Biosecurity - Australian bat lyssavirus

Management of the biosecurity risk

Australian bat lyssavirus (ABLV) is endemic in microbats and flying foxes in Australia. Occasionally infected bats transmit infection to humans through bites or scratches and the resultant human infection is invariably fatal. Fatal spillover infection has been also seen in horses. Transmission to non-bat species is usually associated with bites or scratches from clinically affected bats. The incubation period, like rabies is variable from days to years and death occurs after a short illness characterised by progressive severe nervous signs as typically seen with classical rabies. Closely related lyssaviruses overseas cause illness in a wide range of domestic and wild animals and ABLV infection in additional animal species is likely to be reported in the future. Virus survival outside the host is short term and it is inactivated by many disinfectants and soap. Rabies vaccination is considered to provide cross protection against ABLV challenge.

Scope

The Biosecurity Act 2015 (the Act) promotes biosecurity as a shared responsibility between government, industry and communities. This procedure is a State Priority for NSW and should be read in conjunction with the policy 'Prohibited matter sporadic pests and diseases of animals'. The procedure applies to the NSW Department of Primary Industry (NSW DPI), an office within the NSW Department of Industry, and Local Land Services (LLS) in their role as authorised officers under the Act.

Biosecurity legislation summary

ABLV is listed as prohibited matter under schedule 2 of the Act. This means that a person who owns or is caring for bats or other animals, or a person such as a veterinarian in their professional capacity, has a duty to immediately notify an authorised officer if they suspect, or are aware, that the bats or other animals have ABLV.

Under section 28 of the Act it is an offence for people to deal with prohibited matter. In the context of ABLV, this means that it is an offence for people to do anything that is described in section 12 of the Act as dealing which includes moving, selling or treating bats or other animals infected with ABLV, unless the person could not have reasonably known that they were dealing with ABLV. Note that the Secretary (or delegate) can issue a prohibited matter permit that authorises specific dealings with prohibited matter, such as bats or other animals infected with ABLV, subject to specific conditions.

The collection, use and disclosure of information in accordance with this procedure, including any internal or external discussion or distribution of information, must be in compliance with the Privacy and Personal Information Protection Act 1998 or be exempted by the operation of section 387 of the Act.

Section 387 (2) of the Act provides authority for the disclosure of information about a person, without the consent of the person: to a public sector agency, or to any other person, but only if the disclosure is reasonably necessary for the purpose of exercising a biosecurity risk function.

Work health and safety
The *Work Health and Safety Act 2011* places an obligation on the agency (NSW DPI and LLS) as a person conducting a business or undertaking and workers to provide a safe and healthy workplace. Safe Work Method Statements that support activities included in this procedure must be used in identifying, assessing and controlling risks.

NSW DPI and LLS will work together to create a safe and supportive work environment when undertaking any activities for this procedure.

ABLV is invariably a fatal zoonotic disease and as such, extreme caution must be exercised when dealing with live and dead bats. Handlers must be vaccinated and wear appropriate personal protective equipment (PPE).
Contents

Australian bat lyssavirus procedure 4
1. Roles an responsibilities 4
2. Notification and reporting 4
3. Action following reporting of suspect or confirmed cases of ABLV infection 5
   3.1 History 5
   3.2 Risk assessment 5
   3.3 Handling live bats 5
   3.4 Handling dead bats 5
4. Management of suspected animal or human ABLV interactions 5
   4.1 Category 3 (high human health risk) interaction with bat 6
   4.2 Category 2 bat interactions 6
   4.3 Category 1 interactions (low risk) 6
   4.4 Domestic animals with neurological signs/behaviour changes and possible exposure to a bat within the last two years 6
5. Sampling Australian bat lyssavirus suspect animals 7
6. Advice to owners of exposed animals following laboratory testing of bats 7
   6.1 Bat tests positive 7
      6.1.1 Vaccination 8
      6.1.2 Euthanasia 8
      6.1.3 Health monitoring 8
   6.2 Bat not available for testing 8
   6.3 Bat tests negative 8
7. Vaccination of animals 8
   7.1 Pre-exposure vaccination 8
   7.2 Post Exposure 8
8. Liaison with NSW Health 9
9. Reporting 9
10. Definitions and acronyms 9
11. Documentation 10
12. Records 10
13. Revision history 10
14. Contact 10
Australian bat lyssavirus procedure

