35km south of Perth), where her transmitter was found using a radio receiver. The transmitter was still attached to the tail feathers, which may have moulted out.

This is the first time forest black cockatoos have been satellite tracked in the wild. It provided a lot of useful information including a contribution to our knowledge of post-release survival of rehabilitated Baudin’s black cockatoos. The cockatoo that flew so many kilometres south to Beela had originally been treated for a broken leg, so it was heartening to see that this significant injury, as well as a couple of years in captivity, did not appear to affect her fitness or ability to find food and friends!

This ‘proof of concept’ trial will also enable the satellite tracking process to be optimised for forest black cockatoos, supporting the viability of plans to undertake tracking of all three species as part of a larger health and ecology project, which is required to fill in the knowledge gaps to protect WA’s black cockatoos.

Anna Le Souëf a.lesouef@murdoch.edu.au
Kris Warren k.warren@murdoch.edu.au
The Australian Wildlife Health Network

The Australian Wildlife Health Network (AWHN) is an initiative of the Australian government comprising a network of stakeholders with an interest in wildlife health across Australia. AWHN aims to promote and facilitate collaborative links in the investigation and management of wildlife health in support of human and animal health, biodiversity and trade.

It has been another busy and productive year for AWHN. The following article provides an update on some of our activities of particular relevance to WDA-A members. For further information on the activities of AWHN and the various focus groups, please see the AWHN website: www.wildlifehealth.org.au.

Wildlife health events reported to AWHN

The core business of AWHN is wildlife disease surveillance and collation and management of national wildlife health datasets. Wildlife disease information of potential significance for protection of trade, human health and biodiversity is reported into the national electronic wildlife health information system (eWHIS) by CVO-appointed state and territory wildlife coordinators, zoo coordinators, avian influenza wild bird surveillance coordinators, university researchers and others involved in wildlife disease investigation. A summary report on a selection of events in eWHIS is published through Animal Health Australia’s Animal Health Surveillance Quarterly reports (http://www.animalhealthaustralia.com.au/elibrary) and AWHN newsletters (www.wildlifehealth.org.au – ‘About Us/Newsletters’).

Interesting cases recently reported into eWHIS include: mass mortalities of shearwaters along the eastern, southern and western coasts of Australia; exclusion of white nose syndrome in a southern myotis microbat in NSW; avian pasteurellosis in waterbirds in Victoria; trichomoniasis associated with mortalities of black kites in far north Queensland; Salmonella Typhimurium DT160 in sparrows in Tasmania; and spironucleosis in Australian king parrots in Victoria.

Zoo Based Wildlife Disease Surveillance Program

Trine Kruse & Jemima Amery-Gale, Territory Wildlife Park

The Zoo Based Wildlife Disease Surveillance Program, a collaborative project between AWHN and the Zoo and Aquarium Association, involves reporting of wildlife disease information from free-ranging and rehabilitation cases seen at the zoos’ wildlife clinics. The program, which has now been running for three years, has been very successful with almost 800 records entered directly into eWHIS by the zoos over the course of the program. Funding for the program is currently provided by the Commonwealth Department of Agriculture.
We are pleased to welcome a tenth zoo to the program, Taronga Western Plains Zoo, which will increase the geographic reach of the program and is expected to add to the variety of species and disease syndromes reported. Taronga Western Plains joins the other zoos in the program: Territory Wildlife Park, Taronga Zoo, Sea World, Perth Zoo, Melbourne Zoo, Healesville Sanctuary, Currumbin Wildlife Sanctuary, Australia Zoo Wildlife Hospital and Adelaide Zoo.

Emergency animal disease training

AWHN ran a two-day emergency animal disease (EAD) management workshop in Sydney in August, with a focus on wildlife disease. The workshop was facilitated by Nancy Bombardieri from PIRSA, with sessions and scenarios presented by Rupert Woods and Tiggy Grillo from AWHN, Wayne Boardman from the University of Adelaide, Mark Hawes from the DEPI Victoria, and James Watson from CSIRO-AAHL. A range of wildlife health professionals attended, including veterinarians in private practice, zoo veterinarians, wildlife coordinators and representatives of state/territory environment agencies. Participants appreciated the course content as well as the chance to network with other practitioners from their regions and from around the country. There were many more expressions of interest than could be accommodated at the course, and AWHN hopes to offer further training workshops in future.

