Biodiversity Council

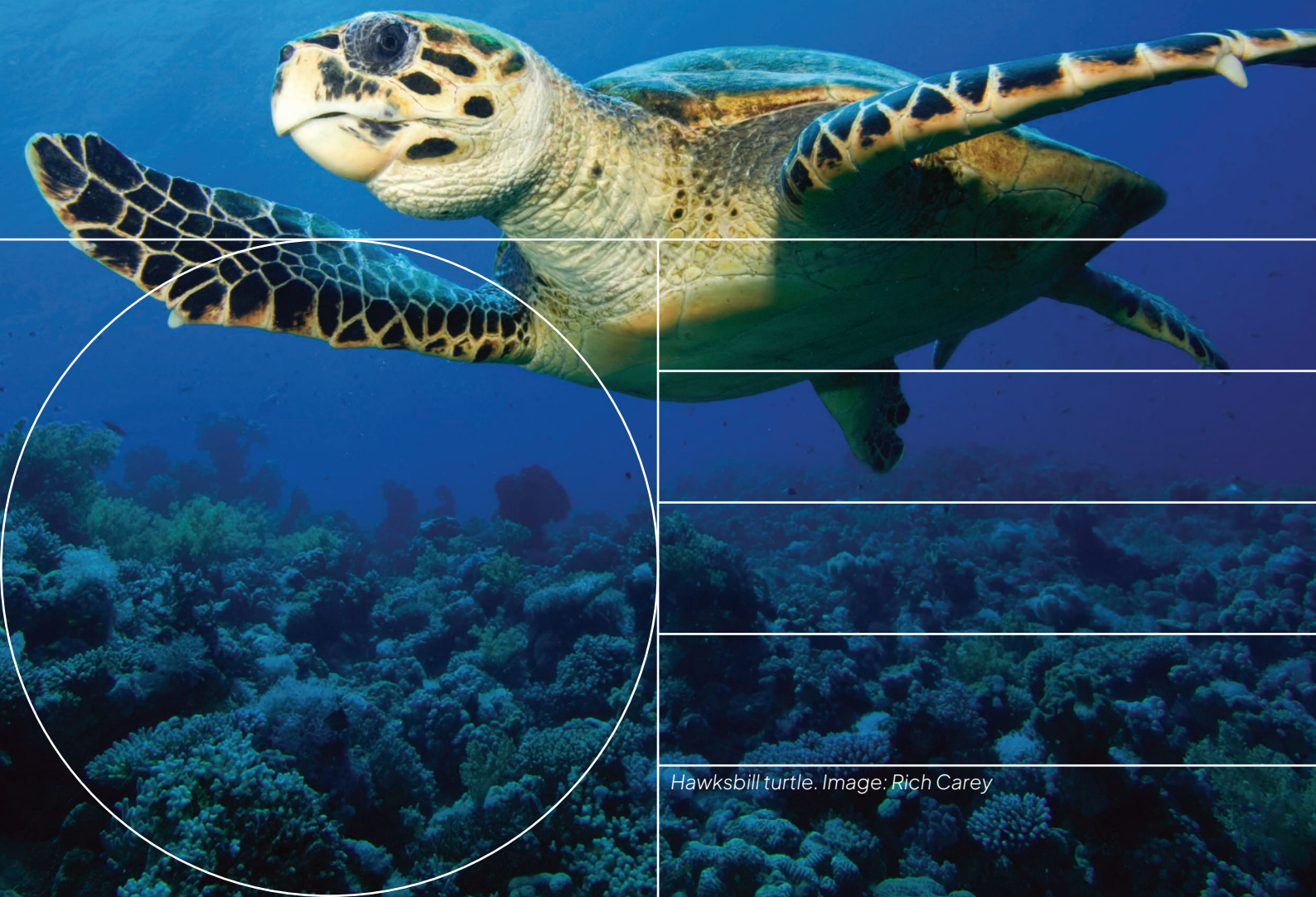
Australian Marine Conservation Society

The cost of preventing extinctions in Australia's marine environment

Research findings

Biodiversity Council and Australian Marine Conservation Society

March 2025



Hawksbill turtle. Image: Rich Carey

Acknowledgement

The Biodiversity Council and Marine Conservation Society acknowledge the First Peoples of the Sea Country of Australia, and pay respect to their Elders, past, present and future and expresses gratitude for long and ongoing custodianship of Country.

Further information

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Contents

THE UNIVERSITY OF MELBOURNE

The **Melbourne Biodiversity Institute** is a group of researchers, innovators, and problem-solvers from across the **University of Melbourne** who are dedicated to addressing the Earth's biodiversity crisis.

Biodiversity Council

The **Biodiversity Council** is an independent not-for-profit expert group founded by 11 Australian universities to promote evidence-based solutions to Australia's biodiversity crisis.

AMCS

The **Australian Marine Conservation Society** (AMCS) is Australia's leading ocean conservation organisation and one of the founding members of Australia's environment movement.

The cost of preventing extinctions in Australia's marine environment

This report summarises the results of the first-ever assessment of the annual government expenditure required to meet the Australian Government's commitment to prevent extinctions in marine environments.

