



# Risk Management Proposal

Zoo Asian Elephants

ZOOASELE.SPE

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# 1 Purpose

The purpose of this document is to:

- Show how options for the management of risk organisms have been assessed.
- Provide recommendations for import requirements.

## 2 Background

An application for the development of an IHS for Asian elephants was received from Auckland Zoo in January 2009. Auckland Zoo's application was in response to the need for companionship for their lone zoo elephant. Auckland Zoo also has longer-term plans to develop a breeding elephant herd.

Auckland Zoo identified Sri Lanka as the most appropriate source country for the elephants.

In response to the request, the Ministry for Primary Industries developed a rapid risk assessment (RRA)<sup>1</sup> for the importation of Asian elephants. The RRA was for captive-bred Asian elephants from registered zoological gardens or wildlife parks, from Sri Lanka. Sri Lanka is not free from foot and mouth disease (FMD), and the only option given in the RRA for managing FMD was quarantine in a third-country free from FMD virus. This was the risk mitigation measure proposed by Auckland Zoo, based on the fact that a zoo elephant recently imported into Australia from Thailand had been quarantined for 3 months on the Cocos (Keeling) Islands.

With delays around the Sri Lankan source, and with Australia developing an import standard for elephants, the original risk assessment was extended to include elephants from Australia.

The Import Health Standard for Zoo Asian Elephants from Sri Lanka and Australia was issued on 19 June 2013. This standard included the requirement for quarantine in an FMD-free country for elephants originating from Sri Lanka. Auckland Zoo used the IHS to import an eight-year-old elephant from Sri Lanka in June 2015. Importation was by way of Niue, where the elephant spent 3 months in quarantine.

Auckland Zoo plans to import more elephants to develop their herd, and has been gifted another animal from the Pinnawala elephant orphanage in Sri Lanka. Auckland Zoo requested that the risk from FMD be reassessed.

MPI developed a further risk analysis in January 2015 - Rapid Risk Assessment: Foot and mouth disease virus in Asian elephants (*Elephas maximus*) from Sri Lanka.

This RMP remains unchanged from the 2013 RMP, other than the updated measures for FMD.

## 3 Objective

The objective is to manage to an acceptable level all biosecurity risks posed by the importation of zoo Asian elephants in a way that is consistent with New Zealand's domestic legislation and international obligations.

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<sup>1</sup> Only got to draft, never signed off, not on website, not put out for consultation

## 4 Options assessment

The RRA that was carried out in 2009 began with a list of risk organisms that had been recorded as occurring in elephants. Risk organisms that were not present in Sri Lanka or Australia were excluded from further consideration.

The diseases that were considered as potential hazards are those that could be transmitted by Asian elephants and may infect domestic, feral or wild animals or humans in New Zealand.

The RRA made individual assessments for the following organisms:

- Foot and mouth virus
- Endotheliotropic elephant herpesvirus
- *Trypanosoma evansi*
- *Mycobacterium bovis*, *Mycobacterium tuberculosis*
- *Bacillus anthracis*
- *Leptospira* spp.
- *Salmonella* spp.
- *Babesia* spp.
- *Filaria* spp.
- Bluetongue virus
- Rabies virus
- Internal and external parasites
- Weed seeds

For development of the IHS, risk management measures were recommended for:

- Foot and mouth virus
- *Trypanosoma evansi*
- *Mycobacterium bovis*, *Mycobacterium tuberculosis*
- *Bacillus anthracis*
- Rabies virus
- Internal and external parasites
- Weed seeds

## 5 Considerations for specific requirements for identified risk organisms

### 5.1 Foot and mouth disease virus (FMDV)

- (1) For the purposes of the World Organisation for Animal Health Terrestrial Code (the Code), foot and mouth disease (FMD) is defined as an infection with FMD virus of animals in the suborder Ruminantia and of the family Suidae in the order Artiodactyla, and of *Camelus bactrianus*.
- (2) It is widely recognised that FMD virus mainly affects members of the order Artiodactyla (cloven-hooved mammals). Most species in this order are thought to be susceptible to some degree. Important livestock hosts include cattle, pigs, sheep, goats, water buffalo and yaks. Other susceptible species include ranched or farmed cervids such as reindeer, deer and elk.
- (3) Infection of elephants with FMD virus is considered to be an extremely uncommon event. Elephant experts consider elephants to be rare spillover hosts in which infection occurs only as a result of close contact with infected ruminants. Moreover, there are no reports suggesting that elephants can spread FMD either to other elephants or to other animal species.

