

Island arks: the need for an Australian national island biosecurity initiative

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Threats to island biotas from non-indigenous species have been extensively documented and remain among the most powerful drivers of biotic extinction. Despite this, Australia does not have a national, comprehensive plan of action for island biosecurity. Recent initiatives by Australian governments could provide the basis for the first systematic and comprehensive approach to securing the future of Australia's continental and oceanic islands. A National Island Biosecurity Initiative would lay the foundations for effective island biosecurity. It would protect globally significant populations of migratory species and play a major role in preventing the extinction of hundreds of threatened species and ecosystems.

Australian islands need a more comprehensive and strategic biosecurity regime. This is evidenced by ongoing expensive efforts to control non-indigenous species on islands in Australia and the progressive loss of native species on those islands. Most islands have not suffered the same range of disturbances as has mainland Australia. However, for some islands, the arrival of non-indigenous species because of the lack of quarantine has led to extinctions (e.g. Burbidge & Manly 2002), the most recent example of which is the loss of the Christmas Island Pipistrelle (*Pipistrellus murrayi*) in 2009. However, these islands are a minority; many Australian islands are largely in a natural condition, and effective biosecurity will be critical if they are to remain so.

Biosecurity is defined by the 'Beale report' (Commonwealth of Australia 2008) as 'the protection of the economy, environment and human health from the negative impacts associated with entry, establishment or spread of exotic pests (including weeds) and diseases'. We propose that implementation of this report's recommendations should include a new and comprehensive strategic framework specifically for island biosecurity. This would be based on an assessment of island biodiversity values and a risk assessment approach. Furthermore, the use of systematic conservation planning (e.g. Pressey & Bottrill 2009) would provide a more rigorous and transparent basis for allocating resources efficiently to different strategies.

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The importance of maintaining the natural condition of Australian islands is underlined by their unique biodiversity values. Oceanic islands are home to many endemic species. Both oceanic and continental islands provide the sole or major breeding and roosting habitats for many species of seabirds, marine mammals and reptiles. Continental islands are also refugia for species that have disappeared or declined on the mainland. Most of Australia's breeding seabirds nest only on islands. Of those nesting on both islands and mainland beaches, island populations fare best (e.g. Fairy Tern (*Sterna nereis*), BirdLife International 2010). The situation is similar for sea turtles: mainland rookeries are subjected to human disturbance and nest predation by pigs, dogs and foxes. 'Marooning', or translocating mainland species at high risk to islands, is becoming more important, the latest example being Gilbert's Potoroo (*Potorous gilbertii*) to Bald Island (WA DEC 2010).

Oceanic islands have been particularly impacted by invasive non-indigenous species. Christmas Island now has at least 175 species of exotic plants and 100 species of exotic animals (Beeton *et al.* 2010). Four of its five native and endemic mammals are extinct and the other is in decline. Macquarie Island's seabirds are threatened by rats, rabbits and mice, and the current eradication project will cost at least \$25 million (Bergstrom *et al.* 2009). On Lord Howe Island, five species of birds and at least 13 species of invertebrates are already extinct because of rats and mice, and the estimated cost of eradicating them is \$8 million (Lord Howe Island Board 2009). Even remote, sub-Antarctic Heard Island has four non-indigenous terrestrial species (Commonwealth of Australia 2005).

Eradication of non-indigenous species from islands is possible. Six species – black rat (*Rattus rattus*), house mouse (*Mus musculus*), rabbit (*Oryctolagus cuniculus*), red fox (*Vulpes vulpes*), feral cat (*Felis catus*) and goat (*Capra hircus*) – have been eradicated from more than 50 Australian islands, and more eradications are planned (e.g. Burbidge & Morris 2002). But prevention is much better than cure when it comes to invasives on islands. Eradication is invariably expensive and usually only possible where no 'non-target' species will be affected by the eradication technique.

There is more than sufficient justification for the Australian Government to take a leadership role in developing a nationally consistent approach to island biosecurity. Of the 8300 islands in Australia, the vast majority are directly relevant to one or more Matters of National Environmental Significance under the *Environment Protection and Biodiversity Conservation Act 1999*. A search of the Department of Environment, Heritage and the Arts SPRAT database with the term 'island' revealed at least 90 listed threatened species (excluding extinct species). Numerous islands are also either within Australian World Heritage Properties, a

Commonwealth Territory, or are wholly or partly covered by a Commonwealth protected area. Many islands are also important to matters covered by the EPBC Act including nationally threatened species and ecological communities, migratory species and marine species, Threat Abatement Plans and Recovery Plans. Many islands contain critical habitats for one or more species listed under various international agreements to which Australia is a signatory.

Our proposal for a National Island Biosecurity Initiative involves the following factors:

1. Establishing biosecurity priorities for all islands based on each island's ecological values and risk assessment, including estimates of the economic costs of eradicating likely invasive species; and,
2. Development of regional biosecurity management systems for all islands while ensuring that high priority/risk islands have individual biosecurity management systems. All biodiversity systems should include the following:
 - Prevention of incursions through quarantine and establishment of procedures to control importation of species for domestic and agricultural purposes.
 - Regular surveillance of high- and medium-priority islands, and occasional surveillance of lower-priority islands.
 - Best-practice approaches (developed and/or modified from existing resources) and appropriate training provided for island managers.
 - Response capability (including the ready availability of equipment and expertise).
 - A range of tailored education programs targeted at island dwellers and visitors.

For the highest-priority islands, island-specific biosecurity plans would include regular monitoring, early detection of non-indigenous species and rapid response capacity, located on the islands where appropriate. For lower-priority islands, a minimum requirement would be generic biosecurity plans including a rapid response capacity in the region.

The basis of this strategic and cost-effective approach is the measurement of ecological values and potential risks for as many Australian islands as possible via the development of a national islands database. With this database, systematic priority rankings could be established based on natural values, potential risks from invasive species, and the costs and feasibility of alternative management actions. This approach would facilitate the establishment of a biosecurity framework for islands within each level of priority. These frameworks could then be refined to suit the particular circumstances on each island.

The Australian Government began the process of identifying and prioritising the biodiversity values of islands in 2005. Some states, for example Victoria (Johnston 2008), have also published their inventories of invasive species on islands. Summaries of

inventories for other states are available via the DEWHA website. A priority listing has been made of the 100 highest-rated islands adversely impacted by vertebrate invasive species, or at high risk of invasion from vertebrate invasives (Ecosure 2009). This preliminary assessment could form the basis of a comprehensive island biodiversity database.

The full proposal for the National Island Biosecurity Initiative is available from the Island Arks web-site (<http://www.islandarks.com.au/>). Comments or suggestions about the concept and suggestions for additional proposals to address conservation and sustainable use on Australian islands are welcome.

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