The research was undertaken by a team of environmental scientists at the University of Melbourne's Melbourne Biodiversity Institute. The research was supported by the Australian Marine Conservation Society and Biodiversity Council.

All costs are given in 2024 Australian dollars.

Humpback Whale.
Image: Whit Welles CC BY 3.0

Key findings

Marine environments and the ocean industries that they underpin support 462,000 jobs in Australia and contribute $150 billion to the Australian economy each year.

Many Australian marine ecosystems and species are rapidly declining. Australia currently has **95 marine species that are listed as threatened with extinction** under Australian environmental law.

Every Australian Government over the past 10 years has committed to preventing extinctions and recovering threatened species, but the cost of achieving this objective has not previously been costed for marine species.

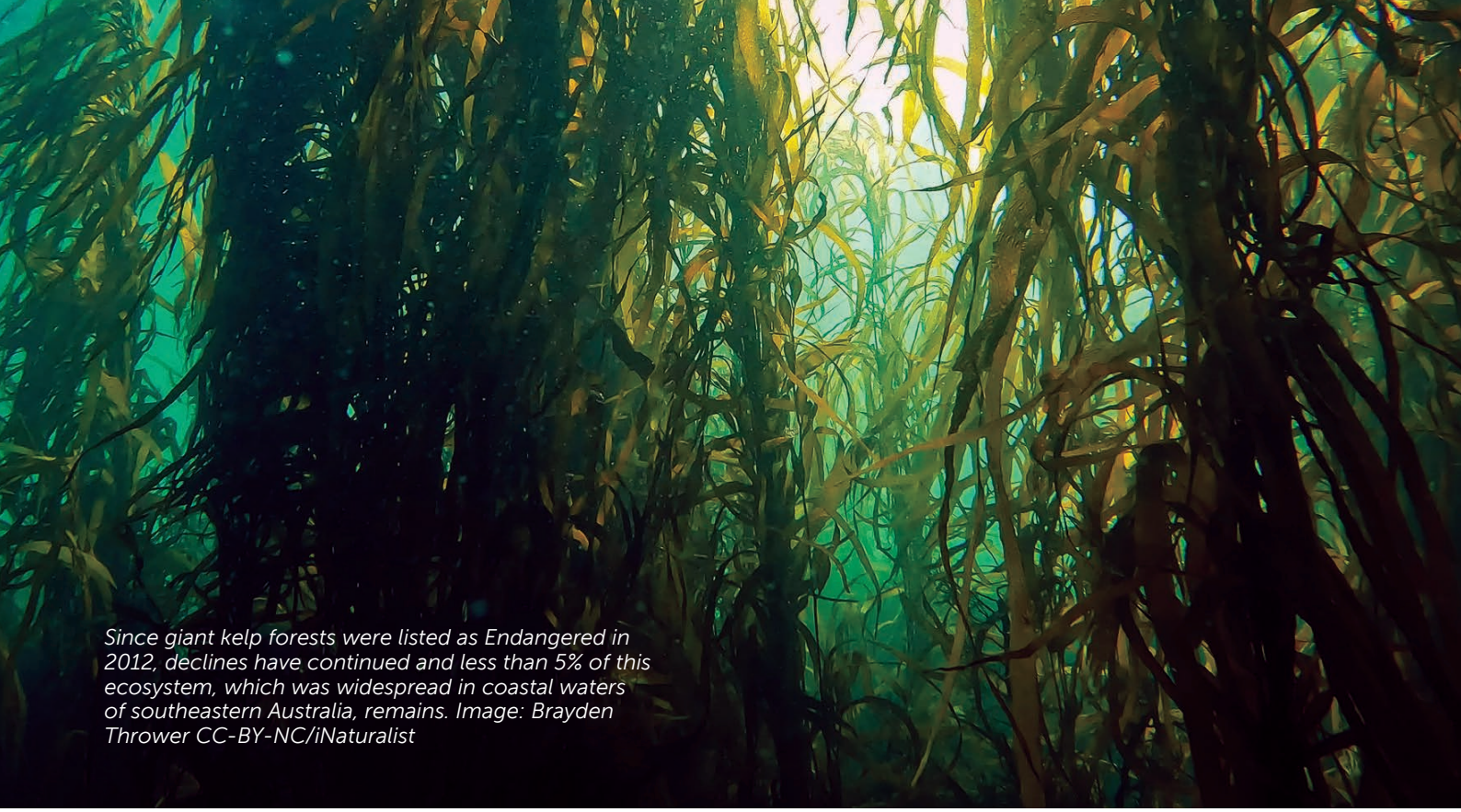
This study found that **Australia needs to invest $340 million per year** in order to deliver effective marine threatened species conservation programs **to prevent extinctions and recover species.**

Australian policy approaches to threatened species management, including funding approaches, are failing to curb threatened species declines. In contrast, the *Endangered Species Act 1973* (US) and supporting programs are effective, with more than 100 species delisted or having their threat status downgraded due to recoveries.

Effective aspects of the *Endangered Species Act 1973 (US)* that **could be applied in Australia** to improve outcomes include: 1) all listed threatened species have a mandatory allocation of funding for recovery actions, and 2) transparent public annual reporting of spending on each threatened species.

