FROM LAB TO LANDSCAPE

Transforming Australia's approach to invasive animals through coordinated mission-driven innovation

Invasive Species Council

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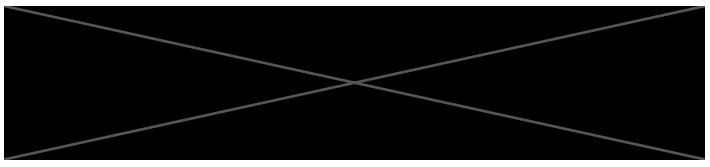

The challenge

Invasive vertebrates are the biggest driver of animal extinctions in Australia and imperil more than 500 threatened species while causing massive landscape degradation. Despite some successes – particularly island eradications and fenced havens – most threats remain highly potent. Current management efforts are often fragmented, thinly spread, under-funded, short term and ineffective.

Evidence from island eradications proves wildlife rebounds dramatically when invasive threats are controlled. Australia has the scientific talent and resources—what's missing is the coordinated, sustained effort to move innovations from concept to continent-wide impact.

Innovation failure

Australia's struggle isn't due to lack of scientific talent or dedication – it's more a systemic failure to move innovations from lab to landscape. Promising ideas languish and projects routinely stall due to short-term funding, bureaucratic entanglement, and absence of end-to-end support systems.

Mission-driven innovation

Drawing inspiration from COVID-19 vaccine development and New Zealand's Predator Free 2050, the Invasive Species Council proposes a transformative approach: **coalesce effort around 2-3 inspiring, high-impact challenges** rather than pursuing scattered incremental improvements.

Mission enablers

- **$40 million pooled innovation fund**: Joint government-philanthropic funding for an ambitious focus on mission/question-driven challenges (not traditional grants).
- **Multi-sectoral taskforce**: A collaboration spanning philanthropic, government, NGO, research and innovation sectors to select missions, manage innovation portfolios from concept to adoption, sustain momentum across political cycles and cut through bureaucratic barriers

Possibly priority mission challenges

Challenge 1: Can we restore eastern quolls to mainland Australia beyond the fence? Restore quolls beyond fenced reserves by innovations to suppress or deter invasive predators. Success would benefit native mammals in the critical 35 g to 5.5 kg weight range—the most extinction-prone group.

Challenge 2: Can we stop the northern and western spread of deer across Australia? Halt the continental expansion of feral deer through large-scale ungulate control breakthroughs and coordinated effort. Prevent deer being permanently established in biodiversity hotspots like south-west WA, the Kimberley, Kakadu, Wet Tropics etc.

Innovation ecosystem approach

Success requires cultivating an entire innovation ecosystem through:

- **Invasive species hackathons**, challenges and innovation prizes
- **End-to-end support** from research through production to adoption
- **Integrated solutions** recognising no single ‘silver bullet’ exists
- **Radical collaboration** embracing best ideas regardless of origin

Expected impact

This concentrated effort would demonstrate Australia's capacity for ambitious environmental problem-solving, create exportable technologies, build a ‘can-do’ conservation culture, and establish a replicable model for tackling other critical environmental challenges.

1. Australia’s extinction crisis

Invasive vertebrates have been the biggest driver of animal extinctions in Australia – wiping out more than 40 native species and seriously threatening more than 600 others. They are also a massive driver of landscape degradation.

When invasive vertebrates are eradicated or suppressed, wildlife rebounds. The removal of rodents from Macquarie Island led to a dramatic resurgence of burrow-nesting seabirds.

While there have been some successes – particularly eradications from islands and biocontrol for rabbits – most invasive vertebrate threats remain highly potent. Some are getting worse. Current management efforts are often thinly spread, ineffective or unstrategic.

To achieve a wildlife revival on mainland Australia will require new ways to overcome invasive threats.

2. The innovation gap

Australia’s failure to overcome invasive threats is not due to a lack of dedication or scientific talent. Innovation is frequently entangled in bureaucracy or remains siloed, preventing the sharing of crucial tools and techniques.

Fragmented short-term funding leads to failure and waste. Projects frequently stall after a proof-of-concept stage, unable to secure the long-term investment needed to move from a promising idea to a field-tested solution.

The success of COVID-19 vaccine programs provides a stark contrast. The rapid development of vaccines was only one part of the mission. The other, equally crucial part was the ability to address the ‘last mile’ challenges of mass production, resilient supply chains, and effective deployment. This involved navigating complex logistical, economic, sociocultural and policy dimensions.

For conservation, success is not merely inventing a new bait or trap but also shepherding that innovation through field-testing, regulatory approval, production and widespread adoption.

We must cultivate an entire ecosystem for innovations, ensuring that great ideas are brought to fruition and scaled from the lab to the landscape.

3. The solution: mission-driven innovation

We've seen the power of focused, long-term, and collaborative efforts in projects such as the rapid development of COVID-19 vaccines and New Zealand's ambitious Predator-Free 2050 goal. By coalescing effort around a few inspiring, high-impact challenges, Australia can transition from a reactive, piecemeal approach to a ‘can-do’ culture of problem-solving ambition for conservation.

Innovations here and there—a new bait, a new device—are not enough. We must go all in to tackle 2 to 3 big invasive challenges, demonstrate success at scale and build on this work to fuel the next success.

We propose two key pillars to achieve this:

1. **Establish a national multi-sectoral taskforce:** No single entity or sector can solve complex challenges alone. The effort should be collectively owned by collaborators from philanthropic, government, non-government and research sectors. Comprising movers and shakers from all sectors, this task force would build support and cut through traditional bureaucratic and political barriers, with responsibilities including:
    - **Mission selection:** Applying a rigorous, auditable framework to select the most impactful and inspiring missions.

