AUSTRALASIAN BAT SOCIETY, INC.

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Senate Standing Committee on Environment and Communications
Australian Government
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Inquiry into environmental biosecurity

To the Committee,

The Australasian Bat Society, Inc. (ABS) is pleased to have the opportunity to make a submission to this Inquiry. The primary aim of the ABS is to advocate for the conservation of bats and their habitats through the advancement of quality science (Appendix 1). Bats make up around a quarter of Australia's land mammal species—about 80 species of small cryptic insectivorous bats through to the large conspicuous flying-foxes. We recognise the intrinsic value of all bat species, their contribution to biodiversity, and their roles in ecosystem services such as maintaining the structure and diversity of Australia's native forests.

We apologise for making this submission well after the due date. We have only recently become aware of the Inquiry.

The ABS recognises the vital importance of strong biosecurity for bat conservation. One of Australia's most recent extinctions—of the Christmas Island pipistrelle (a small bat endemic to Christmas Island)—was probably due to invasive species. However, we focus in this submission on one particular high priority biosecurity risk for Australia's microbats that has received little attention from biosecurity authorities—white nose syndrome, a rapidly expanding fungal disease causing massive declines in numerous bat species and threatening to cause the extinction of some of these in North America.

This submission represents the collective views of the Australasian Bat Society, Inc. It was authorised by the elected executive members and released by its president to The Senate Standing Committee on Environment and Communications.

Yours sincerely,

Dr Kyle Armstrong
President, Australasian Bat Society, Inc.

Inquiry into Environmental Biosecurity

A submission from the Australasian Bat Society, Inc to the Australian Government's Standing Committee on Environment and Communications

Summary

White nose syndrome is an extremely serious fungal disease of insectivorous bats, first detected in hibernating bats in North America in 2006, which is causing catastrophic declines in numerous species. If the pathogen responsible, *Pseudogymnoascus destructans*, naturalises in Australia, it could likewise have severe impacts here on bat species that hibernate in caves and mines. However, basic biosecurity measures and actions such as risk assessment, contingency planning, and adding it to the list of notifiable animal diseases have not been undertaken, as far as we are aware.

With the recent establishment in Australia of two very severe fungal pathogens—chytrid fungus (*Batrachochytrium dendrobatidis*) that causes chytridiomycosis in frogs, and myrtle rust (*Puccinia psidii*) that infects plants in family Myrtaceae—Australia should be well aware of the potential catastrophic consequences for biodiversity of failing to take precautions against new pathogens. Yet, the national peak body for wildlife health, Wildlife Health Australia, is funded primarily to focus only on diseases that are considered risks for agriculture and human health, rather than biodiversity.

The Australasian Bat Society recommends the following actions be taken to address the risk of white nose syndrome:

(1) Fund Wildlife Health Australia to undertake, in collaboration with the Australasian Bat Society and disease experts, risk assessments and contingency planning for potential disease risks to Australian bats, with *Pseudogymnoascus destructans* an urgent first priority.
(2) Add white nose syndrome of bats to the National List of Notifiable Animal Diseases.
(3) Implement measures to reduce the risks of white nose syndrome arriving or establishing (this should be done by both biosecurity and environmental authorities, in collaboration with organisations such as Wildlife Health Australia and the Australasian Bat Society).

The Australasian Bat Society also recommends the following as measures to improve Australia's capacity to reduce biosecurity risks for bats and other Australian wildlife:

(4) Fund Wildlife Health Australia to focus on high priority disease risks for Australian wildlife, in addition to diseases of concern for agriculture and human health (as recommended in the submission by Wildlife Health Australia).
(5) Establish Environment Health Australia, a collaborative body to focus on better preparing Australia to protect the natural environment and native biodiversity from biosecurity threats (as recommended by the Invasive Species Council).

About white nose syndrome

White nose syndrome (WNS) is a disease caused by the fungus *Pseudogymnoascus destructans* (formerly called *Geomyces destructans*), discovered in 2006 in hibernating bats in the United States. The name of the disease derives from a white fungal growth often seen on the muzzle and other parts of the epidermal surface of infected bats.

