

**Management of threatened species and  
ecological communities under the EPBC Act –  
a performance audit by the Australian  
National Audit Office**

Submission by the  
Invasive Species Council

November 2021

## Document details

Invasive Species Council. 2021. *Management of threatened species and ecological communities – a performance audit by the Australian National Audit Office. Submission by the Invasive Species Council.* November 2021.

## About the Invasive Species Council

The Invasive Species Council was formed in 2002 to advocate for stronger laws, policies and programs to keep Australian biodiversity safe from weeds, feral animals, exotic pathogens and other invaders. It is a not-for-profit charitable organisation, funded predominantly by donations from supporters and philanthropic organisations.

## Intellectual property rights

© Invasive Species Council 2021

Unless otherwise noted, copyright and any other intellectual property rights in this publication are owned by the Invasive Species Council.



All material in this publication is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. Creative Commons Attribution 4.0 International Licence is a standard form licence agreement that allows you to copy, redistribute, remix, transmit and adapt this publication provided you attribute the work, you do not use it commercially and you distribute your contribution under this creative commons licence. The licence terms are available from <https://creativecommons.org/licenses/by-nc-sa/4.0/>.

## Inquiries

Invasive Species Council

Address: PO Box 818, Katoomba NSW 2780, Australia

ABN: 27 101 522 829

Web: [invasives.org.au](http://invasives.org.au)

Email: [isc@invasives.org.au](mailto:isc@invasives.org.au)

# Contents

<b>Executive summary.....</b>	<b>1</b>
<b>1. Introduction.....</b>	<b>3</b>
<b>2. Australia’s threat abatement system .....</b>	<b>5</b>
2.1 Background.....	5
2.2 The importance of a concerted focus on threats.....	5
<b>3. Listing of key threatening processes .....</b>	<b>7</b>
3.1 The KTP list has major gaps .....	7
3.2 KTP assessments have been blocked for the past decade.....	9
3.3 Environment ministers have rejected scientific advice to assess and list KTPs.....	10
3.4 The listing process is inefficient.....	10
<b>4. Invasive species KTP listings .....</b>	<b>12</b>
4.1 Invasive species are a major driver of extinctions and declines .....	12
4.2 The threat abatement system is essential for addressing major invasive species threats .....	13
4.3 The novel biota KTP listing has stymied the listing and abatement of invasive species threats .....	13
<b>5. Listing of threatened species.....</b>	<b>18</b>
5.1 Many species at imminent risk of extinction are not listed as threatened under the EPBC Act .....	18
5.2 The majority of Australia’s most imperilled species do not have a recovery plan .....	19
<b>6. Development of threat abatement plans .....</b>	<b>25</b>
6.1 Decisions to not develop a TAP lack transparency and rigour and may be applying the wrong test.....	25
6.2 Threat abatement advices are not an adequate substitute for threat abatement plans .....	29
6.3 The development and revision of threat abatement plans are inefficient .....	29
<b>7. Implementation of threat abatement plans and advices .....</b>	<b>32</b>
7.1 There is almost no measuring or monitoring of and reporting on KTPs or TAP actions or outcomes .....	32
7.2 TAPs often lack essential elements of effective plans.....	32
7.3 Many TAPs are poorly implemented.....	33
7.4 There is no transparency on or prioritisation process for funding threat abatement .....	34
<b>8. References.....</b>	<b>37</b>
<b>Appendix 1. A letter about the novel biota KTP listing.....</b>	<b>39</b>
<b>Appendix 2 Case studies of effective threat abatement .....</b>	<b>41</b>

## Executive summary

The listing of key threatening processes (KTPs) and the preparation and implementation of threat abatement plans (TAPs) are essential mechanisms under the EPBC Act for recovering Australia's threatened species and ecological communities. Ongoing declines and extinctions are inevitable unless Australia does much more to abate the major threats to nature – primarily invasive species, habitat destruction, adverse fire regimes and climate change. The majority of recovery actions require threat abatement at a local or regional habitat scale. Effective threat abatement is the only feasible way to stop the escalation of species losses and declines, and is also essential for fostering resilience – to optimise species' capacity to adapt under climate change and survive other threats.

Australia's threat abatement system has been in place since 1994 but the majority of threats have not been abated and many have worsened, and Australia has suffered several extinctions (mostly due to invasive species). The system itself is mostly sound – it makes sense to list major threats and prepare national plans to address them – but it has been poorly implemented. Following are examples of the deficient implementation of relevance to the ANAO audit.

**Audit criterion 1:** Is the administration of the listing process effective and efficient?

- Australia's list of KTPs has many gaps, with several major threats, including adverse fire regimes and altered hydrological regimes, not listed despite being nominated.
- Over the past decade, successive environment ministers have refused to assess new KTP nominations, particularly invasive species nominations. No KTP nomination since 2011 has been accepted for assessment.
- The listing process is slow and inefficient, with the 4 listings since 2007 taking an average 3.4 years from the closure of KTP nominations. A nomination to list adverse fire regimes has been under assessment for more than 13 years.
- The listing of an all-encompassing 'novel biota' KTP (nominated in 2008 and listed in 2013) has had the perverse effect of stymying any additional listings of invasive species KTPs and has not led to any abatement action, thereby suppressing a vital mechanism for abatement of invasive species threats.
- The list of threatened species under the EPBC Act does not include 29 taxa (fishes, reptiles and plants) recently assessed (by expert elicitation) as being at high or >50% risk of extinction within 10 or 20 years.

**Audit criterion 2:** Have effective and efficient arrangements been established to develop and implement plans and advice?

- A view apparently held by the Environment Department that the EPBC Act does not permit multiple TAPs per KTP may be incorrect, which means the decision of the Environment Minister to not have TAPs for the novel biota listing may not be valid.
- Ministerial decisions to not have a TAP to address a KTP (currently the case for 9 KTPs) lack transparency, and the few published ministerial reasons lack rigour. They cite existing measures addressing threats without any analysis of whether these measures are effective.
- A recent decision to not have a TAP or TAPs to address the novel biota KTP applied an incorrect interpretation of the EPBC Act - by considering whether a TAP was the most feasible, effective

and efficient way to abate the KTP rather than whether it was a feasible, effective and efficient way to do so. There was also a failure to consider whether the KTP could be abated by multiple TAPs.

- There are no implementation guidelines for TAPs and many TAPs lack elements that seem fundamental to effectiveness, such as an implementation taskforce and budget and national coordinator. There is also no framework for integrating priority recovery actions into TAPs.
- Most TAP reviews show that abatement progress has been limited.
- The processes for preparing, reviewing and revising TAPs are inefficient. Currently, there are 3 TAPs awaiting revisions 5–8 years after reviews and another 2 unrevised TAPs that are 9–10 years old. Only 9 of 21 KTPs have an up-to-date TAP or biosecurity plan.
- Information about threat abatement projects funded by the Australian Government, but current only to 2016–17, showed that the majority of TAPs were not funded and that funding had significantly declined.
- Of 96 taxa recently assessed as being at high or >50% risk of extinction within 10 or 20 years, more than 60% lack a national recovery plan. Of the 37 taxa with recovery plans, 70% of the plans are more than 10 years old.

**Audit criterion 3:** Does measurement, monitoring and reporting support the achievement of desired outcomes?

- There is no way of tracking Australia's progress on abating major threats due to a lack of monitoring, measuring and reporting.
- The statutory 5-yearly reviews provide some indication of progress, but occur infrequently (often only once a decade) and are not done by independent experts.
- There is no reporting on whether the TAP implementation obligations (section 269 of the EPBC Act) are being met -- to implement TAPs in Commonwealth areas and seek joint implementation in state/territory areas. There is no general agreement between the Australian, state and territory governments to jointly implement TAPs and, as far as we are aware, no TAP-specific agreements for joint implementation.
- The Australian Government does not assess how much funding is needed to implement TAPs and abate listed KTPs nor provide accessible information on its investments in threat abatement.

# 1. Introduction

The Invasive Species Council welcomes this audit addressing one of the most important issues of our time – the continuing, and probably accelerating, decline and loss of Australian species and ecological communities. As is widely acknowledged, Australia faces an extinction crisis. We lead the world on mammal extinctions [1] and have one of the worst records globally for biodiversity declines [2].

The EPBC Act offers two main, complementary mechanisms for managing threatened species and ecological communities:

- listing of and recovery planning for threatened species and ecological communities
- listing of key threatening processes and threat abatement planning.

Both are essential for recovering threatened species and ecological communities, and both are failing to achieve that.

Our focus in this submission is mainly threat abatement. Unless the major threats to nature are abated, ongoing declines and extinctions are inevitable. We urge the ANAO to focus just as much on the threat abatement functions of the EPBC Act as on the threatened species and ecological community recovery functions.

The work of the Invasive Species Council is mainly focused on one of Australia's major drivers of extinction – invasive species – and our Threats to Nature project is focused on reforming the national threat abatement system to achieve ambitious, nationally coordinated, well-funded abatement efforts for all major threats (where feasible).

Initially, we provide background information on threat abatement under the EPBC Act and why a focus on threats is essential for recovery of threatened species and ecological communities. We then provide information relevant to each of the three audit questions, mainly as they apply to threat abatement, with a particular focus on invasive species threats:

1. Is the administration of the listing process effective and efficient?
2. Have effective and efficient arrangements been established to develop and implement plans and advice?
3. Does measurement, monitoring and reporting support the achievement of desired outcomes?

## ABBREVIATIONS USED IN THIS SUBMISSION

**EC:** ecological community

**FPAL:** finalised priority assessment list

**KTP:** key threatening process

**TAP:** threat abatement plan

**TSSC:** Threatened Species Scientific Committee

## SHORTENED NAMES OF LISTED KTPS

**Noisy miners:** Aggressive exclusion of birds from potential woodland and forest habitat by over-abundant noisy miners (*Manorina melanocephala*)

**Rabbits:** Competition and land degradation by rabbits

**Goats:** Competition and land degradation by unmanaged goats

**Phytophthora:** Dieback caused by the root-rot fungus (*Phytophthora cinnamomi*)

**Turtle bycatch:** Incidental catch (bycatch) of sea turtle during coastal otter-trawling operations within Australian waters north of 28 degrees South

**Seabird bycatch:** Incidental catch (or bycatch) of seabirds during oceanic longline fishing operations

**Chytrid fungus:** Infection of amphibians with chytrid fungus resulting in chytridiomycosis

**Marine debris:** Injury and fatality to vertebrate marine life caused by ingestion of, or entanglement in, harmful marine debris

**5 grasses:** Invasion of northern Australia by gamba grass and other introduced grasses

**Land clearance:** Land clearance

**Garden escapes:** Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants

**Yellow crazy ants:** Loss of biodiversity and ecosystem integrity following invasion by the yellow crazy ant (*Anoplolepis gracilipes*) on Christmas Island, Indian Ocean

**Climate change:** Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases

**Novel biota:** Novel biota and their impact on biodiversity

**Foxes:** Predation by European red fox

**Exotic rats:** Predation by exotic rats on Australian offshore islands of less than 1000 km<sup>2</sup> (100,000 ha)

**Feral cats:** Predation by feral cats

**Feral pigs:** Predation, habitat degradation, competition and disease transmission by feral pigs

**Beak and feather disease / parrot disease:** Psittacine circoviral (beak and feather) disease affecting endangered psittacine species

**Cane toads:** The biological effects, including lethal toxic ingestion, caused by cane toads (*Bufo marinus*)

**Red fire ants:** The reduction in the biodiversity of Australian native fauna and flora due to the red imported fire ant, *Solenopsis invicta* (fire ant)

## 2. Australia's threat abatement system

### 2.1 Background

Almost 30 years ago, with the advent of the *Endangered Species Protection Act 1992*, the Australian Government adopted a two-pronged approach to threatened species conservation – one prong focused on recovery and the other on threat abatement. Australia appears to be the only country with a threat abatement system enshrined in national law.

However, since the first threats were listed in 1994 (predation by red foxes; predation by feral cats; dieback caused by *Phytophthora cinnamomi*; competition and land degradation by feral rabbits; competition and land degradation by feral goats), Australia has suffered several extinctions and the national threatened species list has grown by 76% (1028 species were on the list in 1994).

Despite the obvious failings, the logic and the mechanisms of the threat abatement system are mostly sound. It makes a lot of sense to list major threats to catalyse national planning and coordinated abatement efforts. This recognises that federal leadership and resources, collaboration across state and territory boundaries, and a national research focus are essential for addressing major threats to nature. As demonstrated by a few successes such as the major reduction in seabird bycatch by longline fishers [3], and eradications of invasive species from islands, including World Heritage-listed Macquarie Island [4,5], national threat abatement can work well.

What is missing are comprehensive threat listings, systematic application of the available threat abatement mechanisms, commitments by the Australian and state/territory governments to implement threat abatement plans, consistent arrangements to foster national collaborations and adequate funding.

### 2.2 The importance of a concerted focus on threats

Recovery plans and threat abatement plans typically both focus on threat abatement, but at different scales. Recovery of many threatened species and ecological communities requires effective threat abatement at a local or regional habitat scale (as well as additional recovery actions such as captive breeding and habitat restoration). Threat abatement research is often needed to provide more effective tools for recovery work, and recovery plans should help inform priorities for threat abatement work.

Since Australia started listing threatened species, only a handful are known to have recovered. Recovery has often been stymied by a lack of knowledge of threats (for example, four recent extinctions on Christmas Island, likely due to invasive species [6–8]), a lack of effective methods for abating threats and highly deficient and patchy abatement efforts.

A few major threatening processes – particularly invasive species, habitat destruction and adverse fire regimes – have caused the majority of extinctions and declines in Australia [9–11]. Unless we overcome these mega-threats, many more Australian species and ecological communities will be doomed to perpetual rarity or extinction. With almost 2,000 listed as nationally threatened, it is not feasible to save them all – taxa-by-taxa, community-by-community – while the major threats remain potent.



A concerted focus on threat abatement is needed as a more strategic way to enable recovery of listed species and communities and protect the many unlisted species and communities in decline, some of which are on the edge of extinction (see section 5). It is the only feasible way to stop the escalation of species losses and declines, and is also essential for fostering resilience, to optimise species' capacity to adapt under climate change – another rapidly emerging driver of extinctions. The development of enduring abatement solutions will also be far less expensive over the long term than ongoing species-by-species recovery efforts in the face of unrelenting threats.

### 3. Listing of key threatening processes

**Relevant audit criterion:** (1) Is the administration of the listing process effective and efficient?

**Summary:** Australia's list of key threatening processes (KTPs) is far from comprehensive, with several major threats, including adverse fire regimes and altered hydrological regimes, not listed despite being nominated. Over the past decade, successive environment ministers have refused to assess new KTP nominations, particularly invasive species nominations. No KTP nomination since 2011 has been accepted for assessment. The listing process is slow and inefficient, with the 4 listings since 2007 taking an average 3.4 years from the closure of KTP nominations. A nomination to list adverse fire regimes has been under assessment for more than 13 years.

#### 3.1 The KTP list has major gaps

Table 3-1 shows the 8 threat categories impacting, to a medium or high degree, the 1,795 threatened taxa listed under the EPBC Act in late 2019 (excluding taxa listed as conservation dependent) [11]. The table also provides examples of major threats not listed as KTPs.