1. Roles and responsibilities

Licensed fauna rehabilitators should:
- notify NSW DPI or LLS of all suspect ABLV cases
- only handle suspect live bats if they are vaccinated for rabies and monitored as protected, and trained in bat handling
- use appropriate PPE when handling suspect ABLV infected animals.

Private veterinarians should:
- notify NSW DPI or LLS of all suspect ABLV cases
- pack and submit appropriate samples for testing of suspect ABLV cases in accordance with laboratory advice and best practice biosecurity
- only handle suspect live bats or undertake necropsies on ABLV suspect bats if vaccinated for rabies and monitored as protected, and trained in bat handling
- use appropriate PPE when handling suspect ABLV infected animals.

NSW DPI and LLS staff must:
- report any notifications or suspicions of ABLV they become aware of in accordance with the procedure - Reporting prohibited matter, notifiable pests and diseases of animals and other biosecurity events'.

NSW DPI and LLS managers must:
- direct staff to not handle live bats or perform bat necropsies unless the officer has received a full course of rabies vaccinations and has undertaken monitoring to ensure that their level of protection is adequate.
- provide information on ABLV infection for the general public on the Department's website
- include information about ABLV in briefings on zoonotic disease
- ensure that records of ABLV positive bats and vaccination approvals are entered as soon as possible into the Livestock Health Management System (LHMS) by the NSW DPI Wildlife Coordinator. Guidance on entry of ABLV events can be found in the LHMS manual.

NSW DPI and LLS field staff must:
- coordinate the investigation of any suspect ABLV cases where exposure of a non-bat animal or human may have occurred. Note that NSW DPI and LLS coordinate the animal part of the investigation, and support NSW Health in their investigation of suspect human exposure investigations.
- provide advice in liaison with private practitioners involved in the case, and communicate with the owner when required
- notify the local NSW Public Health Unit of any suspected human exposure to ABLV suspect or confirmed infected animals
- use appropriate PPE when dealing with possible exposure to zoonotic agents.

2. Notification and reporting

ABLV is classed as prohibited matter and is notifiable under the Act.

NSW DPI and LLS staff must report any information regarding suspicion or awareness of ABLV in accordance with the procedure ‘Reporting prohibited matter, notifiable pests and diseases of animals and other biosecurity events’

This reporting obligation also applies to staff at laboratories who receive samples from bats or other animals where:
- the submitter requests ABLV testing, or
- laboratory staff consider that testing for ABLV is appropriate.
3. Action following reporting of suspect or confirmed cases of ABLV infection

3.1 History
Collect details of the incident: time /date/location of potential exposure, status of bat, nature of interaction, clinical signs observed, and details of who has been potentially exposed.

3.2 Risk assessment
Using the history provided a risk assessment must be undertaken on all reports of suspect or confirmed ABLV infection. Guidance on the factors to consider when undertaking a risk assessment for ABLV exposure can be found in ABLV guidelines for veterinarians

Bats can be categorised based on their potential to transmit ABLV to humans and other animals (i.e. potential for an infected bat to have infectious contact with a human or other animal). These categories are listed from highest to lowest urgency for action:

Category 3 (high human health risk) - Bat that is known or reasonably suspected to have had potentially infectious contact with a human (e.g. has bitten or scratched a person). Within Category 3, bats with clinical signs suggestive of ABLV are of highest risk.

Category 2 (high animal health risk, medium human health risk) - Bats that potentially pose a risk of infection to humans due to either:
- history or clinical signs suggestive of ABLV without a history of a potentially infectious contact with a human (Category 2a), or
- history of known or suspected contact with another animal (other animal potentially exposed to ABLV via bat) (Category 2b).

