Biodiversity Council

Addressing the Biodiversity Crisis

Dr Rachel Morgain, Policy and Innovation Lead, Biodiversity Council, University of Melbourne

Image: Nicolas Rakotopare

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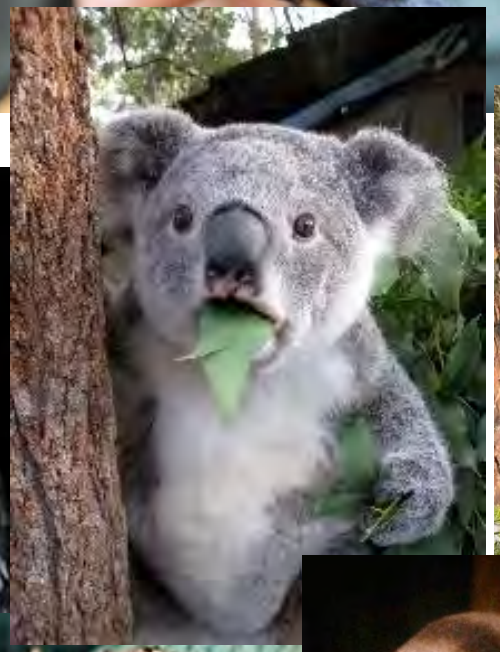
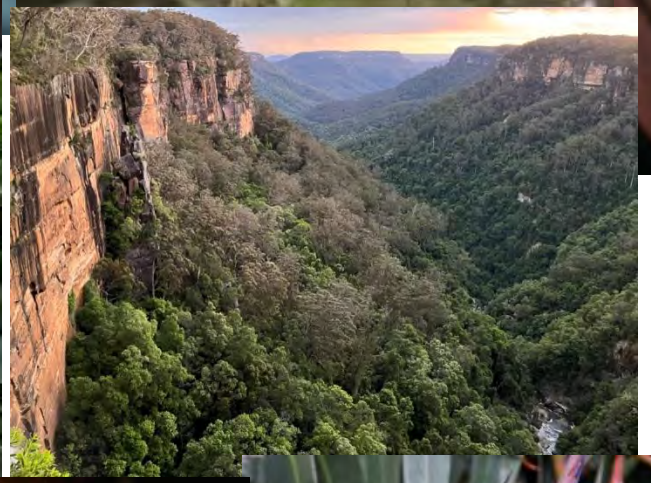
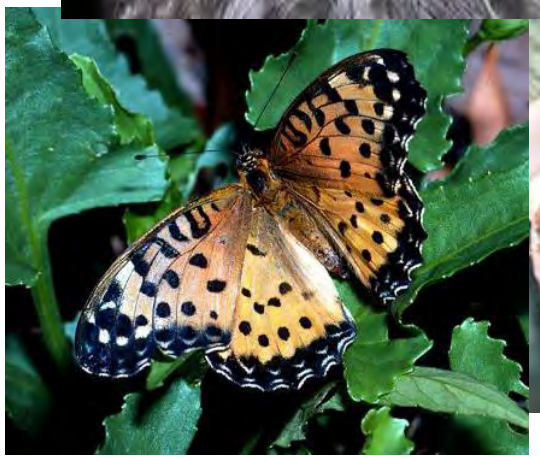
Shellgrit anemone Cronulla foreshore CC John Turnbull









Australia – a unique, megadiverse nation

- 1 of 17 mega-diverse nations
- More species than any other developed nation
- Endemism – a really high number of our species are found only here
  - nearly 9 in 10 of our mammals
  - more than 9 in 10 of our reptiles and frogs