The most serious unlisted KTP is adverse fire regimes, recorded as a medium-impact or high-impact threat for almost a quarter of listed threatened species [11]. Nominated as a KTP in March 2008 and placed on the finalised priority assessment list (FPAL) in October 2008, it is still under assessment 13 years later.<sup>1</sup> Another missing KTP is altered hydrological regimes – *Alteration to the natural flow regimes of watercourses and their floodplains and wetlands* was nominated as a KTP but rejected for assessment in 2015, 2016, 2019 and 2020.<sup>2</sup>

Table 3-2 is a compilation of potential additional KTPs based on a recent expert analysis of the threats to threatened taxa listed under the EPBC Act [11]. The table includes only threats impacting at least 4 listed taxa to a medium or high degree, which is higher than the threshold specified under the EPBC Act for listing a KTP (section 183). The table also includes invasive species threats even though they are encompassed by the novel biota listing. As explained in section 4.3, the novel biota KTP (listed in 2013) is a 'ghost' listing that has not advanced the objects of the EPBC Act. Taking this into account, there are gaps in the KTP list, including of the invasive species encompassed by 6 nominations since 2008 not assessed due to the novel biota listing or rejected for listing by the Environment Minister. Many invasive species are having or will have a much greater impact on biodiversity than indicated by the number of listed threatened taxa impacted. For example, many native fish species severely impacted by invasive fish are not listed as threatened under the EPBC Act (see section 6) and many invasive species have yet to spread to their full extent. Myrtle rust, for example, was first detected in Australia only in 2010 and is already recorded as a medium-impact or high-impact threat to 5 listed threatened taxa [11,12].

---

<sup>1</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/assessments/fpal>

<sup>2</sup> <https://www.environment.gov.au/biodiversity/threatened/nominations/ktp-not-prioritised-assessment>

**Table 3-1. Listed KTPs, their impact prevalence, and major KTP listing gaps**

Major threat category	Number of threat-taxa records / % listed taxa impacted	Relevant listed KTPs	Examples of KTP listing gaps	% listed taxa impacted by the unlisted KTP example
Invasive species (including diseases)	1,117 / 42.2%	Novel biota & 12 other KTPs		
Habitat loss, degradation & fragmentation	579 / 26.6%	Land clearance	Habitat impacts of forestry	1.4%
Adverse fire regimes	423 / 23.1%		Adverse fire regimes	23.1%
Climate change & severe weather	166 / 8.2%	Climate change		
Disrupted ecosystem & population processes	113 / 5.5%	Noisy miner aggression	Macropod overgrazing	3.5%
Overexploitation & other direct human impacts	98 / 4.1%	Seabird bycatch / turtle bycatch		
Changed surface water & groundwater regimes	66 / 3.6%		Changed flow regimes	3.6%
Pollution	21 / 1.1%	Marine debris		

Source of threat data: Ward et al (2021) [11]. Note that only medium-impact and high-impact threats are the focus in this table. Threat-taxa records account for multiple threat impacts within a threat category -- for example, if a species is impacted by an invasive predator, weed and exotic disease.

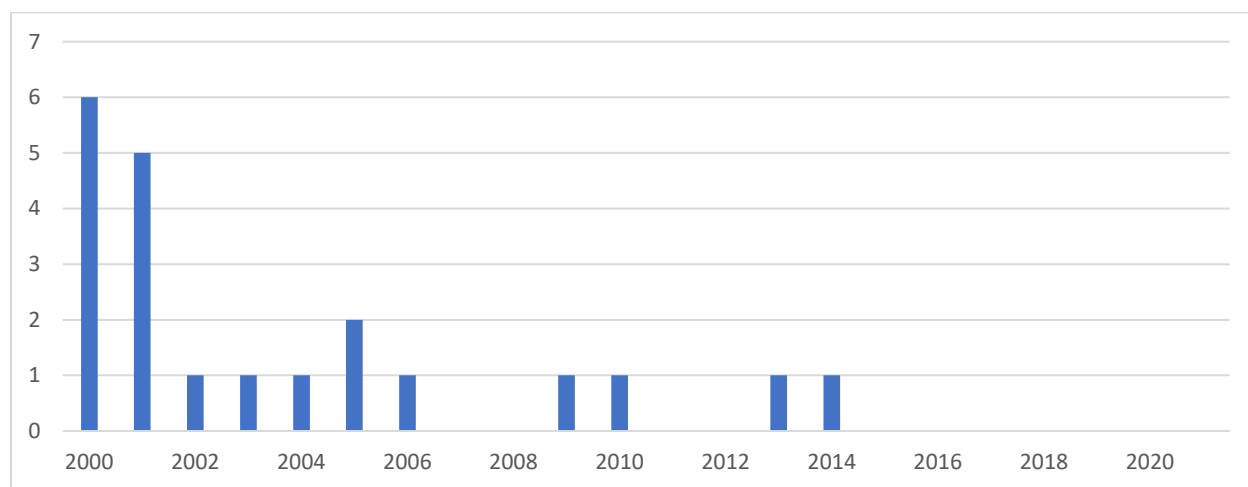
**Table 3-2. Potential additional KTPs recorded as a medium-impact or high-impact threat to at least 4 EPBC-listed threatened species**

Potential KTP	Number of threatened taxa impacted (medium or high impact)	Potential KTP	Number of threatened taxa impacted (medium or high impact)	Potential KTP	Number of threatened taxa impacted (medium or high impact)
Adverse fire regimes	423	Forestry	25	Herbicides & pesticides	11
Changed flow regimes	64	Large invasive ungulates	22	Invasive bees & wasps	8
Macropod overgrazing	62	Fish bycatch (all methods)	15	Seabirds gillnet bycatch	6
Invasive fish	37	Dingoes/feral dogs	11	Myrtle rust	5
Invasive pasture grasses	35	Feral deer	11	Marine invasive species	4

Source of threat data: Ward et al (2021) [11]

### 3.2 KTP assessments have been blocked for the past decade

The rate of KTP listings has greatly slowed in recent years (Figure 3-1). Six KTPs were listed prior to 2000 under the *Endangered Species Protection Act 1992* and carried over to the EPBC Act. Another 12 KTPs were listed during the first decade of the EPBC Act (2000-2009). Since then, there have been just 3 KTP listings. No KTP nomination since 2011 (when the noisy miner nomination was placed on the FPAL) has been accepted for assessment. The *Fire regimes that cause biodiversity decline* KTP nomination currently under assessment was placed on the FPAL in 2008 (this assessment was meant to be finalised in 2013).<sup>3</sup>



**Figure 3-1. Number of KTPs listed per year under the EPBC Act**

**Source:** Species Profile and Threats Database<sup>4</sup>

**Note:** The 6 KTPs listed in 2000 had been listed under the preceding Endangered Species Protection Act 1992.

We estimate that at least 10 KTP nominations made since 2007 have likely been eligible for KTP listing but have not been assessed or, in the case of invasive fish, were rejected for listing by the Environment Minister (see section 3.3). Most were invasive species nominations rejected because of the all-encompassing novel biota KTP listing (Table 4-1, section 4.3.1).

The main reason for the refusal to assess KTP nominations appears to be a lack of resources in the department to undertake assessments -- as reported by the *Guardian* in 2020 based on information obtained under FOI<sup>5</sup> and as indicated by the threat abatement guidelines for the novel biota KTP.<sup>6</sup> Over the past few years, the Environment Department unit responsible for managing KTP nominations and assessments and TAP preparation has been chronically understaffed (ISC's observation).

<sup>3</sup> <https://www.environment.gov.au/sprat-public/action/fpal-submit>

<sup>4</sup> <https://www.environment.gov.au/cgi-bin/sprat/public/publicgetkeythreats.pl>

<sup>5</sup> <https://www.theguardian.com/environment/2020/may/08/australian-government-stops-listing-major-threats-to-species-under-environment-laws>

<sup>6</sup> <https://www.awe.gov.au/sites/default/files/env/pages/008e4e04-642a-45b5-8313-53514b0e1b52/files/novel-biota-threat-abatement-guidelines.pdf>

As well as hindering Australia's capacity to abate major threats, the failure to assess eligible KTP nominations is not fair to those who prepare the nominations in the reasonable expectation that they will be objectively considered. The preparation of KTP nominations is very demanding. Most of the unassessed nominations were prepared by NGOs, including two by the Invasive Species Council, representing a major waste of scarce community resources.

### 3.3 Environment ministers have rejected scientific advice to assess and list KTPs

For at least two KTP nominations the environment minister of the time has rejected the advice of the Threatened Species Scientific Committee (TSSC) to assess a nomination or to list a KTP.

A KTP nomination for *The introduction in Australian inland waters of native or non-native fish that are outside their natural geographic distribution* was placed on the FPAL in 2007 and assessed by the TSSC as eligible for listing.<sup>7</sup> The Environment Department's website describes it as 'one of the major conservation issues in inland aquatic environments'.<sup>8</sup> However, in 2011 the Environment Minister rejected the TSSC's advice and decided to not list this KTP. No reason is provided on the departmental website.<sup>9</sup>

*The cascading effects of the loss or removal of dingoes from Australian landscapes* was nominated as a KTP in 2015 and resubmitted in 2016 and 2017.<sup>10</sup> In 2017, the TSSC recommended that it be assessed – 'there is merit in exploring the role of dingoes in controlling introduced predators and overabundant native herbivores, and enabling the survival and recovery of threatened plants and animals in Australian ecosystems' – but this advice was rejected by the Environment Minister and, noting this, the TSSC decided not to recommend it be placed on the 2018 FPAL.<sup>11</sup>

Both these potential KTPs are likely to have been controversial listings – the dingo nomination because sheep farmers regard dingoes as a major pest, and the non-native fish nomination because recreational fishers oppose controls on stocking invasive fish such as rainbow and brown trout. The ministerial rejection of scientific advice gives rise to concern that some nominations are rejected for political rather than scientific or conservation reasons. The lack of transparency in ministerial decision-making is deeply problematic. Such information should be publicly disclosed as a matter of course.

### 3.4 The listing process is inefficient

The process for assessing KTPs is time-consuming. Table 3-3 lists the time it has taken to assess KTP nominations since 2007, from the time that KTP nominations close until listing or rejection. Since 2007 assessments have taken an average of 3.4 years for listed KTPs (4 listings) and 5.4 years for rejected nominations (3 listings). These statistics do not include the more-than-13 years that the adverse fire regimes KTP has been under assessment.

---

<sup>7</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/nominations/ineligible-ktp/introduction-australian-inland-waters-of-native-non-native-fish>

<sup>8</sup> <https://www.environment.gov.au/biodiversity/threatened/nominations/ineligible-ktp/introduction-australian-inland-waters-of-native-non-native-fish>

<sup>9</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/nominations/ineligible-ktp/introduction-australian-inland-waters-of-native-non-native-fish>

<sup>10</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/nominations/ktp-not-prioritised-assessment>

<sup>11</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/nominations/ktp-not-prioritised-assessment>

**Table 3-3.** Duration of assessments for KTP nominations since 2007

Nomination	KTP nominations closed	Rejected (date)	Listed (effective date)	Assessment duration
Damage to marine ecosystems by trawling in the area of the Southern and Eastern Scalefish and Shark Fishery	Mar-07	May-13		6.1 years
Ecosystem degradation, habitat loss and species decline due to invasion of Northern Australia by introduced gamba grass ( <i>Andropogon gayanus</i> ) and other introduced grasses	Mar-07		Sep-09	2.5 years
Loss and degradation of native plants and animal habitats by invasion of escaped garden plants	Mar-07		Jan-10	2.8 years
The introduction of live native or non-native fish into Australian watercourses that are outside their natural geographic distribution	Mar-07	Nov-11		4.7 years
Fire regimes that cause biodiversity decline	Mar-08	Assessment ongoing		>13.5 years
The introduction of novel biota and its impact on biodiversity	Mar-08		Feb-13	4.9 years
Biodiversity decline and habitat degradation in the Australian rangelands due to the proliferation, placement and management of artificial watering points	Mar-09	Sep-14		5.5 years
Aggressive exclusion of birds from potential woodland and forest habitat by overabundant noisy miners <i>Manorina melanocephala</i>	Mar-11		May-14	3.2 years

**Source:** FPAL lists<sup>12</sup>

**Note:** We have assumed that the 2021 timeframe for KTP nominations (closed 31 March 2021) applies to previous years. The assessment period starts on 1 October for nominations placed on the FPAL.

<sup>12</sup>

[https://www.awe.gov.au/environment/biodiversity/threatened/assessments/fpal#:~:text=The%20Finalised%20Priority%20Assessment%20List,1%20October%E2%80%9330%20September\).](https://www.awe.gov.au/environment/biodiversity/threatened/assessments/fpal#:~:text=The%20Finalised%20Priority%20Assessment%20List,1%20October%E2%80%9330%20September).)

## 4. Invasive species KTP listings

**Relevant audit criteria:** (1) Is the administration of the listing process effective and efficient? (2) Have effective and efficient arrangements been established to develop and implement plans and advice?

**Summary:** Two-thirds of listed KTPs are invasive species, which is appropriate given the scale of the threat and the variety of invasive species encompassed. Threat abatement planning (or similar) is essential for abating the threat of many harmful invasive species. To overcome the need for many more invasive KTP listings, an all-encompassing ‘novel biota’ KTP was nominated in 2008 and listed in 2013. The consequences of this have been perverse – no abatement action has resulted from the novel biota listing and yet it has been used to prevent the listing of any additional invasive species KTPs, thereby suppressing a major mechanism for abating their threats, contrary to the objects of the EPBC Act. A view apparently held by the Environment Department that the EPBC Act does not permit multiple threat abatement plans per KTP may not be legally valid.

**Note:** Some of this section includes information noted in the previous section. It has been included here for the sake of completeness.

### 4.1 Invasive species are a major driver of extinctions and declines

Since European colonisation of Australia, the two major causes of extinction have been invasive species and land clearing [9]. Of the 100 unique Australian species recognised by Australian governments or the IUCN as extinct, invasive species have contributed to 79% of confirmed extinctions (mainly of animals) and been primarily responsible for 45% of them. Land clearing has contributed to 62% of those confirmed extinctions (mainly of plants) and been primarily responsible for 36% of them [9].

Invasive species have thus been the major driver of recorded extinctions in Australia and remain the highest impact threat to Australian species. A recent analysis by Ward et al (2021) of threats to 1795 taxa listed under the EPBC Act found that the most prevalent medium-impact and high-impact threats, as judged by experts, were [11]:

- invasive species and diseases, impacting 42% of listed taxa
- habitat loss, degradation and fragmentation, impacting 27% of listed taxa
- adverse fire regimes, impacting 23% of listed taxa
- climate change and extreme weather, impacting 8% of listed taxa.

A 2018 study by many of the same authors (Kearney et al 2018), using the Australian Government’s Species Profile and Threats database<sup>13</sup> found that invasive species impact 82% of listed threatened terrestrial taxa and that the category encompasses 267 invasive species (207 plants, 57 animals and 3 pathogens) [10].

---

<sup>13</sup> <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>

Therefore, comprehensively listing harmful invasive species and applying effective mechanisms to abate their threats is essential for the recovery of a large proportion of threatened species and ecological communities.

## 4.2 The threat abatement system is essential for addressing major invasive species threats

Given the variety and severity of invasive species threats, it is not surprising that the majority of KTP listings – 14 of 21 listed KTPs – are invasive species (this includes introduced pathogens). They range from individual species listings such as feral cats, unmanaged goats and chytrid fungus to group listings such as escaped garden plants to the all-encompassing novel biota KTP.

A functional threat abatement system is essential for effectively managing invasive species threats. These threats are pervasive and often very challenging to abate. Laws and national park boundaries are no barriers to the spread of invasive species. The most feasible way of abating many invasive species threats is to establish a national taskforce, develop a national plan, appoint a national coordinator, commission research to learn more about the threat and develop effective abatement methods, and implement priority management actions – everything that threat abatement planning should do.