Category 1 (low risk) - Bat that is neither Category 2 nor Category 3 — that is, bat that has no history of known or suspected contact with another animal or person and for which the index of suspicion for ABLV infection is low (e.g. no clinical signs consistent with ABLV).

3.3 Handling live bats
The behaviour or appearance of a bat is not a reliable guide to whether it is infected and all bats should be treated as potentially infectious.

Only appropriately vaccinated and trained people should handle bats. Members of the public should be advised to contact a wildlife care agency such as WIRES who have trained bat handlers.

The following precautions should be taken when handling live bats:
- avoid or minimize bat handling where possible
- wear appropriate protective clothing, long sleeves, long pants, shoes and double gloves (e.g. nitrile rubber which is puncture resistant)
- prevent mucous membrane exposure (eyes/mouth) by a face mask and safety glasses or a face shield
- take all reasonable steps to avoid being bitten or scratched.

3.4 Handling dead bats
Saliva or neural tissue from dead bats is potentially infectious and contact with dead bats should be minimal. If handling is necessary use a shovel or garden fork to move the body. Puncture resistant gloves should be worn if touching the bat. If the bat is to be tested, place the body in a leak-proof bag and seal and then place in another labelled bag and store it in the refrigerator (not freezer). If testing is not required dispose of the body by burial or incineration.

4. Management of suspected animal or human ABLV interactions
NSW DPI takes a precautionary approach to potential ABLV exposures, this assumes that ABLV can be transmitted to in-contact animals during close contact and that an exposed animal may develop clinical illness and constitutes an ongoing transmission risk.
A potential exposure occurs when an animal or human has broken skin (puncture/abrasion) or mucous membrane contact with a suspect or confirmed ABL infected animal or its saliva or neural tissue. If there is any doubt that potential human exposure has occurred it should be assumed that contact has occurred unless it can be categorically ruled out.

NSW DPI will cover the costs of transport and testing of samples ABLV disease investigations under the notifiable disease testing program for category 2 and 3 interactions.

4.1 Category 3 (high human health risk) interaction with bat

For all inquiries where the level of human exposure is assessed as category 3, the inquirer must be advised to contact their medical practitioner and/or NSW Public Health Unit. Where the suspect bat has shown clinical signs suggestive of ABLV immediate action is required.

In addition the person taking the enquiry should obtain contact details from the enquirer and advise the local NSW Public Health Unit of the incident.

If skin or mucous membrane contact has occurred the following first aid advice should be given in the first instance until medical assistance is initiated:

- wash any wounds with soap and water for five minutes
- after washing, apply an antiseptic with virucidal action, such as povidine-iodine, iodine tincture, or aqueous iodine solution
- if saliva enters the eyes, nose or mouth the area should be flushed thoroughly with water
- if available isolate the bat for testing.
- If the suspect bat is available steps to submit the bat for ABLV testing should be initiated.
- If the bat is alive it will need to be euthanased. See above for information on handling bats.
- If the bat is not made available for testing, regulatory action to secure the bat is not undertaken unless requested by NSW Health.

4.2 Category 2 bat interactions

These exposures should also be investigated and testing of the bat undertaken because of the potential risk of direct or indirect human exposure.

If the bat is not made available for testing, regulatory action to secure the bat is not undertaken unless requested by NSW Health.

Any bat that has shown clinical signs indicative of ABLV infection needs to be handled with extreme caution as discussed above.

4.3 Category 1 interactions (low risk)

Where the bat is alive but there are no clinical signs and no history of an animal or human interaction with the bat recommend that the bat, be handled by someone who is vaccinated and trained in bat handling such as a registered wildlife carer in order not to exacerbate any risky interactions. Be aware that bats are often injured because of impaired mobility or ability to respond to danger, and ABLV may be the underlying cause. Therefore all such bats should be treated with caution.

Where the bat is just found dead and no history is available it should be disposed of, ideally by incineration or deep burial, without direct handling, e.g. using a shovel or rubber gloves and a plastic container or strong plastic bag.

Laboratory testing for ABLV is not required for category 1 interactions. Bats can be tested but will be at submitter expense unless alternate program funding is identified.

