THE UNIVERSITY OF MELBOURNE

Melbourne Biodiversity Institute

Biodiversity and plantations - a good news story?

Professor Brendan Wintle

Image: Nicolas Rakotopare

The University of Melbourne acknowledges the Traditional Owners of the unceded land on which we work, learn and live: the Wurundjeri Woi Wurrung and Bunurong peoples (Burnley, Fishermans Bend, Parkville, Southbank and Werribee campuses), the Yorta Yorta Nation (Dookie and Shepparton campuses), and the Dja Dja Wurrung people (Creswick campus).

Nature underpins …

Health – 70% of medicines natural or copies (4b people - solely natural)

Wellbeing – Cognitive development in children

Prosperity – ½ of Global GDP ($44T/yr) – 0.7% GDP loss by 2030 (WB)

Food - 75% of crops animal pollinated, 35% of food production

Climate regulation –Biosphere the only viable carbon sink

But nature's ability to provide these gifts is declining everywhere…

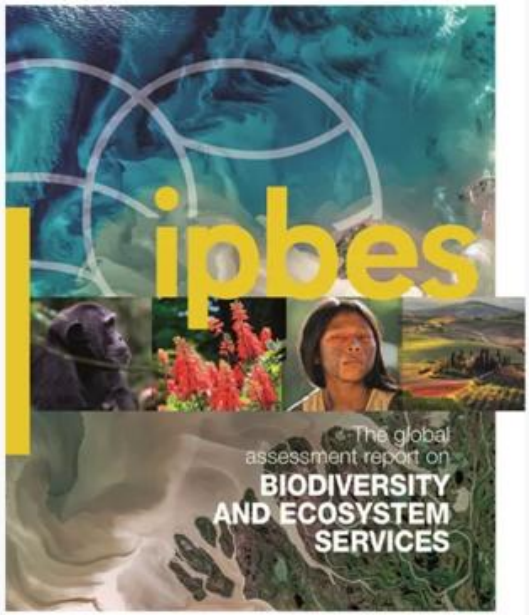
REGULATION OF ENVIRONMENTAL PROCESSES

Nature's contribution to people	50-year global trend	Directional trend across regions	Selected indicator
1 Habitat creation and maintenance	↓ ↓	○	• Extent of suitable habitat • Biodiversity intactness
2 Pollination and dispersal of seeds and other propagules	↓ ↓	○	• Pollinator diversity • Extent of natural habitat in agricultural areas
3 Regulation of air quality	↘	⇅	• Retention and prevented emissions of air pollutants by ecosystems
4 Regulation of climate	↘	⇅	• Prevented emissions and uptake of greenhouse gases by ecosystems
5 Regulation of ocean acidification	→	⇅	• Capacity to sequester carbon by marine and terrestrial environments
6 Regulation of freshwater quantity, location and timing	↘	⇅	• Ecosystem impact on air-surface-ground water partiti
7 Regulation of freshwater and coastal water quality	↘	○	• Extent of ecosystems that filter constituent components to wat
8 Formation, protection and decontamination of soils and sediments	↘	⇅	• Soil organic carbon
9 Regulation of hazards and extreme events	↘	⇅	• Ability of ecosystems to absorb buffer hazards
10 Regulation of detrimental organisms and biological processes	↓ ↘	○ ○	• Extent of natural habitat in agric areas • Diversity of competent hosts of vector-borne diseases

LEVELS OF CERTAINTY

- Well established
- Established but incomplete
- Unresolved

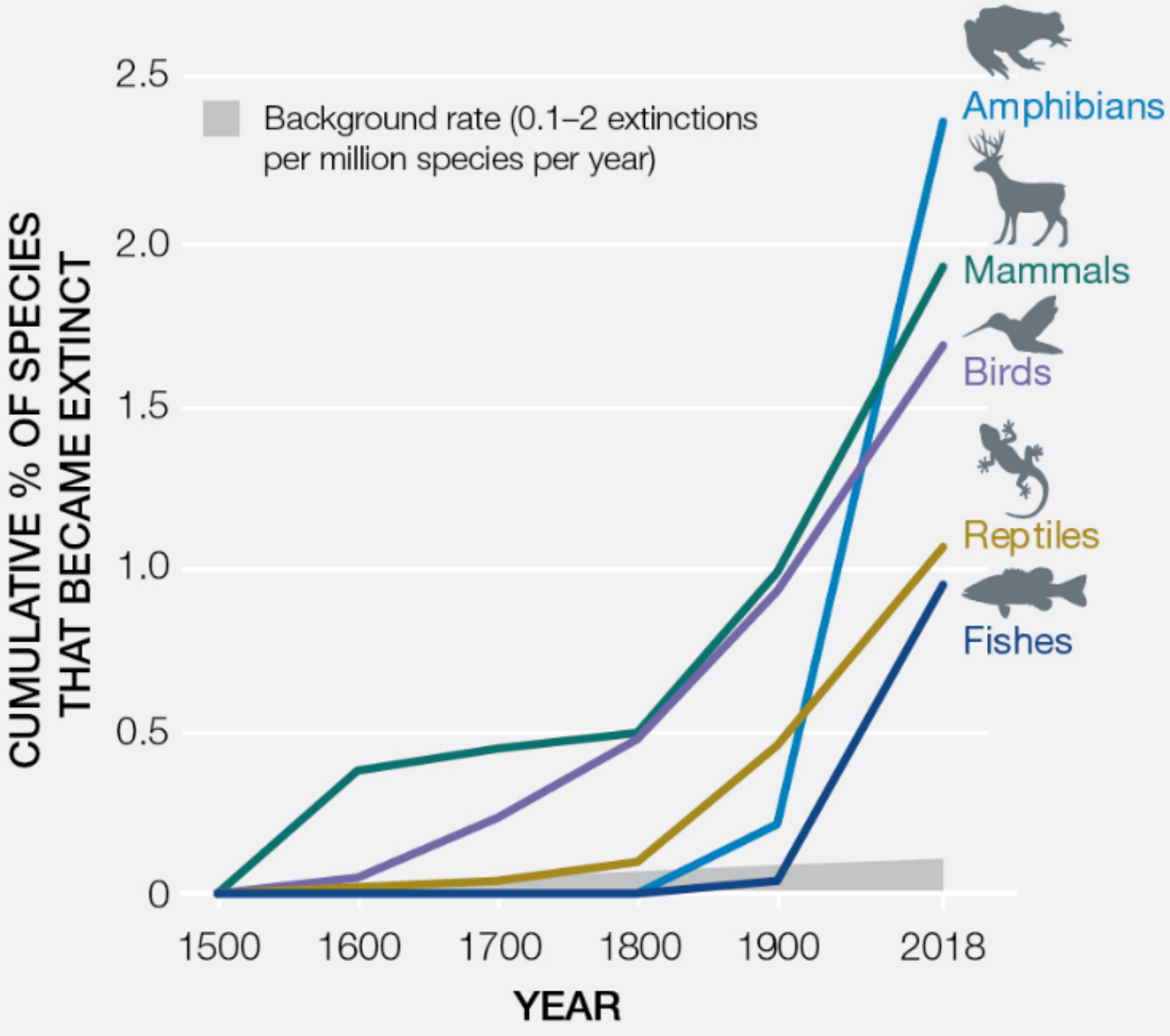
○ Consistent ⇅ Variable Across regions



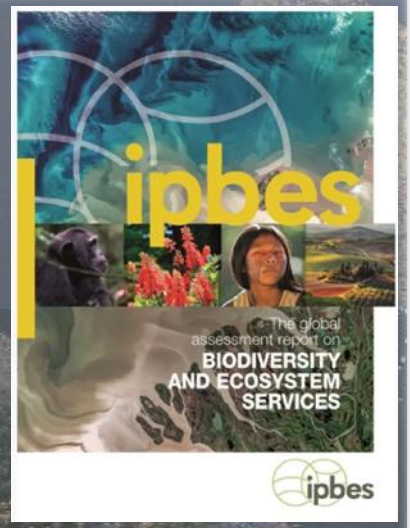
ipbes

Are we in an extinction crisis?