Are you interested in bat health?

The Australian Wildlife Health Network collates recent media articles and publications relating to bat health into a monthly ‘Bat News’ email. If you would like to receive the monthly email, please contact Keren at: kcox-witton@zoo.nsw.gov.au.

The latest issue of Bat Stats is available from the AWHN website: [http://www.wildlifehealth.org.au/ProgramsProjects/BatHealthFocusGroup.aspx](http://www.wildlifehealth.org.au/ProgramsProjects/BatHealthFocusGroup.aspx). This publication, produced by the national Bat Health Focus Group, provides a summary of Australian bat lyssavirus (ABLV) testing in bats in Australia, including analysis of numbers of tested, reasons for submission and a discussion of the public health significance of ABLV.

AWHN Digest

If you would like to receive regular updates about wildlife health more broadly, AWHN produces a weekly email Digest of wildlife health and disease information including media stories, research news, upcoming events and recent publications from both Australia and overseas. To receive the weekly Digest visit our website [http://www.wildlifehealth.org.au/AboutUs1/JointheNetwork.aspx](http://www.wildlifehealth.org.au/AboutUs1/JointheNetwork.aspx), alternatively you can contact Tiggy at tgrillo@zoo.nsw.gov.au to find out more.

Funding for wildlife disease investigations

The National Significant Disease Investigation (NSDI) Program subsidises livestock and wildlife disease investigations by veterinary practitioners, with subsidies between $225 and $650 available per event. In return, the practitioner must provide a case report of the investigation. More information on the program is available at [www.animalhealthaustralia.com.au/programs/disease-surveillance/national-significant-disease-investigation-program/](http://www.animalhealthaustralia.com.au/programs/disease-surveillance/national-significant-disease-investigation-program/) or on the AWHN website [www.wildlifehealth.org.au](http://www.wildlifehealth.org.au) (‘Programs & Projects /NSDI’). For approval of funding for wildlife disease investigations, contact the Wildlife Coordinator in your jurisdiction ([www.wildlifehealth.org.au](http://www.wildlifehealth.org.au) – ‘About Us / Contact Details’). You can also contact AWHN to discuss your application prior to submission.

Examples of wildlife disease investigations approved for funding through the program include: mass mortality events in waterfowl; paralysis and respiratory distress in magpies; a black flying fox with neurological signs where ABLV had been excluded; skin lesions in a free-living eastern water dragon; neurological signs and blindness in macropods; possible viral pneumonia in a snake; and skin lesions in eastern broad-nosed bats.
Shearwater mortalities 2013 - Summary of Event for WDA A newsletter

Tiggy Grillo, Australian Wildlife Health Network

Since October, dead shearwaters (Puffinus spp.) have been washing up along beaches and coastlines from Queensland to South Australia, Western Australia and Tasmania. The majority of the birds have been the short-tailed shearwater (Puffinus tenuirostris). Short-tailed shearwaters are a widespread, abundant seabird species, with a worldwide population in excess of 18 million animals. They spend approximately six months in Australia nesting and breeding before returning to their wintering grounds in the northern hemisphere in April. A number of other shearwater species have also been reported: wedge-tailed (P. pacificus), fluttering (P. gavia) and flesh-footed (P. carneipes).

Reports of dead shearwaters began in Queensland (Qld) and News South Wales (NSW), with subsequent reports of dead birds washing up on beaches in Victoria (Vic), Tasmania (Tas) and South Australia (SA). Shearwaters have also been found washed up on beaches along the southern coastline of Western Australia (WA). The mortalities have received widespread media coverage and public attention as dead birds washed up along beaches and coastlines. Representatives from state and territory departments of environment and agriculture, local councils, zoo and non-for profit wildlife hospitals as well as numerous volunteer wildlife care groups have all been called to respond and provide advice on the situation.

The conclusion is that this is a natural but unfortunate event\(^1\),\(^2\),\(^3\),\(^4\), with birds having died from exhaustion and starvation, following their long annual migration from the northern hemisphere to nesting areas in southern hemisphere. Birds are often in poor condition and have limited energy reserves, having travelled over 15,000km. Die-offs occur annually, however this year has seen an extensive and widespread number deaths. Severe weather and difficulty finding sufficient fish stocks during their migration are considered possible contributing factors\(^5\),\(^6\).