The Australian Government currently expends only one thousandth (0.1%) of the federal budget on conservation action.

Other research has found that Australian Government spending on the environment would need to be **lifted to 1%** (1/100) of the budget in order to adequately support threatened species recovery and the restoration of degraded lands and waters. The results of this marine-focused study align with that conclusion.



Since giant kelp forests were listed as Endangered in 2012, declines have continued and less than 5% of this ecosystem, which was widespread in coastal waters of southeastern Australia, remains. Image: Brayden Thrower CC-BY-NC/iNaturalist

The state of Australia's marine environments

Marine environments are critical to Australia's identity and economy. It has been estimated that the marine environment contributes more than $25 billion to the Australian economy every year in ecosystem services, such as carbon dioxide absorption, nutrient cycling and coastal protection.[1]

Ocean industries contribute $118.5 billion and 462,000 jobs to Australia's economy each year, and this continues to grow rapidly.

Despite this importance, current management is allowing the continual loss and degradation of marine ecosystems and species.

For example, mangroves critical for fish spawning in the Gulf of Carpentaria are showing signs of collapse.[2] Since giant kelp forests were listed as Endangered in 2012, declines have continued and less than 5% of this ecosystem, which was widespread in coastal waters of southeastern Australia, remains. Ninety-five per cent of Australian shellfish reefs and half of our total seagrass area have been destroyed.[3] The 2021 Australia State of the Environment report indicates seamounts, shallow rocky reefs, algal beds, and coral reefs are either in poor or declining condition nationally.[4]

Failure to act effectively on climate change is causing catastrophically harmful ocean warming events and exacerbating other problems. Extreme climatic events (2011 to 2017) have led to abrupt and extensive mortality of key marine habitat-forming organisms—corals, kelps, seagrasses, and mangroves—along over 45% of the Australian coastline.[5] There have been five highly destructive mass coral bleaching events on the Great Barrier Reef in the past seven years[6, 7] and a heat wave in Western Australia is taking a heavy toll on flatback turtle hatchlings and other species this year.

95 Australian marine species are now nationally recognised as threatened with extinction. They include 9 marine reptiles, 9 mammals, 23 fish and 54 birds.

A major gap in delivering a government commitment

Over the past decade, successive Australian Governments have committed to preventing extinctions and recovering threatened species. The commitment has been articulated through successive national plans and strategies, including:

- Australia's Strategy for Nature 2024–2030 (2024, Albanese Government)[8]
- 2022–2032 Threatened Species Action Plan (2022, Albanese Government)[9]
- 2021–2031 Threatened Species Strategy (2021, Morrison Government)[10]
- 2015–2020 Threatened Species Strategy (2015, Abbott Government)[11]

In 2022 the Australian Government also joined 195 nations in signing the Global Biodiversity Framework, of which a key goal is ending human-driven extinctions.

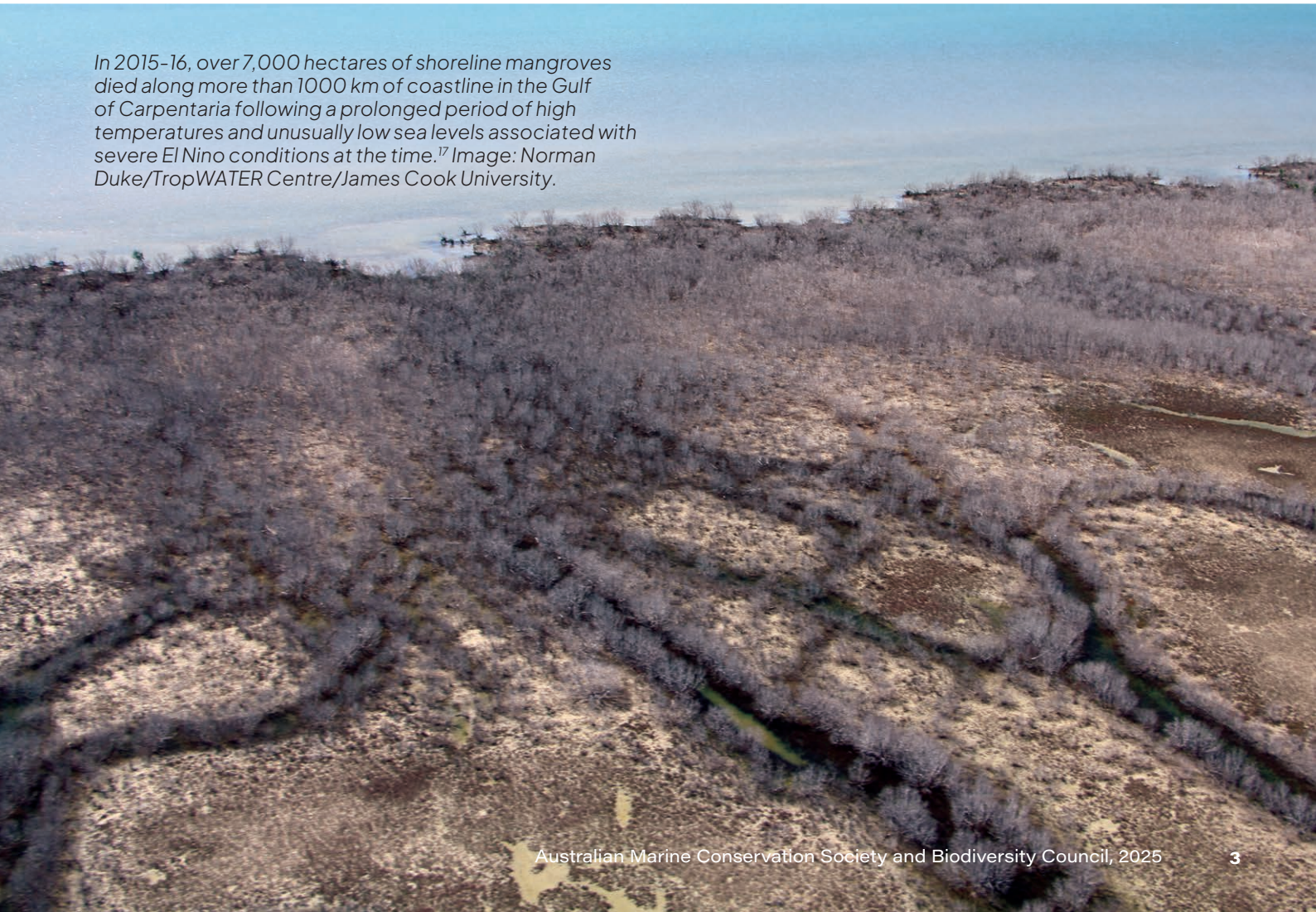
Australia does not yet have an effective system in place to deliver these commitments and to recover species that are listed as threatened with extinction under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Since the establishment of the Act, at least five species have become extinct after they were listed, 64 species have been up-listed to higher threat categories (eg Endangered to Critically Endangered), only 10 species have been down-listed to lower risk categories, and only 6.5% of listed species have recovered such that they no longer meet the eligibility criteria for listing as threatened.[12]