Yes. The Anthropocene extinction event



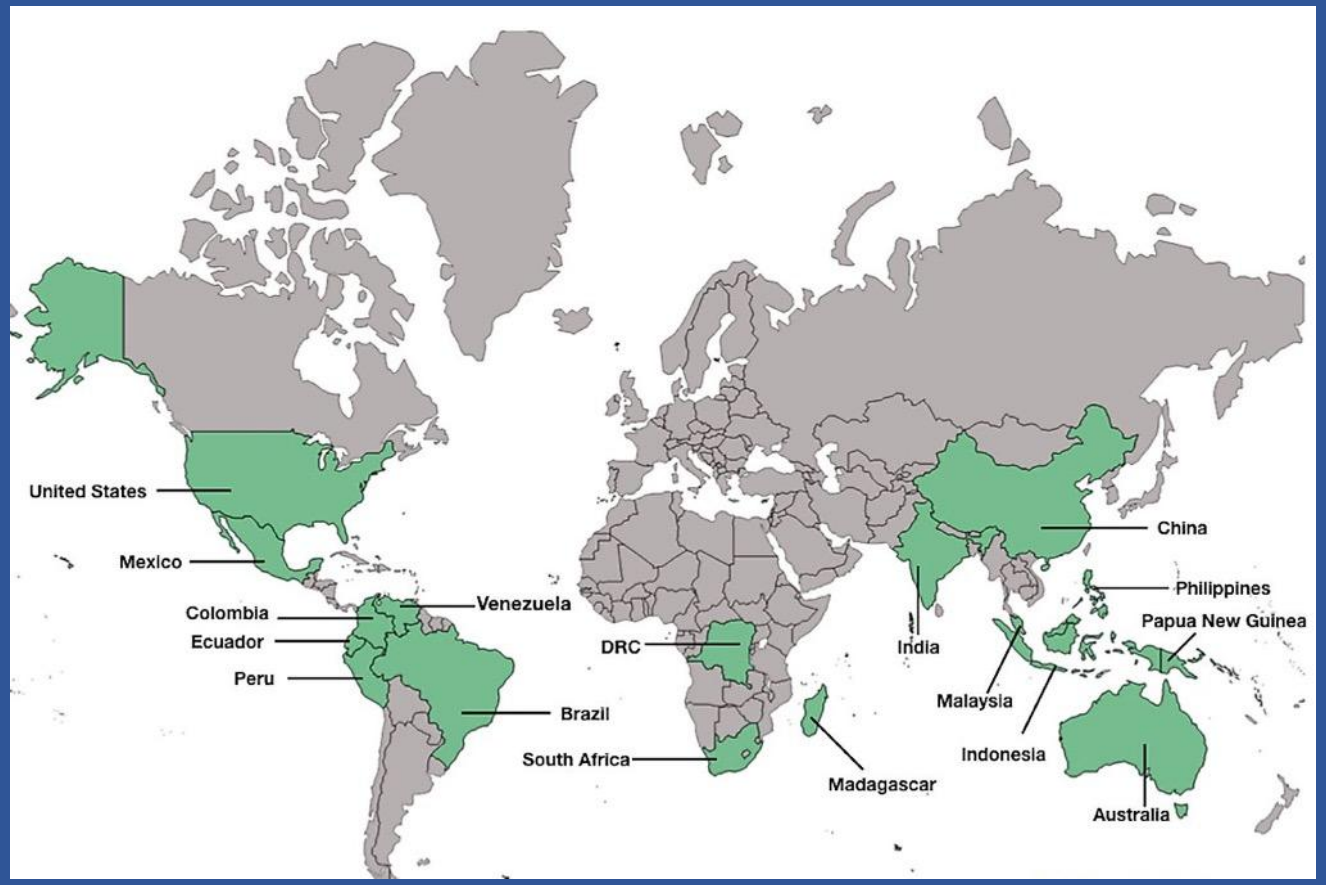
What are the global drivers of loss?



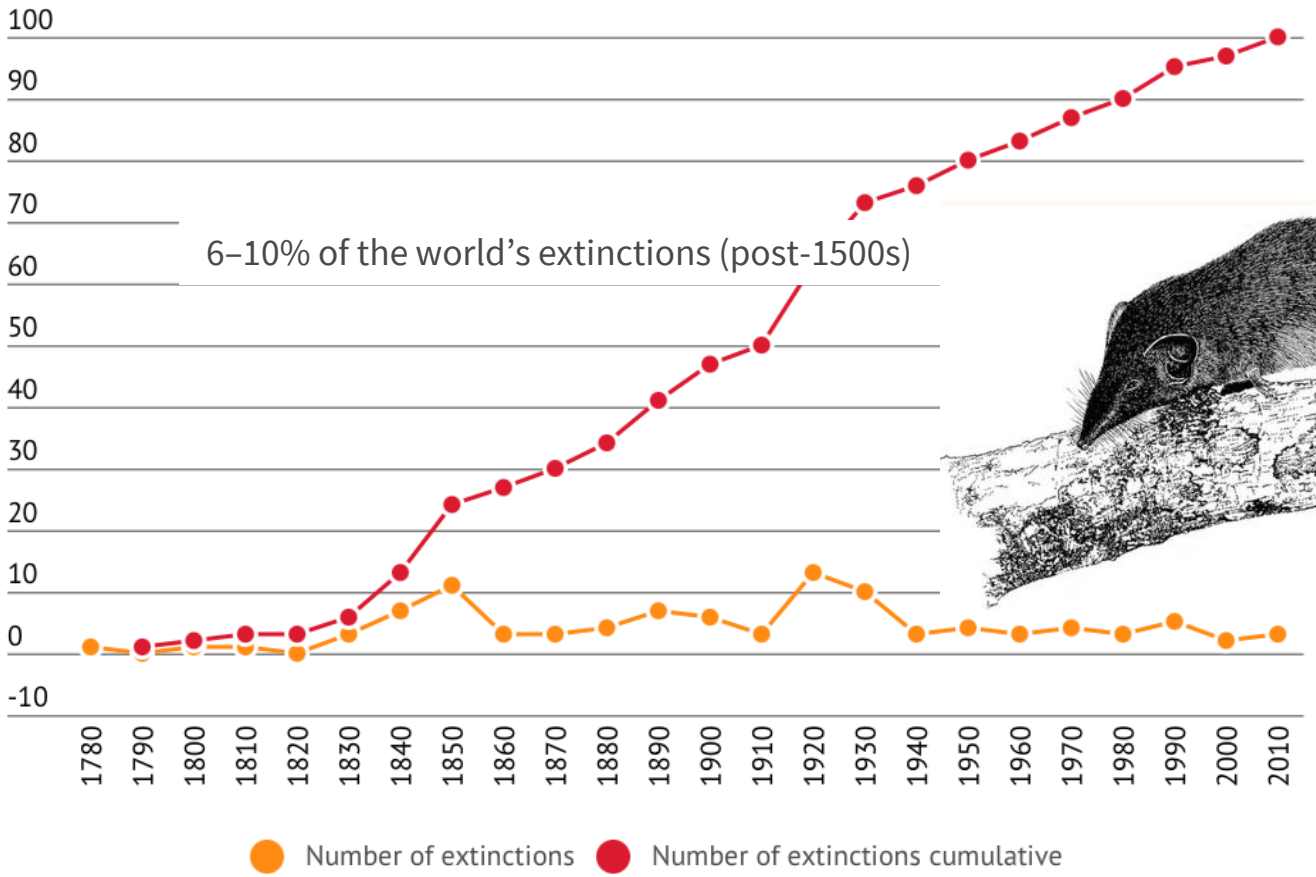
- **75%** of the land area is significantly altered;
- **66%** of the ocean area is experiencing increasing cumulative impacts;
- **85%** of wetland area has been lost
- Half the live coral cover on coral reefs has been lost since 1870 – loss accelerating
- Invasive species (cost $420B/yr ~ 60% of extinctions)

Australia – a unique, megadiverse nation

- 1 of 17 mega-diverse nations
- More species than any other developed nation
- Endemism - 87% mammals, 93% reptiles, 94% frogs found only here



Australian extinctions



Woinarski, et. al (2019). *Biol. Conserv.*, 239, 108261.