- (4) MPI has an existing IHS for zoo antelopes (a species of cloven-hoofed animals), sourced from the FMD-free zone in South Africa. These animals are not required to be tested negative; instead risk mitigation is based on attestations regarding disease freedom in the area.

### 5.1.1 Risk management for FMD virus included in the 2013 IHS

- (1) Although the proponents of the elephant importation were aware that the elephant sanctuary has not had any cases of FMD, it was assumed from the outset that a risk management system would be required for elephants from Sri Lanka similar to that required by the Australian government in their 2004 import conditions for elephants from Thailand. In that situation, elephants had to be subjected to an extended period of quarantine in a special facility built on Coco (Keeling) Islands, and as such the initial proposal put forward by Auckland Zoo was a similar system of third country quarantine on Niue, an island in the South Pacific Ocean.
- (2) The 2013 IHS required elephants imported from Sri Lanka to undergo 3 months quarantine in an FMD-free country prior to import. It is important to note that the decision to require 3 months isolation in Niue was not a product of the RRA that MAF carried out in 2009. Rather it was a condition of the original commodity definition as a result of the proposal being made by the proponent of the import.

### 5.1.2 2015 updated risk analysis from Sri Lanka

- (1) The 2015 updated risk assessment presented several options for risk management of elephants, from a total ban through to strenuous testing and quarantine. To be consistent with import standards that New Zealand has in place for other zoo animals, a total ban on imports is considered unwarranted, and various combinations of diagnostic tests and quarantine measures are available to effectively manage the risk.
- (2) The draft IHS will retain options for elephants to originate from countries free from FMD, or to be tested negative in pre-export isolation (PEI) before undergoing 3 months quarantine in a country free from FMD.
- (3) In addition, an option will be added for elephants to be imported directly into quarantine in New Zealand following PEI in Sri Lanka, based on increased biosecurity measures in the form of testing and quarantine restrictions. The elephants will:
  - a) Be kept in an establishment where FMD has not occurred within a ten-kilometre radius in the 3 months prior to movement to PEI.
  - b) Undergo PEI for 3 months immediately prior to shipment. Biosecurity management of the PEI requirements in Sri Lanka has been greatly increased from the 2013 IHS.
  - c) Be subjected to diagnostic MPI-approved tests for evidence of FMDV infection with negative results at the beginning of PEI, and repeated at the end of that period.
  - d) Be transported from PEI to the place of shipment in a way that ensures no exposure to FMDV.
  - e) On arrival in New Zealand, undergo post-arrival quarantine for 30 days in a transitional facility compliant with the MPI standard 154.02.13 or equivalent.
  - f) Be subjected to MPI-approved diagnostic tests for evidence of FMDV infection with negative results at the beginning and end of the post-arrival quarantine period.

## 5.2 Surra (*Trypanosoma evansi*)

- (1) Surra is a disease affecting many species of animal, mainly horses and camels, and is caused by the protozoan parasite *Trypanosoma evansi*. It is transmitted mechanically by blood sucking flies. Of these, only the stable fly, *Stomoxys calcitrans*, is present in New Zealand. This may be enough to allow the parasite to establish in some areas, although disease has never spread to a temperate climate country.
- (2) *T. evansi* is mentioned briefly in a number of publications as occurring rarely in elephants in Asia. It is very difficult to infect healthy elephants

### 5.2.1 Risk management options for surra from risk assessment

- (1) One or a combination of the following options are available for managing the introduction of *T. evansi* in the commodity:

- a) Elephants could be sourced from premises of origin that have not recorded cases of surra in any resident species.
- b) During PEI, direct examination of the elephants' blood could be carried out using a concentration method recommended by the OIE, with no parasites observed.
- c) As well as direct examination, blood could be tested for antibody by an OIE described method, with negative results, within the 10 days prior to departure.