Unless Australia's threat abatement system becomes more effective, many threatened species and ecological communities will be doomed to perpetual rarity or eventual extinction. This is evident, for example, with mammals highly threatened by feral cats and foxes. More than a third (36%) of surviving non-flying mammal species are 'extremely' or 'highly' susceptible to predation by cats and foxes [13]. Several species are confined to islands or fenced reserves because they cannot survive in the presence of cats and foxes, while others rely on intensive baiting [14,15]. A similar susceptibility applies for frogs at risk of extinction from chytrid fungus [16], native fish susceptible to predation by introduced trout [17], and plants severely impacted by the pathogens *Phytophthora cinnamomi* [18] or myrtle rust [12] or by ungulates (eg deer, horses, pigs) [11,19] (see Table 5-1 for major threats to Australia's most imperilled species).

Although the current list of invasive species KTPs appears to be comprehensive thanks to the 2013 listing of the novel biota KTP, this listing has thus far been of no direct benefit for abating invasive species threats and, perversely, has prevented the listings of KTPs that could have catalysed effective action on serious invasive species threats.

## 4.3 The novel biota KTP listing has stymied the listing and abatement of invasive species threats

In 2013, 'Novel biota and their impact on biodiversity' was listed as a KTP. It had been nominated by the Threatened Species Scientific Committee (TSSC) and placed on the FPAL 5 years earlier, in 2008. It encompasses 6 categories of invasive species threats:<sup>14</sup>

- A. Competition, predation or herbivory and habitat degradation by vertebrate pests

---

<sup>14</sup> <https://www.awe.gov.au/sites/default/files/env/pages/008e4e04-642a-45b5-8313-53514b0e1b52/files/novel-biota-listing-advice.pdf>



- B. Competition, predation or herbivory and habitat degradation by invertebrate pests
- C. Competition, habitat loss and degradation caused by terrestrial weeds
- D. Competition, habitat loss and degradation caused by aquatic weeds and algae
- E. Competition, predation or herbivory and habitat degradation by marine pests
- F. Mortality, habitat loss and degradation caused by pathogens.

#### 4.3.1 The perverse consequences of the novel biota KTP listing

KTP listings are intended to advance the objects of the EPBC Act to protect threatened species and ecological communities by facilitating management of their threats. But, for the past 13 years at least, the effect of the novel biota listing has been the opposite, for it has stymied the listing and management of additional invasive species beyond the already listed KTPs (14 in total).

Since 2008, five nominations of invasive species KTPs have been rejected on the basis that they are encompassed by the broader 'novel biota' KTP (Table 4-1, also see Appendix 1).<sup>15</sup> A sixth nomination (invasive fish) was rejected by the Environment Minister after being assessed by the TSSC and recommended for listing. Because the reasons for that rejection are not available on the departmental website, we don't know whether this was due to it being a controversial listing or because of the novel biota listing. Whatever the reason, no invasive species KTP nomination has been accepted for assessment (placed on the FPAL) since the novel biota KTP was nominated.

Encompassing a multitude of invasive species in one novel biota listing would be helpful if it led to action to abate the highest priority threats. And this is what the Threatened Species Scientific Committee presumably intended when it nominated the novel biota KTP.<sup>16</sup> But, so far, the only action catalysed by the listing has been publication of a few fact sheets.<sup>17</sup>

---

<sup>15</sup> <https://www.environment.gov.au/biodiversity/threatened/nominations/ktp-not-prioritised-assessment>

<sup>16</sup> <https://www.environment.gov.au/system/files/pages/008e4e04-642a-45b5-8313-53514b0e1b52/files/novel-biota-threat-abatement-guidelines.pdf>

<sup>17</sup> <http://www.environment.gov.au/cgi-bin/sprat/public/publicshowkeythreat.pl?id=20>

**Table 4-1.** Nominated invasive species KTPs not assessed or rejected subsequent to the 2008 nomination of ‘Novel biota and their impact on biodiversity’

Nominated invasive species KTP	Year nominated	Outcome	Reason given
Loss of habitat and native flora due to expansion of the weed lippia ( <i>Phyla canescens</i> )	2008	Not assessed	Falls under the novel biota KTP assessment
The invasion, establishment and spread of <i>Lantana camara</i> impacts negatively on native biodiversity including many EPBC listed species and communities	2008	Not assessed	Falls under the novel biota KTP assessment
Ecosystem degradation, habitat loss and species decline due to invasion in southern Australia by introduced tall wheat grass ( <i>Lophopyrum ponticum</i> )	2010	Not assessed	Falls under the novel biota KTP assessment
Introduction in Australian inland waters of native or non-native fish that are outside their natural geographic distribution	2007	Ministerial rejection 2011	No reason available. Assessed by the TSSC as eligible for listing.
Herbivory and habitat degradation by feral deer	2011	Not assessed	Falls under the novel biota KTP assessment
Ecosystem degradation, habitat loss and species decline in arid and semi-arid Australia due to the invasion of buffel grass ( <i>Cenchrus ciliaris</i> and <i>C. pennisetiformis</i> )	2012	Not assessed	Falls under the novel biota KTP assessment
Introduction, establishment, and spread of, and infection by, exotic rust fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	2014	Not assessed	Falls under the novel biota KTP assessment

Sources: Australian Government<sup>18,19</sup>

### 4.3.2 The potential of the novel biota listing

What the novel biota listing was meant to achieve is not wholly clear. The Environment Department wrote to the Invasive Species Council in September 2011 that the novel biota KTP had been nominated to ‘avoid the need for assessments of individual invasive species’ (see Appendix 1; this letter was to inform the Invasive Species Council that our two nominations would not be assessed because of the novel biota listing.)

The 2013 novel biota threat abatement guidelines imply that resource deficiencies were a major reason for the novel biota listing – because the list of nominated invasive species:<sup>20</sup>

*has grown so large that individual evaluations could divert the Government’s attention and resources for many years. Despite a wide range of legislation, plans, strategies and initiatives, the impacts of novel biota on Australian ecosystems are increasing.*

<sup>18</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/nominations/ktp-not-prioritised-assessment>

<sup>19</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/nominations/ineligible-key-threatening-processes>

<sup>20</sup> <https://www.environment.gov.au/system/files/pages/008e4e04-642a-45b5-8313-53514b0e1b52/files/novel-biota-threat-abatement-guidelines.pdf>

The 2013 guidelines point to the potential benefits of the listing, if it led to a systematic prioritised planning approach to invasive species threats:<sup>21</sup>

*Despite a wide range of legislation, plans, strategies and initiatives, the impacts of novel biota on Australian ecosystems are increasing. The current state legislative and management arrangements make timely and effective action cumbersome and unwieldy. If this continues, more species and ecological communities will be affected and the task of management will become more difficult. The Threatened Species Scientific Committee (the Committee) considers that there is a lack of consistent mechanisms for setting priorities to abate the threats posed by novel biota. Accordingly, the Committee proposes that all novel biota should be seen as a real or potential threat to native biodiversity, and that a new planning framework should be developed to integrate the responses to different species. [Underlining added]*

The Invasive Species Council has had preliminary discussions with the Environment Department about a potential method for prioritising invasive species for threat abatement. We support this proposed approach, but the long period of inaction since the listing of the novel biota KTP is unacceptable.

Whatever the original intention, the unfortunate consequence has been suppression of the major mechanism to achieve national abatement of invasive species threats to the environment. In the 13 years since the nomination, no new invasive species KTPs have been listed, and many invasive species threats have worsened. And in the 8 years since the novel biota listing, no new planning framework has been developed.

This inaction has been costly. For example, since our nomination of feral deer as a KTP in 2011,<sup>22</sup> the threat has escalated as deer have rapidly multiplied and spread. The cost and difficulty of managing them is now much greater than if action had been taken a decade ago. We nominated the KTP because national recognition of the threat and federal leadership and coordination was needed to overcome the inaction by state governments, who were protecting feral deer for the sake of hunters rather than managing them as a threat (feral deer are still protected in Victoria and Tasmania).<sup>23</sup>

The need for national threat recognition and leadership was also the motivation for our 2010 KTP nomination of tall wheatgrass, a highly invasive pasture grass bred and promoted by the Victorian Government despite the threats to biodiversity.<sup>24</sup>

---

<sup>21</sup> <https://www.environment.gov.au/system/files/pages/008e4e04-642a-45b5-8313-53514b0e1b52/files/novel-biota-threat-abatement-guidelines.pdf>

<sup>22</sup> <https://invasives.org.au/publications/nomination-feral-deer-federal-key-threatening-process-march-2011/>

<sup>23</sup> <https://invasives.org.au/publications/nomination-feral-deer-federal-key-threatening-process-march-2011/>

<sup>24</sup> <https://invasives.org.au/publications/nomination-tall-wheat-grass-invasion-federal-key-threatening-process-march-2010/>

### 4.3.3 The neglected potential for multiple threat abatement plans under the novel biota KTP

In 2013, the Environment Minister decided to not have a TAP to abate the novel biota KTP.<sup>25</sup> This was consistent with the advice of the TSSC. Although it is clearly not feasible to abate the multiple types of novel biota threats with a single TAP, the minister apparently did not consider the potential for multiple TAPs to be a feasible, effective and efficient way to abate novel biota threats.

We have been advised that the Environment Department considers the EPBC Act does not allow for multiple TAPs for a single KTP. This is reflected in the TSSC listing advice for novel biota, which considers only the feasibility, effectiveness and efficiency of having one TAP to abate the entire threat.<sup>26</sup>

We have recently obtained legal advice that the EPBC Act does allow for multiple TAPs per KTP (we should be able to provide formal legal advice by December 2021). Section 23(b) of the *Acts Interpretation Act 1901* (Cth) states that ‘words in the singular number include the plural’. Therefore, references to ‘a threat abatement plan’ in section 270A of the EPBC Act can be interpreted as allowing for the development of multiple TAPs per KTP. Such an interpretation would best achieve the objects of the EPBC Act, consistent with section 15AA of the *Acts Interpretation Act*, which states that:

*In interpreting a provision of an Act, the interpretation that would best achieve the purpose or object of the Act (whether or not that purpose or object is expressly stated in the Act) is to be preferred to each other interpretation.*

If the Environment Minister or Environment Department has legal advice to the contrary stating that multiple threat abatement plans per KTP are not permitted, the EPBC Act should be amended to address this unintended consequence of listing overarching threat categories as KTPs (an issue mainly pertinent to invasive species).

We also believe the Environment Minister applied the wrong legal test when making the decision to not have a TAP or TAPs to respond to the novel biota KTP – by considering whether a TAP would provide the most feasible, effective and efficient way of abating the KTP rather than a feasible, effective and efficient way. This is discussed in section 6.1.1.

---

<sup>25</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/novel-biota-impact-on-biodiversity>

<sup>26</sup> <https://www.awe.gov.au/sites/default/files/env/pages/008e4e04-642a-45b5-8313-53514b0e1b52/files/novel-biota-listing-advice.pdf>

## 5. Listing of threatened species

**Relevant audit criteria:** (1) Is the administration of the listing process effective and efficient? (2) Have effective and efficient arrangements been established to develop and implement plans and advice?

**Summary:** The list of threatened species under the EPBC Act is far from comprehensive. It does not include 29 taxa recently assessed (by expert elicitation) as being at 'high' or >50% risk of extinction within 10 or 20 years, particularly fishes, reptiles and plants. Of the 96 taxa assessed as being at high or >50% risk of extinction, more than 60% lack a national recovery plan. Of the 37 taxa with recovery plans, 70% of the plans are more than 10 years old.

### 5.1 Many species at imminent risk of extinction are not listed as threatened under the EPBC Act

Australia's list of threatened species under the EPBC Act is a poor reflection of the actual state of biodiversity at risk. The deficiencies of the listing process are starkly exemplified by the absence from the list of several species judged in recent expert elicitation assessments to be at high or >50% risk of imminent extinction (within 10 years for plants and 20 years for animals) (Table 5-1) [17,19–23]. The gaps in the national threatened species list are particularly significant for fishes, reptiles, plants and invertebrates (only butterflies have been assessed in the recent studies of extinction risk).

Of Australia's 22 most imperilled freshwater fishes, 20 have been assessed as having a >50% risk of extinction within 2 decades, but only 3 of the 22 are listed as threatened under the EPBC Act [17] (Table 5-1). Of Australia's 20 most imperilled terrestrial squamates (snakes and lizards), 13 are not listed as threatened under the EPBC Act, including 4 assessed as having a >50% risk of extinction within 2 decades [20]. Of Australia's 26 most imperilled butterflies, 23 are not listed as threatened under the EPBC Act [21]. In addition, 1 mammal and 2 frog taxa among Australia's most imperilled taxa are not listed as threatened [22,23]. Overall, of the 134 animal taxa assessed as being the most imperilled of their groups, 58 (43%) are not listed as threatened under the EPBC Act.

Of 55 plant taxa assessed in 2019 as being at high risk<sup>27</sup> of extinction within a decade, 6 are not listed under the EPBC Act (7 have been recently listed, all as critically endangered) and for others their status under the EPBC Act does not match their high degree of imperilment [19]. Another 132 have been assessed as having a moderate risk of extinction in 10 years, but we have not checked how many are listed as threatened. Overall, of a candidate list of 1,135 'highly threatened' plant taxa, 81 at the time of the 2017 assessment were not listed under either the EPBC Act or state/territory legislation [19].

Table 5-2 lists the 29 taxa (fishes, reptiles and plants) assessed as having a high or >50% risk of extinction within 10 or 20 years that are not listed under the EPBC Act (30% of the high-risk taxa). The proportion of unlisted taxa is likely to be even higher for the additional taxa assessed as being at moderate or lower (<50%) risk of extinction within 20 years.

---

<sup>27</sup> The plant taxa assessed as being at high risk of extinction within 10 years weren't assigned a percentage risk. They were all extremely rare taxa (known from <250 individuals and/or a single population) and assessed as undergoing continuing decline (Silcock and Fensham 2019).

There are also likely to be many more species in grave peril as well as many more extinctions than recognised under the EPBC Act (37 plant taxa<sup>28</sup> and 67 animal taxa<sup>29</sup> are currently recorded as extinct under the EPBC Act). In Western Australia, 23 endemic plant species have not been recorded for more than 50 years, and on Christmas Island more than 50 endemic invertebrate species have not been recorded for at least 100 years [9,24]. Even among mammals, at least another 8 endemic species – most previously not recognised as species – are likely to be extinct [9]. And another 2 frog species are also probably extinct [16].

## 5.2 The majority of Australia’s most imperilled species do not have a recovery plan

Only 37 of 96 taxa assessed as having a high or >50% risk of extinction within 10 to 20 years are subject to a recovery plan under the EPBC Act (Table 5-3). The 59 taxa lacking a recovery plan comprise 30 taxa listed as threatened under the EPBC Act and 29 taxa not listed. Applying the average time it takes to list threatened species (say 3 years) and the several years (often >10 years) it takes to prepare recovery plans (very few recovery plans are recommended these days)<sup>30</sup> a substantial proportion of these taxa are likely to be extinct or close to it before any recovery plan under the EPBC Act is prepared (let alone acted on). Of the 37 taxa with a recovery plan, 26 (70%) plans are more than 10 years old, suggesting a lack of recovery activity.