Including 39 mammals

- 10% of pre-European mammal spp
- 30% of global mammal extinctions

Pig-footed bandicoot

Lindy Lumsden

2000+ now at high risk **>1/3 not monitored** **40% no recovery plan**

Declining abundance of Australia's species

The Australian Threatened Species Index 2020

Threatened Species Recovery Hub

National Environmental Science Programme

~ 2% year

Relative abundance

1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3

1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015

Year

19 Australian ecosystems at risk of collapse

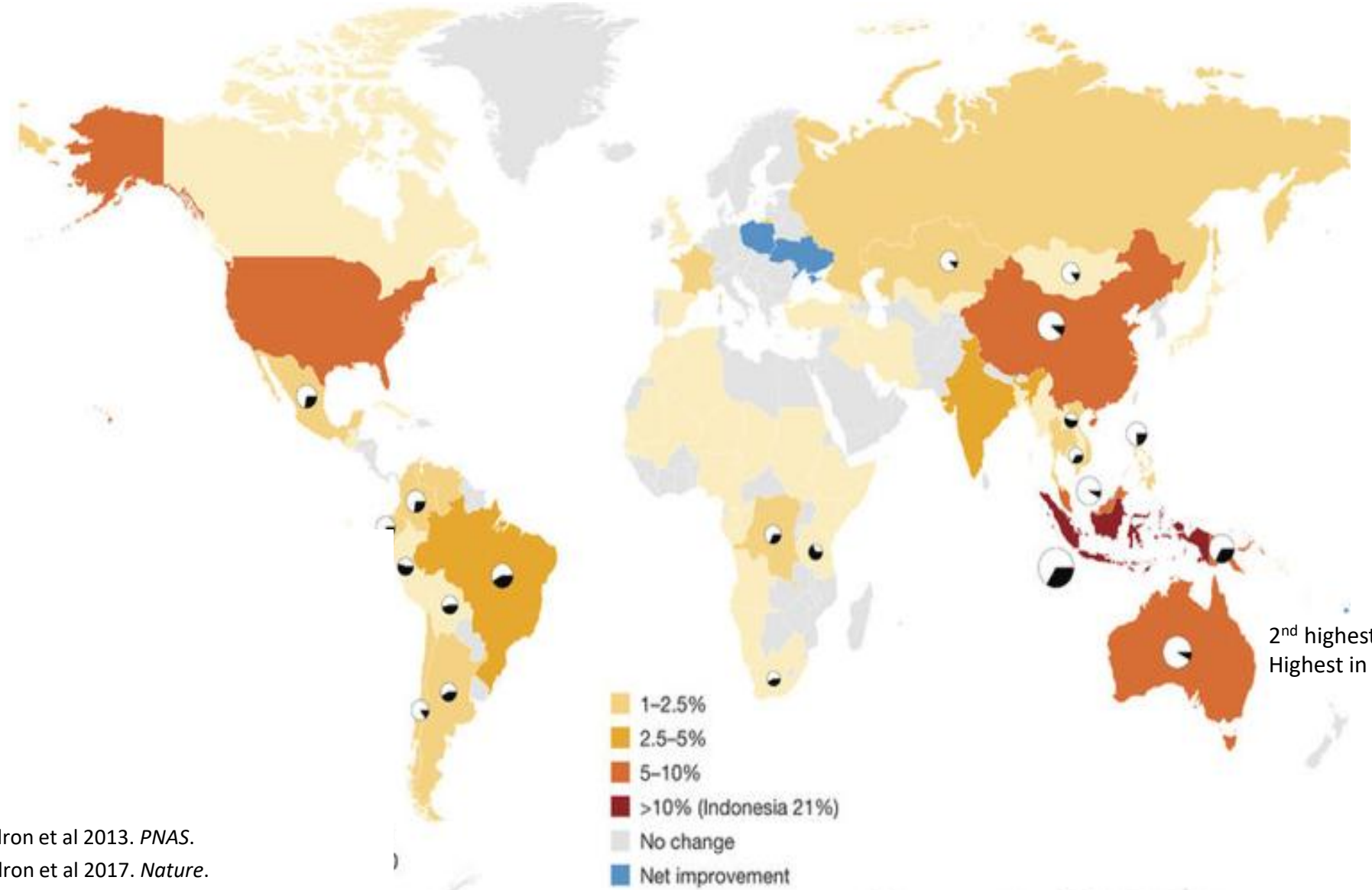
$6-7B/yr to GDP

$1B/yr to GDP

Source
based
al. (202
from th

Australian tropical savana
Mangrove forests
Western-central arid zones
Great Barrier Reef
Ningaloo Reef
Wet tropical rainforest
Georgina Gidgeen woodlands
Murray Darling River Basin riverine
Shark Bay seagrass beds
Snowpatch herbfields
Monaro Tablelands
Mediterranean forests & woodlands
Sub-alpine forests
Great Southern Reef kelp forests
Murray Darling River Basin waterways
Great Southern Reef kelp forests
Mountain ash forests
Gondwanan conifer forests

Global biodiversity loss



2nd highest rate of loss on planet
Highest in developed world

Waldron et al 2013. *PNAS*.
Waldron et al 2017. *Nature*.

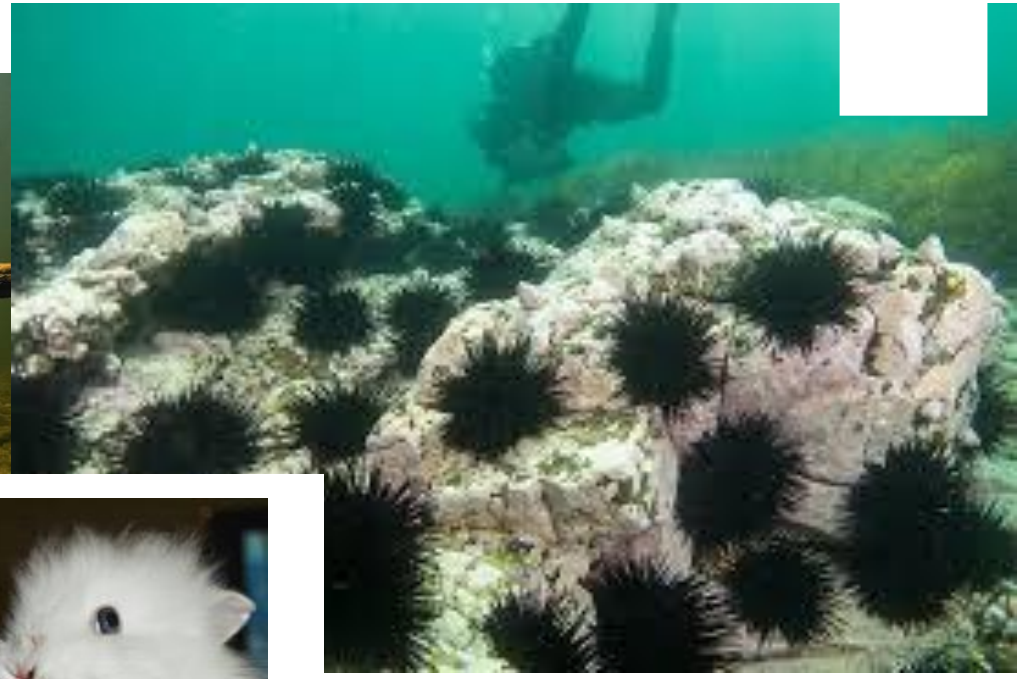
Drivers – direct habitat destruction

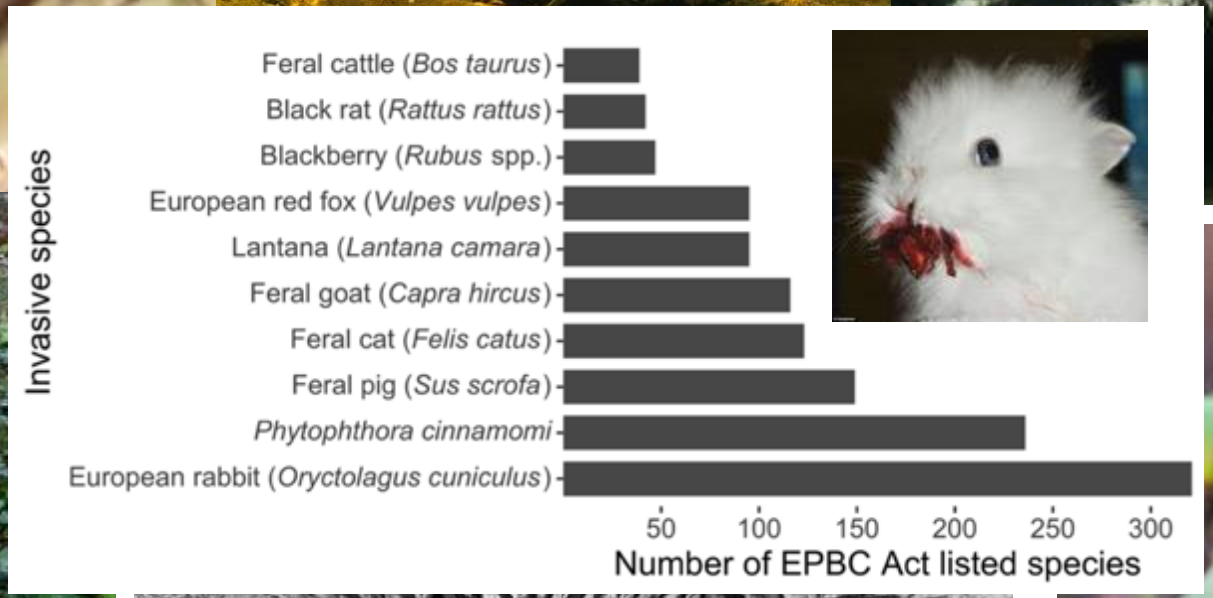
Endangered species habitat area size of Tasmania cleared since 2000 (8M ha)
>half the area of England (98% not assessed under EPBC Act)

95% of private land cleared in Victoria

680K hectares cleared in Qld in 2018/19 (12 months)

