



National Environmental Science Program Threatened Species Recovery Hub impacts



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Department of Agriculture, Water and the Environment

GPO Box 858 Canberra ACT 2601

Telephone 1800 900 090

Web awe.gov.au

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Threatened Species Recovery Hub

About this hub

The <u>Threatened Species Recovery Hub</u> is 1 of 6 hubs from the first phase of the <u>National Environmental</u> <u>Science Program</u> (NESP). It conducted research to support the recovery of Australia's 1,814 threatened species and 91 threatened ecological communities. The hub worked closely with more than 250 partners across the country, including government agencies, national parks, conservation groups, Indigenous land managers, farmers and community groups.

NESP funding: \$32.98 million

Host organisation: The University of Queensland

Hub leader: Professor Brendan Wintle

Hub partners: The Australian National University, University of Sydney, University of New South Wales, Charles Darwin University, University of Tasmania, RMIT University, Monash University, University of Melbourne, University of Western Australia, Australian Wildlife Conservancy





Get a snapshot of the hub's work in this 2-minute video.

Key themes

- Preventing extinctions through emergency action
- Improving detection and tracking of how species are doing
- Providing safe havens and bringing species back
- Reducing threats to species and ecosystems to promote recovery
- Supporting Indigenous-led research for threatened and culturally significant species
- Using social and economic opportunities for threatened biodiversity conservation

Find out more about the <u>Threatened Species Recovery</u> <u>Hub's projects</u>.

Preventing extinctions through emergency action

Some recent extinctions in Australia were predicted yet occurred nonetheless because management responses were enacted too slowly, ineffectively, or not at all. To support management agencies, land managers, and environment and community groups to prevent extinctions, the hub has identified plants and animals with a high probability of extinction within the next decade, and the critical management responses required to avert their extinctions.

The hub undertook a wide range of <u>research</u> for species at critical risk of extinction. On Christmas Island, the hub supported Parks Australia in its conservation efforts for the Lister's Gecko and Christmas Island Blue-tailed Skink, which are extinct in the wild. This included <u>investigating and trialling</u> a semi-wild reintroduction of Blue-tailed Skinks on the island and translocations to 2 islands in the Cocos Keeling archipelago.





Find out about the top 22 freshwater fish species at most risk of extinction in this <u>video</u>.

In Tasmania, projects included emergency field trials of innovative recovery actions for 3 highly imperilled species. For <u>Orange-bellied Parrots</u>, several projects were undertaken including interventions to improve reproductive success and ecological burning to increase food abundance. Chicks of <u>Forty-spotted Pardalotes</u> were successfully protected from a deadly parasite by nesting-feathers laced with bird-safe insecticide that parent birds carried back to nests from a dispenser. In the trial, chick survival increased to 95% compared to only 8% in untreated nests.

And for <u>Swift Parrots</u>, the hub's research previously found that in some regions half of nesting females, chicks and eggs were being killed by Sugar Gliders. The hub trialled techniques such as automated solar-powered doors to reduce predation by Sugar Gliders at nest boxes, and provided new information about how to use nest boxes more effectively in restoration projects.

Impact snapshots: Preventing extinctions through emergency action



Identifying species on the brink

Working with more than 100 threatened species experts across the country, the hub <u>identified</u> the Australian birds, mammals, freshwater fish, snakes, lizards, frogs, butterflies and plants at greatest risk of extinction within the next 20 years. In response, new management actions, surveys and research were initiated for many of the most imperilled species identified, including the King Island Brown Thornbill, Fassifern Blind Snake and Northern Bettong.

This work raised community awareness about the potential loss of many species and informed the species prioritisation process for the Australian Government's second *Threatened species strategy*.



Bushfire response

The 2019–20 wildfires caused a loss of extraordinary magnitude to Australian biodiversity. The hub provided rapid scientific <u>support</u> to government management agencies for emergency planning for threatened biodiversity affected by the fires.

This included identifying the most affected animals (vertebrates and invertebrates) and ecological communities, designing new rapid survey methods, and advising on priority recovery actions. It also included new research on managing compounding threats, such as cats, feral <u>herbivores</u> and <u>Myrtle Rust</u> in fire-affected landscapes and research for specific faunal groups, such as how ash and sediment post-fire <u>affects</u> native fish, frogs and crayfish.



Genetic rescue of imperilled populations

Hub research is helping species that are facing genetic issues due to inbreeding, such as the <u>Eastern Bristlebird</u>, <u>Western Ringtail</u> <u>Possum</u>, <u>Norfolk Island Morepork</u> and mainland Eastern Barred Bandicoot. For example, a <u>trial</u> at Mt Rothwell, Victoria, introduced Tasmanian genes to the mainland Eastern Barred Bandicoot population through breeding.