### 5.2.2 Recommended option

- (1) Animals for import must be from a country free from surra, or in PEI a blood sample taken from each elephant must be examined and found free from *T.evansi*, and tested negative for *T.evansi* using OIE-recommended methods.

## 5.3 Tuberculosis

- (1) Tuberculosis caused by both *Mycobacterium tuberculosis* and *Mycobacterium bovis* occurs in both African and Asian elephants, and the disease is chronic, progressive and debilitating. *Mycobacterium tuberculosis* and *M. bovis* are both present in New Zealand.
- (2) All zoo animals are required to originate from, and be imported into, government registered containment facilities. If a zoo animal infected with TB was imported into New Zealand, they would not come into direct contact with farmed cattle or deer. The likelihood of a possum or other wildlife vector accessing the enclosure, contracting TB, and then infecting cattle or deer outside the zoo is extremely remote.

### 5.3.1 Risk management options for tuberculosis from risk assessment

- (1) One or a combination of the following options are available for managing the introduction of tuberculosis in the commodity:
  - a) Culturing of trunk washings was the preferred test for some time; however, this method has subsequently been found to be relatively insensitive.
  - b) Intradermal (tuberculin) testing is not considered to be accurate in elephants.
  - c) PCR, ELISA tests and an immunoblot have been mentioned in elephant papers but are not available commercially
  - d) Multi-drug anti-tuberculosis treatment regimens over 12-18 months have been recommended, but it is unknown if treatment is curative in elephants.
  - e) The MAPIA (multi-antigen print immunoassay) test is commonly used.
  - f) A lateral flow assay, the Elephant TB STAT-PAK, has completed government licensing procedures in the USA, and is commercially available and included in the US Animal Health Committee guidelines on tuberculosis in elephants.
  - g) Sentinel animals (tuberculin negative calves) in close contact with the elephants while they are in PEI.

### 5.3.2 Recommended option in draft import health standard

- (1) Animals for import must be from a country free from tuberculosis, or tested free. For maximizing sensitivity, the TB STAT-PAK will be used as a screening test, and if positive, the MAPIA test will be used as a confirmatory test. The STAT-Pak test is available as a test kit that can be used inside quarantine, while the MAPIA test is a laboratory-based test.

### 5.3.3 Recommended option in final import health standard

- (1) Since development of the 2009 RRA, risk assessment for tuberculosis in imported zoo animals has been reconsidered. *Mycobacterium tuberculosis* and *M. bovis* are both present in New Zealand, and MPI cannot impose biosecurity measures that are more restrictive than our domestic controls. The importation of zoo animals will not affect New Zealand's biosecurity or overall TB status, so testing requirements are for the importing zoo to decide and arrange with the exporter.

## 5.4 Anthrax (*Bacillus anthracis*)

- (1) Anthrax is a common cause of elephant deaths in Africa, and has also been reported to occur in Asian elephants and cause deaths of elephants in zoos. It is present in Sri Lanka.
- (2) The likelihood of introduction of anthrax in clinically healthy animals is remote.

### 5.4.1 Risk management options for anthrax from risk assessment

- (1) One or a combination of the following options are available for managing the introduction of anthrax in the commodity:
  - a) The incubation period is very short (as little as hours and not more than a few weeks) so PEI could be considered as a risk mitigation measure.
  - b) Although antibiotics may be effective if started early, the course of disease is usually rapid and infections are often fatal.
  - c) Efficient live spore vaccines are available for control of the disease.

### 5.4.2 Recommended option

- (1) The animals must remain clinically healthy during the PEI period. No further measures are required, which is consistent with other current zoo standards.