This reflects a broader trend of decline. Where monitoring of Australia's threatened species populations is occurring it is demonstrating steep and ongoing declines. Monitoring data is available for 8% of Australia's threatened species through the Threatened Species Index and shows that Australia's threatened species populations have fallen by an average of 61.5% since 2000.[13]

Changing the trajectory of threatened species to deliver Australia's commitment to prevent extinctions will require considerable ongoing investment in effective conservation programs and targeted species-specific recovery actions.

For Australia's threatened marine species, this is expected to include actions like protecting critical habitats from development, habitat restoration, managing fishing quotas and reducing animals caught as fishing bycatch, reducing water and light pollution, controlling invasive species, reducing marine debris and entanglement e.g. from plastic pollution, climate action to reduce ocean heatwaves and acidification, monitoring, research, and in some cases captive breeding.

Until this study, a realistic estimate of the total investment required to deliver these commitments was unknown and this has undermined our national ability to budget for and effectively resource programs in order to recover species and prevent extinctions. A realistic estimate is essential information if the Australian Government intends to act to deliver these promises.



In 2015-16, over 7,000 hectares of shoreline mangroves died along more than 1000 km of coastline in the Gulf of Carpentaria following a prolonged period of high temperatures and unusually low sea levels associated with severe El Nino conditions at the time.[17] Image: Norman Duke/TropWATER Centre/James Cook University.

Olive Ridley Sea Turtle hatchlings. Australia has many of the same species of threatened marine turtles as the US, where more than AUD $7 million per year is spent on the conservation of each species. Image: Bethany McCarter CC BY 4.0

Learning from the United States

There have been too few successful threatened species recovery programs in Australia to be able to estimate the cost by extrapolating from Australian data so we drew data from the United States. The United States has many of the same marine turtle species on their *Endangered Species Act 1973* list, and also has a comparable array of marine mammals, sea- and shorebirds, and fish from different environments.

The United States has a track record of implementing successful recovery programs for species listed under the *Endangered Species Act*. A key element of the United States' success has been that the act mandates funding for threatened species recovery once species are listed.

The amount of funding allocated in the United States appears to be approximately sufficient as their US Fish and Wildlife Service (USFWS) endangered species recovery programs are credited with preventing the extinction of 290 species. They have also led to 62 species being delisted[14] and another 15 proposed for delisting[15] following recovery. 56 species species have been downlisted to lower risk categories (endangered to threatened).[16] The populations of 85% of *Endangered Species Act*-listed birds have stabilised or recovered following their listing.

The USFWS publishes detailed annual reports of federal and state government expenditure on endangered and threatened species conservation within categories such as fisheries management, refuges, land acquisition, law enforcement, research, international conservation efforts, and regional and field office operations for listing, recovery and consultation. This reporting has provided the data to underpin this study and also provides a potential blueprint for the Australian Government.

Currently, there is no easily accessible compilation of data on how much Australian federal and state governments spend on individual species recovery. This contributes to a lack of transparency and government accountability in Australia which should be addressed as a matter of urgency. Without transparent and readily available conservation expenditure data, it is hard to review, refine and improve conservation policy and action effectiveness and efficiency.