Little brown bat and tri-colored bat showing visible symptom of white nose syndrome. *Photos: Ryan von Linden, New York Department of Environmental Conservation (L), Darwin Brock (R) (creative commons).*

There is an excellent website with up-to-date information about WNS, maintained as part of a coordinated North American response to the disease by 19 US federal agencies, 42 state and local governments, 39 non-governmental organisations and 15 universities (see whitenosesyndrome.org). Unless otherwise indicated, the information in this section comes from that site or the fact sheet by the US Fish and Wildlife Service downloadable from the WNS website[1].

The fungus causing WNS has been detected on 12 bat species in North America, and confirmed to cause disease in seven of these. The disease has killed more than 5.7 million bats in North America in the eight years since it was discovered. In some caves, 90 to 100 percent of bats have died. It threatens some species with extinction. By the end of the 2013–2014 hibernating season, WNS had spread to 25 states of the United States and five provinces in Canada.

The fungus has also been detected on at least eight European bat species, but generally does not cause severe disease. It is thought to be native to Europe and to have spread from there to the United States by humans. The catastrophic impacts in North America are due to the immunological naivety of these bats to the fungus[2].

WNS disrupts the winter hibernation of bats, causing them to wake more frequently. This causes dehydration and the accelerated consumption of fat reserves needed to survive hibernation. Bats with WNS have been seen flying outside in the day and clustering near the entrances of the caves and mines where they hibernate.

The fungus grows best between 5° and 10° C and ceases growth above 20° C. There is evidence that the fungus can persist (in cave soil, on cave surfaces, on caving gear) for long periods (possibly years) in the absence of bats[3].

The potential risk to Australian bats

The pathogen *P. destructans* is not known to be in Australia, and Australian bats, like those in North America, are presumably immunologically naive to the fungus and therefore likely to be highly susceptible if they are infected. Of the bat species observed to carry the fungus, Australia shares one genus with North America (*Myotis*) and two with Europe (*Myotis, Rhinolophus*[4]) as well as numerous other species within the same families that have similar ecology. More than 30 species of Australian bats roost in caves or disused mines, and while none enter long term hibernation in the same way as those in North America and Europe, there are some that occupy caves with relatively low temperatures and enter shorter periods of torpor. At most potential risk is the Critically Endangered Southern Bent-winged Bat *Miniopterus orianae bassanii (=M. schreibersii*), which occupies caves in south-eastern Australia.

Of eight recent investigations of suspected cases of WNS in Australia, one involved a tree-roosting bat (*Mormopterus beccarii*) found with infiltrative facial fungal growth. Although it fortunately proved not to be caused by *P. destructans*[5], the case highlights that we know very little about endemic infiltrative fungi and the risks and rates of fungal infection in both tree and cave-roosting bat species.

Wildlife Health Australia (formerly the Australian Wildlife Health Network) recommends a formal disease risk assessment and contingency planning for this potential pathogen in Australia. In 2013, it prepared a fact sheet on WNS, warning that cavers / speleologists could carry the fungus from overseas on their clothing or gear[6].

Based on what is known about the pathogen, including its likely capacity to survive for long periods in the absence of bats (for instance, on the boots, clothing or gear of cavers), we are concerned that the pathogen will eventually arrive in Australia.

The Australian Speleological Federation will be hosting the International Union of Speleology Congress in 2017, which will bring many cavers from around the world. This is likely to greatly increase the risk of WNS arriving in Australia.

Biosecurity measures taken in Australia

There has been some education of bat researchers, conservationists and cavers about the risk of WNS introduction through fact sheets and other publications[7], and presentations at conferences. There is also capacity in Australia to investigate suspected cases of WNS, with this disease having been ruled out in eight cases to date[8]. In addition, Biosecurity Queensland has published diagnostic guidelines for veterinarians[9].

Biosecurity measures needed

White nose syndrome could potentially be for bats the equivalent of foot and mouth disease for the livestock industry. It should be taken just as seriously. Yet, while Australian governments have invested millions of dollars to prevent foot and mouth disease, there has been almost no action to prevent WNS.

Fundamental to protecting bats from this disease is to first understand the risks of the pathogen arriving in Australia and infecting bats, the potential pathways for this to occur, the species and sites at risk, and the potential consequences of the disease. In other words, there needs to be a comprehensive risk assessment. As far as we are aware, this has not occurred. It should be undertaken as a collaboration between experts in bats, wildlife disease and biosecurity.