It has greatly improved the health and breeding success of more than 200 offspring so far, which represents more than 10% of the mainland population, and will eventually improve the viability of the entire mainland population. The increased genetic diversity will also better enable the population to adapt to future environmental conditions.



A propagation technique for highly imperilled leek orchids

Australia has 38 threatened leek orchids. Previously, they could not be propagated in nurseries, which was a major impediment to recovery programs. Hub <u>research</u> undertaken in partnership with the Royal Botanic Gardens Victoria has unlocked the secret of how to propagate leek orchids. The technique is expected to allow most of Australia's 38 nationally threatened leek orchids to be propagated.

The method has already been used to propagate hundreds of plants of 7 different, highly imperilled species, including <u>5</u> that were badly affected by the 2019-20 bushfires.

Improving detection and tracking of how species are doing



Robust monitoring is essential to know whether species are recovering, stable or declining; if management is working; and which species are in greatest need of assistance.

Hub research has:

- evaluated the extent of monitoring for Australia's threatened species
- enhanced the state of knowledge and capacity in Australia for threatened species monitoring and management
- placed this knowledge into the hands of agencies and people on the ground through collaborations with 112 partners, including 28 government agencies, more than 30 Indigenous groups, and a wide variety of nongovernment organisations and community groups.



This <u>video</u> highlights how one of the hub's new monitoring techniques is helping the Kangaroo Island Glossy Black Cockatoo following the catastrophic 2019–20 fires.

Projects have investigated and trialled applications of new technologies such as infra-red (<u>thermal</u>) cameras and eDNA; developed robust <u>methods</u> to detect species that had been rarely sighted in decades; collaborated with Indigenous rangers and Traditional Owners on monitoring <u>approaches</u> that build on traditional tracking skills; and developed <u>tools</u> to improve the efficiency and effectiveness of large-scale regional monitoring programs.

The hub also developed and successfully trialled a <u>platform</u> to bring all of Australia's threatened species monitoring data together in one place, to tell the community about the bigger picture of how threatened species are faring.

Impact snapshots: Improving detection and tracking of how species are doing



New methods for hard-to-detect species

It is hard to conserve species you cannot find. The hub developed new, effective detection and monitoring methods for many elusive threatened species, including the <u>Night Parrot</u>, <u>Silver Headed and Dusky antechinuses</u> and South-eastern Red-tailed Black Cockatoos.

Although the Kangaroo Island Dunnart had rarely been detected in 20 years, a hub project developed an effective monitoring method that has led to many new detections and a much greater understanding of its trends and where the species persists on the island. This new knowledge has helped to underpin the establishment of a haven to protect the species.



Arid zone wildlife monitoring

Over the past 20 years, almost 50,000 records of desert species have been made during 15,000 sandplot surveys, carried out by more than 40 Indigenous and non-Indigenous groups working across Australia's deserts. Working collaboratively with these groups to collate and analyse these data for the first time, a hub <u>project</u> has sharpened knowledge about the distributional limits and population trends for threatened species such as bilbies and Great Desert Skinks.

By examining where species occur, and how often they are detected, the project is providing guidance about the most efficient sampling designs for meeting local, regional and national monitoring objectives.



Better-designed monitoring programs

The hub undertook a wide range of <u>research</u> to help improve monitoring programs, from single-species monitoring programs such as for the <u>Brush-tailed Rabbit Rat</u> and Wiliji, (West Kimberley Rock-wallaby) to regional multi-species monitoring programs. Hub findings have underpinned a redesign of monitoring across 5 national parks in the Northern Territory and will also be applied to other national parks such as Christmas Island.

Hub scientists worked with the Malleefowl Recovery Team to <u>redesign</u> a national Malleefowl monitoring program implemented by citizen scientists and other partners across 140 sites. The findings have led to new conservation actions for Malleefowl.



Threatened Species Index

Before the hub, there was no way to look at overall trends for threatened biodiversity in Australia or to understand which species groups or regions are doing better or worse. The <u>Threatened Species Index</u> team <u>developed</u> a platform that could address this gap and worked with more than 70 organisations and individuals to collect and analyse monitoring data on more than 250 threatened species from across the country.

It has revealed that, over the last 2 decades, the population sizes of threatened mammals have declined by one third, threatened birds by half and threatened plants by two-thirds, on average.