4.4 Domestic animals with neurological signs/behaviour changes and possible exposure to a bat within the last two years

Any such domestic animal should be treated with caution. Advise the owner that the animal should be isolated from people and other animals until it has had a clinical examination by a veterinarian who is aware of the full history.
A risk assessment must be conducted as to the likelihood that the animal has ABLV, and the risk it poses to other animals and humans. If the risk is assessed as high or medium, particularly if the animal has a classic rabies presentation, then the animal should be humanely euthanased in a manner that poses minimal risk to personnel. For companion animals the whole animal should be submitted intact to the State Veterinary Diagnostic Laboratory for ABLV testing.

For horses or other livestock suspected of being ABLV infected, collection of appropriate samples may be undertaken in the field if safety precautions are adhered to and if Hendra virus infection has been excluded.

For other cases where no other cause of the neurological signs is apparent after clinical and laboratory investigation, then euthanasia and submission of samples for testing is also recommended.

As ABLV infection is notifiable any suspicion of ABLV infection must be reported.

In situations where euthanasia is not carried out on a non-bat species that is suspected of being ABLV infected based on the clinical history, an authorised officer will give a biosecurity direction to the owner or person in charge of the suspect animal to isolate the animal from other animals, pending further decisions regarding the management of the animal.

If a written risk assessment by a government veterinarian concludes that the animal presents a significant risk to people or other animals and the owner is not prepared to have the animal euthanased voluntarily a further biosecurity directive may be used to seize the animal.

Subsequent management of the animal including possible euthanasia under section 136 of the Act will be determined by the NSW DPI Chief Veterinary Officer (CVO) who will take into account the written risk assessment and the on-going welfare of the animal as well as the resource implications involved.

Any person who has had potential exposure to an animal suspected of being ABLV infected should be referred immediately to their local NSW Public Health Unit or general practitioner for assessment. The District Veterinarian or NSW DPI veterinarian must also notify the local NSW Public Health Unit.

5. Sampling Australian bat lyssavirus suspect animals

Advice on samples to collect for ABLV testing and packaging arrangements for transport can be found on the State Veterinary Diagnostic Laboratory ABLV webpage.

Suspect bats are usually submitted whole. Often suspect bats if dead may be found partially dismembered but residual nervous tissue can still be tested. For larger animals such as dogs or cats submission of the entire head is adequate, while for suspect large animals debulking of the head or submission of the brain may be necessary to fit into transport containers. Tissues should be chilled and not frozen.

Infected bats may show aggression and actively seek contact. This has been documented in two of the human cases. Live bats will need to be euthanased before they can be submitted for laboratory testing.

ABLV is a serious zoonotic pathogen so extreme care should be taken when collecting samples. The work instruction, ‘Correct use of PPE for infectious animal disease investigations’, should be consulted.

Live animal tests for ABLV diagnosis have low sensitivity and only useful if positive. A negative result does not mean the animal is not infected with ABLV.

Samples should be triple-bagged and a note inserted outside the bags but inside the esky indicating that suspect ABLV submission is enclosed. The samples should be submitted chilled with adequate ice bricks for the transport period. The laboratory will also need to be advised that ABLV suspect samples are being submitted.

6. Advice to owners of exposed animals following laboratory testing of bats

6.1 Bat tests positive

The owner must be advised that the contact animal has a low risk of developing ABLV infection but if it did it could potentially then also transmit the infection to humans or other animals.
Advice to the animal owner should include the following options.

6.1.1 Vaccination
Rabies vaccination of the at-risk animal as soon as possible after the contact with the bat should mitigate the risks of clinical ABLV infection. An application needs to be made to the NSW DPI CVO by the veterinarian administering the vaccine to access and use rabies vaccine.

6.1.2 Euthanasia
To avoid any further risk of humans contracting ABLV infection from a suspect animal, the owner has the option of authorising euthanasia of the animal (especially in those cases where it can be established that physical contact between the animal and the bat definitely occurred).