What the research did

Our study examined the expenditure of USFWS programs in 2020 per species to recover marine species in each of four broad groups: reptiles, mammals, fish and birds. We adjusted these figures to 2024 values by adjusting for the total inflation over the period (21.2%).

We then applied these average annual expenditure rates to Australia's 95 nationally threatened marine species to provide the first robust estimate of the total annual expenditure required to prevent extinctions and resource their recovery.

The six salmon species listed under the ESA were excluded from the results as Australia does not have comparable species. These species are of huge commercial importance in the US and require widespread catchment management. On average, they receive 170 times more funding than other listed marine fish species.

The results were sense-checked by a panel of experts who were asked whether the estimates provided were a reasonable estimate of the expenditure needed to stabilise species populations and avert near-term (<10 year) risk of extinction.

Results

The total estimated cost to prevent extinctions and recover Australia's 95 threatened marine species is $340M per year. See table 1.

Table 1: Actual expenditure on threatened species in the United States per species and the estimated total expenditure required to prevent extinctions of Australian threatened species. All amounts are in 2024 Australian dollars.

Species group	Average US expenditure per species (in 2024 $AUD)	No. EPBC Act Listed species	Estimated total expenditure to recover EPBC Act-listed species
Reptiles	$7,131,236	9	$64,181,120
Mammals	$4,883,091	9	$43,947,818
Fish	$5,093,330	23	$117,146,574
Birds	$2,115,685	54	$114,246,986
Total		**95**	**$339,522,498**

Image: David Clode/Unsplash

Leatherback turtle. Image: Jasmin O'Brien CC-BY-NC iNaturalist

Ghost nets present a threat to turtles and other wildlife.Image: NOAA

Marine reptiles

Australia has nine threatened marine reptile species, comprising six marine turtles, including the green, hawksbill and leatherback turtles, and three sea snakes, the dusky, short-nosed and leaf-scaled sea snake.

The average US expenditure per threatened marine reptile species is over $7 million per year, in 2024 Australian dollars.

This is the highest per-species expenditure of any marine faunal group. The higher cost is partly due to the high proportion of marine turtles in the group. Many of the reasons for the high cost of marine turtle conservation in the US would also apply in Australia, where most of our marine reptiles are also marine turtles.

Compared to other species, which may occur in much smaller areas, effective marine turtle conservation often requires conservation efforts over vast areas of coastline and seas. This includes protecting turtle nests from invasive species, especially feral pigs, reducing light pollution and plastic pollution and addressing climate impacts.

Some of these threats require broader policy and regulatory changes and community engagement and not just direct action at specific locations. As marine turtles can migrate vast distances including through high seas, and marine plastic pollution can travel great distances, effective conservation also requires international cooperation.

The estimated total expenditure required to protect and recover Australia's nine threatened marine reptiles is $64 million per year.

Australia has three threatened sea snakes. Image: Rafi Amar CC-BY-NC iNaturalist

Sei whale. Image: Geoffrey Delahaye CC-BY-NC iNaturalist

Marine mammals

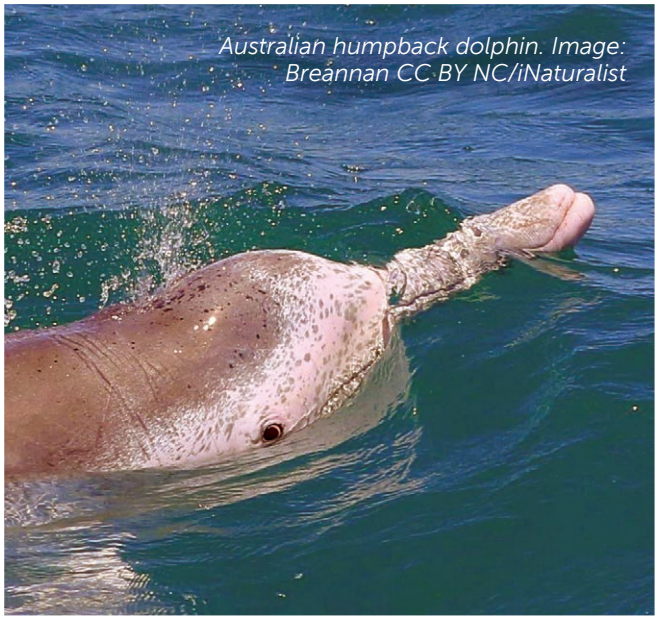
Australia has nine threatened marine mammal species, including four whales (blue, fin, sei and southern right whales), two dolphins (Australian humpback and Australian snubfin) two seals (southern elephant and subantarctic fur-seal) and the Australian sea-lion.

The average US government expenditure to conserve marine mammals, including whales, seals and sealions, is just under $5 million per year per species in 2024 Australian dollars.

This is lower than the total conservation spending on these species, as it does not include considerable philanthropic spending on these species. Amounts of philanthropic investment are generally lower in Australia than the US so the actual expenditure required by the Australian Government to prevent extinctions and recover marine mammals in Australia could easily be more than estimated here.

The estimated total expenditure required to protect and recover Australia's 9 threatened marine mammals is $44 million per year.