The potential for diseases to be involved a part of the cause of the mortalities is being investigated: a number of birds have been submitted for necropsy from a number of locations in NSW, Vic, Tas and WA. All have showed similar results, including muscle wasting, emaciation and evidence of starvation. Some infectious diseases including avian influenza and Newcastle disease have been excluded by PCR in the events in NSW, Vic, Tas and WA. Infection with West Nile Virus was also excluded by PCR in birds from NSW.

More detailed reports are currently being collated by AWHN. The AWHN would like to thank all those who submitted information for this report, including AWHN subscribers, state and territory wildlife coordinators, university researchers and zoo veterinarians.

References:
**ARWH case summary July to September 2013**

Thank you to everyone for your contributions to the Registry this year. We hope that you have a great break over the holidays and want to wish you a very prosperous 2014.

Over the holidays you might have time to check out our new blog. We have been using images and case details from a few emerging investigations and some classical diagnostic finds to create an interesting case blog on our public website – have a look at [http://theregistry.org.au/case-blog](http://theregistry.org.au/case-blog). Feel free to send us an email to comment on the cases and we will update the blog. More cases will be uploaded over the course of the holidays.

Best wishes,

Karrie and Jane

**July 2013**

- **Green turtle (9403.1) – subadult, Bundeena NSW** - This young turtle was submitted by WIRES after being found stranded, and died shortly after being collected. The turtle was emaciated, with abundant shell algae, barnacles and ulcers, all indicating that the animal had been ill and floating for some time. Its stomach was full of ingesta. The turtle had severe enteritis, with extensive erosions and catarrhal exudation, associated with the presence of large numbers of trematode parasites (Image: Trematode parasites and catarrhal exudates line the intestine). Two trematodes were also present within the urinary bladder, where there was very mild, perivascular inflammation. This turtle had cardiovascular trematodes, with an aortic granuloma where presumably adult trematodes had been resident, and large numbers of ova granulomas in the tissues. The ova were very large, with at least...
one long apical spicule (Image: Splenic trematode ova showing long apical spicule, 400x H&E). These aortic trematodes with very large ova with spicules seem to be a fairly recent finding in NSW green turtles.

Microthrombi in the pulmonary vasculature and mild endocarditis may have been attributable to the intravascular trematode ova, as there was no evidence of septicaemia (no growth on bacterial culture of lung and liver) or other thrombotic process. The turtle had a focal granuloma in the lung, which seemed to be walled off and an incidental finding at the time of death. See our blog for more details.

This is the first case of enteritis associated with severe trematodiasis in a green turtle that we have seen in the Registry. A similar case has more recently been submitted and will be included in the next summary. Please contact us if you have seen similar cases in NSW or other parts of the country.

- Green turtle (9370.1) - adult, Pipers Bay, NSW - The turtle was euthanased due to profound weakness. The turtle had aspirated a fish into its trachea and had evidence of septicaemia (microthrombi in many organs), and a severe, necrotising colitis, which was sufficient to account for its weakness. The turtle was in very good body condition. A portion of decomposing fish filled the majority of the lumen of the trachea, just caudal to the glottis. Presumably the turtle aspirated a regurgitated fish after feeding. According to feeding records, this likely occurred approximately 24 hours prior to euthanasia. The consistency of the lungs is highly suggestive of an acute pneumonia. Histopathology supports the presumption that bacteria from the fish were aspirated into the lungs to initiate pneumonia. Bacteria spread rapidly from the lungs throughout the blood stream. Acute sepsis may explain the animal's renal and pancreatic oedema. Bacterial culture of tissues was not conducted as it is presumed that a variety of fish-related bacteria would be isolated. The turtle was reported to be difficult to hand feed due to profound weakness. The cause of this weakness is uncertain as there were no lesions visible in the skeletal muscles, peripheral or central nervous system. The turtle had passed ingesta from the entire small intestine. It was surprising to see loosely packed sea grass in the stomach, as this must have been stable in the stomach for the entire 3 weeks that the turtle had been in care.