Drivers – invasive species

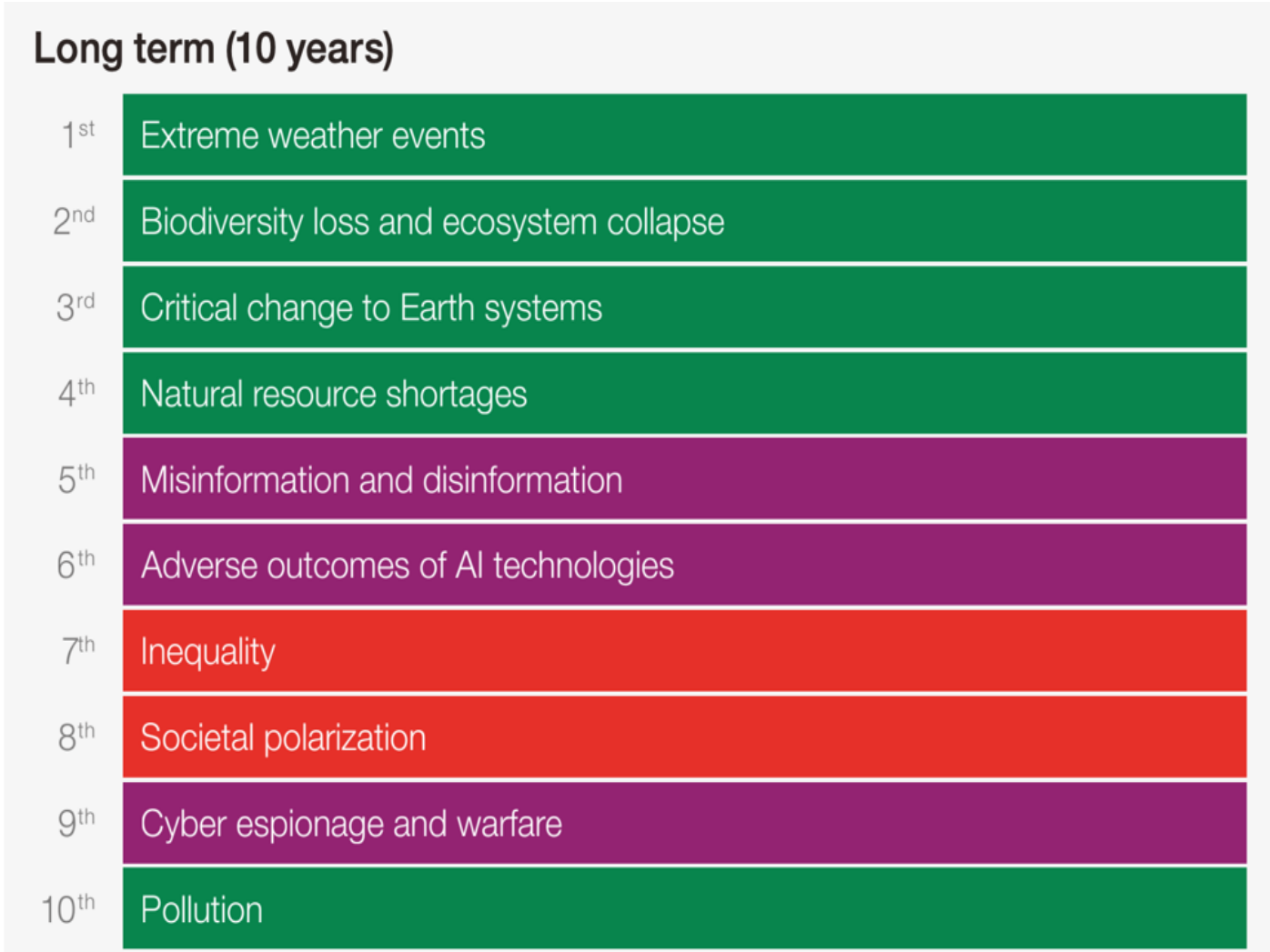




Drivers – climate change

WORLD ECONOMIC FORUM

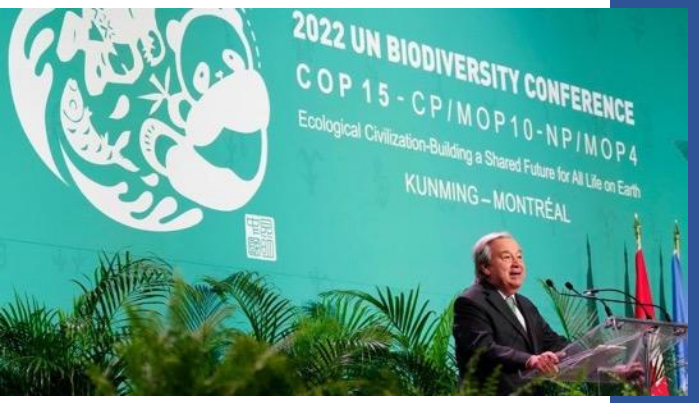
Long term (10 years)



Policy context

Global Biodiversity Framework (GBF)

Montreal December 2022 – 195 States + EU



- **Conserve 30% of Earth by the end of the decade** – land, sea, waterways
- **Fighting extinction** – human-induced extinction of known threatened species is halted, and, by 2050
- **Nature disclosures for businesses** –large and transnational companies disclose "their risks, dependencies and impacts on biodiversity" (TNFD)

EU Laws

UN environment programme

Who we are ⌄ Where we work ⌄ W

Home / News, Stories & Speeches / story

29 JUN 2022 | STORY | NATURE ACTION

European Union proposes law to bring back nature

Australian farmers fear exports could be hurt by new EU land-clearing laws

But environmental groups say changes could put sustainable producers at 'front of queue'

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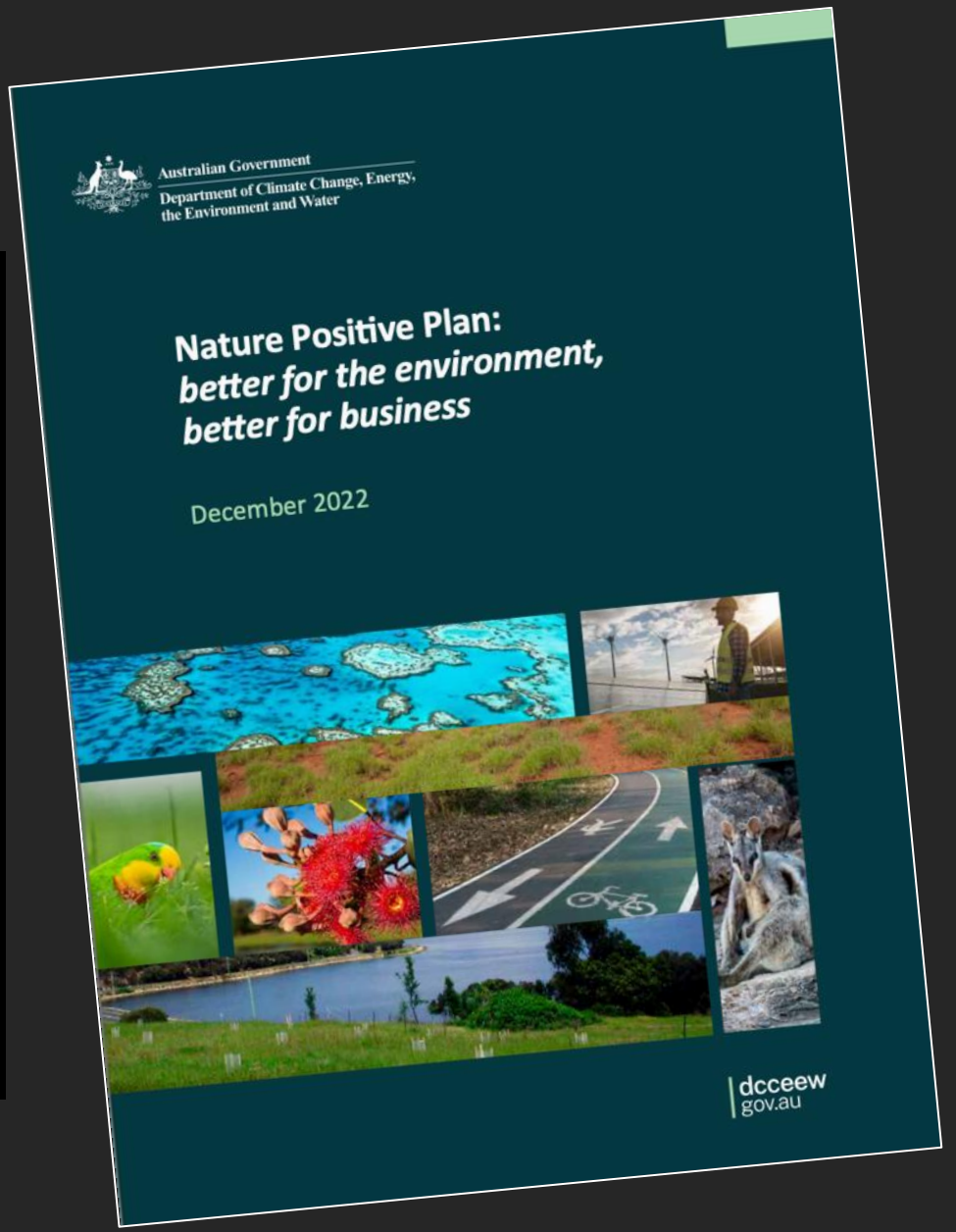
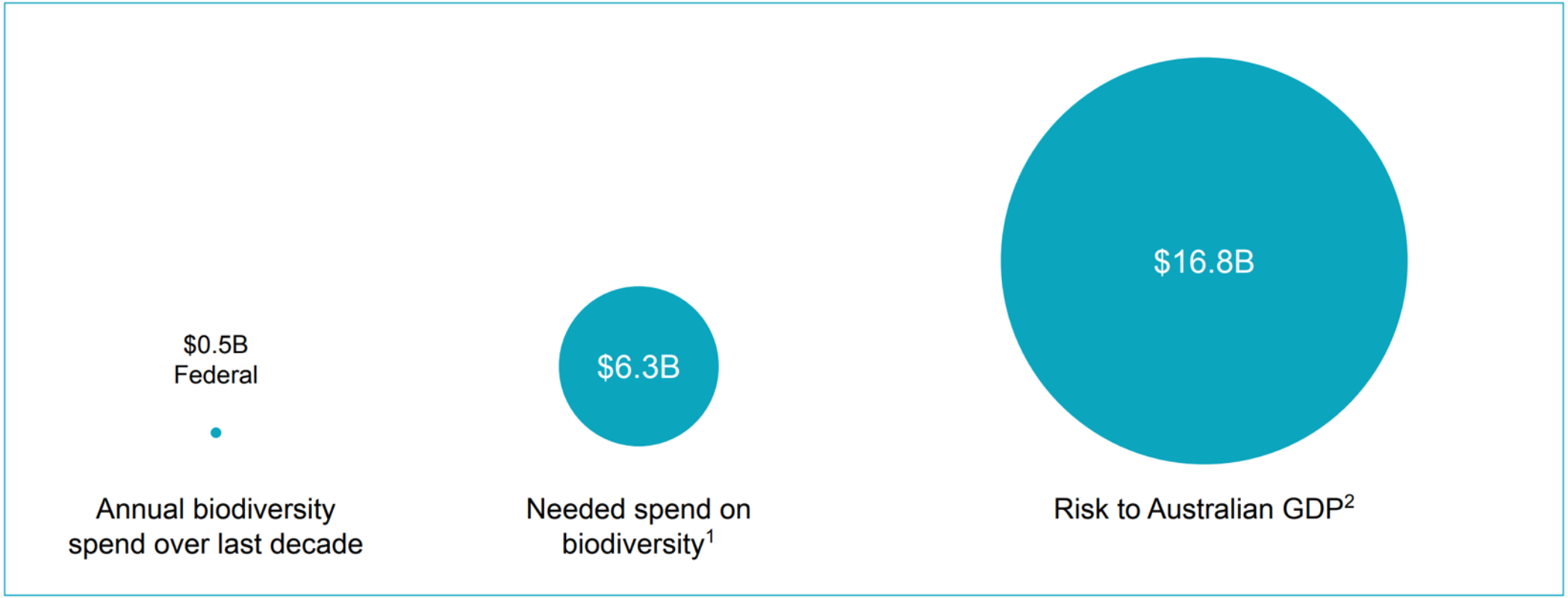