Subantartic fur-seal. Image: Simben CC-BY-NC-ND iNaturalist



Australian humpback dolphin. Image: Breannan CC BY NC/iNaturalist

Whale shark. Image: NOAA

Marine fish

Australia has 23 threatened marine fish species, of which roughly half (13 species) are sharks including the speartooth, grey nurse and whale sharks, Maugean skate and dwarf sawfish. Non-shark threatened fish species include the red, spotted and Ziebel's handfishes, whitesnout anemonefish and Sydney seahorse.

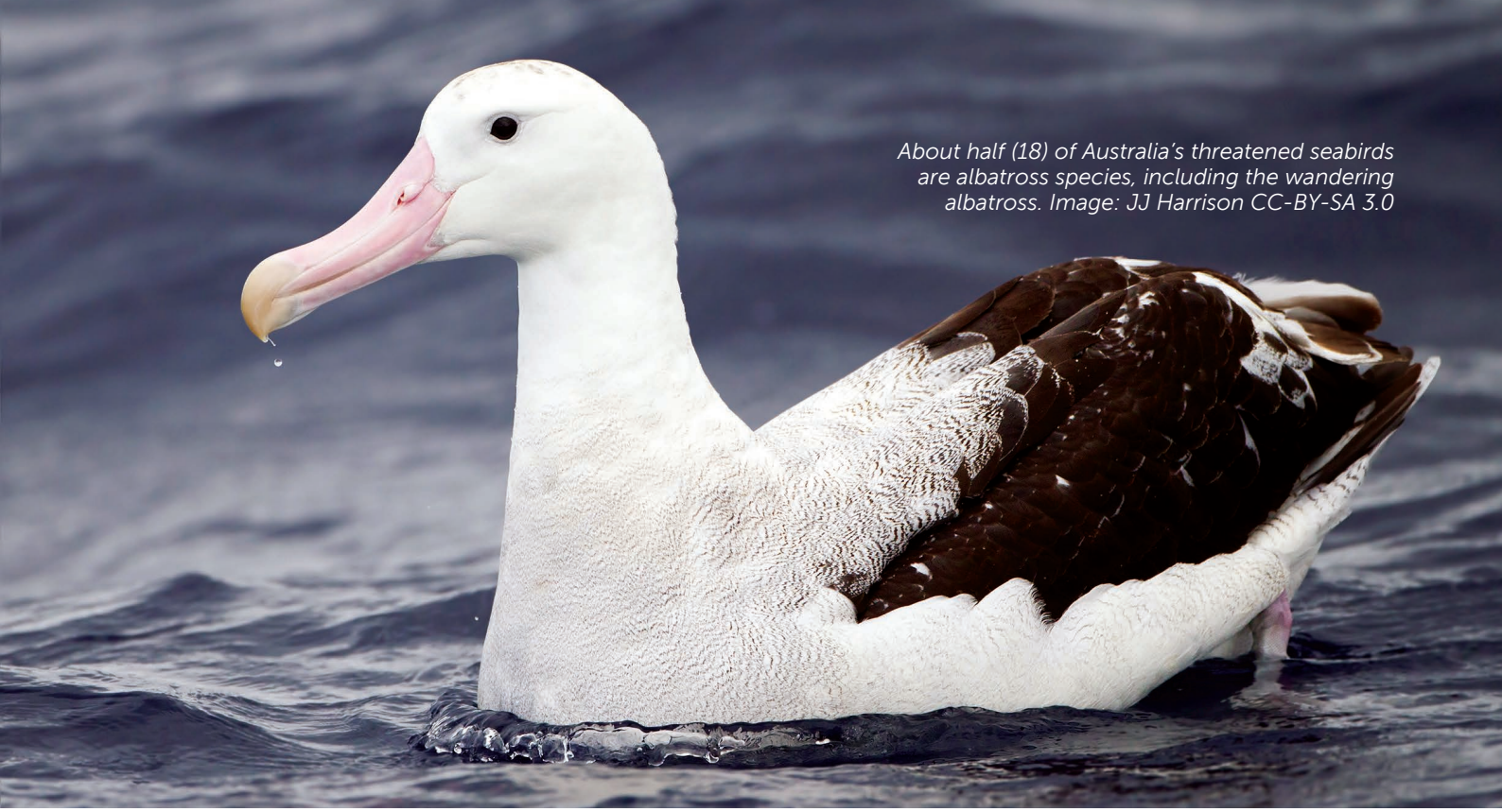
The average US government expenditure to conserve marine fish other than salmon and sturgeon species is just over $5 million per year in 2024 Australian dollars. (In contrast, threatened salmon and sturgeon species receive almost $200 million in conservation spending each per year.)

This figure was applied to each of the 23 threatened marine fish, including the seven Conservation Dependent marine fishes listed under the EPBC Act. The analysis did not apply a higher rate to the commercially important Conservation Dependent species, such as orange roughy and school shark, so the estimate provided here is conservative and likely to be an underestimate.

The estimated total expenditure required to protect and recover Australia's 23 threatened marine fish is estimated at $117 million per year.

Freshwater sawfish. Image Simon Fraser University CC BY 2.0 Flickr

Whites seahorse. Image Richard Ling CC BY SA Wikimedia Commons



About half (18) of Australia's threatened seabirds are albatross species, including the wandering albatross. Image: JJ Harrison CC-BY-SA 3.0

Marine birds

Australia has 54 threatened marine bird species, many of which are migratory, such as the far eastern curlew, red knot and shy albatross. The species are roughly two-thirds (37) seabirds and one-third (17) shorebirds.