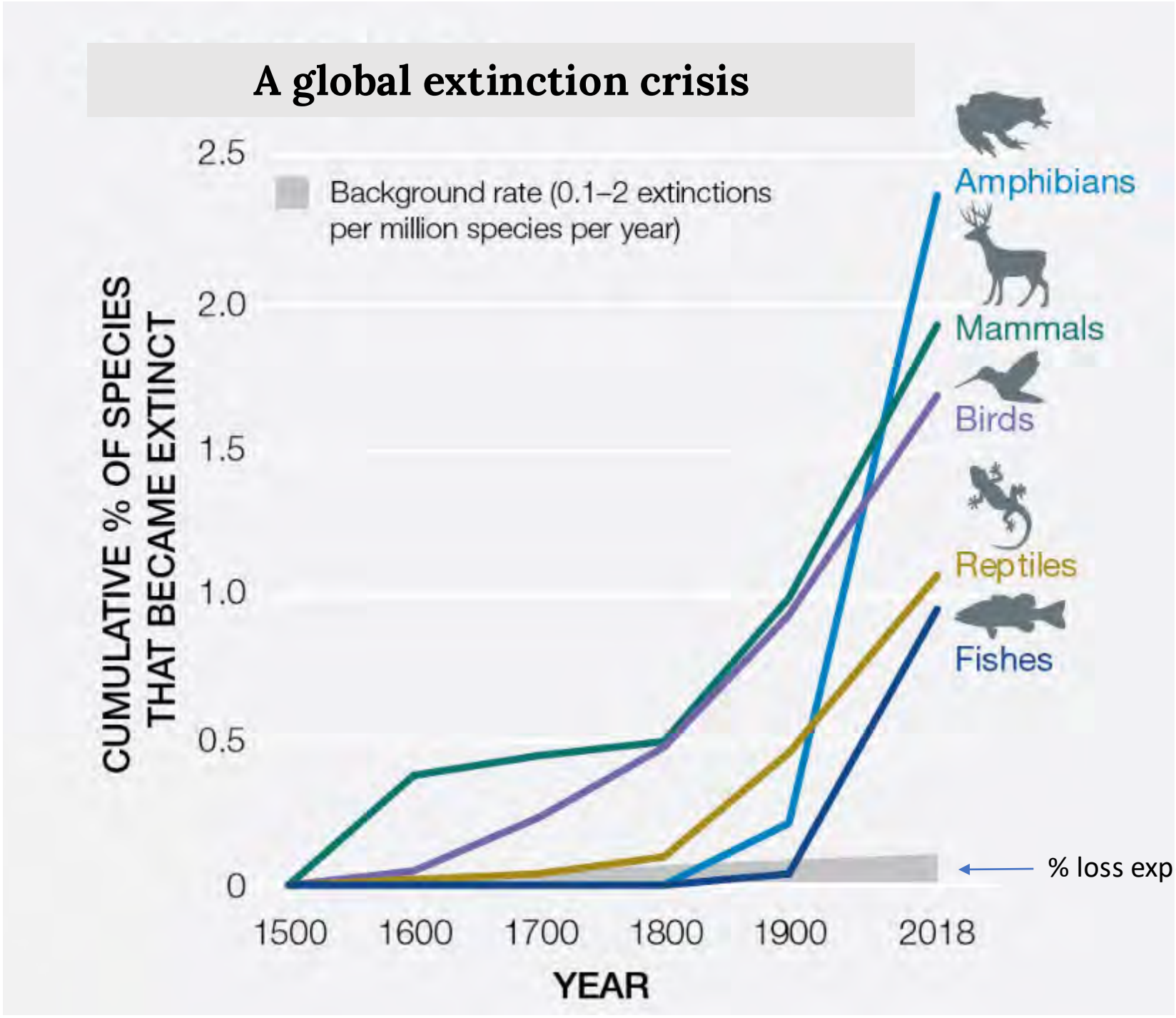


Biodiversity underpins all aspects of our world

- Our interconnected ecosystems – ‘the webs of life’
- Our own health, wellbeing, food, air, water, spirituality
  - 70% of all drugs are natural or copies of natural drugs – and 4 billion people rely primarily on natural medicines
  - 75% of all crops are animal pollinated
  - Natural systems are the ONLY carbon sink

…but its capacity to do so is declining everywhere

A global extinction crisis



% loss expected from geological record

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 destroyed
- Half the live coral cover on coral reefs has been lost since 1870 – loss accelerating
- Marine plastic pollution increased tenfold since 1980
- 32 million hectares of primary or recovering tropical forest were lost between 2010 and 2015

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 partitioning
7 Regulation of freshwater and coastal water quality	↘	○	• Extent of ecosystems that filter or add constituent components to water
8 Formation, protection and decontamination of soils and sediments	↘	⇅	• Soil organic carbon
9 Regulation of hazards and extreme events	↘	⇅	• Ability of ecosystems to absorb and buffer hazards
10 Regulation of detrimental organisms and biological processes	↓	○	• Extent of natural habitat in agricultural areas
	↘	○	• Diversity of competent hosts of vector-borne diseases

LEVELS OF CERTAINTY

- Well established
- Established but incomplete
- Unresolved

Pollinator loss

- Three quarters of flying insects in Europe have been lost in the past three decades
- 16% of pollinators and 30% of bees that have been looked at are at risk of extinction (IUCN)
- 9 in 10 wild flowering plants, 8 in 10 crop species depend on animals/insects for pollination

As our Earth's species are lost, so are its food webs

Children born today will see literally thousands of animals disappear in their lifetime, as global food webs collapse

Published: December 17, 2022 2.49pm AEDT

Insects are vanishing worldwide – now it's making it harder to grow food

Published: February 15, 2023 11.21pm AEDT

Catherine_P/Shutterstock

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Over the past 20 years a steady trickle of scientific papers has reported that there are fewer insects than there used to be. Both the combined weight (what scientists call biomass) and diversity of insect species have declined. Some studies were based on sightings by amateur entomologists, while others involved scientists

Author

Stuart Reynolds
Emeritus Professor of Biology, University of Bath

ies loss globally. We know more
, droughts and other natural

true toll climate change and
's because it has largely
": when species go extinct
ut.