## 5.5 Rabies

- (1) Rabies is endemic in Sri Lanka, and disease has occasionally been reported in elephants in endemic areas. The consequences of importing an infected elephant would be restricted to the animal itself, as the likelihood of transmission from the infected elephant is low. Nevertheless, in view of the potential risk to handlers if an imported elephant did begin to show early signs of rabies, the risk is considered to be non-negligible.

### 5.5.1 Risk management options for rabies from risk assessment

- (1) The OIE Code recommends, for wild animals from countries considered infected with rabies, that the animals are certified as showing no clinical signs of rabies on the day of shipment, and were kept since birth, or for the 6 months prior to shipment, in an establishment where separation from susceptible animals was maintained, and no case of rabies was reported for at least 12 months prior to shipment.
- (2) As well as these measures, for domestic ruminants, equids, camelids and suids from countries considered infected with rabies, the OIE Code recommends vaccination.
- (3) Hence, one or a combination of the following options are available for managing the introduction of rabies in the commodity:
  - a) Government certification that the animals showed no clinical sign of rabies on the day of shipment, and were kept since birth, or for the 6 months prior to shipment, in an establishment where no case of rabies was reported for at least 12 months prior to shipment.
  - b) Government certification that the animals, for the previous 6 months, had been separated from other animals that are susceptible to rabies.
  - c) Elephants could be vaccinated not less than 6 months and not more than one year prior to shipment in the case of a primary vaccination, which should have been carried out when the animals were at least 3 months old, or not more than one year prior to shipment in the case of a booster vaccination.
  - d) Elephants could be subjected not less than 3 months and not more than 24 months prior to shipment to an antibody test as prescribed in the OIE Terrestrial Manual with a positive result equivalent to at least 0.5 IU/ml.

### 5.5.2 Recommended option

- (1) The elephants are from a rabies-free country, or must be certified free from signs of rabies, and be from a rabies-free establishment that is protected from contact with susceptible animals (such as wildlife). This is consistent with other current zoo standards.
- (2) In addition, an option for vaccination will be included so that elephants can be imported from parks where isolation from wild animals cannot be guaranteed (as is the case for the elephant orphanage that has been identified in Sri Lanka).

## 5.6 Internal parasites

- (1) A range of internal parasites have been reported in elephants, including gastric bots, cestodes, gastro-intestinal nematodes, liver flukes, hydatid cysts etc. None of these are likely to be significant pathogens for elephants or for other animals in zoos. However, there is enough uncertainty in this area to warrant caution, and for that reason the risk is considered to be non-negligible.

### 5.6.1 Risk management options for internal parasites from risk assessment

- (1) One or a combination of the following options are available for managing the introduction of internal parasites in the commodity:
  - a) Elephants could be treated with an endoparasiticide effective against nematodes trematodes, cestodes, and bot-fly larvae 7-10 days prior to entering quarantine.
  - b) Elephants could be treated with an endoparasiticide within 48 hours after entering quarantine.
  - c) The efficacy of the endoparasiticide could be checked 7-14 days after treatment by examining faecal samples from the treated elephants using the faecal floatation concentration/sedimentation method, +/- by examination of a perineal scraping or sticky-tape preparation; and be required to give a zero egg count.
  - d) While being held in quarantine, all soiled bedding and faeces could be removed at least every 10 days.
  - e) Treatments and testing could be repeated on animals that have positive egg counts until they give a zero egg count; the anthelmintic type should be changed as necessary.
  - f) On arrival in third country PEI, the animals could be retreated with an endoparasiticide.
  - g) Within 3 days of export to New Zealand animals could again be treated with an endoparasiticide.

### 5.6.2 Recommended option

- (1) An efficacious treatment for internal parasites must be given on entry to PEI, and repeated again prior to export to New Zealand. This is consistent with other recent zoo standards.