About half (18) of our threatened seabirds are albatross species, including the wandering, sooty, shy and white-capped albatrosses. Other threatened seabirds include eight petrel species, such as the blue, herald and southern giant-petrels and the imperial shag and Abbott's booby.

Our threatened shorebirds include four plovers (greater sand, lesser sand, grey and eastern hooded plovers), three sandpipers (curlew, sharp-tailed and terek sandpipers), three godwits (Nunivak bar-tailed, northern Siberian and black-tailed godwits) and two knots (great and red knots).

The average US government expenditure to conserve marine seabirds and shorebirds is just over $2 million per year per species in 2024 Australian dollars.

The estimated total expenditure required to protect and recover Australia's 54 threatened marine birds is $114 million per year.

Blue petrel. Image: JJ Harrison CC BY SA Wikimedia Commons

Ruddy turnstone. Image: Hans Hilewaert CC BY SA 4.0 Wikimedia Commons

Recommendations

This study provides a good first estimate of the magnitude of funding required to conserve Australia's threatened marine species and should be used to inform Australian Government budgeting for marine threatened species recovery.

A valuable next step is for governments to determine individual species' needs through detailed recovery planning that quantifies the cost of addressing threats and preventing extinctions through emergency management.

To effectively protect and recover Australia's marine threatened species, the Australian and state and territory governments must work together to lift government expenditure on the protection and recovery actions for marine species to around $340 million per year. Without this level of expenditure marine species will continue to decline and jeopardise the important contributions that marine ecosystems make to the Australian economy.

The Australian Government currently allocates only one-one thousandth of the federal budget to conservation action. Given the incredible importance of a healthy environment to sustain our economy and way of life, it is recommended that overall spending on conservation action should urgently be lifted to 1% (one-one hundredth) of the federal budget. 1% of the budget could allow for adequate expenditure for each of Australia's listed-threatened species and drive ecosystem restoration across Australia's degraded lands and marine environments, including shellfish reefs, seagrass beds, mangroves and estuaries.

Under the Global Biodiversity Framework the Australian Government committed to identifying and eliminating government subsidies that are harmful to the environment. An initial assessment identified that existing Australian Government subsidies account for 4% of the federal budget. Reforming and eliminating these nature-harmful subsidies presents a unique opportunity to reallocate some of these funds to adequately resource conservation action.

The proposed reform of the EPBC Act should include the addition of mandated allocations to fund recovery actions for every EPBC Act-listed threatened species, as occurs with the US Endangered Species Act.

The Australian Government should commence publicly available annual reporting of federal and state government expenditure on threatened species conservation, identifying the actual expenditure per species and across key action areas, as occurs in the US. This would increase transparency and accountability and provide data to refine conservation strategies to improve effectiveness and efficiency over time.

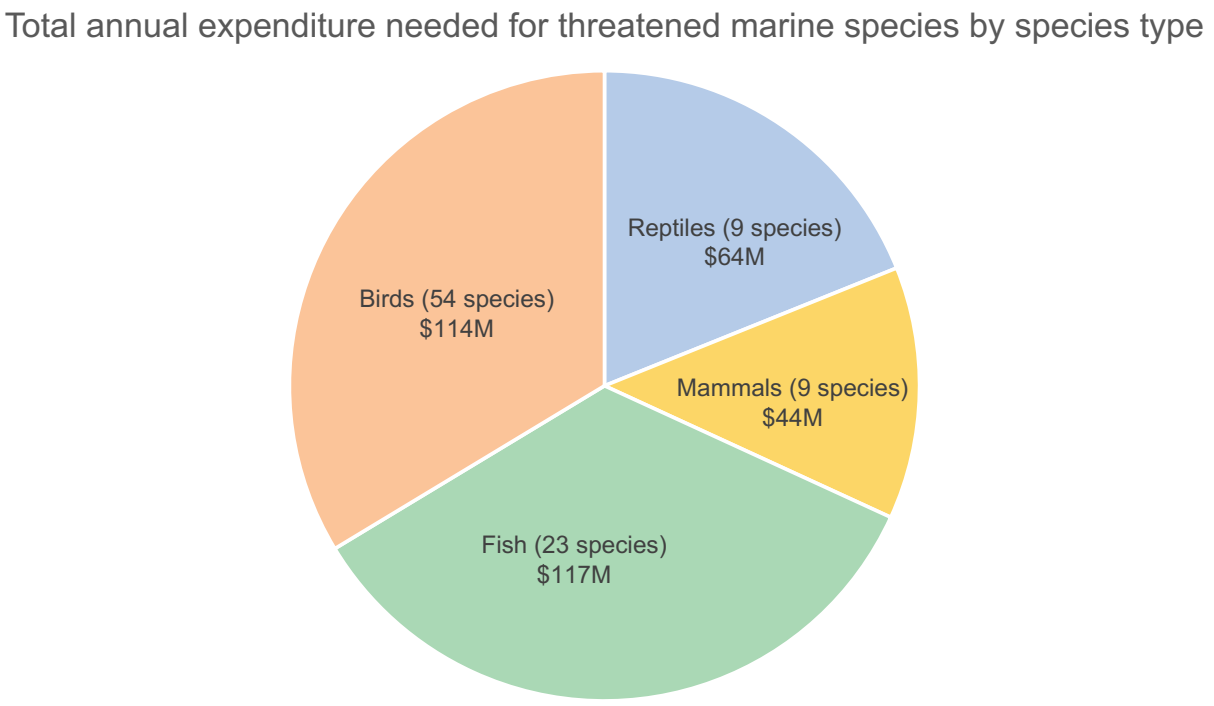


Figure 1: The total required annual spending on marine threatened species divided by species types.