6.1.3 Health monitoring
In this option the animal should be kept under observation for at least two years for any changes in behaviour or signs of ill-health (due to the possible long incubation period). If these are seen they should be immediately reported to NSW DPI. The owner needs to also understand that observing the animal does not reduce the potential exposure risk and if clinical signs suggesting ABLV disease are reported, it is likely to be recommended that the animal be euthanased and samples taken for ABLV testing.

Testing for ABLV antibodies in animals thought to be exposed is of limited value as antibodies to natural infection appear after the onset of clinical signs.

6.2 Bat not available for testing
The owner must be advised that the in contact animal has a very low risk of developing ABLV infection but if it did it could potentially then also transmit the infection to humans or other animals.

The options for managing this scenario include the ones listed above. An additional option where the suspect bat is alive and not showing any clinical signs of ABLV infection but is not available for euthanasia and testing is to monitor the health status of the isolated bat for 10 days. The purpose of the monitoring is not to determine if it is ABLV infected but whether it was likely to be infectious at the time of the animal interaction. A bat free of clinical signs 10 days after an interaction is unlikely to have been infectious at the time of interaction.

6.3 Bat tests negative
No Further action required
It is important for a negative result particularly for category 3 interactions, that there is a very high level of confidence that the bat sent for testing is the same bat which had a human or animal interaction. This should be emphasised in communication with submitters.

7. Vaccination of animals

7.1 Pre-exposure vaccination
Pre-exposure vaccination is undertaken for animals moving overseas where they may be exposed to rabies or other lyssaviruses. A wider use of pre-exposure vaccination in Australia may be considered if ABLV infection is detected more frequently in non-bat species or the risks of exposure for susceptible species increases. Clinical ABLV infection was detected in two yearling horses in Queensland in 2013 and overseas closely related lyssaviruses have occasionally caused clinical disease in a wide range of wild and domesticated species. The occurrence of sporadic ABLV infection in additional susceptible species in the future cannot be discounted.

The use of rabies vaccine in animals moving overseas is coordinated by the Commonwealth Department of Agriculture and Water resources (DAWR). For many countries rabies vaccination of companion animals is an entry requirement. Contact DAWR for details on pre-exposure rabies vaccination for animals being exported from Australia.

7.2 Post Exposure
There is no vaccine specifically against ABLV. However, because ABLV is closely related to rabies virus, inactivated rabies vaccines are expected to provide a high degree of cross-protection against ABLV.

To provide the best chance of protection the vaccine must be given well before the appearance of clinical signs. Protective immunity is normally in place by 21 days after the second vaccination but caution should be used in contact with the animals until 60 days have passed.

An ‘emergency’ permit is in place for use of inactivated rabies vaccine during an ABLV incident, subject to NSW DPI CVO authorisation on a case by case basis. A form “Application for authorisation to use rabies vaccine” for treatment following exposure to ABLV’ is available to registered veterinarians on the NSW DPI website. Animals must be microchipped prior to application. An information sheet detailing the process for using rabies vaccine in animals for ABLV post exposure prophylaxis is also available on the NSW DPI website. (Post exposure vaccination for Australian bat lyssavirus infection) If a vaccinated animal develops clinical signs suggestive of ABLV infection it must be reported to NSW DPI or LLS and investigated by a veterinarian.

Note: all costs associated with post exposure vaccination of domestic mammals, elective euthanasia or ongoing veterinary monitoring of a domestic mammal that has been exposed to a bat will be at the expense of the owner/manager.

8. Liaison with NSW Health

NSW Health must be notified of all cases where human exposure to a suspect or confirmed ABLV infected animal is suspected to have occurred or where any ABLV positive animal (including bats) is confirmed. The local NSW Public Health Unit will be notified by the District Veterinarian while the NSW DPI CVO (or nominee) will notify staff in the Communicable Diseases Branch of the Centre for Health Protection. The location of the incident, date and contact details for involved parties would be information NSW health would need to undertake their own assessments.

9. Reporting

All information regarding incidents of suspected or confirmed ABLV infection are to be recorded in LHMS by the NSW DPI Wildlife Coordinator.