"Zero human mediated extinctions after 2030"

4 Annual Federal government spending over decade is <8% of estimated annual need, and <3% of risks posed to the economy



The World Bank has estimated high income countries could lose 0.7% of GDP by 2030 (A$16.8B p.a.)

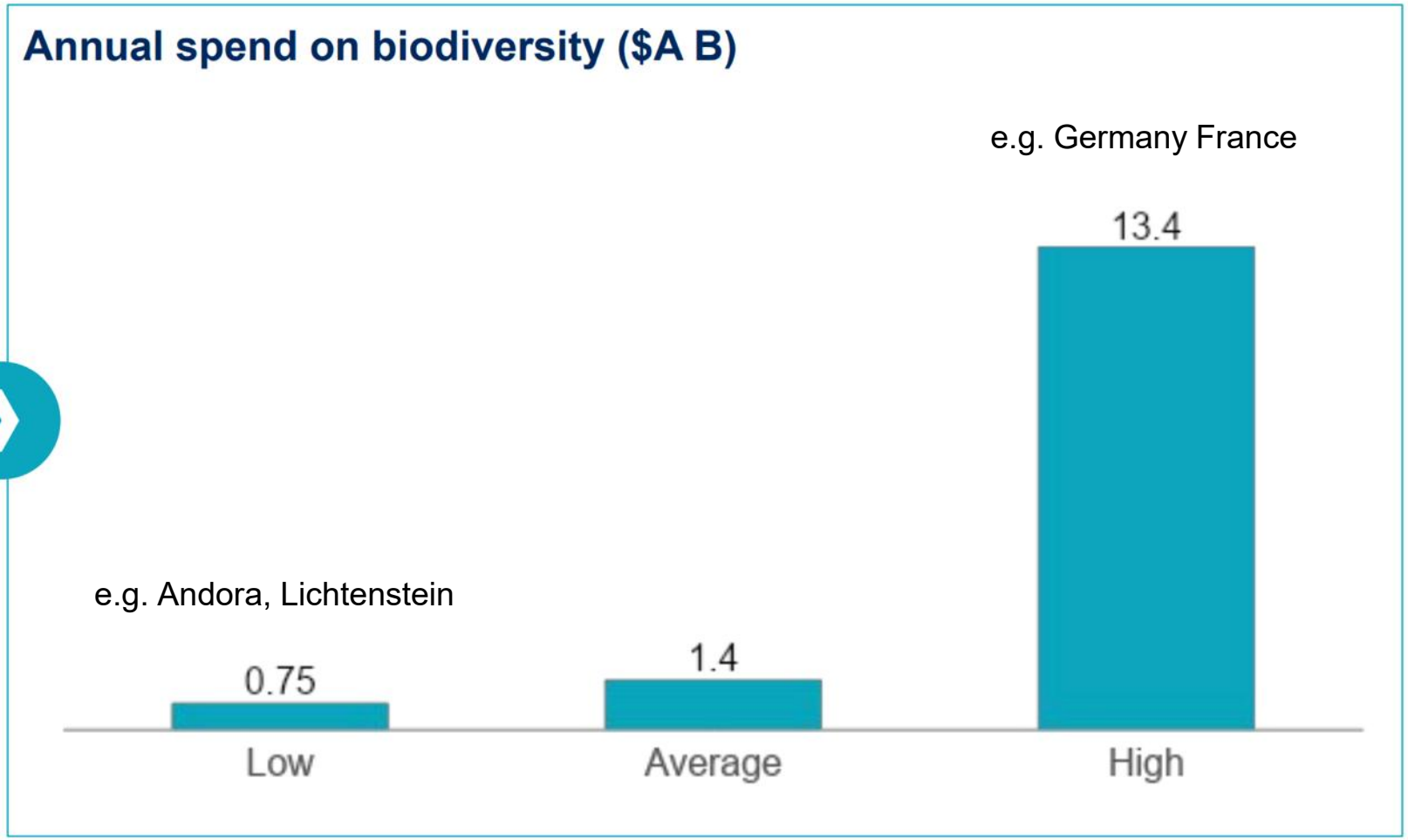
https://30by30.org.au/blog/2024/05/27/the-price-of-nature/

2 In the EU, biodiversity spending averages around A$1.4 billion p.a.

Data on global biodiversity spend is opaque and not consistent

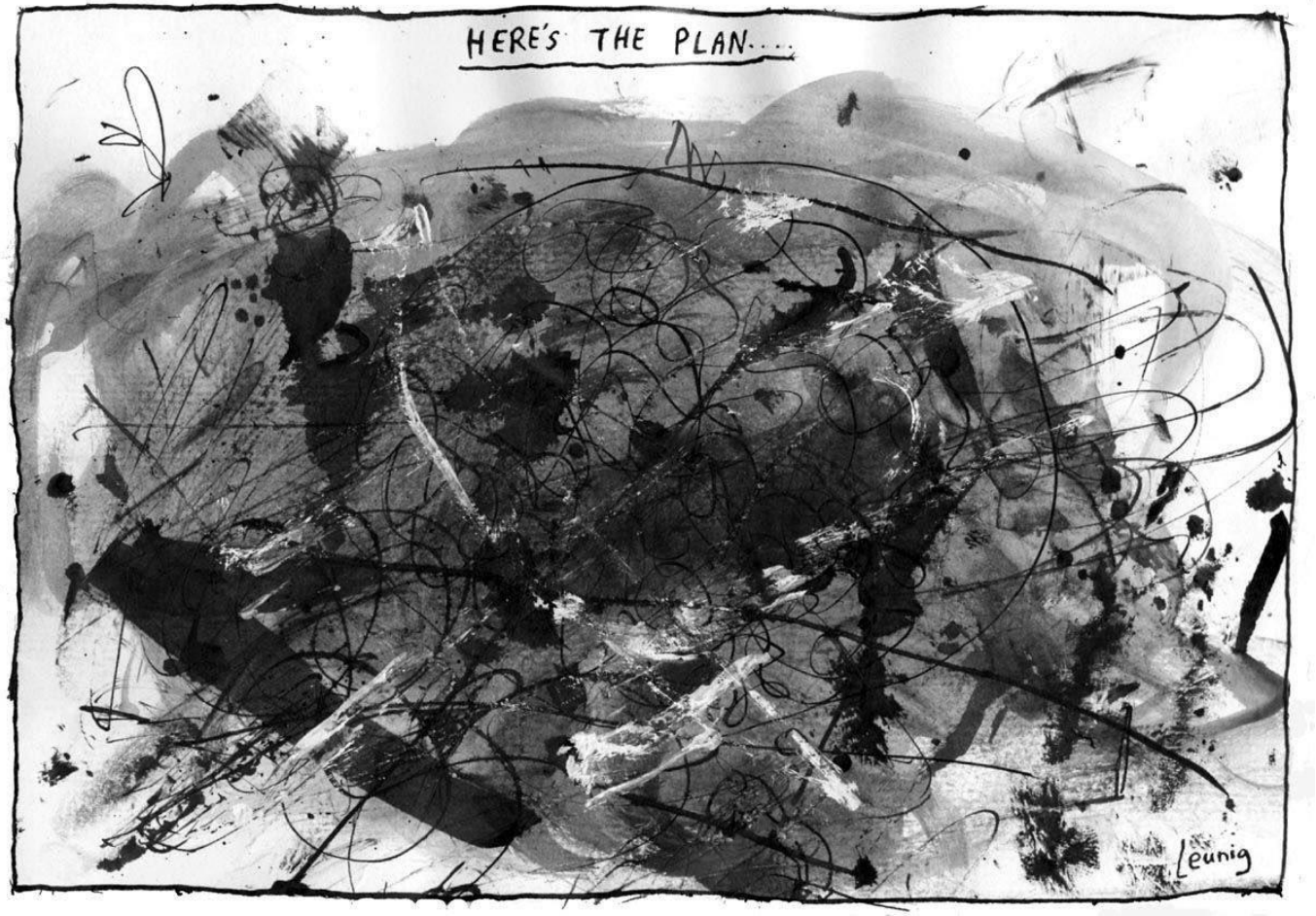
However, EU benchmarking shows that public spending equated to 23B EUR in 2019

Average spending was $A1.4B per member state with highest spending countries up to $A13.4B p.a.