Australia has three Critically Endangered species of handfish, including the spotted handfish. Image: David Clode/Unsplash

References

1 DCCEEW (2024). Marine. Webpage accessed 15 Dec 2024. https://www.dcceew.gov.au/environment/marine

2 Bergstrom D. M., Wienecke B. C., van den Hoff J. et al. (2021) Combating ecosystem collapse from the tropics to the Antarctic. Global Change Biology 27, 1692–1703. https://doi.org/10.1111/gcb.15539.

3 Gillies C. L., McLeod I. M., Alleway H. K., Cook P., Crawford C. et al. (2018) Australian shellfish ecosystems: past distribution, current status and future direction. PLoS One 13, e0190914. https://doi.org/10.1371/journal.pone.0190914.

4 Trebilco R, Fleming A, Hobday AJ, Melbourne-Thomas J, Meyer A, McDonald J et al. (2021). Warming world, changing ocean: mitigation and adaptation to support resilient marine systems. Reviews in Fish Biology and Fisheries. https://soe.dcceew.gov.au/

5 Babcock R., Bustamante R., Fulton E. et al. (2019) Severe continental-scale impacts of climate change are happening now: extreme climate events impact marine habitat forming communities along 45% of Australia's coast. Frontiers in Marine Science 6, 411. https://doi.org/10.3389/fmars.2019.00411.

6 Henley, B. J., McGregor, H. V., King, A. D., Arzey, A. K., Karoly, D. J., Lough, J. M., DeCarlo, T. M., & Linsley, B. K. (2024). Highest ocean heat in four centuries places Great Barrier Reef in danger. Nature, 632(8024), 320–326. https://doi.org/10.1038/s41586–024–07672–x

7 Byrne, M., Waller, A., Clements, M., Kelly, A. S., Kingsford, M. J., Liu, B., Reymond, C. E., Vila-Concejo, A., Webb, M., Whitton, K., & Foo, S. A. Catastrophic bleaching in protected reefs of the Southern Great Barrier Reef. Limnology and Oceanography Letters. https://doi.org/10.1002/lol2.10456

8 Commonwealth of Australia (2024) Australia's Strategy for Nature 2024–2030, . https://www.dcceew.gov.au/sites/default/files/documents/australias-strategy-for-nature-2024–2030.pdf

9 DCCEEW 2022, Threatened Species Strategy Action Plan 2022–2032, Department of Climate Change, Energy, the Environment and Water, Canberra, September. CC BY 4.0. https://www.dcceew.gov.au/sites/default/files/documents/threatened-species-action-plan-2022–2032.pdf

10 The Australian Government's Threatened Species Strategy 2021–2031 DAWE 2021, Department of Agriculture, Water and the Environment, Canberra, April. CC BY 4.0. https://www.dcceew.gov.au/sites/default/files/documents/threatened-species-strategy-2021–2031.pdf

11 Department of the Environment and Energy. (2015). Threatened Species Strategy. https://www.dcceew.gov.au/sites/default/files/documents/ts-strategy.pdf

12 Woinarski, J. C., Garnett, S. T., Gillespie, G., Legge, S. M., Lintermans, M., & Rumpff, L. (2023). Lights at the end of the tunnel: The incidence and characteristics of recovery for Australian threatened animals. Biological Conservation, 279, 109946. https://doi.org/10.1016/j.biocon.2023.109946

13 TSX (2025). The Australian Threatened Species Index (2025). Threatened Species population trend since 2020 base year. The University of Queensland. Accessed on 23 Jan 2025. https://tsx.org.au/tsx2024/?type=all&tgroup=All&group=All&subgroup=All&state=All&statusauth=Max&status=VU_EN_CR&management=All&refyear=2000

14 https://ecos.fws.gov/ecp/report/species-delisted

15 https://ecos.fws.gov/ecp/report/species-listings-proposed-change-delisting

16 https://www.doi.gov/pressreleases/us-fish-and-wildlife-service-proposes-delisting-23–species-endangered-species-act-due

17 Duke, N.C. 2022. Climate change killed 40 million Australian mangroves in 2015. Here's why they'll probably never grow back. The Conversation: online. 28 July 2022. https://theconversation.com/climate-change-killed-40–million-australian-mangroves-in-2015–heres-why-theyll-probably-never-grow-back-166971

An Australian sea lion pup. The species is Endangered. Image: Andrea Izzotti/iStock

Cape Otway coastline.
Image: Dietmar Rabich
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