August 2013

- Australian Pelican (9235.3) and Sacred Ibis (9235.4) - Woy Woy, NSW - These birds both emanated from a colony where there was a report of a mass mortality of 70 birds last November and ongoing intermittent mortality. The pelicans and ibis examined by the Registry have all had severe multisystemic, fibrinoid vasculopathy, which has been associated with haemorrhages into tissues, and acute degeneration and necrosis, and mild early fibroplasias in the heart muscles (Image: petechial haemorrhage throughout the heart), clear fluid collecting in the pericardial sac, and this bird also had acute haemorrhage in the pancreas. The ibis have somewhat milder lesions, often including mild fibrinous inflammation throughout the coelomic cavity.

Currently, our working differential diagnoses include: heavy metal intoxication (particularly lead and mercury), domoic acid toxicity, vitamin E/selenium responsive myopathy, or an acute viral infection. Tissues are currently being tested for toxicities by the NSW Environment Protection Authority. Swabs and tissues of affected animals submitted to NSW DPI to rule
out avian influenza, West Nile virus (which is known to cause similar heart lesions to those in the pelican), Newcastle disease (which can cause acute pancreatic haemorrhage) and chlamydiotosis have all returned negative results. Tissues from several pelicans have been submitted for next generation sequence analysis to attempt to identify the presence of any other potential viral pathogens. For more information on these cases please see our blog page.

- **Green turtle (9445.1) – Lake Macquarie, NSW – Subadult female, euthanased due to emaciation and severe and extensive obstruction of the distal small and entire large intestine with very hard, dry faeces, associated with foci of full thickness intestinal haemorrhage. The pink hue to the skin, multifocal skin ulcers, fluid in the coelomic cavity, and haemorrhage into the stomach wall due to blood vessel damage, are highly suggestive of systemic bacterial infection (septicaemia). It seems likely that bacteria penetrated the compromised intestinal wall and circulated systemically via blood or lymphatic vessels. Bacterial culture was not pursued as the animal had been treated with antibiotics, which would likely have inhibited bacterial growth in culture, and the bacterial spread systemically were likely secondary to the primary process of obstipation. The cause of this obstipation syndrome in marine turtles is uncertain, and may relate to anything that changes gut motility, or causes dehydration. The solidified faeces eventually seem to erode the intestinal mucosa, as seen with the severe, subacute ulcers here.**

- **Green turtle (9418.1) – Botany, NSW, adult, female - The turtle was euthanased due to severe injuries to the shell, which extended into the coelomic cavity and lung. The parallel nature of the wounds is most consistent with injury sustained by a propeller. Tissues were subjected to histopathology as these acutely traumatised animals provide a good opportunity to study the normal state and health status of marine turtles. It was interesting to note that this animal did not have any evidence of spirorchid fluke infection. The turtle was in excellent body condition and had no evidence of disease that may have predisposed it to floating or injury. The pulmonary haemorrhage was most likely a result of direct trauma. The gastric erosions are most likely the result of ischaemia caused by circulatory collapse (shock). The turtle had focal nodules in the lungs that contained inflammation and fungi. It is not unusual to find such granulomas in the lungs of turtles. These nodules are most often incidental, although in immunocompromised animals the fungal infections can erupt from these nodules to become more severe and sometimes spread systemically. A report with images was provided to NSW OEH for community education purposes.**

- **Glossy black cockatoo (9419.1) – Deep Cove Narrabeen, NSW - The young bird was found paralysed in the bush. An engorged paralysis tick was found on the right side of the face. Tick paralysis is suspected as there was no evidence of other injury or illness, and no indication that other toxic agents had recently been ingested. No lesions were noted on histopathology. Unfortunately, there is no test to detect tick toxin in human or animal tissues or specimens.**

- **Brown antechinus (9415.1) – Garigal NP, NSW - The adult, male antechinus appears to have died as a result of predation while contained within an Elliot trap. The animal had a broad range of**
interesting underlying lesions, mostly related to parasitism. It is not unusual for antechinus to have a relatively high burden of parasites approaching the breeding season. Large, basophilic intranuclear inclusion bodies in the renal tubular epithelial cells are most likely to be associated with herpes virus infection. It is interesting to note that in this animal the renal infection was associated with an apparent ascending bacterial infection in the renal pelvis. While most of the findings in this animal are likely to have been inconsequential to the host, babesiosis and herpesvirus infection have been linked with post breeding mortality in male antechinus. On gross post mortem examination, the animal appeared to have white foci throughout the liver that were thought to represent an infection, but on microscopic examination these foci represented glycogen storage.