The major threats to the most imperilled species are the big 4 mega-threats (often in combination): a wide variety of invasive species (more than 250 pathogens, weeds, vertebrates or invertebrates are recorded as threats [10]), adverse fire regimes, habitat destruction, and climate change (Table 5-1). The inefficiencies of Australia’s listing process and the lack of recovery plans for imperilled taxa highlight the importance of optimising the integration of recovery priorities within threat abatement plans and programs. They also highlight the importance of focusing on research to develop abatement solutions for high priority invasive species threats and other difficult-to-abate threats.

---

<sup>28</sup> <https://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora>

<sup>29</sup> <https://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=fauna>

<sup>30</sup> Very few taxa listed as critically endangered since 2010 are required to have a recovery plan. And the majority of taxa required to have a recovery plan do not get one unless they already had a plan in place. The following 9 critically endangered taxa are required to have a recovery plan but do not (the date is the year of the listing):

- 2010: [https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=21846](https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=21846)
- 2010: [https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=82403](https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=82403)
- 2012: [https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=22903](https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=22903)
- 2013: [https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=76155](https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=76155)
- 2019: [https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=1934](https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1934)
- 2019: [https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=1934](https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1934)
- 2014: [https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=1526](https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1526)
- 2018: [https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=198](https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=198)
- 2014: [https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=87611](https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=87611)

**Table 5-1.** The extinction risks of Australia’s most imperilled taxa, whether they are listed as threatened under the EPBC Act, and their major threats (all as assessed by expert elicitation)

Group	Extinction risk within 20 years			Number not listed, EPBC Act	Major threats
	>50%	20–50%	<20%		
Freshwater fishes [17]	20	2	-	19 of 22	Climate change (increased frequency of extreme events), invasive species (mainly trout) [17]
Birds [22]	9	6	5	0 of 20	Invasive species (mainly predators), adverse fire regimes, habitat destruction, livestock grazing [25]
Lizards & snakes [20]	6	8	6	13 of 20	Invasive species (mainly weeds, cats, foxes), land clearing, livestock grazing, adverse fire regimes, climate change [20,26]
Frogs [23]	4	10	8	2 of 22	Invasive species (chytrid fungus, pigs, fish), climate change, adverse fire regimes, habitat destruction [23]
Mammals [22]	1	15	4	1 of 20	Invasive species (cats, foxes), adverse fire regimes [27]
Butterflies [21]	1	7	18	23 of 26	Adverse fire regimes, habitat destruction, invasive species, climate change [21]
	Extinction risk within 10 years				
	'High' risk		'Moderate' risk		
Plants [19]	55		132	7 of 55 high risk taxa	Herbivores (feral, native, domestic), climate change, adverse fire regimes, invasive pathogens (mainly Phytophthora), urbanisation [19]

**Sources:** As noted in the table.

**Notes:** For plants, taxa assessed as being at ‘high risk’ of extinction within 10 years are extremely rare (known from <250 individuals and/or a single population) and are undergoing continuing decline. For the frogs, an additional 4 species assessed as having a >50% risk of extinction are regarded as already extinct (and this may be the case also for 2 additional species), so haven’t been included here.

**Table 5-2.** Taxa not listed under the EPBC Act assessed as having a high (plants) or >50% (animals) risk of extinction within 10 years (plants) or 20 years (animals)

Group	Taxa
Snakes & lizards [20]	<p>Fassifern blind snake (<i>Anilius inoperatus</i>)</p> <p>Lyons grassland striped skink (<i>Austroblepharus barrylyoni</i>)</p> <p>Bathurst grassland earless dragon (<i>Tympanocryptis mccartneyi</i>)</p> <p>Gravel Downs ctenotus (<i>Ctenotus serotinus</i>)</p>
Freshwater fishes [17]	<p>East Gippsland galaxias (<i>Galaxias aequipinnis</i>)</p> <p>Short-tailed galaxias (<i>Galaxias brevissimus</i>)</p> <p>Shaw galaxias (<i>Galaxias gunaikurnai</i>)</p> <p>Tapered galaxias (<i>Galaxias lanceolatus</i>)</p> <p>West Gippsland galaxias (<i>Galaxias longifundus</i>)</p> <p>McDowall's galaxias (<i>Galaxias mcdowalli</i>)</p> <p>Dargo galaxias (<i>Galaxias mungadhan</i>)</p> <p>Kosciuszko galaxias (<i>Galaxias supremus</i>)</p> <p>Stocky galaxias (<i>Galaxias tantangara</i>)</p> <p>Hunter galaxias (<i>Galaxias</i> sp.)</p> <p>Moroka galaxias (<i>Galaxias</i> sp.)</p> <p>Morwell galaxias (<i>Galaxias</i> sp.)</p> <p>Yalmy galaxias (<i>Galaxias</i> sp.)</p> <p>Daintree rainbowfish (<i>Cairnsichthys bitaeniatus</i>)</p> <p>Malanda rainbowfish (<i>Melanotaenia</i> sp.)</p> <p>Running River rainbowfish (<i>Melanotaenia</i> sp.)</p> <p>SW Victoria river blackfish (<i>Gadopsis</i> sp.)</p> <p>Barrow cave gudgeon (<i>Milyeringa justitia</i>)</p>
Plants [19]	<p><i>Zieria exsul</i></p> <p><i>Spiranthes elytra</i></p> <p><i>Grevillea hodgei</i></p> <p><i>Eucalyptus ornans</i></p> <p><i>Eriochilus paludosus</i></p> <p><i>Diuris byronensis</i></p> <p><i>Clausena smyrelliana</i></p>

**Sources:** As indicated for each group. Note that the high-risk plants were not assigned a % extinction risk. The high-risk category comprises taxa assessed as extremely rare (known from <250 individuals and/or a single population) and undergoing continuing decline.



**Table 5-3.** The state of recovery planning for taxa assessed as having a high or >50% chance of extinction within 10 or 20 years

Group	Taxa with a national recovery plan (year published)	Taxa lacking a national recovery plan
Mammals	Central rock-rat (2018)	
Birds	King Island brown thornbill (2012) Orange-bellied parrot (2016) King Island scrubtit (2012) Western ground parrot (2014) Plains-wanderer (2016) Regent honeyeater (2016)	Houtman Abrolhos painted button-quail Grey Range thick-billed grasswren Herald petrel (ceased 2015)
Snakes & lizards	Victoria grassland earless dragon (2012)	Fassifern blind snake Lyons grassland striped skink Bathurst grassland earless dragon Gravel Downs ctenotus Arnhem Land gorges skink
Frogs	Kroombit tinker frog (2002) Southern corroboree frog (2012) Armoured mistfrog (2001)	Baw Baw frog
Fishes	Swan galaxias (2006) Red-finned blue-eye (2010)	East Gippsland galaxias Short-tailed galaxias Shaw galaxias Tapered galaxias West Gippsland galaxias McDowall's galaxias Dargo galaxias Kosciuszko galaxias Stocky galaxias Hunter galaxias ( <i>Galaxias</i> sp.) Moroka galaxias ( <i>Galaxias</i> sp.) Morwell galaxias ( <i>Galaxias</i> sp.) Yalmy galaxias ( <i>Galaxias</i> sp.) Daintree rainbowfish Malanda rainbowfish ( <i>Melanotaenia</i> sp.) Running River rainbowfish ( <i>Melanotaenia</i> sp.) SW Victoria river blackfish ( <i>Gadopsis</i> sp.) Barrow cave gudgeon
Butterflies		Australian fritillary
Plants	<i>Acacia pharangites</i> (2009) <i>Ballantinia antipoda</i> (2010) <i>Banksia montana</i> (2005) <i>Borya mirabilis</i> (2010) <i>Caladenia amoena</i> (2001) <i>Caladenia busselliana</i> (2008) <i>Calochilus richiae</i> (2010) <i>Commersonia erythrogyna</i> (2003)	<i>Acacia subflexuosa</i> subsp. <i>capillata</i> (ceased 2015) <i>Acacia volubilis</i> (ceased 2015) <i>Antrophyum austroqueenslandicum</i> <i>Banksia fuscobracteata</i> <i>Banksia vincentia</i> <i>Caladenia macroclavia</i> (ceased 2021) <i>Clausena smyrelliana</i> <i>Daviesia bursarioides</i>

Group	Taxa with a national recovery plan (year published)	Taxa lacking a national recovery plan
	<i>Cyphanthera odgersii</i> subsp. <i>occidentalis</i> (2008) <i>Epacris stuartii</i> (1999) <i>Epilobium brunnescens</i> subsp. <i>beaugleholei</i> (2006) <i>Eremophila pinnatifida</i> (2002) <i>Gossia gonoclada</i> (2001) <i>Kelleria bogongensis</i> (2006) <i>Lambertia echinata</i> subsp. <i>occidentalis</i> (2003) <i>Phebalium daviesii</i> (2011) <i>Pityrodia scabra</i> subsp. <i>scabra</i> (2009) <i>Prasophyllum correctum</i> (2006/2010) <i>Prasophyllum murfetii</i> (2009) <i>Prasophyllum taphanyx</i> (2017) <i>Prasophyllum tunbridgense</i> (2017) <i>Senecio behrianus</i> (2010) <i>Spyridium furculentum</i> (2006) <i>Wikstroemia australis</i> (2010)	<i>Diuris byronensis</i> <i>Eremophila subangustifolia</i> <i>Eriochilus paludosus</i> <i>Eucalyptus imlayensis</i> <i>Eucalyptus ornans</i> <i>Gentiana bredboensis</i> <i>Grevillea caleyi</i> (ceased 2015) <i>Grevillea calliantha</i> <i>Grevillea hodgei</i> <i>Grevillea</i> sp. Gillingarra (R. J. Cranfield 4087) <i>Hibbertia tenuis</i> <i>Petrophile latericola</i> <i>Pimelea cremnophila</i> <i>Pimelea venosa</i> <i>Pomaderris delicata</i> <i>Prasophyllum laxum</i> <i>Pterostylis psammophila</i> <i>Pultenaea</i> sp. Genowlan Point (NSW 417813) <i>Sphaerolobium acanthos</i> <i>Spiranthes elytra</i> <i>Symonanthus bancroftii</i> (ceased 2021) <i>Verticordia spicata</i> subsp. <i>squamosa</i> (ceased 2016) <i>Zieria exsul</i>

**Sources:** SPRAT databases (for listed threatened taxa)<sup>31</sup> and expert elicitation studies for extinction risks [17,19–23]

**Note:** The taxa lacking recovery plans include those not listed as threatened under the EPBC Act (see Table 5-2). Some were assessed by the TSSC as not requiring a recovery plan.

The first Threatened Species Strategy (2015-2020)<sup>32</sup> included targets for improving recovery plan implementation, monitoring and governance. There is no evidence that the Australian Government met any of these targets. The plan included establishing:

- a national database of recovery teams,
- a monitoring and reporting framework for recovery plan implementation and
- creating a national network to enhance recovery efforts.

The Environment Department still states on its website that:

<sup>31</sup> <https://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=fauna> and <https://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora>

<sup>32</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/publications/threatened-species-strategy-2015-2020>

*A list of nationally registered recovery teams will be published on the Department's website and recovery team reporting will be published annually.<sup>33</sup>*

And

*An electronic on-line 'Recovery Team Annual Progress Report' is currently being developed and will be trialled in the first half of 2018.<sup>34</sup>*

However, there is no publicly available information to suggest that either of these were implemented. This warrants interrogation by the ANAO team.

Concerningly, recovery teams have conveyed to ISC staff their reluctance to register as an official Recovery Team under the government's proposed framework due to:

- increased administrative burdens with limited to no additional support
- perceptions that the terms of reference would inhibit recovery teams advocating for the conservation of species (especially where this involves criticisms of government policy).

---

<sup>33</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/recovery-teams/national-register> (accessed 5-11-21)

<sup>34</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/recovery-teams/monitoring-reporting> (accessed 5-11-21)

## 6. Development of threat abatement plans

**Relevant audit criterion:** (2) Have effective and efficient arrangements been established to develop and implement plans and advice?

**Summary:** Ministerial decisions to not have a TAP to address a KTP (currently the case for 9 KTPs) lack transparency, and the few published ministerial reasons lack rigour. They cite existing measures addressing threats without any analysis of whether these measures are effective. A recent decision to not have a TAP or TAPs to address the novel biota KTP applied an incorrect interpretation of the EPBC Act - by considering whether a TAP was the most feasible, effective and efficient way to abate the KTP rather than whether it was a feasible, effective and efficient way to do so. There was also a failure to consider whether the KTP could be abated by multiple TAPs. The processes for preparing, reviewing and revising TAPs are inefficient. Currently, there are 3 TAPs awaiting revisions 5–8 years after reviews and another 2 unrevised TAPs that are 9–10 years old.

### 6.1 Decisions to not develop a TAP lack transparency and rigour and may be applying the wrong test

Only 12 of 21 listed KTPs currently have a threat abatement plan (Figure 6-1). Another 2 KTPs (red imported fire ants and yellow crazy ants on Christmas Island) are subject to a biosecurity plan (which replaced a previous TAP). That leaves 7 KTPs without any TAP or equivalent plan (Figure 6-1), including the novel biota KTP encompassing a wide variety of invasive species threats (section 4).

Under section 270A(2) of the EPBC Act:

*The Minister must decide to have a threat abatement plan for the process if he or she believes that having and implementing a threat abatement plan is a feasible, effective and efficient way to abate the process.*

The ministerial decision to not have a TAP lacks transparency in most cases. For most KTPs lacking a TAP there is no information on the departmental website about why the minister made the decision to not have a TAP and what the views of submitters were. It is also not evident from the departmental website whether decisions to not have a TAP have been reconsidered every five years as required under the EPBC Act section 270A(1).

Where ministerial reasons are provided, they mostly do not address the criteria for ‘feasible, effective and efficient’ outlined in *Guidelines for assessing key threatening process nominations according to the Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act) and EPBC Regulations 2000*.<sup>35</sup> To determine feasibility, the guidelines specify that ‘an analysis needs to be undertaken using scientific (including social dimensions) information to evaluate the possible success of interventions’. This should include (among other assessments) the development of one or more options for intervention; an assessment of the effectiveness of each option in providing a contribution to abatement; a designation of the level of confidence that each option will contribute to a reduction in the threat that is faster than either ‘business as normal’ or the rate of increase in the threat’ the resources required for each option;

---

<sup>35</sup> <https://www.awe.gov.au/sites/default/files/env/pages/d72dfd1a-f0d8-4699-8d43-5d95bbb02428/files/ktp-guidelines.pdf>

and a determination of surveillance and/or monitoring that would be required to determine whether an option has been successful. For effectiveness, the guidelines recommend assessments (among others) of the need for the Australian Government to take a lead, to fill a national gap or to harmonise approaches (eg legislation, political will, community messages). To determine the potential efficiency of having a TAP, the guidelines recommend assessing, among other things, the direct and indirect costs of options, the outcomes of the options and the value that these contribute to abating the threat and the capacity to leverage other stakeholders including other jurisdictions to contribute to the option. Such assessments would be very useful in assessing how best to abate a KTP and the most appropriate role for the Australian Government, but there is no evidence in any of the published reasons that the guidelines have been applied.

### 6.1.1 The decision to not have a TAP for the novel biota KTP

The reasons for the ministerial decision to not have a TAP for the novel biota listing (23 January 2013) are published on the departmental website.<sup>36</sup> They are brief and lack analysis of the potential pros and cons of having one or more TAPs, and whether they would meet the guidelines for feasible, effective and efficient. The only reason given is this:<sup>37</sup>

*In addition to existing management measures that are in place at a national scale, state and territory governments have management measures in place for plant and animal weeds and pests that contribute to the management of threats arising from novel biota.*

The existing measures are not specified in the ministerial reasons (although they are in the TSSC listing advice) and their effectiveness is not considered. The mere existence of other measures does not mean that they are effective for abating a threat. It is clear from the TSSC's listing advice and the nominations for invasive species KTPs rejected because of the novel biota listing that existing measures are not effectively abating many novel biota threats.