Source: European Commission, Biodiversity financing and tracking, 2022; Notes: Spend is EU and Member state domestic spend only; High = Average of top 6 countries; Spend is mostly federal, but sub-national spend is only partially included. Biodiversity spend per sqm and per $ GDP are also low compared to the EU (EU is roughly half land mass of Australia; it's GDP per capita is two-thirds of Australia's)

Progress on nature positive plan and new nature laws...



POLICY FAILURE

- No new nature laws (continued weak protection)
- Funding totally inadequate
- No 'independent' EPA
- (some progress on 30 by 2030)

Australia in summary

- Declining biodiversity
- Failing laws, Failed policy, Inadequate funding
- Contribution from private sector necessary if we're to have any chance





Why biodiversity needs forestry

Summary

- wood >> concrete and steel for nature and climate
- growth in demand for ACCUs presents opportunities and risks to biodiversity

Australian Government

Agriculture and Land Sector Plan

Land sector

-74 Mt CO_2-e

- Environmental plantings
- Plantation forestry
- Farm forestry
- Savanna fire management
- Managing lands to increase soil carbon (e.g. pasture improvements)
- Blue carbon
- Biochar

74,000/10t/ha ~ 7.5M hectares >> area of Tasmania

Timber is a better building material for climate and nature

- Constructions represents 34% of global CO2 emissions
- Concrete and steel alone – 18% …. AND…
- 30% of biodiversity loss (UNEP 2025)

Plantations can be good for biodiversity

wood4good

Good data!

Forest Ecology and Management
Volume 365, 1 April 2016, Pages 51-60

The biodiversity contribution of wood plantations: Contrasting the bird communities of Sweden's protected and production oak forests

A. Felton [a], P.O. Hedwall [a], M. Lindbladh [a], T. Nyberg [b], A.M. Felton [a], E. Holmström [a], I. Wallin [a], M. Löf [a], J. Brunet [a]

Plantation bird species richness ~ 75% of old natural forest
Understorey cover in plantations > natural forest

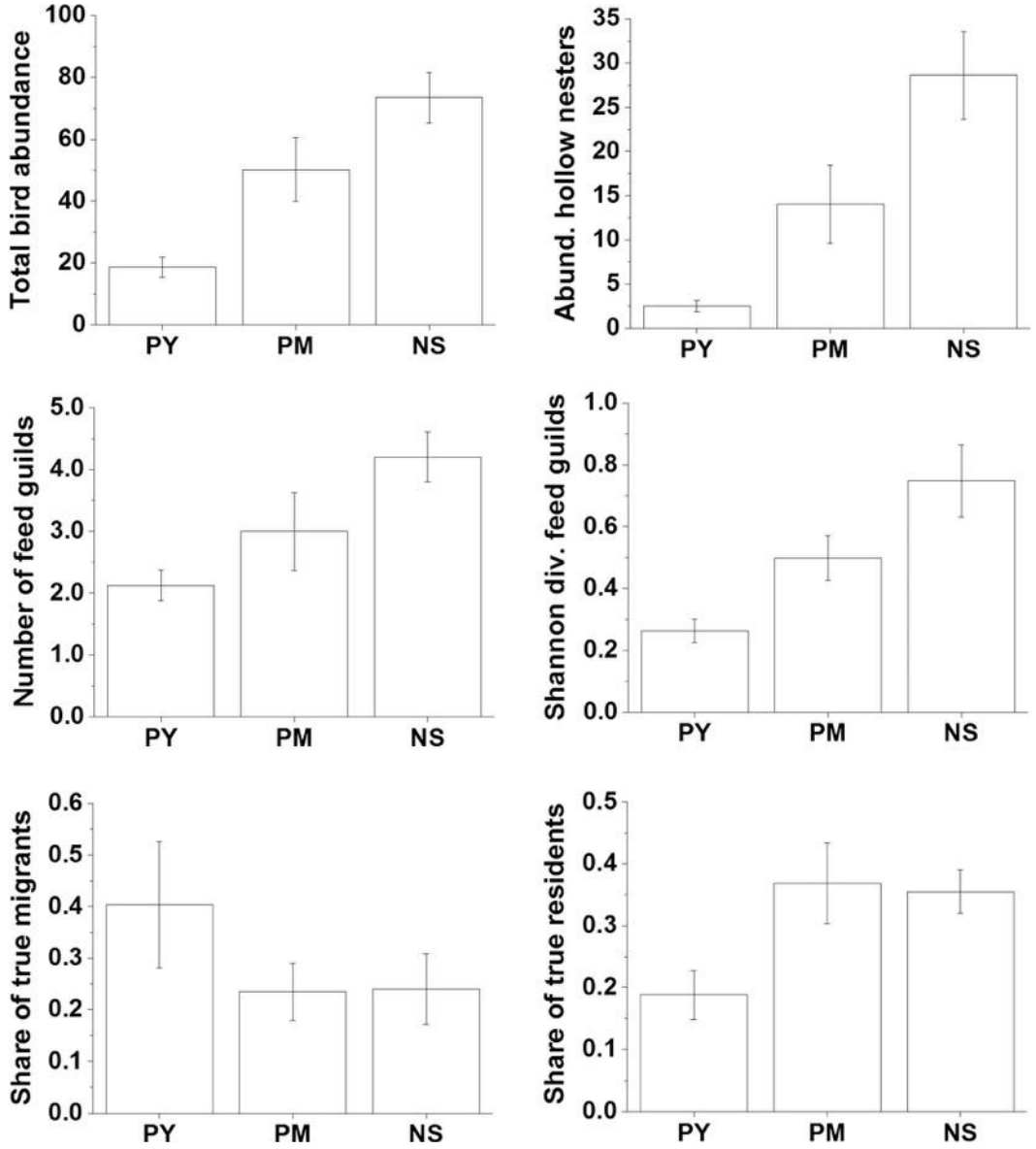
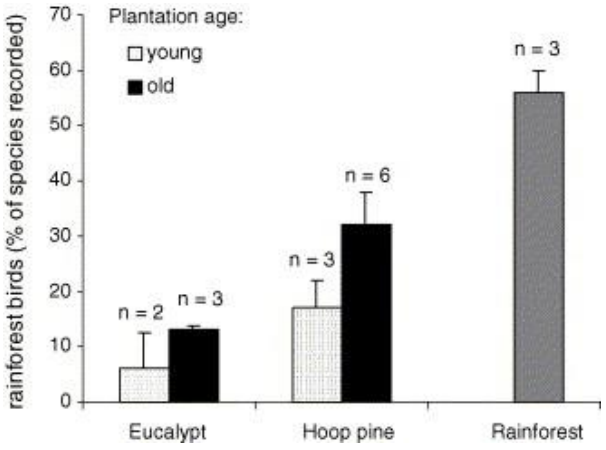


Fig. 2. Bar charts (±2 SE) illustrating mean summary metrics and functional groupings for the three stand types natural stands (NS), mature production stands (PM), and young production stands (PY).

Aussie examples - data

Hoop pine plantations



wood4good

forico
future fibre

Forico conducts and facilitates multiple projects across the plantation and native vegetation areas, which monitor and maintain ecological integrity and biodiversity.

NATIVE FAUNA SURVEY

In 2023, Forico engaged the services of Eco Logical Australia for a pilot survey focusing on the diversity and abundance of native fauna in plantations and adjacent natural forest areas.