- **Portfolio management:** Overseeing a portfolio of innovation projects, ensuring they are progressing from research to field testing and adoption.
- **Long-term governance:** Sustaining momentum and legitimacy in a changing political and economic environment.
- **Innovation adoption and diffusion:** Actively shepherding solutions through the entire innovation cycle, from concept to commercialisation and widespread adoption.

2. **Create a pooled fund:** We propose a minimum **$40 million Invasive Species Innovation Fund**, with pooled funding from governments and philanthropists. Not a traditional grant program, it would be designed to **coalesce effort around inspiring mission-driven challenges**. Pooling funds reduces administrative burden and shares risk, encouraging investment in ambitious, high-impact projects.

4. Success principles

Our model is built on key lessons learned from decades of conservation efforts and an understanding of the innovation cycle:

- **Elicit ideas from all corners**: One core of this model is inspiring breakthroughs by a series of hackathons, innovation sprints, prizes and challenges.
- **Beyond the 'silver bullet':** While we seek breakthroughs, we recognise that most threats require a suite of integrated solutions. The fund would foster diverse solutions that can work together for greater impact.
- **The critical 'last mile':** Good ideas are not enough. Many promising projects in Australia fail to move beyond proof of concept due to a lack of support for deployment and adoption. This fund would support the transition of winning ideas into real-world applications.
- **Long-term investment is essential:** Episodic, short-term funding leads to failure and wasted effort. A 10-year timeframe provides stability and time necessary for true innovation to flourish.
- **Focus is key:** Trying to fix too many problems at once dilutes effort. Committing to a realistic number of priority challenges will ensure resources are concentrated for maximum effect.
- **Public good funding:** Solving environmental problems often cannot rely on commercial incentives. The fund's public-good focus, leveraging both government and philanthropic investment, ensures solutions are driven by impact, not profit.
- **Radical collaboration:** Innovation is stifled when investment is focused on a single organisation or idea. Our model is multi-sectoral, collaborative and embraces the best ideas no matter the origin.
- **A culture of ambition:** A history of difficult environmental threats has bred a fatalistic lack of ambition in some decision-makers. Achieving successes will build a 'can-do' culture that drives momentum and encourages more success.
- **Pooled funding:** Rather than governments and philanthropy just giving out grants, this is an opportunity to pool resources into a central fund with a common mission.
- **Regulatory fast-tracking:** Bureaucratic processes, including research or regulatory approvals such as through APVMA, can be a major barrier to public good innovation and real world application.

5. Possible priority missions

Here are 2 challenges that are ambitious, inspiring, and have the potential to drive innovations with broad applications:

- **Can we restore eastern quolls to mainland Australia beyond the fence? (Box 1):** This challenge requires innovation in predator control (cats and foxes) and logistics at an unprecedented scale.
- **Can we stop the northern and western spread of deer across Australia? (Box 2):** This requires breakthroughs in large-scale ungulate control and new models for cross-tenure collaboration.

Challenge 1. Can we restore eastern quolls to mainland Australia beyond the fence?

Eastern quolls were once one of south-eastern Australia's most abundant mammals, but their populations crashed around 1900, as foxes spread. They now only survive in the wild in Tasmania.

There is an Eastern Quoll Conservation Coalition, a collaboration between NGOs, zoos and sanctuaries and government agencies, but turbocharging this effort will drive success.

The vision: Thriving populations of eastern quolls able to persist on the Australian mainland beyond fenced sanctuaries.

Broader benefits: Strategies developed to enable easter quoll restoration would benefit other susceptible native mammal species within the critical weight range of 35 grams to 5.5 kilograms.

How to achieve this: We need tools to suppress fox and cat populations below harmful densities or deter them from preying on quolls, coordinated and persistent effort

Innovations worth pursuing to help achieve this include:

- **Conditioned taste aversion:** Teach foxes and cats to avoid specific foods by associating them with unpleasant experiences, thereby reducing their predation on native wildlife.
- **Olfactory misinformation strategies:** Use scent manipulation to alter fox and cat behaviour, deterring them from areas or disrupting hunting and reproductive patterns.
- **Biocontrol with native predators:** Could reintroduction of Tasmanian devils aid native wildlife by deterring invasive foxes and cats?
- **Real-time alert tools:** Develop detection tools, such as camera traps, that alert wildlife managers immediately to the presence of foxes and cats to enable prompt intervention.
- **Automated intervention tools:** Equip real-time detection tools with the ability to automatically deliver interventions once foxes or cats are detected – e.g. delivery of toxin or sounds, smells or visions that alter their behaviour.

Challenge 2. Can we stop the northern and western spread of deer across Australia?

With an estimated population of 1–2 million and a rapidly expanding range, feral deer are one of Australia's most serious environmental and agricultural threats. Without action, deer are predicted to spread across the entire continent – trashing, trampling and polluting sensitive ecosystems, preventing landscape regeneration and increasing costs of environmental planting.

The vision: The National Feral Deer Action Plan has set an ambitious goal to stop the northern and westward spread of feral deer across the entire continent. Prevent deer being permanently established in biodiversity hotspots like south-west WA, the Kimberley, Kakadu and the Wet Tropics.

Broader benefits: Strategies developed to effectively eradicate isolated deer populations and maintain containment boundaries would be applicable to efforts to control deer in other areas, including World and National Heritage locations like the Blue Mountains, Tasmanian Wilderness and Australian Alps.

What we need: We need new tools to eradicate and control deer at scale, particularly in areas of high density, in forests and in urban and peri-urban areas – for example:

- aggregators that lure deer while preventing access by native animals like kangaroos
- drones with thermal imaging allowing for detection in darkness and through dense vegetation, paired with machine learning and AI