Once the risks and pathways are understood, there should be planning for measures to (a) limit the risks of the pathogen arriving and establishing in Australia, and (b) maximise the potential to detect and effectively respond to the disease should it establish in Australia. If the fungus does arrive in Australia, it will be important for biosecurity and environmental authorities to respond quickly to eradicate it, if this is at all possible. As has been repeatedly demonstrated (for example, with myrtle rust) delays in detection or response are likely to mean the disease becomes ineradicable.

Until the risk assessment and contingency planning are undertaken, it is not clear what measures are needed to maximise protection for Australian bats. They are likely to include the following:

- Education of cavers and quarantine precautions directed at cavers travelling from countries with WNS;
- Addition of WNS to the National List of Notifiable Animal Diseases (see http://www.agriculture.gov.au/animal-plant-health/pests-diseases-weeds/animal/notifiable);
- Barriers to limit access to caves assessed as being at risk;
- Education of people likely to come into contact with at-risk bats (e.g. cavers and bat researchers) to reduce risky behaviour and promote surveillance;
- Development of protocols to facilitate rapid diagnosis of the disease;
- A commitment under the National Environmental Biosecurity Response Agreement (NEBRA) to respond rapidly to the disease and implement measures to eradicate WNS if it is considered feasible (applying the precautionary principle), and the preparation of a decision matrix to assist in decision-making responses should the disease be detected;
- Involvement of the Australasian Bat Society in decision-making (preferably as a member of the National Management Group, although this would require amending the NEBRA) on any response to WNS;
- Development of an agreement with Australasian Bat Society about its role in preparing and responding to WNS.

Institutional arrangements

Implementation of a contingency plan for WNS will require government funding and collaboration between biosecurity authorities, environmental agencies (at Commonwealth and State levels), bat and disease experts and conservationists.

Wildlife Health Australia already has the institutional arrangements in place to facilitate such collaboration. It has a Bat Health Focus Group, where the risks of WNS have been discussed. However, as outlined in its submission to this inquiry, Wildlife Health Australia is funded primarily to focus on diseases of priority for agriculture and human health, not biodiversity[10]:

> "Australia's current wildlife health system is almost entirely driven by agricultural and human health needs."
>
> "Diseases of wildlife that impact upon Australia's biodiversity and environment are a low priority."
>
> "There is an immediate need to bring environment into Australia's wildlife health system."
>
> "[W]ildlife biosecurity information and response sources differ from production sources and need separate support. Australia's wildlife health system is almost entirely focussed on agricultural drivers."
>
> "Expanding the activities of Wildlife Health Australia, whose current focus is trade and agriculture, to include a focus on diseases of wildlife that may impact upon the environment, biosecurity and biodiversity is the obvious solution."

This is exemplified by the contrast in funding and attention given to bat diseases that can infect humans or horses—many millions of dollars have been spent by governments on responding to Australian bat lyssavirus and Hendra virus, with no funding provided for white nose syndrome risk assessment since the discovery of widespread bat deaths in the US in January 2007.

Wildlife Health Australia needs funding to allow it to undertake work on WNS and other diseases that are biodiversity threats. As a representative body for bat experts and conservationists, the Australasian Bat Society is well placed to collaborate with Wildlife Health Australia and facilitate the participation of bat experts and conservationists.

Fungal disease precedents

There has been a worrying trend of increasing spread of wildlife pathogens around the world. Two recent precedents in Australia that exemplify the potential catastrophic consequences of new fungal diseases are (1) myrtle rust, a disease of plants in family Myrtaceae caused by *Puccinia psidii*, and (2) chytridiomycosis, a disease of frogs caused by *Batrachochytrium dendrobatidis*. Chytridiomycosis has caused at least four frog extinctions in Australia, and many more worldwide. The potential for myrtle rust to cause extinctions also appears to be high and may affect nectar-feeding bat species such as flying-foxes, including those listed as Threatened.

These diseases demonstrate the extremely high costs to both biodiversity and the economy that can result from biosecurity failures. Australia should be seeking to learn the lessons from failures here and elsewhere to prevent the introduction of emerging infectious diseases, including white nose syndrome. We are still in a position where we can act to prevent the introduction of this and other potential wildlife diseases.