Also of concern is that the Environment Minister of the time appears to have applied the wrong test in this decision. The ministerial reasons say this:<sup>38</sup>

*Following independent advice and public consultation, it is considered that a threat abatement plan would not be the **most** feasible, effective or efficient mechanism to manage such a broad threatening process.* [Bolding added.]

This is a very demanding test -- a TAP would have to be more feasible, effective and efficient than any other existing or potential mechanism. But it is inconsistent with the requirement under the EPBC Act, section 270A(2), which says:

---

<sup>36</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/novel-biota-impact-on-biodiversity>

<sup>37</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/novel-biota-impact-on-biodiversity>

<sup>38</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/novel-biota-impact-on-biodiversity>

*The Minister must decide to have a threat abatement plan for the process if he or she believes that having and implementing a threat abatement plan is **a** feasible, effective and efficient way to abate the process. [Bolding added.]*

The substitution of most for a significantly alters the meaning of this test. The Environment Department's website perpetuates the error in its explanation of when a TAP should be developed, saying that the decision to have a TAP:<sup>39</sup>

*is based on whether having and implementing a plan is the most 'feasible, effective and efficient way to abate the process'.*

The minister's reasons also diverge from the test under the EPBC Act by substituting 'or' for 'and' between 'effective' and 'efficient', which also changes the meaning.

We also think the Environment Minister has erred in the novel biota decision by not considering whether multiple TAPs rather than a single TAP would be 'a feasible, effective and efficient' way to abate novel biota threats. This was discussed in section 4.3.3.

### 6.1.2 Existing measures as a reason for not having a TAP

For KTPs without a TAP, the available reasons (whether provided by the TSSC or the Minister) often cite existing national, state and territory measures for addressing the KTP (Table 6-1). Although environment ministers are required to consider whether a TAP is an effective means to abate a KTP, they do not, it appears, consider whether the existing measures are effective.

In none of the cases in Table 6-1 for which existing measures are cited as a reason for not having a TAP is there any analysis of how effective these existing measures are, and whether there are gaps in those measures. For example, with the escaped garden plants KTP, the ministerial reason of 2009 notes existing measures without any comment on whether they are effective:<sup>40</sup>

*existing measures in place at national and state and territory levels provide a framework for a broad range of actions for border protection and weed management and control.*

But the TSSC's listing advice,<sup>41</sup> the threat abatement advice developed by the Environment Department,<sup>42</sup> and the 2009 review of the EPBC Act [28] (among other assessments) make clear that existing measures have not been effective in abating the KTP, and that remains the case today. As noted, this is also clearly the case for the novel biota KTP, which encompasses many invasive species threats. As the basis for sound decision-making on whether to have a TAP, there should be a gap analysis of existing abatement measures, and the canvassing of TAP-based options to remedy deficiencies in existing measures.

---

<sup>39</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/threat-abatement-plans>

<sup>40</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/escaped-garden-plants>

<sup>41</sup> <https://www.awe.gov.au/sites/default/files/env/pages/eb0c7652-5cec-4d2d-b8ae-f60cd2d30281/files/threat-abatement-advice-invasion-escaped-garden-plants.pdf>

<sup>42</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/escaped-garden-plants>

**Table 6-1.** KTPs that lack a TAP or similar plan and reasons given for not having a TAP (by the TSSC or Environment Minister)

KTP	Main reason given for not having a TAP
Land clearance	TSSC 2001: A TAP would not contribute any additional threat mitigation, would involve setting up further consultative working groups, and would be duplicative of best practice already stated in the National Framework. <sup>43</sup>
Loss of climatic habitat	TSSC 2001: A TAP could not reduce losses of climatic habitat because it is due to global emissions, would not contribute additional threat mitigation above current initiatives and would duplicate other actions. <sup>44</sup>
Sea turtle bycatch, otter trawling	TSSC 2001: Unnecessary due to actions and plans by industry to implement bycatch mitigation devices and the recovery plan for marine turtles. <sup>45</sup>
Beak & feather disease	We could not find any published reason for allowing the TAP to cease in 2015.
Escaped garden plants	Minister 2009/2014: Existing national and state and territory measures provide a framework for a broad range of actions for border protection and weed management and control. <sup>46</sup>
Novel biota	Minister 2013: Existing management measures already contribute to threat management. <sup>47</sup>
Noisy miners	Minister 2014: A TAP would be too broad in scope and coarse in resolution. <sup>48</sup>

### 6.1.3 The neglect of the potential for partial or multiple threat abatement plans

Although it seems clear that a single threat abatement plan for the novel biota KTP or the escaped garden plants KTP is not a feasible way to abate those KTPs, they encompass many threats that could feasibly be abated by a TAP. As noted in section 4.3.2, the listing of the novel biota KTP is only useful if it enables the development of TAPs to address the highest priority invasive threats encompassed by the listing. Similarly, for other overarching KTPs such as escaped garden plants, land clearance, and loss of climatic habitat, there are likely to be aspects of the threat that can feasibly, effectively and efficiently be addressed through a TAP. It appears that the potential for this has been ignored -- it is not addressed in the reasons available.

<sup>43</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/land-clearance>

<sup>44</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/loss-of-habitat-caused-by-greenhouse-gases>

<sup>45</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/incidental-catch-sea-turtles-during-otter-trawling>

<sup>46</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/escaped-garden-plants>

<sup>47</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/novel-biota-impact-on-biodiversity>

<sup>48</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/overabundant-noisy-miners>

## 6.2 Threat abatement advices are not an adequate substitute for threat abatement plans

For 3 KTPs without a TAP -- novel biota, escaped garden plants, and beak and feather disease -- the Environment Department has published a threat abatement advice or advices in place of a TAP:<sup>49</sup>

- Novel biota and their impact on biodiversity (2013)
- Ecosystem degradation, habitat loss and species decline in arid and semi-arid Australia due to the invasion of buffel grass (*Cenchrus ciliaris* and *C. pennisetiformis*) (2014)
- Invasive pasture grasses in northern Australia - gamba grass, para grass, olive hymenachne, perennial mission grass and annual mission grass (2014)
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants (2014)
- Psittacine circoviral (beak and feather) disease affecting endangered psittacine species (2016)

These advices do not provide any impetus for action. The use of advices implies that the main barrier to action is a lack of information about how to abate a threat. This is untrue for most major threats. Instead, what is needed is a plan and an implementation process to catalyse research and collaborative abatement (and recovery) actions.

## 6.3 The development and revision of threat abatement plans are inefficient

Figure 6-1 sets out the timeframes for the listing of KTPs and the development, review and revisions of TAPs.

Fifteen KTPs have had a TAP at some stage, although only 12 do so now. Six final or draft TAPs were carried over from the Endangered Species Protection Act in 2000. For the other 9 KTPs, the time between the KTP listing and the TAP going into effect has ranged from 1 to 6 years and averaged about 3.5 years. For the 2 most recent KTP listings with a TAP, the time lag has been about 3 years. Although the development of most TAPs has occurred within the 3-year statutory timeframe, this does not mean the process is efficient.

Most TAPs have been reviewed within 6 years and completed TAP revisions have then taken 1 to 5 years after the review. But the following 5 TAPs are almost-or-more-than a decade old and still awaiting revisions:

- The unmanaged goats TAP (2008) was reviewed in 2013 and the Environment Minister made a decision in 2014 that the plan should be modified. This has not occurred.
- The red foxes TAP (2008) was reviewed in 2013 and the Environment Minister made a decision in 2013 that the plan should be modified. It is currently being revised.<sup>50</sup>

---

<sup>49</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/threat-abatement-advices>

<sup>50</sup> <https://www.awe.gov.au/sites/default/files/documents/three-chiefs-newsletter-june-2021.pdf>



- The exotic rodents offshore islands TAP (2009) was reviewed in 2016, and the Environment Minister made a decision in 2016 that the plan should be modified.<sup>51</sup> This has not occurred.
- The cane toads TAP (2011) was reviewed in 2016<sup>52</sup> and is now being revised.<sup>53</sup>
- We assume that the five listed grasses TAP (2012) has also been reviewed but there is no information on the departmental website about that review or whether the TAP will be revised.

This means that only 9 of 21 KTPs have an up-to-date TAP or biosecurity plan.

---

<sup>51</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/publications/tap/reduce-impacts-exotic-rodents-biodiversity-australian-offshore>

<sup>52</sup>

[https://www.aph.gov.au/Parliamentary\\_Business/Committees/House/Environment\\_and\\_Energy/Canetoads/Government\\_Response](https://www.aph.gov.au/Parliamentary_Business/Committees/House/Environment_and_Energy/Canetoads/Government_Response)

<sup>53</sup> <https://www.awe.gov.au/sites/default/files/documents/three-chiefs-newsletter-june-2021.pdf>

**Figure 6-1.** The timing of KTP listings, TAP developments and revisions, and TAP reviews

Listed KTP	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Rabbits		T	L					R			T					R			T					
Goats		T	L					R			T					R								
Phytophthora			L	T					R		T	D					T				T			
Seabird bycatch	T		L				R		T					R			T				T			
Foxes		T	L					R			T					R								
Cats		T	L					R			T						R	T						
Turtle bycatch				L																				
Land clearance				L																				
Climate change				L																				
Parrot disease				L				T							R			R						
Feral pigs				L				T						R						T				
Chytrid fungus					L				T						R				T					
Red fire ants						L			T						R	T								
Marine debris							L				T							R			T			
Crazy ants								L	T						R	T								
Cane toads								L						T					R					
Exotic rats									L		T								R					
5 grasses											L				T							R?		
Garden escapes													L											
Novel biota																L								
Noisy miners																	L							

KTP listed (L)

TAP developed/revise (T)

TAP in force

No TAP

R = review, D = disallowed

Note: There is often very little information about TAP reviews on the departmental website, so there may be a few missing from this table. The pre-2000 TAPs were prepared under the Endangered Species Protection Act.

## 7. Implementation of threat abatement plans and advices

**Relevant audit criteria:** (2) Have effective and efficient arrangements been established to ... implement plans and advice? (3) Does measurement, monitoring and reporting support the achievement of desired outcomes?

**Summary:** There is no way of tracking Australia's progress on abating major threats due to the major lack of monitoring, measuring and reporting. The 5-yearly reviews provide some indication of progress, but occur infrequently (often only once a decade) and are not done by independent experts. There are no implementation guidelines for TAPs and many TAPs lack elements that seem fundamental to effectiveness, such as an implementation taskforce and budget and national coordinator. There is also no framework for integrating priority recovery actions into TAPs. There is no reporting on whether the TAP implementation obligations (section 269 of the EPBC Act) are being met -- to implement TAPs in Commonwealth areas and seek joint implementation in state/territory areas. There is no general agreement between the Australian, state and territory governments to jointly implement TAPs and, as far as we are aware, no TAP-specific agreements for joint implementation. Most TAP reviews show that abatement progress has been limited. The Australian Government does not assess how much funding is needed to implement TAPs and abate listed KTPs nor compile information on its investments in threat abatement. Information about threat abatement projects funded by the Australian Government current to 2016–17 showed that the majority of TAP actions were not federally funded and that funding had significantly declined.

### 7.1 There is almost no measuring or monitoring of and reporting on KTPs or TAP actions or outcomes

It is impossible to track Australia's progress on threat abatement. There is no national framework for measuring, monitoring or reporting on KTPs or TAP actions or outcomes.

The only regular reporting – in the Environment Department's annual report – is merely on the listing of KTPs and the development of TAPs (as required under the EPBC Act), but not on whether they are being implemented and whether KTPs are being abated. The 5-yearly Australian state of the environment reports provide a fairly coarse overview of major threats, but do not analyse the effectiveness of TAP implementation.<sup>54</sup>

The only detailed reports on progress are the occasional reviews of TAPs. Section 279(2) of the EPBC Act requires that each plan 'be reviewed by the Minister at intervals of not longer than 5 years'. In practice, the reviews are much less frequent. During the 20-or-more years that the 6 oldest TAPs have been in place, there have been no more 2 reviews (Figure 6-1), so these reviews clearly do not offer a meaningful way to track Australia's progress on abating KTPs.

Other deficiencies of the TAP reviews are that most are done internally rather than by independent experts and the review results are often not available on the departmental website.

### 7.2 TAPs often lack essential elements of effective plans

As far as we know, there has been no analysis by the Australian Government of TAP effectiveness or the elements of effective TAPs. There are also no TAP implementation guidelines.

---

<sup>54</sup> <https://soe.environment.gov.au/sites/default/files/soe2016-biodiversity-launch-version2-24feb17.pdf?v=1488792935>

Most TAP decision-making lacks transparency, with no information available about how abatement actions are determined and prioritised. This is particularly the case for TAPs that lack an implementation taskforce. To guide prioritisation of threat abatement actions, a ‘priority threat management’ approach (as outlined in [29]) is needed to identify the best returns on investment actions, based on the likely costs, potential benefits and feasibility of proposed actions.

TAPs often lack other elements essential for effective plans such as explicit obligations and targets for abatement, an implementation budget, monitoring and reporting requirements, and triggers for review. This means that TAPs can ‘sit on a shelf’ and that a threat may escalate without that being realised and without the abatement plan being amended to respond to altered circumstances.

Guidelines incorporating best practice standards for TAP development and implementation are needed. To develop these, the outcomes of TAPs should be analysed to identify the elements of both effective and ineffective TAPs and implementation processes.

Perhaps more critical than any other TAP element is the need for a taskforce comprising Australian and state/territory representatives, Traditional Owners, scientists, environmental NGOs and other stakeholders with the motivation to drive TAP implementation (see section 7.3 for one example). A national coordinator is also important to lead the implementation.

For a substantial number of Australia’s listed threatened species, the abatement of threats is the primary recovery action needed. But there is no explicit process or framework for integrating priority recovery actions (from recovery plans or conservation advices) into TAPs to optimise the efficiency of threat abatement and recovery efforts. Such a process could mitigate the need for some individual recovery plans (although some species need species-specific actions such as captive breeding and translocation or abatement of several different threats). It could also focus more resources on long-term abatement solutions and ultimately benefit many more species.

### 7.3 Many TAPs are poorly implemented

Under section 269 of the EPBC Act, the Commonwealth must (1) implement a threat abatement plan to the extent it applies in Commonwealth areas and (2) seek the cooperation of a state or territory to jointly implement the plan if the plan applies in that state or territory. The Australian Government does not report on either of these requirements, so the extent to which they are being met is unknown. The one exception is with the seabird bycatch TAP, which has been effectively implemented in Commonwealth waters under federal fisheries processes.

There is no general agreement between the Australian, state and territory governments to jointly implement TAPs, so the obligation under section 269(2) (to jointly implement TAPs with state/territory governments) presumably relies on informal, TAP-by-TAP agreements. Whether there are any implementation agreements is unknown, but we think it unlikely (with the possible exception of the feral cat TAP).

Effective national implementation of a TAP requires a long-term, well-funded commitment from the relevant governments. This is unlikely to occur unless there is an explicit agreement between the governments specifying their responsibilities to jointly implement a plan or plans. Effective partnerships are founded on transparent arrangements and commitments.

