



Murdoch
UNIVERSITY

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in the School of
**VETERINARY & LIFE
SCIENCES**

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Biosecurity and invasive animal research

Murdoch University prides itself on its fundamental and applied research, as demonstrated by our work in biosecurity and invasive animals. Our researchers work across terrestrial and aquatic systems directly with industry and community partners.

Murdoch biosecurity and invasive animal research has international outreach. We are developing innovative tools that have broad application (e.g. innovative monitoring technology, aversion training methods) to address issues of national importance (e.g. management of urban invasive species, canid control methods). We also use WA case studies to illustrate issues that are problematic across the country and overseas, e.g. feral ungulates (such as pigs and deer), weeds, total grazing pressure, invasive fish, and community engagement.

Our core areas of biosecurity and invasive animal research include:

1. Developing innovative surveillance and monitoring techniques for invasive species and introduced species (both terrestrial and marine) based on molecular methods, statistical and economic theory.
2. Investigating alternative control/eradication methods for invasive species in terrestrial (agriculture and environment) and aquatic systems, for both protection of ecosystems and to ensure market access.

3. Understanding the biology of invasive species in ecosystems, forestry, fisheries and agriculture.
4. Advancing the understanding and mitigating impacts of introduced ungulates and top-predators.
5. Enhancing engagement with community and industry.

Biosecurity and invasive species management are also important for agriculture. Pest control and biosecurity are important to ensure market access and therefore trade. Wild dogs, feral pigs, and invasive birds such as rainbow lorikeets and starlings threaten the livelihoods of many Australian farmers. Identifying control tools and helping to monitor the spread of such species are therefore important ways that we can contribute to food production in Australia.



Predators

Australia, an island continent with a long history of isolation, stands out in terms of global evolutionary distinctiveness. Australian flora and fauna are marked by extremely high endemism and uniqueness. The red fox and feral cat have significantly impacted on Australian fauna and are believed to have contributed to the extinction of more than 25 Australian mammal species. These two predators are recognised as the greatest threat to many extant Australian species.





Wildlife monitoring cameras allow us to capture behaviour of invasive species and native wildlife, such as this.



Examples of our biosecurity and invasive animal research:

Investigating alternative control methods

Murdoch researchers are combining behavioural and ecological approaches to determine how wild canids respond to baiting and other control methods. Understanding their biology and behaviour will help us improve efficacy and target specificity of broad-scale ground baiting programs.

Feral fish control

Murdoch researchers are actively involved with State and local government agencies in the control of introduced fishes in WA. Feral fish can have devastating and unexpected impacts on native aquatic animals and their habitats. The number of introduced freshwater fishes in WA has increased markedly over the past two decades such as the Pearl Cichlid, which has now spread into the Swan and Canning River systems. A number of introduced parasites and diseases have recently been found in WA as a result of introduced fishes. Understanding the threats posed by these new species and prioritisation of populations for control is crucial for mitigating their impacts.

Developing innovative monitoring techniques

We are actively investigating new ecological monitoring techniques across a range of terrestrial and aquatic systems. For example, we are using genetic tools to screen for invasive fish species, and are testing and validating the use of infrared sensing technology for monitoring terrestrial species.



Molecular tools

Our innovative approaches identifying the illegal movement of restricted feral pests, connectivity of populations (and therefore control cells), and understanding population explosions have influenced management by both conservation and agriculture agencies. Our world-first molecular approaches to understanding pest species population dynamics have been adopted in Europe and the USA.

Invasive species in urban areas

Foxes and cats represent a substantial threat to urban biodiversity as well as posing a significant biosecurity issue. Understanding how these animals use the urban landscape (e.g. corridors that allow access and location of den sites) and the efficacy of collar-mounted hunting deterrents (e.g. bibs and bells) are important ways that we can decrease their impacts.

Community engagement

Human decision making and behaviour is driven by a complex suite of social and psychological constructs. This is a particular challenge for scientists working with invasive species and trying to engage with communities. Any chance of success in managing invasive species will be dependent on community cooperation and

Working with community members through developing control measures such as baiting protocols (above) or methods to control domestic cat predation (below).

high participation rates in key initiatives. Our researchers have been investigating how people perceive invasive species and identify how their actions can improve biosecurity outcomes. Educating future generations on the impacts of invasive species is also our focus through our participation in the Scientists in Schools (CSIRO) program.

Industry engagement

We maintain strong links to industry, other Australian and international universities, Government agencies and NGOs to ensure translation and application of our research in the real world. For example, our research has close linkages with the Department of Primary Industries and Regional Development (DPIRD), Department of Biodiversity, Conservation and Attractions (DBCA) as well as relevant industry bodies (e.g. Meat and Livestock Australia) and multinational companies such as Chevron. We welcome new industry partners. ■

More information

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If you are interested in our research and would like to know more, then please contact us on vlsresearch@murdoch.edu.au
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