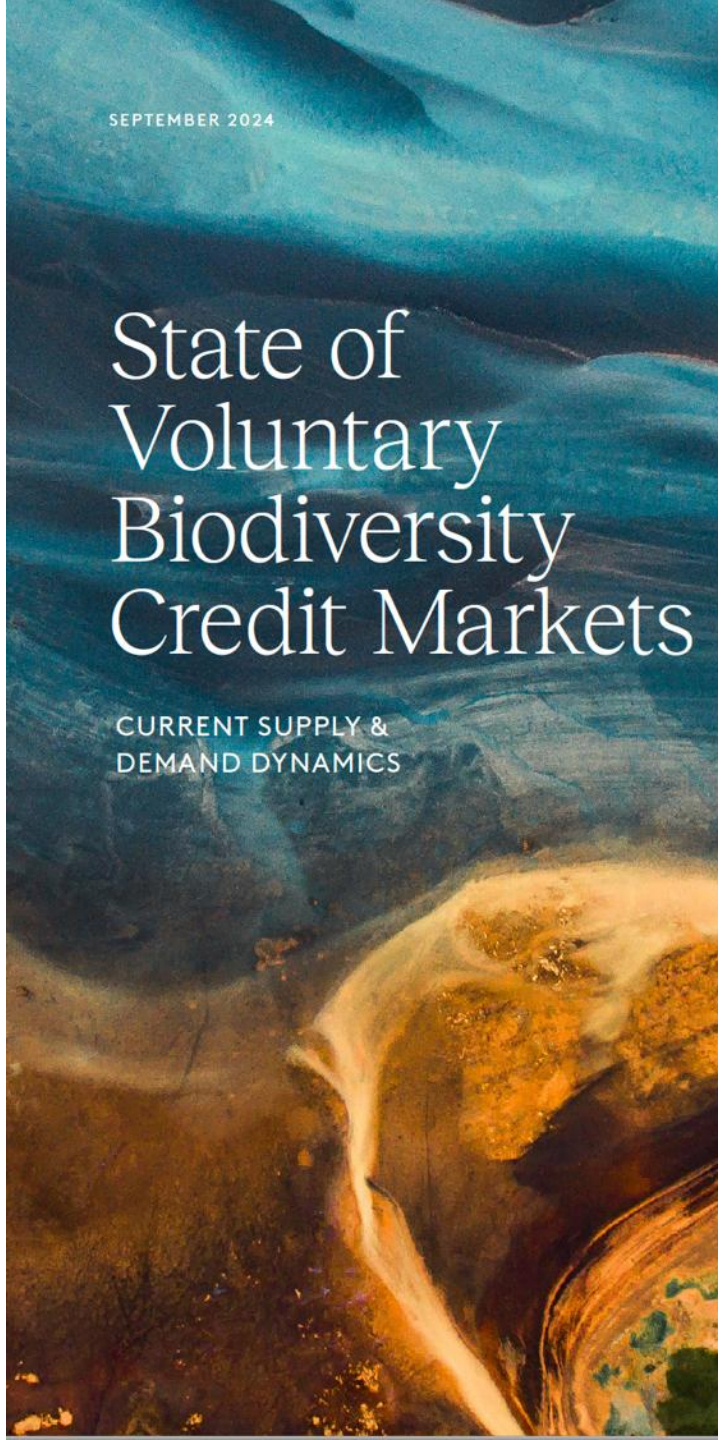
The survey recorded 93 species across all fauna groups, with birds making up 89% of the 11,380 records. Eleven of the twelve bird species endemic to Tasmania were present in both plantation and native forest, including the Yellow-throated honeyeater, Black-headed honeyeater and Tasmanian scrubwren. Many bird species were observed to be utilising the plantations for feeding. Black-headed honeyeaters and Strong-billed honeyeaters occurred in large foraging flocks searching for insects under the loose bark of hardwood plantation trees.

Baseline Ecological Assessment of the Crosbie Plantation, Toolleen, Victoria

Prepared for wood4good & The City of Greater Bendigo

May 2021

Financial opportunity – are biodiversity credits viable and worth the trouble?



Between approximately

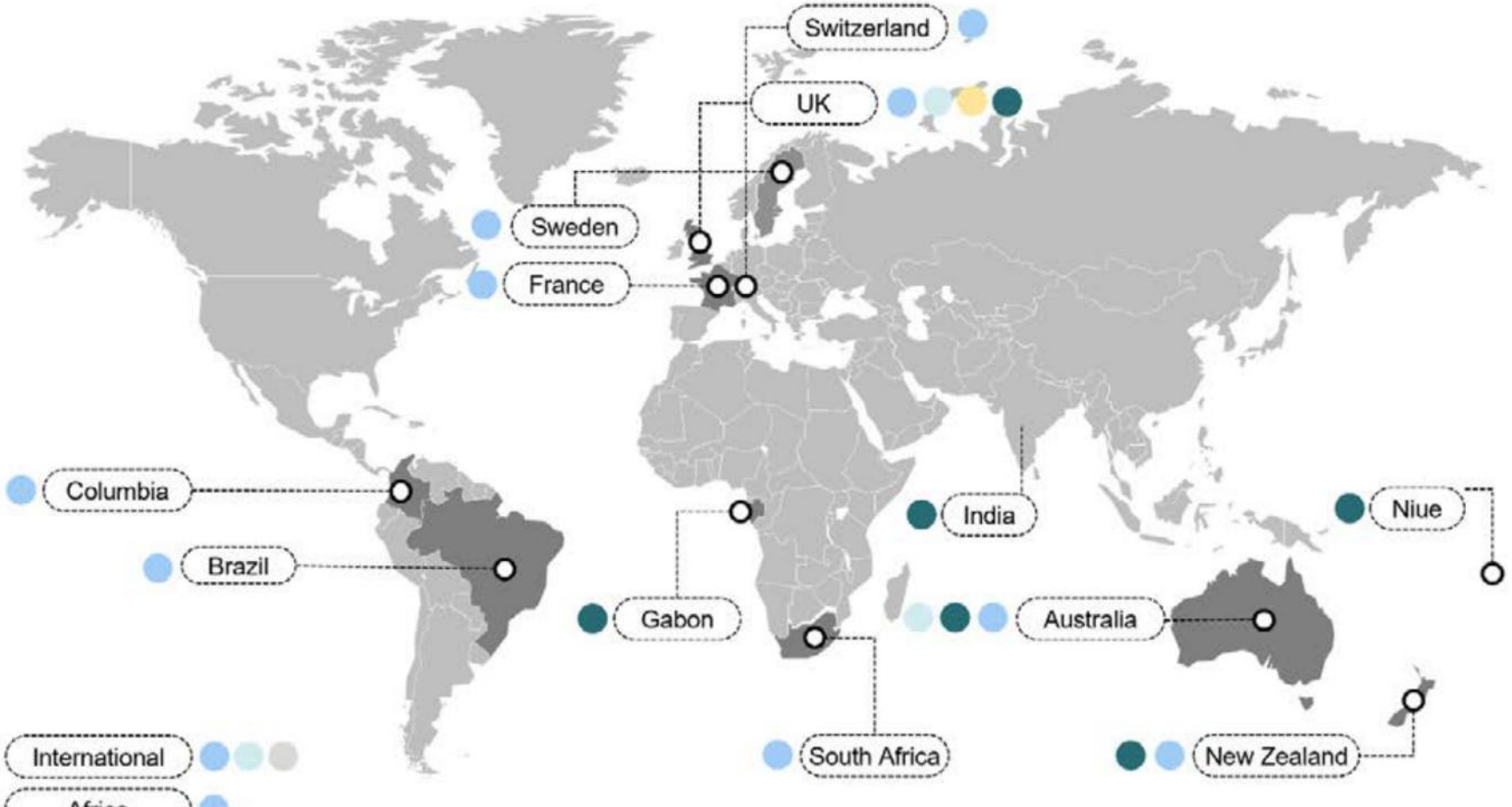
US$325,000 and US$1,870,000

worth of credits are estimated to have been sold to date.[7]

The majority of credits that have been sold were priced at US$25 per credit or less.

Pricing was informed by multiple factors, including recouping project costs plus a margin and buyers' willingness to pay.

FIGURE 3: SCAN OF VOLUNTARY BIODIVERSITY CREDIT SCHEMES AND INITIATIVES GLOBALLY[24]



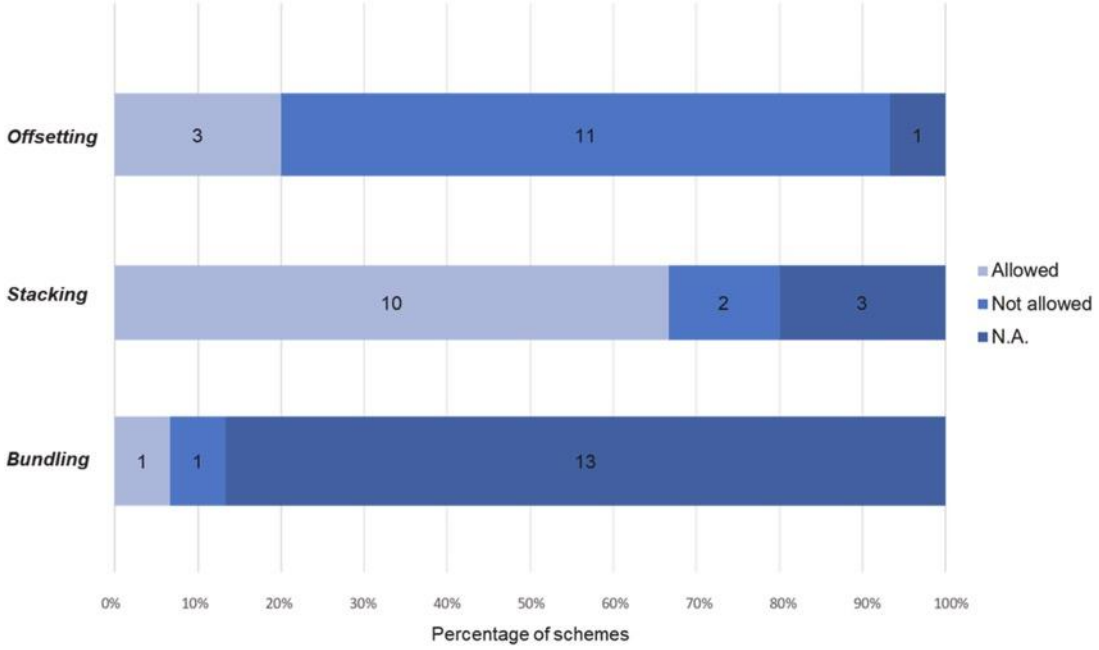
Journal of Cleaner Production
Volume 523, 10 September 2025, 146382