Most TAP reviews make clear that Australia has made limited progress to abate KTPs, including on KTPs listed 20 or more years ago. Based on the TAP reviews available in 2018 (some since removed from the departmental website), we concluded 3 years ago that of the 11 KTPs for which reviews

were available, 'good' progress had been made only on 4: seabird bycatch (see Box 1 and Appendix 2), red fire ants and yellow crazy ants (Christmas Island) and invasive rodents on islands (Appendix 2). Some promising progress has also been made on the feral cat threat abatement in part because it was a priority focus of the *Threatened Species Strategy 2015--2020*<sup>55</sup> (the only TAP to be prioritised).

For many or most TAPs, it seems the Australian Government regards its role mainly or only as providing guidance (in the form of the TAP) and hoping that the states and territories will implement them -- rather than providing leadership and driving implementation itself to achieve the objects of the EPBC Act. This was explicated in the 2016 Senate inquiry into the threat of marine plastic, when:<sup>56</sup>

*the Department of the Environment reminded the committee that the TAP is a 'guide' rather than an 'implementation plan'. [Bolding added]*

It was also evident in the government's response to the recent House of Representatives inquiry into controlling the spread of cane toads, with the TAP described as:<sup>57</sup>

*a national strategy to **guide** efforts by all levels of government, research organisations and non-government organisations in reducing the impacts of cane toads on native animals and ecosystems. [Bolding added]*

There was no commitment in that response to do more than revise the cane toad TAP, undertake the statutory 5-year review and 'consider' cane toad management in documents relevant to Commonwealth lands. There was no commitment to fund abatement activities or establish a national implementation taskforce. If threat abatement is to be effective, TAPs have to be regarded as instruments to be implemented (requiring federal government leadership) rather than as mere guidance for others to follow.

## 7.4 There is no transparency on or prioritisation process for funding threat abatement

The Australian Government does not assess how much funding is needed to implement TAPs and abate listed KTPs nor provide information on how much funding it provides for threat abatement.

One departmental webpage titled *Threat Abatement Projects* provides information on funding for threat abatement projects, but only up to 2016-17.<sup>58</sup> It shows that the majority of TAPs have not been subject to federal funding for implementation. In 2016-17, the only projects listed were for the feral cat TAP. This webpage also shows that funding for threat abatement projects has dropped precipitously from a high of just over \$5 million in 2004-05 to less than \$200,000 in the years 2015-16 and 2016-17 (Figure 7-1).

It is difficult to gauge the level of current funding because it is dispersed over different programs (there is no specified funding stream for threat abatement). The government's response to the cane toad inquiry said any funding TAP actions would 'be subject to evaluation against program

---

<sup>55</sup> <https://www.awe.gov.au/environment/biodiversity/threatened/publications/threatened-species-strategy-2015-2020>

<sup>56</sup>

[https://www.aph.gov.au/Parliamentary\\_Business/Committees/Senate/Environment\\_and\\_Communications/Marine\\_plastics/Report](https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/Marine_plastics/Report)

<sup>57</sup>

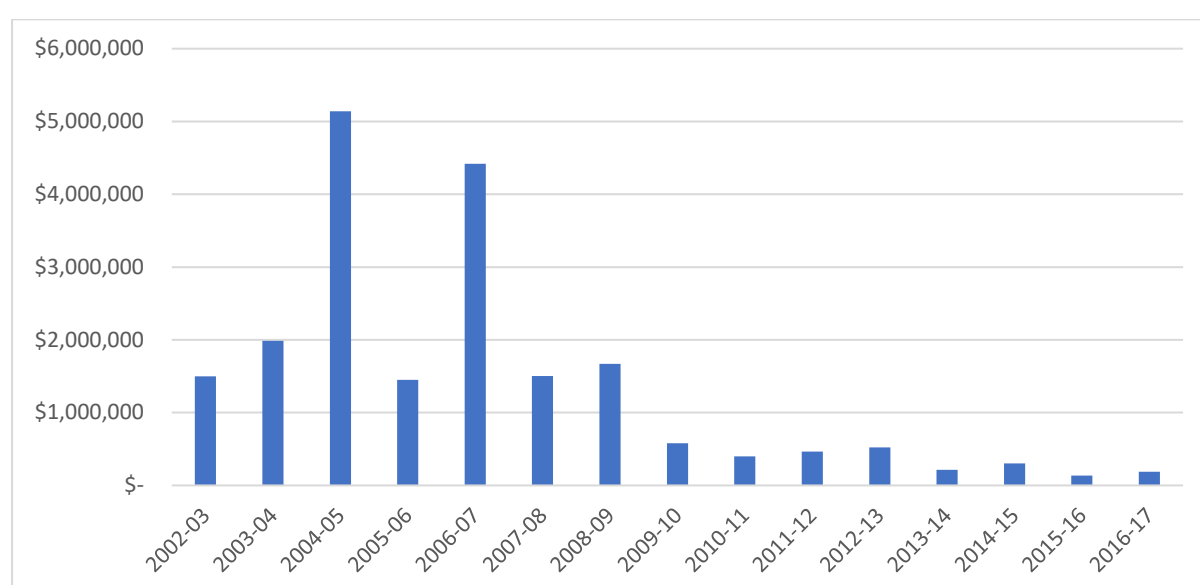
[https://www.aph.gov.au/Parliamentary\\_Business/Committees/House/Environment\\_and\\_Energy/Canetoads/Government\\_Response](https://www.aph.gov.au/Parliamentary_Business/Committees/House/Environment_and_Energy/Canetoads/Government_Response)

<sup>58</sup> <https://www.awe.gov.au/biosecurity-trade/invasive-species/funded-projects>

guidelines, available funds and other competing priorities’.<sup>59</sup> Without funding, there is no Australian Government commitment to implement TAPs and abate major threats to nature.

This sums up the major deficiency of the national threat abatement system – a lack of commitment. There are detailed plans for addressing many of Australia’s major threats but no obligation and very little commitment to fund or implement them.

The few outstanding threat abatement successes – particularly the reduction of seabird bycatch in longline fishing and the eradication of invasive species from many islands, creating havens for threatened species (see Appendix 2 case studies) – demonstrate that Australia has the capability to overcome major threats. We have a national system for threat abatement (and species recovery), world-leading scientific capability, many committed land managers and significant national wealth. In effect, any future extinctions will be a choice that Australia makes.



**Figure 7-1.** Funding for threat abatement projects, 2002-03 to 2016-17

Source: Australian Government<sup>60</sup>

### BOX 1. A SUCCESSFUL THREAT ABATEMENT PLAN

The TAP for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations is widely regarded as Australia’s most successful. It has achieved a greater-than-90% reduction in albatross and petrel deaths in Commonwealth longline fisheries, with bycatch in 2018 thought to be less than 50 birds [3]. Reasons for its effectiveness include the following (see Appendix 2 for a case study):<sup>61</sup>

<sup>59</sup>

[https://www.aph.gov.au/Parliamentary\\_Business/Committees/House/Environment\\_and\\_Energy/Canetoads/Government\\_Response](https://www.aph.gov.au/Parliamentary_Business/Committees/House/Environment_and_Energy/Canetoads/Government_Response)

<sup>60</sup> <https://www.awe.gov.au/biosecurity-trade/invasive-species/funded-projects>

<sup>61</sup> The following text has come from a case study by the Threats to Nature project (see Appendix 2).

- **Federal leadership and multi-stakeholder engagement:** Because the seabird bycatch problem is mainly confined to fisheries under the control of the Australian Fisheries Management Authority (AFMA), the Australian Government has been able to exercise leadership and mandate the adoption of safe fishing measures. The involvement of a multi-stakeholder threat abatement team, which has met annually to review progress, has been vital for ensuring rapid responses to issues as they arise and promoting continuous improvement. The fishing industry has been motivated to trial and adopt new methods. The involvement of an environmental NGO (Humane Society International) has been important to sustain the ambition under the abatement plan to achieve zero bycatch.
- **Clear objectives and robust consequences:** Each iteration of the abatement plan has defined clear measurable performance criteria and responses when the criteria are not met. The specified escalating responses to breaches – ranging from investigation to closure of a fishing area – provide the industry with a strong incentive to comply with bycatch limits.
- **Monitoring and research:** When longline fishing was listed as a key threatening process, little was known about the scale of the problem and the first abatement plan covered just one fishery. Requirements for independent observers on board fishing vessels have provided much more reliable information and fostered compliance with the abatement plan. Trials of different fishing gears have helped develop cost-effective mitigation measures that reduce bycatch while maintaining productivity. The development of new electronic monitoring systems will reduce costs, improve compliance and enable more effective data collection.
- **Financial commitment:** The Australian Government spent about \$1–2 million over the 5 years to 2018 to implement the threat abatement plan and the fishing industry invested at least \$0.5 million on research and development. Australian Government agencies and philanthropic organisations (both here and overseas) have also invested in research.

## 8. References

1. Woinarski JC, Burbidge AA, Harrison PL. Ongoing unraveling of a continental fauna: decline and extinction of Australian mammals since European settlement. *Proceedings of the National Academy of Sciences*. 2015;112: 4531–4540.
2. Waldron A, Miller DC, Redding D, Mooers A, Kuhn TS, Nibbelink N, et al. Reductions in global biodiversity loss predicted from conservation spending. *Nature*. 2017;551: 364–367. doi:10.1038/nature24295
3. Baker GB, Robertson G. Management of seabird bycatch leads to sustainable fisheries and seabird populations. *Recovering Australian Threatened Species: A Book of Hope*. CSIRO Publishing; 2018. pp. 23–31.
4. Springer K. Eradication of invasive species on Macquarie Island to restore the natural ecosystem. *Recovering Australian Threatened Species: A Book of Hope*. CSIRO Publishing; 2018. pp. 13–22.
5. The miracle of Macquarie Island. 26 Apr 2019 [cited 6 Dec 2020]. Available: <https://www.theaustralian.com.au/weekend-australian-magazine/back-to-nature-macquarie-islands-remarkable-resurgence/news-story/ed36d1f7072769f0fd19bdf52418f134>
6. Jon-Paul Emery, Valentine LE, Yvette Hitchen, Nicola Mitchell. Survival of an extinct in the wild skink from Christmas Island is reduced by an invasive centipede: implications for future reintroductions. *Biological Invasions*. 2020; 1–12.
7. Woinarski J. A Bat's End: The Christmas Island Pipistrelle and Extinction in Australia. CSIRO PUBLISHING; 2018.
8. Woinarski J, Driscoll D, Cogger H. Vale 'Gump', the last known Christmas Island Forest Skink. *The Conversation*. 2014;8 August.
9. Woinarski J, Braby M, Burbidge A, Coates D, Garnett S, Fensham R, et al. Reading the black book: The number, timing, distribution and causes of listed extinctions in Australia. *Biological Conservation*. 2019;239: 108261.
10. Kearney SG, Carwardine J, Reside AE, Fisher DO, Maron M, Doherty TS, et al. The threats to Australia's imperilled species and implications for a national conservation response. *Pacific Conservation Biology*. 2018;25: 231–244. doi:10.1071/PC18024
11. Ward M, Carwardine J, Yong CJ, Watson JE, Silcock J, Taylor GS, et al. A national-scale dataset for threats impacting Australia's imperiled flora and fauna. *Ecology and Evolution*. 2021.
12. Makinson R, Pegg GS, Carnegie AJ. Myrtle Rust in Australia: A National Action Plan July 2020. Australian Plant Biosecurity Science Foundation; 2020.
13. Radford JQ, Woinarski JC, Legge S, Baseler M, Bentley J, Burbidge AA, et al. Degrees of population-level susceptibility of Australian terrestrial non-volant mammal species to predation by the introduced red fox (*Vulpes vulpes*) and feral cat (*Felis catus*). *Wildlife Research*. 2018;45: 645–657.
14. Legge S, Woinarski JC, Burbidge AA, Palmer R, Ringma J, Radford JQ, et al. Havens for threatened Australian mammals: the contributions of fenced areas and offshore islands to the protection of mammal species susceptible to introduced predators. *Wildlife Research*. 2018;45: 627–644.
15. Pearson D. Recovery plan for five species of rock wallabies: blackfooted rock wallaby (*Petrogale lateralis*), Rothschild rock wallaby (*Petrogale rothschildi*), short-eared rock wallaby (*Petrogale brachyotis*), monjon (*Petrogale burbidgei*) and nabarlek (*Petrogale concinna*) 2012–2022. Perth: Western Australian Government Department of Environment and Conservation; 2012.
16. Skerratt LF, Berger L, Clemann N, Hunter DA, Marantelli G, Newell DA, et al. Priorities for management of chytridiomycosis in Australia: saving frogs from extinction. *Wildlife Research*. 2016;43: 105–120.



17. Lintermans M, Geyle HM, Beatty S, Brown C, Ebner BC, Freeman R, et al. Big trouble for little fish: identifying Australian freshwater fishes in imminent risk of extinction. *Pacific Conservation Biology*. 2020.
18. Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*. In: Australian Government Department of the Environment and Energy [Internet]. [cited 1 Mar 2018]. Available: <http://www.environment.gov.au/biodiversity/threatened/publications/threat-abatement-plan-disease-natural-ecosystems-caused-phytophthora-cinnamomi>
19. Silcock J, Fensham R. Using evidence of decline and extinction risk to identify priority regions, habitats and threats for plant conservation in Australia. *Australian Journal of Botany*. 2019;66: 541–555.
20. Geyle HM, Tingley R, Amey AP, Cogger H, Couper PJ, Cowan M, et al. Reptiles on the brink: identifying the Australian terrestrial snake and lizard species most at risk of extinction. *Pacific Conservation Biology*. 2020.
21. Geyle HM, Braby MF, Andren M, Beaver EP, Bell P, Byrne C, et al. Butterflies on the brink: identifying the Australian butterflies (Lepidoptera) most at risk of extinction. *Austral Entomology*. 2021;60: 98–110.
22. Geyle HM, Woinarski JC, Baker GB, Dickman CR, Dutson G, Fisher DO, et al. Quantifying extinction risk and forecasting the number of impending Australian bird and mammal extinctions. *Pacific Conservation Biology*. 2018;24: 157–167.
23. Geyle HM, Hoskin CJ, Bower DS, Catullo R, Clulow S, Driessen M, et al. Red hot frogs: identifying the Australian frogs most at risk of extinction. *Pacific Conservation Biology*. 2021.
24. James D, Green P, Humphreys W, Woinarski J. Endemic species of Christmas Island, Indian Ocean. *Records of the Western Australian Museum*. 2019;34: 55–114.
25. Garnett S, Szabo J, Dutson G. The action plan for Australian birds 2010 / S.T Garnett, J.K. Szabo and G. Dutson. Collingwood, Vic: CSIRO Publishing; 2011.
26. Mitchell N, Cox N, Bowles P, Tingley R, Macdonald S, Shea G, et al. The action plan for Australian lizards and snakes 2017. CSIRO Publishing; 2019.
27. Woinarski JC, Burbidge AA, Harrison PL. The Action Plan for Australian Mammals 2012. Collingwood, VIC: CSIRO Publishing; 2014.
28. Hawke A. The Australian Environment Act – Report of the Independent Review of the Environment Protection and Biodiversity Conservation Act 1999. Canberra: Department of the Environment, Water, Heritage and the Arts; 2009. Available: <http://www.environment.gov.au/system/files/resources/5f3fdad6-30ba-48f7-ab17-c99e8bcc8d78/files/final-report.pdf>
29. Carwardine J, Martin TG, Firn J, Reyes RP, Nicol S, Reeson A, et al. Priority Threat Management for biodiversity conservation: A handbook. *Journal of Applied Ecology*. 2019;56: 481–490.