Providing safe havens and bringing species back



Translocations are an increasingly important conservation tool for threatened plants and animals, but they present many challenges, and many attempts fail. Hub <u>research</u> has filled major knowledge gaps around <u>if</u> and <u>when</u> to translocate species, the best <u>methods</u>, <u>genetic</u> considerations, monitoring and <u>evaluation</u>, and national priorities.

For example, the hub's analysis has resulted in practical <u>guidance</u> on where predator exclosure projects should be implemented to maximise benefits to threatened mammal conservation nationally, while minimising costs.

Guidelines for the Translocation of Threatened Plants in Australia

The hub undertook a wide range of research to increase the capacity for successful plant translocations. A key tool delivered was the expanded and revised *Guidelines for the translocation of threatened plants in Australia*, presented in this <u>video</u>.

To ensure the research meets the practical needs of Australia's on-ground conservation managers, hub projects were undertaken in collaboration with more than 100 partners, many of whom are expanding their translocation programs. This includes Commonwealth and state agencies, local governments, national parks, zoos, botanic gardens, non-government organisations such as the Australian Wildlife <u>Conservancy</u>, haven managers, Indigenous groups, natural resource management organisations, 20 universities and CSIRO.

Together, they undertook pivotal field trials for more than 30 threatened species, such as the <u>Eastern Quoll</u>, <u>Bluetailed Skink</u> and <u>Roundleaf Honeysuckle</u>. The findings will aid the successful establishment and resilience of translocated populations for many threatened species.

Impact snapshots: Providing safe havens and bringing species back



Ensuring new havens go in the most beneficial places

The hub's systematic <u>review</u> of safe havens (sites without introduced predators) has identified the 29 threatened mammal species in most urgent need for inclusion in future havens and the most strategic regions for new havens to be established.

The findings have helped inform the design of the Australian Government's Environment Restoration Fund – Safe Havens grants and \$7 million in funding to expand Australia's havens network. The new havens will help conserve at least 24 threatened species around the country, with at least 9 of these species, such as the Kowari, not currently represented in any safe haven across Australia.



Supporting Yawuru to explore a haven for their Country

The hub provided <u>support</u> to Nyamba Buru Yawuru, whose traditional lands cover 5300sq km of tropical coastline and inland savanna country around Broome in Western Australia, to explore opportunities to develop a feral predator-free wildlife sanctuary on their Country. This included scientific support, community consultation, and helping Yawuru Rangers and Traditional Owners travel to an established haven and talk with Traditional Owners there.

If a fenced haven was established on Yawuru Country it would be the first in northern Australia and the first to be led and managed by an Indigenous organisation.



Improving the success of animal reintroductions

There are still many unknowns with threatened species reintroductions. Using an adaptive management approach where reintroductions are set up like experiments offers an opportunity to learn from and improve methods. Along with many other partners, the hub supported Parks Australia in a trial <u>reintroduction</u> of Eastern Quolls to Booderee National Park.

Detailed tracking of the released animals by the hub revealed the factors most influential to the long-term survival and establishment of the animals. This led to changes in park management for the animals, and has provided critical information to inform reintroductions in Booderee and elsewhere.



Improving threatened plant translocations

Translocations are an important tool in preventing extinctions. In partnership with the Australian Network for Plant Conservation, the hub undertook a wide range of <u>research</u> that has greatly increased the capacity for successful plant translocations nation-wide. This included a review of every plant translocation undertaken in Australia over the last 30 years; revised and expanded national guidelines; genetic research for species with small and fragmented populations; and field trials with the Western Australian Government for 5 species and subspecies totalling 1,650 plants.

Reducing threats to species and ecosystems to promote recovery



Identifying and effectively controlling the threats facing threatened species is crucial to their conservation, but there are still many gaps in knowledge about how to most effectively manage these threats.

The hub <u>developed</u> a wide range of new knowledge and tools to support conservation managers to solve complex threat management issues with sophisticated science. It also undertook strategic national <u>planning</u>, mapping the major threats facing every threatened species, to underpin a national roadmap to prevent extinctions and promote recovery of Australia's threatened species.



This <u>video</u> highlights the advances the hub has achieved through research to better understand and manage the impact of feral cats.

Hub <u>research</u> to better understand and manage the impact of feral and pet cats on Australian wildlife was shortlisted for the prestigious Eureka Prize for Applied Environmental Research. One of the many parts of the program quantified the impact of pet cats on native wildlife and examined policies for cat management in more than 500 councils.

The findings and their promotion have contributed to much greater national awareness of the impact of roaming pet cats and to the establishment of cat containment policies for many new and existing suburbs, in Victoria, the Australian Capital Territory and the Northern Territory. On average, each suburb where cats are not allowed to roam will save more than 20,000 native animals per year.