• Brown antechinus (9449.1) – Garigal NP – The adult male antechinus died shortly after being recovered in poor condition from an Elliot trap. There was no evidence of traumatic injury upon gross post mortem examination of the animal. Evidence of digested blood was found in the intestinal cavity. This is most likely evidence of gastrointestinal ulceration, which is a common occurrence associated with shock, circulatory collapse and resulting ischaemia in antechinus. Breeding male antechinus have been shown to have high concentrations of circulating corticosteroids, which has been associated with gastric ulceration and death, just after the breeding season. Histopathology confirmed the presence of acute myocardial damage, another common sign of ischaemia associated with shock/circulatory collapse. The animal had a wide variety of underlying parasitic infections, and viral infection in its prostate gland and testis.

The inclusions in the prostate and testicle are consistent with herpesvirus infection, which has been previously described in breeding male antechinus. There is some debate as the potential effects of this virus on the immune system of the host. Historically this virus was thought to be a cytomegalovirus, but more recently, it has been described by Wilks et al as a gamma herpes virus. The finding of reproducing coccidia within the prostate gland of this animal is very interesting and rare. The identification of this organism and its relationship to the coccidial parasite cysts (thought to be Neospora or Sarcocystis sp) will be further studied through a PhD student at the University of Sydney.

It was interesting to note that the animal trapping was timed to occur before the antechinus breeding season, and this animal had very little active sperm production, yet it had many mature spermatozoa trapped within a blocked tubule in the epididymis. It seems likely that this male had previously bred and avoided post-breeding mortality. Perhaps the age of this animal may have predisposed it to be more sensitive to subsequent stressful events. Check out the blog for images of these and other findings.

• Powerful owl (9412.1) - wild, Collaroy, NSW, adult female – The bird was found in the middle of the road unable to fly away. On examination, the bird’s right pupil was slightly larger than the left, and that right eye was unresponsive to light. The bird had a persistent head tilt to the left and neurological signs. On examination under anaesthesia a few days after presentation, a fistula was found in the palate, just caudal to the choanal slit, and slightly left of midline. A swab from the fistula was collected and contained mucus. Radiographs of the head identified possible lysis on the left side of the palate, near the fistula. E coli were cultured from the swab of the fistula. Long acting amoxil was added to the treatment and the bird was assist fed. The bird began to seizure one week later and died before treatment could be administered.

The powerful owl suffered an acute haemorrhagic event in the meninges, which was most likely associated with a subacute infection throughout the bones of the cranium. The bird had an acute inflammatory haemogram, which seems consistent with widespread infection through the calvarium. The oral fistula did not appear to communicate with the meninges or eye sockets. With mucus extending from the choanal slit, there may have been a sinusitis. Microbial culture revealed a light growth of mixed gram negative rods in the bone, but no growth in the brain. Presumably, a traumatic
event lead to the formation of a palatine fistula, which seeded bacteria into the bones of the skull, prior to the oral mucosa sealing the defect. This is a very rare and interesting case.

- Tasmanian devil (9409.1) - captive, NSW – This aging devil was euthanased due to hind limb weakness, ataxia and radiographic changes suggestive of a narrowing at the T11/12 intervertebral disc space. Unfortunately, no changes confirming this finding were identified either grossly or histopathologically. However, an organization and recanalizing thrombus was detected in one adrenal gland. Although this would not likely be directly responsible for lameness, it may indicate thrombosis in this region, making a saddle thrombus or similar pathology a differential diagnosis. Incidental findings in this devil included two skin masses, gastric nematodes and endogenous lipid pneumonia.