10. Definitions and acronyms

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<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>ABLV</td>
<td>Australian bat lyssavirus</td>
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<tr>
<td>Bats</td>
<td>Fruit eating bats( flying foxes) and insect eating bats(microbats)</td>
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<td>Confirmed Case</td>
<td>A case confirmed in the laboratory using diagnostic tests specific to ABLV, i.e. ABLV confirmed by ABLV-specific nucleic acid or antigen typing tests</td>
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<tr>
<td>CVO</td>
<td>Chief Veterinary Officer of NSW</td>
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<tr>
<td>DAWR</td>
<td>Department of Agriculture and Water Resources</td>
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<tr>
<td>Exposure</td>
<td>Exposure occurs when an animal or human is bitten or scratched by a bat or has mucous membrane or broken skin contact with saliva or neural tissue from a bat</td>
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<td>Incubation period</td>
<td>The time period between virus entry and the onset of clinical signs</td>
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<td>LHMS</td>
<td>Livestock Health Management System</td>
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<td>NSW DPI</td>
<td>NSW Department of Primary Industries</td>
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<td>LLS</td>
<td>Local Land Services</td>
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<tr>
<td>Positive animal</td>
<td>An animal that tests positive for ABLV using the Fluorescent Antibody Test (FAT) on fresh brain smears.</td>
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<tr>
<td>Precautionary principle</td>
<td>The establishment of an obligation, if the level of harm may be high, for action to prevent or minimise such harm even when the absence of scientific certainty makes it difficult to predict the likelihood of harm occurring, or the level of harm should it occur.</td>
</tr>
<tr>
<td>Susceptible animals</td>
<td>Species susceptible to ABLV infection. Bat human and horse cases reported to date but closely related lyssaviruses overseas cause illness in many warm-blooded animals both domestic and wild.</td>
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<tr>
<td>Suspect animal</td>
<td>Any animal (including bats) showing clinical signs that are consistent with infection by ABL, as well as any bat that has bitten/scratched a person or animal.</td>
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11. Documentation

Policy – Prohibited matter – sporadic pests and diseases of animals
Policy - Biosecurity collection, use and disclosure of information
Policy - Records Management (IND-I-177)
Policy - Information Security (IND-I-197)
Policy - Classified Information (IND-I-196)
Policy - Government Information (Public Access) (IND-I-178)
Procedure - Biosecurity collection, use and disclosure of information
Procedure - Reporting notifiable pests and diseases of animals
Procedure - Prohibited matter pests and diseases of animals – investigation and alert phase
Procedure - Personal decontamination kit & use for property visits.

Work Instruction

Correct use of PPE for infectious animal disease investigations

AUSVETPLAN Disease strategy Australian bat lyssavirus - version 3.0 2009
AUSVETPLAN Operational Procedure Manual - Decontamination and Disposal
Application for authorisation to use rabies vaccine
Post exposure vaccination for Australian bat lyssa virus infection
Primefact – Australian bat lyssavirus
Australian bat Lyssavirus guidelines for veterinarians
Australian Bat Lyssavirus information for veterinarians
State Veterinary Diagnostic Laboratory ABLV webpage
ABLV factsheet Wildlife health Australia
Australian Immunisation handbook
NSW Factsheet: Rabies and other Lyssavirus infection

12. Records

Records created as a result of this procedure are stored in the Livestock Health Management System (LHMS).

Records relating to properties placed under biosecurity restrictions must be maintained for at least ten years.

13. Revision history

<table>
<thead>
<tr>
<th>Version</th>
<th>Date issued</th>
<th>Notes</th>
<th>By</th>
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<tbody>
<tr>
<td>1</td>
<td>01/07/2017</td>
<td>New procedure developed from amalgamation and complete revision of old policy and procedure in response to the Biosecurity Act 2015.</td>
<td>Animal Biosecurity and Welfare</td>
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14. Contact

Biosecurity NSW – General Enquires
1800 808 095
biosecurity@dpi.nsw.gov.au