## 5.7 External parasites

- (1) Elephants can be infested with ticks, flies, mites and lice. Only Ixodid (hard bodied) ticks are known to parasitise elephants. Zoo animals in general are not considered a significant pathway for the introduction of exotic ticks, mainly due to small volumes of animals imported, and reduced exposure in captivity – particularly where zoos are not situated within known tick distribution zones. It is considered possible that exotic ticks might be present in small numbers on imported elephants. Exotic ticks are known vectors of other potentially significant zoonotic diseases. Therefore the risk is considered to be non-negligible.
- (2) Infestation with the elephant louse *Haematomyzus elephantis* has been found on Asian elephants in Sri Lanka, but topical or oral treatment with Ivermectin is effective.

### 5.7.1 Risk management options for external parasites from risk assessment

- (1) The following measures could be considered to mitigate the risk of importing exotic external parasites:

- a) Elephants could be treated during the 48 hours immediately prior to entering quarantine with an effective insecticide/acaricide solution applied to the animals by thoroughly wetting the entire animal including under the tail, ears, the axillary region, between the hind legs, and the interdigital spaces (e.g. using a backpack spray unit).
- b) Elephants could be held isolated for 30 days in quarantine premises with impervious washable floor and walls or on a fenced, impervious pad without walls and surrounded by a cleared area free from vegetation. Bedding should not be straw or plant material that could contain tick eggs and larvae. Inert materials such as wood shavings or sterilised peat could be considered suitable. The animals could be fed rations that are inspected and determined to be free from potential contamination with external parasites, especially ticks, tick eggs, larvae or nymphs.
- c) If possible, the elephants would be meticulously inspected for ticks and other ectoparasites, at least 10 days after entering quarantine. If still infested, the treatment could be repeated and animals inspected again at least 10 days later. Treatments and inspections could be repeated until the animals are found to be free from evidence of external parasites. The ectoparasiticide could be altered if the previously used treatment has not been effective.
- d) Elephants could have all the bedding on which they are housed removed every ten days during the quarantine period and, at this time, the walls and floor could be thoroughly cleaned, and sprayed with an acaricide.
- e) Elephants could be treated with an acaricide within the 3 days prior to shipment to the third country PEI.
- f) On arrival in the third country PEI, the elephants would be held in premises with appropriate surfaces for environmental treatment and prevention of ticks escaping (such as a water moat) for 10 days (tick drop off time). This could be repeated on arrival in quarantine in New Zealand if required.

### 5.7.2 Recommended option

- (1) Elephants must be treated with an effective insecticide/acaricide solution on entry to PEI, the PEI environment must be kept free of ticks, and the elephants must be re-treated then examined and certified tick-free before leaving PEI.

## 5.8 Weed seeds

- (1) Risk analysis concludes there is a non-negligible risk of introduction of exotic species on animal hair, within skin folds, or in their faeces.
- (2) Because the animals will be held for a considerable time in a third country quarantine, the risk to New Zealand from weed seeds from Sri Lanka is negligible. Importation of weed seeds from the third country quarantine is possible unless appropriate measures are taken.

### 5.8.1 Risk management options for weed seeds from risk assessment

- (1) The following measures could be considered to mitigate the risk of importing exotic weed seeds:
  - a) The elephants could be thoroughly washed and then inspected for contaminating plant material immediately prior to entering PEI.
  - b) Regular removal of faeces and soiled bedding during PEI would reduce the likelihood that weed seeds will be present in faeces that could contaminate the animals' body surfaces.
  - c) On arrival in New Zealand, the animals could be held in quarantine for a suitable period on impervious flooring, and all faecal material collected daily for incineration using a licensed destruction plant while in post-arrival quarantine.

### 5.8.2 Recommended option

- (1) Feed and bedding material in PEI must be free from evidence of weeds and weed seeds. Prior to departure to New Zealand the animals must be certified as free from visible contamination with plant material. On arrival in New Zealand the animals must be held in an isolation facility for a period of 1 week, during which time all dung is collected and destroyed. These measures are consistent with other zoo and livestock import standard.