Translocation of Animals and Health Screening to Prevent Disease

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Disease may occasionally play a primary role in population declines. Canine distemper is a viral disease that causes meningitis, dehydration and death in African wild dogs and has decimated their numbers (Vucetich & Creel 1999; Bildt et al. 2002). Another example is the widespread amphibian declines due to the fungal disease chytridomycosis (Hero 1997).

However, disease is more commonly a threatening process to an already critical population. A recent example of this is the outbreak of the viral disease in the wild population of the endangered cape parrots in South Africa. This disease evolved in Australian parrots where it exists at a low prevalence in wild populations. It is believed that movement of captive Australian parrots into South Africa has transferred the disease and it has now entered the wild population of cape parrots. The cape parrots were already threatened by habitat loss and poaching. Similarly, another viral disease is affecting marine turtles throughout the world. Fibropapillomatosis appears as warty growths on marine turtles skin and internally, leading to a slow wasting death (Adnyana et al. 1997).

Habitat management may influence the incidence of disease in wild populations by changing animals' behaviour and environmental conditions to suit potential pathogens. Hihi on Mokoia island suffer high mortality rates, and the most likely explanation was a high prevalence of *Aspergillus fumigatus* on the island. Perrott (2001) found evidence that *A. fumigatus* was encouraged by disturbance and habitat modification, suggesting the history of human activity on Mokoia (intensive clearing and agriculture) has made Mokoia unsuitable for hihi due to disease risk. There may also be potential for humans to deliberately manage habitats to reduce levels of pathogens affecting wildlife species.

One type of habitat management designed to reduce disease risk is biosecurity. Biosecurity considerations are particularly important with translocations (including re-introductions and supplementation) of animals from other areas or captive stocks. There is a potential to introduce a disease to a new area, or to introduce a variant of a disease not encountered before, which can result in catastrophic outbreaks of disease. The use of quarantine principles and health screening can reduce the risks associated with the movements of these animals but there are limitations to the testing that can currently be done. Therefore, the goal of health screening in translocation of animals is risk management rather than zero risk policies.

General biosecurity principles used in disease outbreaks and to reduce disease risks include surveillance and diagnosis of wildlife deaths; isolating the ecosystem or animals affected where possible; quarantine for translocations and introductions including disease screening; and visitor restrictions in outbreak situations (people, animals). However the movements of people and wild animals can make true isolation logistically impossible.

Notable historical translocations of wildlife in New Zealand

1. Kiore (Polynesian rat) introduced by Maori in ~10th Century
2. Possums introduced from Tasmania in 1800's for fur trade

Notable early translocations for conservation in NZ

Kakapo Richard Henry (1890s) moved 700 Kakapo to Resolution Island, Dusky Sound - 10 years after mustelids introduced. Mustelids invaded these areas soon afterwards

Black robins
7 birds to Little Mangere Island
Takahe
4 island populations established as reserves/safeguards

Brown teal
~1600 birds raised (supported by Ducks Unlimited) and released with extremely poor survival rates (predators)

Current translocations in New Zealand

Approximately 30 DOC approved translocation projects each year. (eg. Operation Nest Egg for kiwi and blue duck) with two main indications:

1. Conservation of threatened species
2. Restoration of biodiversity after habitat rehabilitation

Disease risks associated with the translocation of animals

- Introduction of a new infectious organism from the source population to a new area and naïve population
- Exposure of naïve/stressed translocated animals to a new pathogenic organism in the destination environment
- Expression of latent disease or diseases of captivity (not necessarily infectious) during the stress of quarantine and translocation
- Zoonotic diseases

Introduction of a new infectious organism from the source population

Potentially most serious consequence of a translocation
Examples
Conquistadors and Aztecs (pox and influenza)
South African parrots (Psittacine circovirus from captive parrots)
Hawaiian forest birds (malaria and pox)
African wild dogs (canine distemper)

Exposure of naïve/stressed translocated animals to a new pathogenic organism in the destination environment

Risk is the failure of the translocation or potential spread or persistence of disease in new host

Examples
- Koalas in Australia (tick paralysis 25/50 dead)
- Brush tailed possums in NZ (tuberculosis)
- Black rhinos in Kenya (trypanosomiasis)

Expression of latent disease or diseases of captivity during translocation

Risks of failure of translocated animals
- Aspergillosis (waterfowl, kiwi, hihi)
- Parasitism (internal and external)
- Increased shedding of disease organisms, quarantine infections, development of new strains
- Coccidiosis in kiwi, hihi and saddleback

Zoonotic disease

Immediate risk to translocation staff
- Chlamydiosis (parrots and pigeons)
- Salmonellosis (all animals)
- Tuberculosis
- Rabies (overseas)

Public health risk (rare)
- West Nile Virus (overseas)
- Avian Influenza (overseas)

Minimising the disease risk

Biosecurity measures
Quarantine
Hygiene
Health (disease) screening
- Source populations
- Translocated animals
- Destination populations

Disease Surveillance
- Pre and post release
- Post mortem

Disease surveys

Constraints on risk management

Financial
Knowledge
- diseases/normal microflora of native species
- captive husbandry of many native species

Logistical
- wild animals in captivity
- remote locations
- life history constraints

Compromises commonly made

Reduced biosecurity (little or no quarantine)
Minimal testing
Minimal or zero surveillance of source and destination environments
Minimal follow up of released animals

How is NZWHC involved?

Disease surveillance
DOC threatened species diagnostic contract
Ongoing surveillance research projects
Bycatch studies of marine mammals
Health screening
    design of translocation health protocols
    diagnostic testing (pathology, microbiology and parasitology)
Field work

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