Authors

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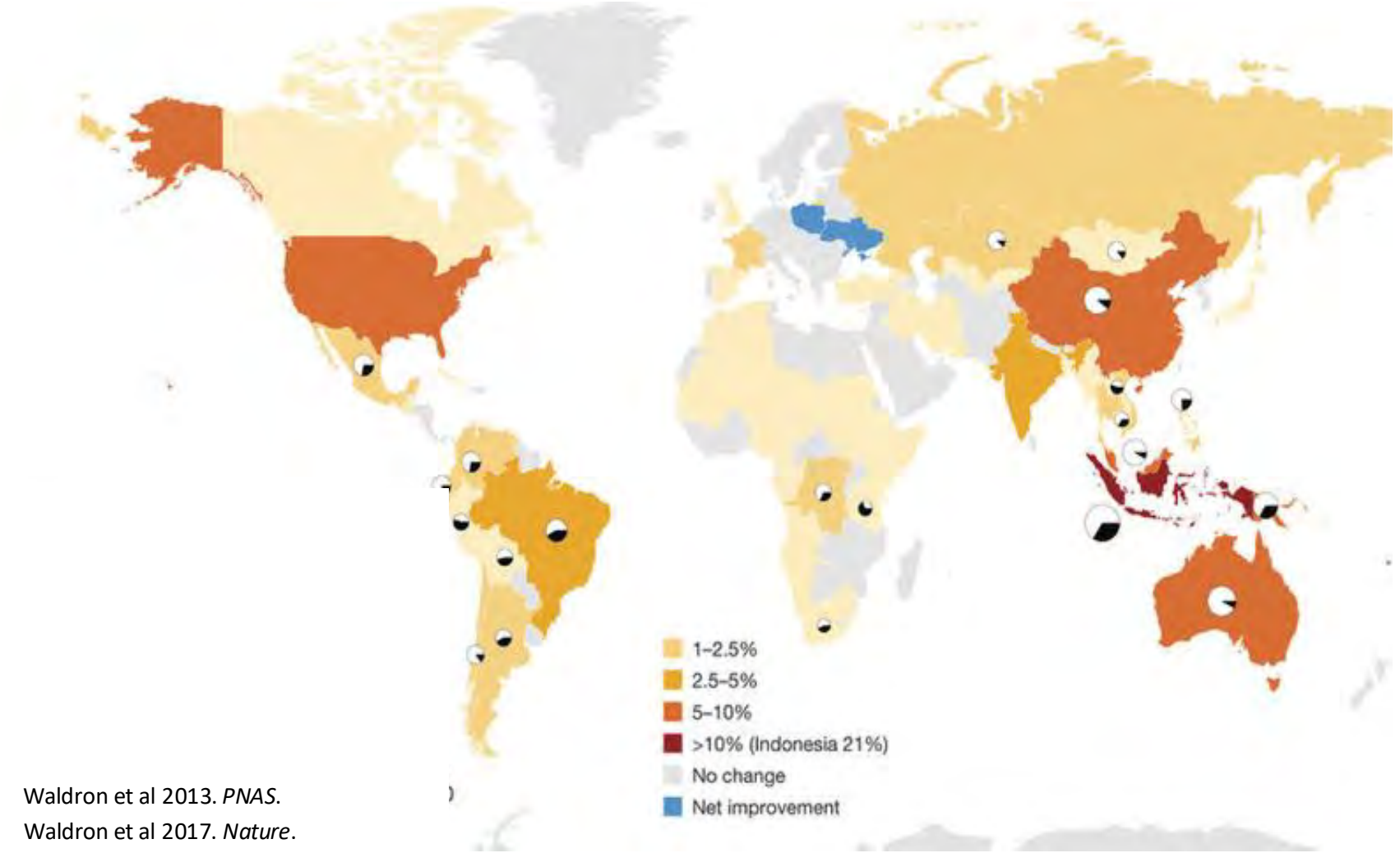
Giovanni Strona
Doctoral program supervisor, University of Helsinki