- Spotted harrier (9440.1) – captive, NSW – This bird was euthanased following an extended period of treatment for bumblefoot affecting both feet. Histological examination of the feet revealed deep, chronic and ongoing inflammation with granulation tissue formation. The inflammation did extend to tendons sheaths and periosteum, but had not developed into osteomyelitis. Interestingly, this bird was also discovered to be harbouring a parasitic infection under its skin which is typically found in frogs. No previous reports of sparganosis occurring in a raptor could be found. Presumably, this is a paratenic host situation following consumption of an intermediate host, such as a frog. (Image: Spargana parasites found under the skin along the dorsal neck in a spotted harrier, an unusual host).

- Australasian grebe (9432.1) – wild, Newtown, NSW - An immature female grebe found being attacked by birds was kept in care for 6 weeks. Two days prior to euthanasia, it began falling over in the water and was unable to right itself. On gross examination, marked fungal infection of the air sacs and lungs (Aspergillus) was noted in addition to a focal thickening of the vertebral column. Histopathology revealed a focus of this fungal infection in the spinal cord, resulting in near complete destruction of the cord at this site.

**September 2013**

- Inshore Bottlenose Dolphin – neonate male – Manly, NSW – a neonatal dolphin was found floating in water off of Dobroyd Head. Although the animal was in an advanced state of decomposition, the examination was worthwhile as tissues were submitted to the museum, neonatal measurements were collected and the cause of death was identified. Foetal hairs and an open umbilicus confirmed the age of the animal. 4-5cm contusions on the flanks overlying areas of deep haemorrhage were consistent with blunt trauma and suggestive of intraspecific injury.

- Hawksbill Turtle (9496.1) – wild, adult – The turtle had severe and extensive fibrinopurulent and catarhal enteritis. The severity of the lesion was quite remarkable, and there was extensive ulceration and thickening of the intestinal wall. In one area, the turtle had formed a firm fibrinous cast of the intestinal lumen. This finding, along with the severe biliary fibrosis and the degree of emaciation of the animal all suggest that the animal has had enteritis for some time. The pink skin of the animal and its very weak condition indicate that the animal was most likely septicaemic at the time of presentation,
but no bacteria were isolated in culture – most likely due to ante-mortem antibiotic therapy. The turtle had several other parasite infections and localised fungal pneumonia, but these seem unlikely to have been sufficient to contribute to the enteritis or emaciated state of the animal.

• Blotched bluetongue lizard (9414.2) – captive, NSW - Adult female euthanased following an extended history of swollen, abnormal gums and intermittent lethargy. On gross examination, a large mass appeared to be replacing the right ovary and/or oviduct (Image: large fleshy appearing mass replaces the right ovary and displaces the abdominal organs). Histopathological examination confirmed that this mass was a tumour within the oviduct wall with extensive secondary bacterial infection. The issue with the gums is thought to have been secondary to this tumour.

• Mallard Ducks (9492.1, 9514.1-3) – Woy Woy, NSW - ducks from two outbreaks of mortality, at the same property, were submitted. Although the submitter is very concerned about the possibility that her neighbour may be poisoning the ducks, the ducks have had gross and histological lesions very similar to the ibis and pelicans found in the adjacent bay – see above.

• Red neck wallaby (9476.1) – in care, Kempsey/Collombatti area – Reports of an increased incidence of mortality in macropods in the Macley Valley, including 4 adult females in the Collombatti area (each had a joey and two of these Joeys died), an adult female from East Kempsey and 2 adults from Dondingalong area. One of the joey’s from Collambatti, was submitted for examination. The young animal appears to have suffered a fairly acute, severe, and widespread infection with single celled parasites. The organisms and associated lesions are consistent with Toxoplasma gondii infection, although additional tests such as PCR or immunohistochemistry would be required to confirm the diagnosis. The animal appeared to have been acutely parasitaemic, with protozoa circulating in peripheral monocytes.

If you have any questions relating to cases outlined in this report please feel free to contact the Registry (arwh@zoo.nsw.gov.au or 02 9978 4749).

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Cover Photo -

The Stuttering Barred Frog (*Mixophyes balbus*) can be heard and found along mountain creeks cascading through warm and cool temperate rainforest on the mid north coast of NSW, Australia. This species is listed as vulnerable by the IUCN and coexists with at least two other vulnerable frog species at the site this individual was seen on the eastern Dorrigo plateau. The image was captured by Andrew Peters using an iPhone 5c.