## Appendix 1. A letter about the novel biota KTP listing



Australian Government

Department of Sustainability, Environment, Water, Population and Communities

Our reference: 2010/07448 and 2011/05692

Ms Carol Booth  
Invasive Species Council  
162 Sonogo Lane  
GREENLANDS QLD 4380

Dear Ms Booth

### *Assessment Period Commencing 1 October 2011*

Thank you for your nomination of 'Ecosystem degradation, habitat loss and species decline due to invasion in southern Australia by introduced Tall Wheat Grass (*Lophopyrum ponticum*)' and 'Herbivory and Habitat Degradation by Feral Deer' for assessment for listing as a key threatening process under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Your nominations satisfied the information requirements set out in the EPBC Act regulations. The Threatened Species Scientific Committee (the Committee) considered all nominations that satisfied the regulations, and prepared a Proposed Priority Assessment List for the Minister of Sustainability, Environment, Water, Population and Communities (the Minister), the Hon Tony Burke. Based on this advice, the Minister has established a Finalised Priority Assessment List.

I wish to notify you that your nominations of 'Ecosystem degradation, habitat loss and species decline due to invasion in southern Australia by introduced Tall Wheat Grass (*Lophopyrum ponticum*)' and 'Herbivory and Habitat Degradation by Feral Deer' have not been included on the Finalised Priority Assessment List for the assessment period commencing 1 October 2011. In this instance the Committee gave priority to other nominations in making its recommendation to the Minister and the Minister accepted the Committee's advice.

Assessments are prioritised based on national significance, quality of information, level of threat, efficacy of existing protection measures and likely conservation benefit. In making its recommendation about your nominations, the Committee noted that 'Ecosystem degradation, habitat loss and species decline due to invasion in southern Australia by introduced Tall Wheat Grass (*Lophopyrum ponticum*)' and 'Herbivory and Habitat Degradation by Feral Deer' are included in its assessment of the broader key threatening process 'Novel biota and their impact on biodiversity'.

The scope of the broader KTP covers all invasive species including competition, habitat loss and degradation caused by terrestrial weeds and vertebrate pests. The Committee nominated the broader KTP as an overarching KTP to cover all species of novel biota, to capture the whole threat and avoid the need for assessments of individual invasive species. The Committee has completed its assessment of the overarching KTP and provided its advice to the Minister for consideration for listing. In its assessment both feral deer and tall wheat grass have been included as specific examples of invasive novel biota. Once the listing decision is made the Committee's listing advice will be available on the department's web site at <http://www.environment.gov.au/biodiversity/threatened/index.html>.



GPO Box 787 Canberra ACT 2601 Telephone 02 6274 1111 Facsimile 02 6274 1666  
[www.environment.gov.au](http://www.environment.gov.au)



The EPBC Act provides for a nomination that was not included on this Finalised Priority Assessment List to be automatically reconsidered for inclusion on the Proposed Priority Assessment List for the subsequent assessment period, in this case the assessment period commencing on 1 October 2012. The Department will retain your nomination for 'Herbivory and Habitat Degradation by Feral Deer' and forward it to the Committee when it considers nominations for the 2012 Proposed Priority Assessment List. Alternatively, if you would like to update your nomination, you should resubmit it in response to the next call for public nominations, to be advertised later this year.

The EPBC Act provides for all nominations to be considered for prioritisation in two consecutive years. As your nomination for 'Ecosystem degradation, habitat loss and species decline due to invasion in southern Australia by introduced Tall Wheat Grass (*Lophopyrum ponticum*)' was considered in 2010 and 2011 it is no longer eligible for consideration in the next assessment round. The nomination could be considered again for prioritisation if a new nomination that provides sufficient information is re-submitted in a future call for nominations, however, the Committee considers all invasive species to be covered by the overarching KTP 'Novel biota and their impact on biodiversity'.

If you require additional information please contact Micheal Deering, Director Species Listing Section by telephone on (02) 6274 2238 or email [michael.deering@environment.gov.au](mailto:michael.deering@environment.gov.au).

Thank you again for your nomination and interest in conserving Australia's unique biodiversity.

Yours sincerely



Deb Callister  
A/g Assistant Secretary  
Wildlife Branch

14 September 2011

## Appendix 2. Two case studies of effective threat abatement



# ISLAND RESCUE

Case studies in success







Royal Penguins-Macquarie Island-Credit Kimberley Collins CC BY 2p0

**A**ustralia's islands are biodiversity treasures – centres of endemism and havens for species threatened on the mainland. But many have been degraded by rabbits, goats and other feral plant-eaters and their wildlife decimated by cats, rats and other invasive predators.

Eradicating such invaders has been one of the greatest conservation achievements in Australia in recent times, with Macquarie and Dirk Hartog islands outstanding exemplars.










## THE THREAT TO ISLANDS FROM INVASIVE VERTEBRATES

Australia's islands are precious.<sup>1</sup> In particular, our oceanic islands (those never linked to the mainland) harbour large numbers of unique species – Christmas Island, for example, has, or had, 11 birds, 5 mammals, 5 reptiles, 5 fish, 16 plants and about 200 invertebrates unique to the island.<sup>2</sup>

Our islands are also important as safe havens for species threatened on the mainland. About 100 islands now harbour 32 threatened mammal species susceptible to predation by cats and foxes.<sup>3</sup>

But the isolation of islands also means that their wildlife are highly vulnerable to invasive species.<sup>3</sup> Evolving with fewer competitors, predators and parasites than continental wildlife,

**Figure 1. Number of eradication successes on Australia islands (up to 2018), for the top 9 introduced species**

Black rat		73
Goat		58
European rabbit		33
Cat		23
Red fox		12
House mouse		11
Pig		9
Sheep		7
Red jungle fowl		4

Source: Database of Island Invasive Species Eradications (2018)<sup>9</sup>

island species often have poor defences against invaders.<sup>4</sup> Although islands (not counting Tasmania) make up only 0.5% of Australia's land area, species endemic to islands account for about 30% of our extinctions, most due to invasive species, particularly predators such as cats and black rats.<sup>5</sup>

A 2009 assessment of Australia's priority islands (for conservation values and invasive species impacts) documented 60 introduced vertebrates with medium to major potential impacts. The highest-impact species included black rat, cane toad, cat, donkey, goat, horse, pig, rabbit and fox.<sup>7</sup>

## ERADICATING ISLAND INVADERS

In Australia and worldwide, some of the greatest conservation achievements of recent times have come from eliminating harmful invaders on islands. Australia (and New Zealand) has been a pioneer in island eradications.<sup>8</sup> By 2018, Australia had achieved 243 successful eradications of 18 introduced species on islands – mainly black rats, goats, rabbits, cats, foxes and pigs (Figure 1).

The largest Australian islands subject to eradications have been sub-Antarctic Macquarie Island (128 km<sup>2</sup>) (Box 1), and the Western Australian Dirk Hartog Island (630 km<sup>2</sup>) (Box 2). Both are World Heritage sites with outstanding conservation values.

## BOX 1

### Macquarie Island

**Island values:** One of the world's premier breeding sites for seabirds and marine mammals.<sup>10</sup>

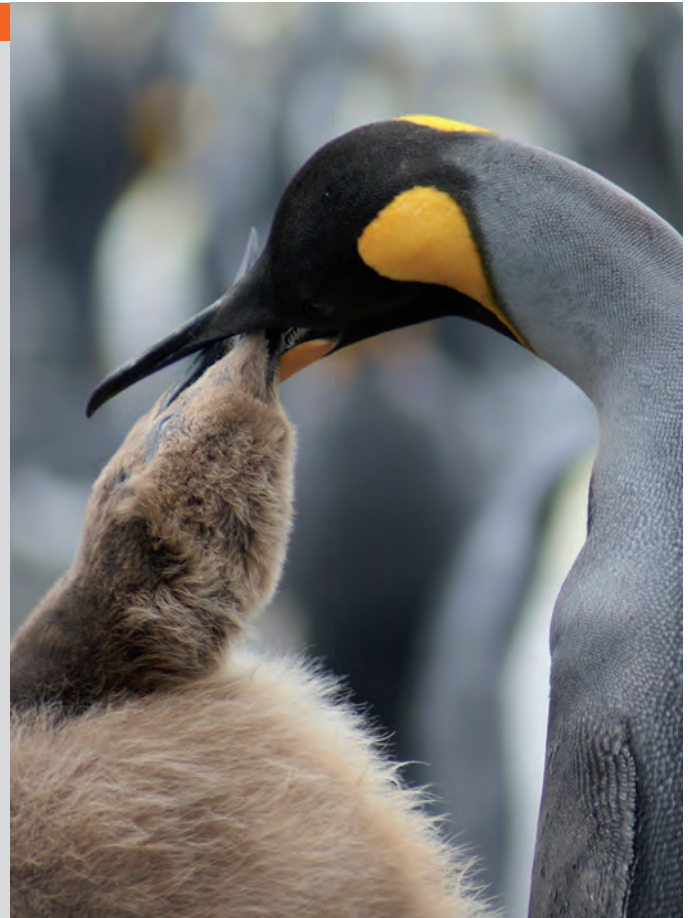
**Eradications:**

- Wekas (1989): Preyed on seabirds and a now-extinct endemic rail and parakeet.<sup>11</sup> Eradicated by shooting.<sup>12</sup>
- Cats (1990): Preyed on seabirds (killed ~60,000 seabirds a year<sup>13</sup>) and a now-extinct endemic rail and parakeet.<sup>11</sup> Eradicated by shooting and trapping.<sup>11</sup>
- Black rats and house mice (2011): Could threaten seabirds in the absence of cats and rabbits.<sup>14,15</sup> Eradicated by aerial baiting.<sup>12</sup>
- Rabbits (2014): Overgrazed plants, caused denudation and erosion. Eradicated by biological control (rabbit haemorrhagic disease), toxic baits and shooting.<sup>12</sup>

**Cost:** \$20 million for the 2007–2014 program, funded by the Tasmanian and Australian governments.<sup>12</sup>

**Outcomes:** Vegetation recovery has been dramatic<sup>16,17</sup> and eight threatened seabird populations have rebounded enough for

The oiling gangs that plundered seal and penguin populations on Macquarie Island in the 19th and early 20th centuries inflicted further damage by introducing invasive animals. Photo: King penguins on Macquarie Island | Kimberley Collins | CC BY 2.0



## BOX 2

### Dirk Hartog Island

**Island values:** Globally significant for birds, marine turtles, reptiles, seascapes and landscapes.<sup>19</sup> When restoration is complete, the island will support 'one of the most diverse mammal assemblages in Australia'.<sup>19</sup>

**Eradications (year achieved):**

- Sheep (2015) and goats (2017): Caused habitat degradation. Removed by mustering and shooting.<sup>19</sup>
- Cats (2018): Caused the local extinction of at least 10 mammal species, leaving just three native mammals on the island. Eradicated by aerial baiting and trapping.<sup>18</sup>

**Cost:** <\$7 million.<sup>18,20</sup> Funded by the Western Australian Government and the Gorgon Barrow Island Net Conservation Benefits Fund.<sup>21</sup>

**Outcomes:** Ecosystem recovery is evident with increased vegetation cover and less erosion.<sup>20</sup> The reintroduction of

Dibblers are one of 10 mammal species being reintroduced to Dirk Hartog Island. The others are boodies, woylies, Shark Bay bandicoots, western quolls, mulgaras, greater stick-nest rats, desert mice, Shark Bay mice and heath mice. Banded hare-wallabies and rufous hare-wallabies have also been introduced (although it is not certain whether they were part of the original fauna). Photo: Emma Massembauer, DBCA





# THE ELEMENTS OF SUCCESS

**Clear objectives:** One of the appealing features of island eradications is that the objectives are clear and can be decisively achieved within a few years, with recovery of species often occurring without further interventions (as long as biosecurity is effective in preventing reinvasion).

**Escalating ambitions:** As eradication techniques have advanced, so have ambitions. The sizes and types of eradications now far exceed what was thought possible only a decade or two ago. They demonstrate the power of learning from doing.

**Planning, trialling, problem-solving:** Success requires detailed planning, which may take several years, and testing of assumptions and techniques under all conditions.<sup>22</sup> High levels of logistical competence are essential, particularly for eradications on remote islands.<sup>12</sup> Tenacity, persistence and creativity are often needed to solve problems during a project.<sup>12</sup>

**Full financial commitment:** Securing funding for the duration of a project is often the most important success factor.<sup>22</sup> It is vital that funding is not wound back as numbers of the target species dwindle, for the last few individuals are often the most difficult and expensive to remove.<sup>22</sup>

**National threat planning:** Two threat abatement plans – for exotic rodents on islands and feral cats – have each accorded high priority to island eradications and been instrumental in generating support for eradications.

## WHERE WE ARE NOW

Australia has made great strides with island eradications, and ambitious projects are underway or proposed to eradicate feral cats from another five large islands by 2030.<sup>3</sup> But the pace of eradications is slow. A systematic assessment is needed to identify the highest eradication priorities.<sup>23</sup> It is also important to boost biosecurity on Australia's islands to prevent new invasions.<sup>24</sup>



An innovative partnership project successfully eradicated black rats (*Rattus rattus*) from an island off Flinders Island in Tasmania's far northeast. Photo: John French

## REFERENCES

1. Woinarski, J.; Garnett, S.; Lindenmayer, D.; Legge, S. Learning from Loss. *Wildlife Australia* 2017, 54 (1), 22.
2. James, D.; Green, P.; Humphreys, W.; Woinarski, J. Endemic Species of Christmas Island, Indian Ocean. *Records of the Western Australian Museum* 2019, 34 (2).
3. Legge, S.; Woinarski, J. C.; Burbidge, A. A.; Palmer, R.; Ringma, J.; Radford, J. Q.; Mitchell, N.; Bode, M.; Wintle, B.; Baseler, M. Havens for Threatened Australian Mammals: The Contributions of Fenced Areas and Offshore Islands to the Protection of Mammal Species Susceptible to Introduced Predators. *Wildlife Research* 2018, 45 (7), 627–644.
4. Invasive alien species: Islands and invasive alien species <https://www.cbd.int/island/invasive.shtml> (accessed Dec 6, 2020).
5. Woinarski, J. C.; Burbidge, A. A.; Reside, A. E. Enhancing Island Conservation Outcomes: The Policy and Legal Context, Need, and Options. *Australian Island Arks: Conservation, Management and Opportunities* 2018, 45–59.
6. Jon-Paul Emery; Valentine, L. E.; Yvette Hitchen; Nicola Mitchell. Survival of an Extinct in the Wild Skink from Christmas Island Is Reduced by an Invasive Centipede: Implications for Future Reintroductions. *Biological Invasions* 2020, 1–12.
7. Ecosure. *Prioritisation of High Conservation Status of Offshore Islands. Report to the Australian Government Department of the Environment, Water, Heritage and the Arts*; Cairns, Queensland, 2009.
8. Veitch, C.; Clout, M.; Martin, A.; Russell, J.; West, C. Island Invasives: Scaling up to Meet the Challenge. *Occasional Paper SSC* 2019, No. 62.
9. DIISE. The Database of Island Invasive Species Eradications, developed by Island Conservation, Coastal Conservation Action Laboratory UCSC, IUCN SSC Invasive Species Specialist Group, University of Auckland and Landcare Research New Zealand <http://diise.islandconservation.org>.
10. Copson, G.; Whinam, J. Review of Ecological Restoration Programme on Subantarctic Macquarie Island: Pest Management Progress and Future Directions. *Ecological Management & Restoration* 2001, 2 (2), 129–138.
11. Robinson, S. A.; Copson, G. R. Eradication of Cats (*Felis catus*) from Subantarctic Macquarie Island. *Ecological Management & Restoration* 2014, 15 (1), 34–40.
12. Springer, K. Eradication of Invasive Species on Macquarie Island to Restore the Natural Ecosystem. In *Recovering*