Biosecurity for bats

The Action Plan for Australian Mammals 2012 recognised 79 bat species in Australia, of which 3 species are extinct, 9 species or subspecies were assessed as Threatened, and 18 species or subspecies as Near Threatened[11]. The most recent extinction—of the Christmas Island pipistrelle—is presumed to have occurred just five years ago, in 2009. Although the causes have never been established definitively, it is thought to have been lost due to a combination of effects from invasive species (yellow crazy ants, wolf snakes and giant centipedes) and a failure to act in time. The Critically Endangered Christmas Island flying-fox is also likely to be suffering impacts due to invasive species. Habitat loss is generally a primary threat for declining bat species, but invasive species are thought to be a contributing threat for several species (for example, due to cat predation, competition for hollows by feral honey bees, impacts on food sources from myrtle rust)[11]. The ABS agrees with several other submitters to the Inquiry that there needs to be much greater focus in Australia on environmental biosecurity. As exemplified by the lack of preparation for WNS in contrast to the preparation for diseases that threaten livestock, environmental biosecurity lags behind that for industry and human health.

Stronger biosecurity in Australia relies on fostering collaboration between biosecurity and environmental authorities at federal and state levels, researchers and community groups such as Australasian Bat Society. We strongly endorse the recommendation by the Invasive Species Council, supported by 30 other environmental NGOs, as well as several submitters to the Inquiry, to establish a body—Environment Health Australia—to foster collaborative endeavours to strengthen biosecurity for Australian biodiversity.

Recommendations

(1) Fund Wildlife Health Australia to undertake, in collaboration with the Australasian Bat Society and disease experts, risk assessments and contingency planning for potential disease risks to Australian bats, with *Pseudogymnoascus destructans* an urgent first priority;

(2) Add white nose syndrome of bats to the National List of Notifiable Animal Diseases;

(3) Implement measures to reduce the risks of white nose syndrome arriving or establishing (this should be done by both biosecurity and environmental authorities, in collaboration with organisations such as Wildlife Health Australia and the Australasian Bat Society);

(4) Fund Wildlife Health Australia to focus on high priority disease risks for Australian wildlife, as well as diseases of concern for agriculture and human health (as recommended in the submission by Wildlife Health Australia);

(5) Establish Environment Health Australia, a collaborative body to focus on better preparing Australia to protect the natural environment and biodiversity from biosecurity threats (as recommended by the Invasive Species Council).

Acknowledgements

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[6] Australian Wildlife Health Network. (2013). *Exotic – White-nose Syndrome Fact Sheet*.

[7] In addition to the AWHN fact sheet, Biosecurity Queensland has published one at http://www.daff.qld.gov.au/animal-industries/animal-health-and-diseases/a-z-list/white-nose-syndrome

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[9] Department of Agriculture, Fisheries and Forestry, Queensland Government. (2014). *White-nose Syndrome*. http://www.daff.qld.gov.au/animal-industries/animal-health-and-diseases/a-z-list/white-nose-syndrome.

[10] Wildlife Health Australia (2014). *Wildlife Health Australia (WHA) Submission: Inquiry into Environmental Biosecurity*.

[11] Woinarski C, Burbidge A and Harrison P (2014). *The Action Plan for Australian Mammals 2012*. CSIRO Publishing.

Appendix 1

About the Australasian Bat Society, Inc

The ABS is a professional body comprising around 350 members, representing research scientists in universities and government, students, wildlife rehabilitators, environmental consultants and members of the public with a general interest in bats. We aim to promote the conservation of all populations of all species of bats in Australasia, and our activities extend from grass roots advocacy to scientific research, and the development of standards and the provision of conservation advice at Local, State and Commonwealth Government level.

Our members have been instrumental in the development of Commonwealth documents and resources such as "The Action Plan for Australian Bats", "Survey guidelines for Australia's threatened bats", entries in the Species Profile and Threats Database, Conservation Advice and Guidance Note documents, and several Recovery Plans for Threatened-listed species.

Through its members, the ABS has strong links with similar societies in other countries such as Bat Conservation International and the South East Asian Bat Conservation Research Unit, other conservation groups in Australia such as the Humane Society and the Places You Love Alliance, and our members contribute our specialist knowledge to international organisations including the International Union for the Conservation of Nature, Flora and Fauna International, and the World Wildlife Fund and Conservation International.

http://ausbats.org.au