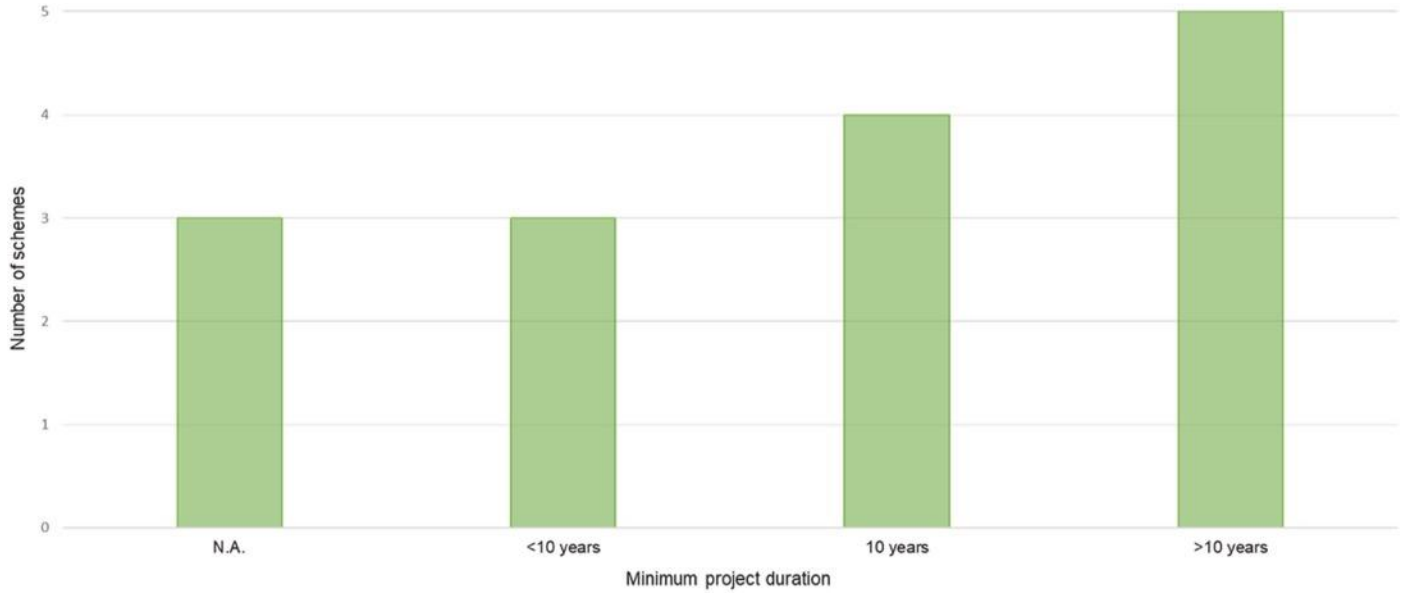
Review

Biodiversity credits schemes: a comparative analysis

Edoardo Croci [a b], Benedetta Lucchitta [a b], Marta Cusa [b]

- Most preclude regulatory (biodiversity) offsets
- Total global project area = 1M hectares
- 80% of area in Brazil
- Australia has largest number of projects
- Price range 7$-68,000$ /ha/yr (!)
- Average ~ 25$/ha/yr…





Demand and sales

Table 5. Schemes' market. ∗Values based on own calculations. ∗∗Values sent via mail.

Scheme developer	*# of projects*	*Area (ha)*	*Activity type*	*# credits issued (estimated)*	*# credits sold (retired)*	*Price ($/ha/y)*
ases	5	142	Both	3086	N.A. (0)	94–233
BioCarbon	1	200	Both	N.A.	N.A.	N.A.
GreenCollar	20	51,233	Restoration	60,435	N.A.	N.A.
LIFE Institute	14	758,760	Both	(4,396,923)	N.A.	N.A.
Regen Network Development	2	60,600	Preservation	(1,475,300)	N.A.	7-18∗
Savimbo	1	74,200	Preservation	94,000	2030∗	60–90
Terrascape	2	N.A.	N.A.	N.A.	N.A.	N.A.
Terrasos	1	340	Both	62,063	1543∗ (1285)	733-1052
Wilderlands	4	696	Both	5,570,080∗∗	120,610∗∗	20,400–68,000∗∗

"Currently a very thin market…"

(opportunity for govt investment to kick start?)

Croci et al. 2025 (previous slide)

Future demand drivers

The Value Chain

UPSTREAM

Activities related to the sourcing and procurement of goods and services that feed into the organization's operations.

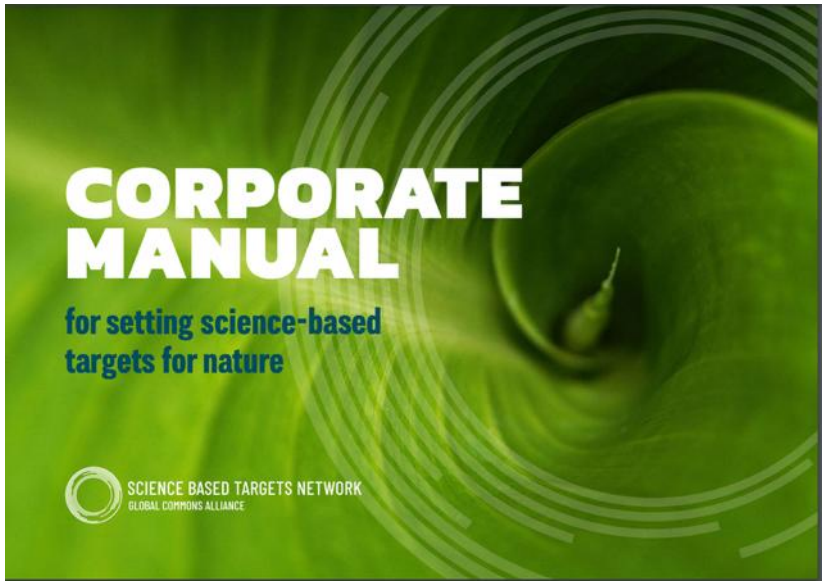
DIRECT

Activities that an organization directly controls and manages.

DOWNSTREAM

Activities that occur after the organization's direct operations, involving the distribution, use, and disposal of the organization's products or services. What our grads do

(TNFD, 2024)



Certificates vs credits – measurement and fungibility

“Trying to add up apples and oranges is a problem, not being able to add them in a bigger problem” (Patrick O’Connor, pers.comm, yesterday)

“Where the good being traded is poorly defined and hard to measure … markets are unlikely to perform well.” (John Quiggan, Economist)

Certificates vs credits – measurement and fungibility

If all certificates effectively have the same value (in the market), we'll see a lot of work on the cheapest-to-restore ecosystems and little on the hard/complex stuff

So how do I get started?

Australian Government
Department of Climate Change, Energy, the Environment and Water

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Environment

Environmental markets

Nature Repair Market

Platform for Land and Nature Repair

Ecological Knowledge System

Methods for the Nature Repair Market

Methods for the Nature Repair Market

Last updated: 09 October 2025

Methods are legislative instruments that set out how Nature Repair Market projects must be carried out.

Methods outline project requirements, including:

- the conditions a project must meet to be registered
- project eligibility
- when biodiversity certificates can be issued

Native Fauna

F-01: Accounting for Nature Mammal Condition Method

F-02: A native woodland bird assessment methodology for diverse regenerating farmlands

F-03: Regional-scale Native Vertebrate Fauna Method

Accounting for Nature.

About | Framework | Resources | Registry | Programs

Method Catalogue.

Welcome to the Accounting for Nature® Method Catalogue. It serves as a repository of accredited methodologies designed to facilitate the build of an Environmental Account.

No methods under Nature Repair Market that specifically involve harvesting and thinning – but no reason they cant be developed… measurement is far from sorted

Conclusions (more questions than answers)

Melbourne Biodiversity Institute

There is immense demand for land-sector carbon sequestration – and demand for carbon + biodiversity should grow – but…

What is the biodiversity conservation business case for timber growers/managers? Not yet clear – pathways and rewards remain uncertain and guidance/leadership from Government (through NRM) is at best sluggish – if not totally lacking.

How might it benefit or impact their business? There are almost certainly opportunities for income diversification – add-on… But the details are slowly emerging, and the accounting rules will be key (where harvest is involved)

How do they minimise risks and take advantage of opportunities? Start measuring now – it's not that expensive and having a good baseline is key to grasping opportunities.

Thanks for having me

Brendan Wintle
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https://biodiversitycouncil.org.au/
https://biodiversity.unimelb.edu.au/

Image: Nicolas Rakotopare

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