- Australian Threatened Species: A Book of Hope*; CSIRO Publishing, 2018; pp 13–22.
13. Jones, E. Ecology of the Feral Cat, *Felis Catus* (L.), (Carnivora: Felidae) on Macquarie Island. *Wildlife Research* 1977, 4 (3), 249–262.
  14. Pye, T.; Swain, R.; Seppelt, R. Distribution and Habitat Use of the Feral Black Rat (*Rattus Rattus*) on Subantarctic Macquarie Island. *Journal of Zoology* 1999, 247 (4), 429–438.
  15. Cuthbert, R.; Hilton, G. Introduced House Mice *Mus Musculus*: A Significant Predator of Threatened and Endemic Birds on Gough Island, South Atlantic Ocean? *Biological conservation* 2004, 117 (5), 483–489.
  16. Harris, I. This week at Macquarie Island: 10 January 2020 <https://www.antarctica.gov.au/news/stations/macquarie-island/2020/this-week-at-macquarie-island-10-january-2020/> (accessed Jan 4, 2021).
  17. Critically Endangered Herb Thriving on Macquarie Island after Seven-Year Feral Animal Eradication Program. *The Guardian*. June 1, 2020.
  18. Algar, D.; Johnston, M.; Tiller, C.; Onus, M.; Fletcher, J.; Desmond, G.; Hamilton, N.; Speldewinde, P. Feral Cat Eradication on Dirk Hartog Island, Western Australia. *Biological Invasions* 2020, 22 (3), 1037–1054.
  19. Algar, D.; Morris, K.; Asher, J.; Cowen, S. Dirk Hartog Island ‘Return to 1616’ Project—The First Six Years (2014 to 2019). *Ecological Management & Restoration* 2020, 21 (3), 173–183.
  20. Heriot, S.; Asher, J.; Williams, M. R.; Moro, D. The Eradication of Ungulates (Sheep and Goats) from Dirk Hartog Island, Shark Bay World Heritage Area, Australia. *Biological Invasions* 2019, 21 (5), 1789–1805.
  21. Minister for Environment, Hon Stephen Dawson. World record feral cat eradication for Dirk Hartog Island. Media statement <https://www.mediastatements.wa.gov.au/Pages/McGowan/2018/10/World-record-feral-cat-eradication-for-Dirk-Hartog-Island.aspx> (accessed Jan 4, 2021).
  22. Island Feral Cat Eradication Workshop, Kangaroo Island, 26–28 June 2018. Natural Resources Kangaroo Island 2017.
  23. Wilcox, C.; McCreless, E. Feral animals are running amok on Australia’s islands – here’s how to stop them <http://theconversation.com/feral-animals-are-running-amok-on-australias-islands-heres-how-to-stop-them-64307> (accessed Jan 5, 2021).
  24. Senate Environment and Communications References Committee. *Environmental Biosecurity: The Adequacy of Arrangements to Prevent the Entry and Establishment of Invasive Species Likely to Harm Australia’s Natural Environment, Including Recent Biosecurity Performance and Australia’s State of Preparedness for New Environmental Incursions.*; Australian Government, 2015.



If Australians are to protect what is most distinctive about this country – our unique plants, animals and ecological communities – we urgently need to overcome the key threats facing them.



It is not possible to recover all of our threatened species one by one through species-focused efforts. We also need a concerted national focus to overcome the major threats our native plants and animals have in common – in particular **invasive species, climate change, habitat destruction, adverse fire regimes** and **changes to natural water flows**.

Australia’s threat abatement system needs to be more ambitious, better funded and nationally coordinated.



# SAVING SEABIRDS

Case studies in success

THREATS  
TO NATURE



**In the late 1980s, it became clear that longline fishing was killing thousands of threatened seabirds each year in Australian waters. An albatross would fly thousands of kilometres over the ocean only to have their life cut short – snagged on a fishing hook and drowned.**

This case study explains how a combination of federal leadership, industry engagement, conservation advocacy, and the implementation of safer fishing methods have achieved a major reduction in the numbers of seabirds killed as bycatch. This is a standout exemplar of how Australia's national threat abatement system can work.

## THE THREAT OF LONGLINE FISHING

Millions of baited hooks are set each day on the world's oceans, on thousands of lines that each trail up to a hundred kilometres or more. Petrels, albatrosses and shearwaters, which use smell to search over vast areas for patchily distributed prey, are lured to longline fishing vessels by the smell of discarded offal. To them, the trailing baits look just like prey. As the lines float near the surface (while being set or hauled in), the birds dive and try to snatch the bait. But they often become impaled on the hook and then drown as the sinking line drags them underwater. Worldwide, 160,000 to 320,000 or more seabirds die this way each year (2011 estimate).<sup>1,2</sup>

In the late 1980s, declining albatross populations and emerging information about deaths in longline fisheries led to suspicions that fisheries bycatch was a major threat to seabirds.<sup>3</sup> It was estimated that 8700 birds were killed on longlines in Australian waters in 1994, three-quarters of them albatrosses.<sup>4</sup>

Longline fishing occurs in almost all Australian waters. Seabirds are mainly at risk in seven Commonwealth fisheries targeting large fish such as tuna, billfishes, toothfish and snappers: the Antarctic, Coral Sea, Eastern Tuna and Billfish, Heard Island and McDonald Islands, Macquarie Island Toothfish, Southern and Eastern Scalefish and Shark, and Western Tuna and Billfish fisheries.<sup>5,6</sup>

At least 30 seabird species in Australian



Albatrosses, petrels and other sea-birds swirl around a longline fishing vessel that has bird scaring lines hanging off the cables. Photo: Matt Brady ©

**Table 1. Seabirds in Australian waters most affected by longline fishing<sup>5</sup>**

Species name	National conservation status
Grey-headed albatross ( <i>Thalassarche chrysostoma</i> )	Endangered
Wandering albatross ( <i>Diomedea exulans</i> )	Vulnerable
Black-browed albatross ( <i>Thalassarche melanophris</i> )	Vulnerable
Shy albatross ( <i>Thalassarche cauta</i> )	Vulnerable
Campbell albatross ( <i>Thalassarche impavida</i> )	Vulnerable
White-capped albatross ( <i>Thalassarche steadi</i> )	Vulnerable
Indian yellow-nosed albatross ( <i>Thalassarche carteri</i> )	Vulnerable
White-chinned petrel ( <i>Procellaria aequinoctialis</i> )	Not listed
Great-winged petrel ( <i>Pterodroma macroptera</i> )	Not listed
Grey petrel ( <i>Procellaria cinerea</i> )	Not listed
Wedge-tailed shearwater ( <i>Ardenna pacifica</i> )	Not listed
Flesh-footed shearwater ( <i>Ardenna carneipes</i> )	Not listed

waters are killed by longline fishing (Table 1 shows those assessed as moderately to highly affected).<sup>5</sup> Most are albatrosses and large petrels, and most are listed as threatened. These species have long lifespans, low reproductive rates and low rates of natural mortality, making them highly vulnerable to decline from even very low levels of additional mortality.<sup>4</sup> Wandering albatrosses, for example, can live 60 or more years, usually breed at about 10 years of age and produce a chick only every second year (Box 1).<sup>7</sup>

## ABATING THE LONGLINE FISHING THREAT

In 1995, the Australian Government listed the bycatch of seabirds by longline fishing as a key threatening process. The scientific committee advised that 'even low kill rates' presented 'substantial threats to the survival of albatross species'.<sup>4</sup>

# TO N T R E

Stakeholders from the fishing industry, research organisations, conservation groups and state and federal government agencies worked together to develop the Threat Abatement Plan for the Incidental Catch (or by-catch) of Seabirds during Oceanic Longline Fishing Operations, released in 1998. The goal of this five-year plan was to reduce the bycatch rate to less than 0.05 per 1000 hooks in all longline fisheries.<sup>8</sup> The problem was tackled from several angles: fisher education, research and monitoring to improve knowledge of seabird impacts and develop safer fishing techniques, and

independent onboard observers to verify bycatch rates. The main change was a requirement for lines to be set at night, when seabirds are less active. Although this substantially reduced the seabird bycatch, it wasn't enough to achieve the goal.<sup>8</sup>

In the two decades since, the threat abatement plan has been reviewed and revised three times, with the latest revision released in 2018. Each has specified that the ultimate aim is to achieve zero seabird bycatch in all longline fisheries, but that this is not realistic in the short-term. The 2018 plan requires five longline fisheries to

reduce their bycatch rate to less than 0.01 per 1000 hooks and the other two fisheries to reduce it to 0.05. They can use a variety of measures to achieve this, including night fishing, weights to rapidly sink baits beyond the reach of seabirds and bird scaring lines.

Great progress has been made. By 2007 the bycatch for all Commonwealth fisheries was estimated to be less than 200 a year<sup>9</sup> and by 2018 it was thought to be less than 50.<sup>10</sup>

## BOX 1



### A life in the sky tragically cut short

Wandering albatrosses are among the biggest birds in the world, with a whopping 3.5 metre wingspan. They spend most of their time soaring over the ocean and can travel more than 120,000 kilometres a year, landing only to mate, breed and take care of their young. They live 60 or more years, mate for life and produce only a single chick every second year. These life history traits put them at risk of population decline even if only a small proportion of birds are lost as bycatch in longline fishing.

The wandering albatross is listed as vulnerable by both the Australian Government and the IUCN. While the major threat worldwide is capture as fishing bycatch, the species is also threatened by invasive cats and mice eating chicks in some of their breeding sites (on subantarctic islands). Climate change is expected to have a severe impact due to shifts in their foraging habitat.

Photo: A wandering albatross off the coast at Port Fairy, Victoria. Photo: Ed Dunens | CC BY 2.0

## THE ELEMENTS OF SUCCESS

**Federal leadership and multi-stakeholder engagement:** Because the seabird bycatch problem is mainly confined to fisheries under the control of the Australian Fisheries Management Authority (AFMA), the Australian Government has been able to exercise leadership and mandate the adoption of safe fishing measures. The involvement of a multi-stakeholder threat abatement team, which has met annually to review progress, has been vital for ensuring rapid responses to issues as they arise and promoting continuous improvement. The fishing industry has been motivated to trial and adopt new methods. The involvement of an environmental NGO, Humane Society International, has been important to sustain the ambition under the abatement plan to achieve zero bycatch.

**Clear objectives and robust consequences:** Each iteration of the abatement plan has defined clear measurable performance criteria and responses when the criteria are not met. The specified escalating responses to breaches – ranging from investigation to closure of a fishing area – provide the industry with a strong incentive to comply with bycatch limits.

**Monitoring and research:** When longline fishing was listed as a key threatening process, little was known about the scale of the problem and the first abatement plan covered just one fishery. Requirements for independent observers on board fishing vessels have provided much more reliable information and fostered compliance with the abatement plan. Trials of different fishing gears have helped develop cost-effective mitigation measures that reduce bycatch while maintaining productivity. The development of new electronic monitoring systems will reduce costs, improve compliance and enable more effective data collection.<sup>10</sup>

**Financial commitment:** The Australian Government spent about \$1–2 million over the 5 years to 2018 to implement the threat abatement plan and the fishing industry invested at least \$0.5 million on research and development.<sup>10</sup>



The great-winged petrel is one of 12 seabirds in Australian waters most affected by longline fishing. Photo: JJ Harrison | CC BY-SA 4.0

Australian Government agencies and philanthropic organisations (both here and overseas) have also invested in research.<sup>6</sup>

### WHERE WE ARE NOW

Thanks to a 25-year threat abatement effort, Australia has made excellent progress in reducing seabird bycatch.

However, persistence is needed to further improve fishing technologies and practices to achieve the goal of zero seabird bycatch. Globally, many seabird species are in trouble, with 30% of all species now threatened.<sup>11,12,13</sup> Incidental capture in fisheries (mainly longline and trawl) is their greatest threat.<sup>2</sup> Having demonstrated the potential for abating bycatch threats, Australia can play an important role encouraging other countries to adopt similar measures.



## REFERENCES

1. Anderson ORJ, Small CJ, Croxall JP, Dunn EK, Sullivan BJ, Yates O, Black A. Global seabird bycatch in longline fisheries. *Endang Species Res* 2011 14:91-106.
2. Zhou C, Brothers N, Browder J & Jiao Y. Seabird bycatch loss rate variability in pelagic longline fisheries. *Biological Conservation* 2020 247, 108590.
3. Phillips RA, Gales R, Baker GB, Double MC, Favero M, Quintana F, et al. A global assessment of the conservation status, threats and priorities for albatrosses and large petrels. *Biological Conservation* 2016, 201 169–183.
4. Endangered Species Scientific Subcommittee. Advice to the Minister for the Environment on a public nomination to Schedule 3 of the *Endangered Species Protection Act 1992* (the Act) Incidental catch (or bycatch) of seabirds during oceanic longline fishing operations 1995 [http://www.environment.gov.au/biodiversity/threatened/key-threatening-](http://www.environment.gov.au/biodiversity/threatened/key-threatening-processes/incidental-catch-of-seabirds-longline-fishing)
5. Commonwealth of Australia. Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations. Department of the Environment and Energy, Canberra 2018. <https://www.antarctica.gov.au/about-antarctica/environment/plants-and-animals/threat-abatement-plan-seabirds/> or <https://www.legislation.gov.au/Details/F2018L01562>
6. See <https://www.afma.gov.au/fisheries> for information on their target species.
7. Weimerskirch, H. Linking demographic processes and foraging ecology in wandering albatross—Conservation implications. *J Anim Ecol.* 2018; 87: 945–955.
8. Baker GB and Schubert M. Implementation of Australia's Threat Abatement Plan for the Incidental Catch of Seabirds During Oceanic Longline Fishing Operations. 2006 <https://www.ccsbt.org/ja/system/files/resource/ja/4d9503930a9cb/info04.pdf>
9. Baker GB and Finley L. National assessment report for reducing the incidental catch of seabirds in longline fisheries. 2008.
10. Baker GB and Robertson G. *Management of seabird bycatch leads to sustainable fisheries and seabird population in 'Recovering Australian Threatened Species: a book of hope'* Garnett S et al (eds) 2018. CSIRO Publishing.
11. Croxall et al. Seabird conservation status, threats and priority actions: a global assessment. *Bird Conservation International* 2012 22, 1–34.
12. Gorta S et al. Pelagic citizen science data reveal declines of seabirds off south-eastern Australia. *Biological Conservation* 2019 235, 226-235 <https://doi.org/10.1016/j.biocon.2019.05.007>
13. Spatz et al. Managing invasive mammals to conserve globally threatened seabirds in a changing climate. *Conserv. Lett.* 2017 10, 736–747. <https://doi.org/10.1111/conl.12373>



If Australians are to protect what is most distinctive about this country – our unique plants, animals and ecological communities – we urgently need to overcome the key threats facing them.



It is not possible to recover all of our threatened species one by one through species-focused efforts. We also need a concerted national focus to overcome the major threats our native plants and animals have in common – in particular **invasive species, climate change, habitat destruction, adverse fire regimes and changes to natural water flows.**

Australia's threat abatement system needs to be more ambitious, better funded and nationally coordinated.