Impact snapshots: Reducing threats to species and ecosystems to promote recovery



Tackling diseases

The hub undertook pivotal research to understand and manage a range of introduced diseases that threaten the survival of many species. This work included understanding the diseases, the conditions that favour them, the species at greatest risk and interactions with other threats; trialling treatments; identifying <u>refuges</u>; and supporting emergency captive breeding programs for species at imminent risk.

The research is benefitting trees and shrubs threatened by <u>myrtle rust</u>; Christmas Island reptiles threatened by an <u>Enterococcus</u> <u>Bacterium</u>; wombats threatened by <u>mange</u>; and frogs threatened by <u>chytrid fungus</u>.



Better management of foxes

Red Foxes are one of the greatest threats to Australia's native mammals and pose a major risk to livestock. To combat this, Australia spends more than \$16 million a year on Red Fox control, but when control programs are not strategic, fox numbers can quickly recover.

Collaborating with Parks Victoria and the Victorian Department of Environment, Land, Water and Planning, a hub <u>team</u> developed the FoxNet app, which land managers can use to test different bait station layouts, frequencies and timings on simulated fox populations. FoxNet is now being used by government and non-government agencies to evaluate and plan fox management programs for conservation across Victoria.





Climate change is a current and increasing threat for many species. A wide variety of hub projects will contribute to the better management of climate impacts on threatened species.

For example, the hub collaborated with Western Australian Government managers of the <u>Western Swamp Tortoise</u> to test assisted colonisation to cooler southern wetlands; established the micro-climate requirements of the <u>White-bellied Frog</u> to inform the selection of translocation sites; and developed a <u>model</u> to determine the ideal timeframe for when threatened montane frog species could be relocated to suitable habitats that are currently outside their natural range.



Overcoming barriers to fish movement

A significant cause of native fish declines is barriers to fish movement, which can lead to population fragmentation and loss of access to important habitat. Hub <u>researchers</u> used a bio-hydrodynamics laboratory to fill critical knowledge gaps about the swimming ability and behaviour of key native fish species, and tested new and existing designs for fishways.

The research is applicable nation-wide to help reduce the impact of man-made barriers that limit native fish movement and will underpin the New South Wales Department of Primary Industries' new *Road crossing design guidelines*.

Supporting Indigenous-led research for threatened and culturally significant species



A key priority of the hub was empowering Indigenous leadership and management of significant plants and animals. The hub collaborated with 45 Indigenous groups on 25 research projects covering 21 Indigenous Protected Areas (IPAs), 4 national parks and other Indigenous lands.

These collaborations valued traditional ecological knowledge and support 2-way science approaches. They have resulted in a wide range of new and improved tools and knowledge to support improved management of threatened and culturally significant <u>species</u> and ecological <u>communities</u> across Australia.



Find out about research led by Karajarri Rangers that is helping them better manage fire and biodiversity on their 2.4-millionhectare IPA in this <u>video</u>. An Indigenous Reference Group (<u>IRG</u>) supported the hub to strengthen the engagement and participation of Indigenous people in hub projects. The IRG also worked to draw attention and support for the management of <u>culturally</u> significant species.

Sixty percent of threatened species occur on Indigenousmanaged land. The hub's Healing Country <u>report</u> quantifies current and potential Indigenous involvement in managing species that are significant for conservation across Australia and identifies 4 ways that Indigenous leaders and practitioners can be supported to empower their rights and responsibilities to heal Country for significant species.

Impact snapshots: Supporting Indigenous-led research for threatened and culturally significant species



Martu-developed Mankarr (Greater Bilby) monitoring program

Martu Traditional Owners are custodians of one of the last strongholds of the Greater Bilby. Martu people collaborated with hub scientists to co-design and establish a robust and practical monitoring program for bilbies and pest species that is based on traditional ecological knowledge and tracking skills.

The monitoring <u>program</u> is helping Martu people evaluate the effectiveness of their land management strategies for bilbies, and contributes to national recovery planning. Their 2017 and 2018 surveys found bilby signs at 80% of sites and cat signs at over 50%.



Karajarri- and Ngurrara-led fire research for their IPAs

Karajarri and Ngurrara Rangers and Traditional Owners have led research projects to support culturally informed fire management over the pirra (desert) of the Karajarri and Warlu Jilajaa Jumu IPAs, which cover over 41,000sq km. The rangers collaborated with the hub to use old aerial photography to understand fire regimes of the past, and to set up a biodiversity monitoring program to measure management outcomes.

The monitoring is helping the rangers set clear management targets for fire-sensitive species and tell their communities about their work. Learn more in this <u>video</u>.



Arakwal shape IUCN Green Listing

Arakwal National Park is owned by the Arakwal people and is governed through a joint management agreement. Two of the park's significant values are the Graminoid Clay Heath Endangered Ecological Community and the associated Byron Bay Orchid. A <u>project</u> supported an Arakwal-led approach underpinned by International Union for Conservation of Nature (IUCN) Green List evaluation frameworks to develop an effective cross-cultural planning process and seasonal planning calendar for the park and orchid.

The guidelines can also be applied to other species and locations, have been recognised by the IUCN as good practice, and are now shaping how Green Listings are done.



Tiwi Rangers use fire to reduce cat impacts

A <u>collaboration</u> on the Tiwi Islands has investigated how cats, fire and habitat condition interact to affect native mammals. The findings have given the Tiwi Land Rangers confidence that their new fire management strategies will help conserve Tiwi Island native mammals. They have begun implementing island-wide programs of low-intensity burning in the early dry season.

This will help decrease the frequency and extent of high-intensity wildfires late in the dry season, while also leaving plenty of patches of unburnt vegetation, to help species such as the Brush-tailed Rabbit-rat survive in a world with cats.

Using social and economic opportunities for threatened biodiversity conservation

Threatened species occur across a wide variety of land tenures. Many species have all or most of their distribution outside conservation reserves, including across agricultural, urban and industrial areas.

Effective conservation of all species therefore requires meaningful engagement with a wide variety of land managers. In addition, human behaviour and choices are a major driver of the threats to nature, so <u>engaging</u> the broader community can play a major role in biodiversity outcomes. Implementing recovery actions also supports jobs, particularly in remote and regional areas.



How does the far eastern curlew use Darwin Harbour?



Darwin's busy working port is an important place for the Far Eastern Curlew. Beach visitors and dog walkers can also play a big role in helping this species. Learn more in this <u>video</u>. Good policy requires robust evidence of costs and benefits. Hub <u>research</u> has filled major knowledge gaps in this area by developing tools and data that can be used to more accurately estimate the cost of recovery programs and quantified community willingness to pay and public preferences for threatened species programs. The latter has highlighted that the community do not want to see species extinctions and are willing to financially contribute to prevent them.

Impact snapshots: Using social and economic opportunities for threatened biodiversity conservation



Bitterns benefitting from research with rice growers

In the New South Wales Riverina, the hub collaborated with rice growers and irrigation communities to identify practical ways that growing practices can be adjusted to support the Australasian Bittern to successfully breed. The work has also explored the commercial opportunities of 'bittern-friendly rice'.

Riverina rice growers are the custodians of 60% of the national Australasian Bittern population and 40% of the global population so this work will make a major contribution to the long-term survival of this species.



Restoring species within Box Gum Grassy Woodland agricultural landscapes

South-eastern Australia's Box Gum Grassy Woodlands are a threatened ecological community that also supports many threatened plants and animals.

In partnership with the <u>Sustainable Farms</u> initiative, the hub <u>worked</u> with farmers across the region on: research that has revealed how revegetation plantings can be improved to benefit threatened birds and plants; planting and grazing trials for the <u>Yass Daisy</u>; rocky habitat restoration trials for the <u>Pink-tailed</u> <u>Worm-lizard</u>; a trial cull of <u>Noisy Miners</u> to benefit woodland birds; and investigations into the effectiveness of nest boxes for threatened species.



Biodiversity sensitive urban design: the future of cities

Conserving nature in cities has benefits for human health and wellbeing as well as for biodiversity. A <u>team</u> from the hub and the Clean Air and Urban Landscapes Hub developed an innovative framework to support local governments, developers, urban planners and architects to implement Biodiversity Sensitive Urban Design (BSUD).

The framework underpins the South Australian Government's Green Adelaide BSUD policy, urban development plans in established and growth areas such as Fishermans Bend and Averley in Victoria, and voluntary performance tools such the Green Building of Australia's Green Star Communities.



Ecosystem accounts quantify tradeoffs to support better policy

Ecosystem <u>accounts</u> provide information on the economic value of land-use activities in a format that allows for quantitative comparison and analysis of trade-offs. They are a powerful tool to guide policy-making about regional land management issues. The work is informing government policy.

For example, a case <u>study</u> on the Victorian Central Highlands showed that their contributions to regional GDP included the agriculture (\$312m), water supply (\$310m) and tourism (\$260m) industries. The value of water supply and tourism industries greatly surpassed the native forest industry contribution (\$12m) and demonstrated a strong economic incentive to protect the forests on which they depend.

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