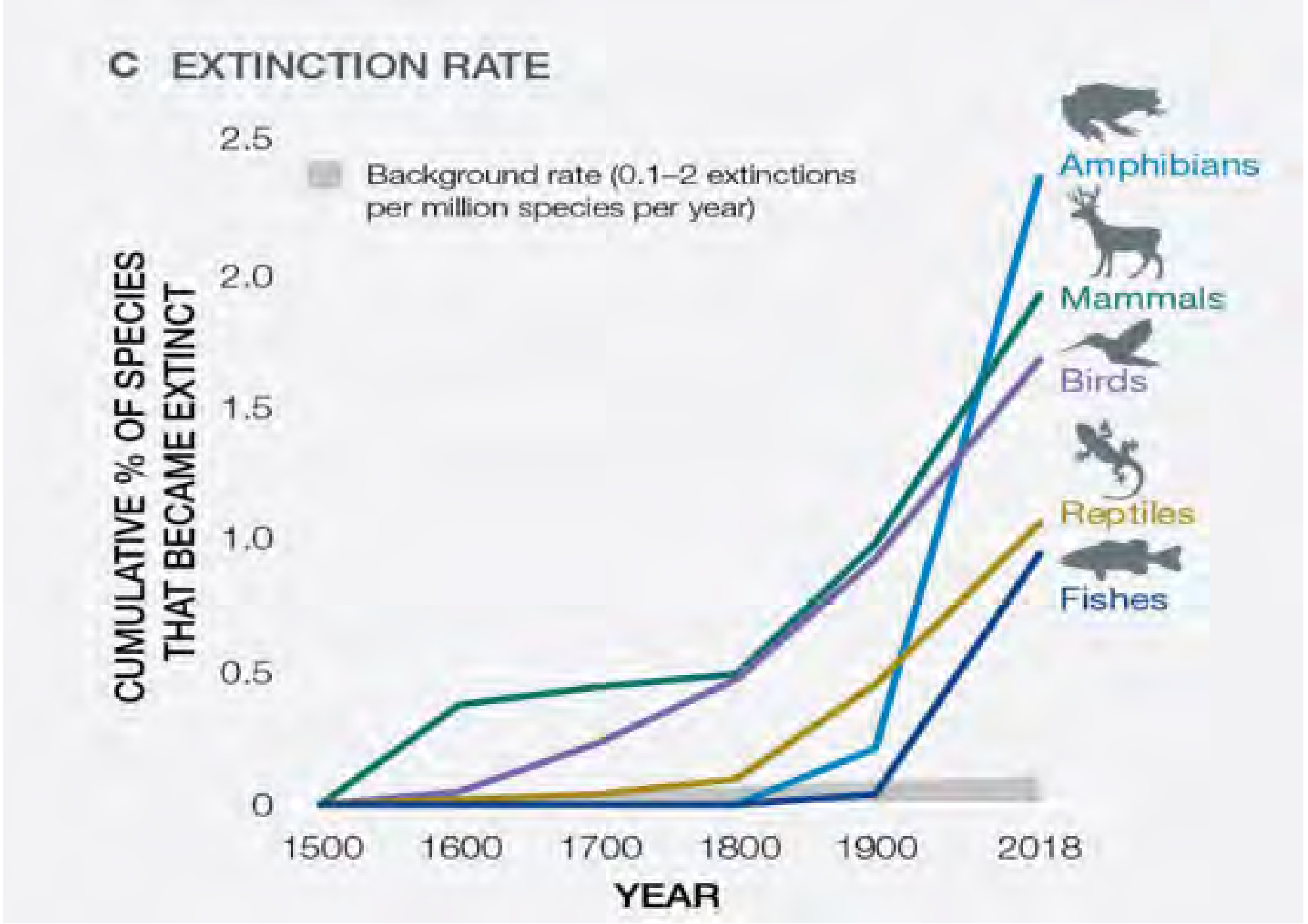
Disclosure statement

Australia is #2 in the world... in biodiversity loss

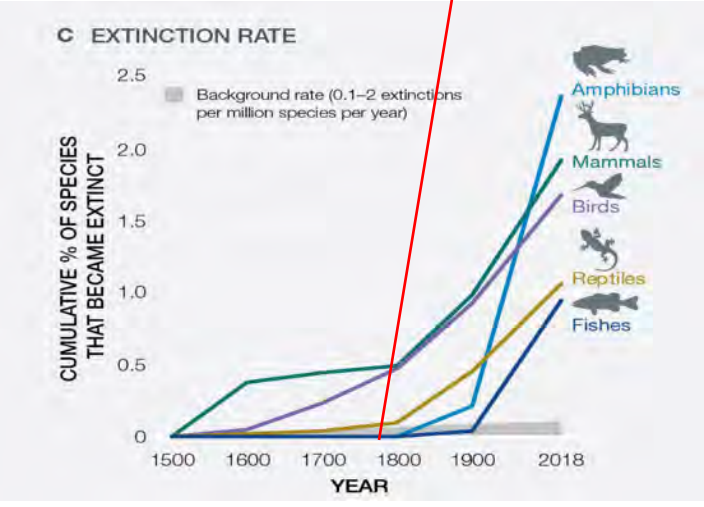


2nd highest rate of loss on planet
Highest in developed world

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

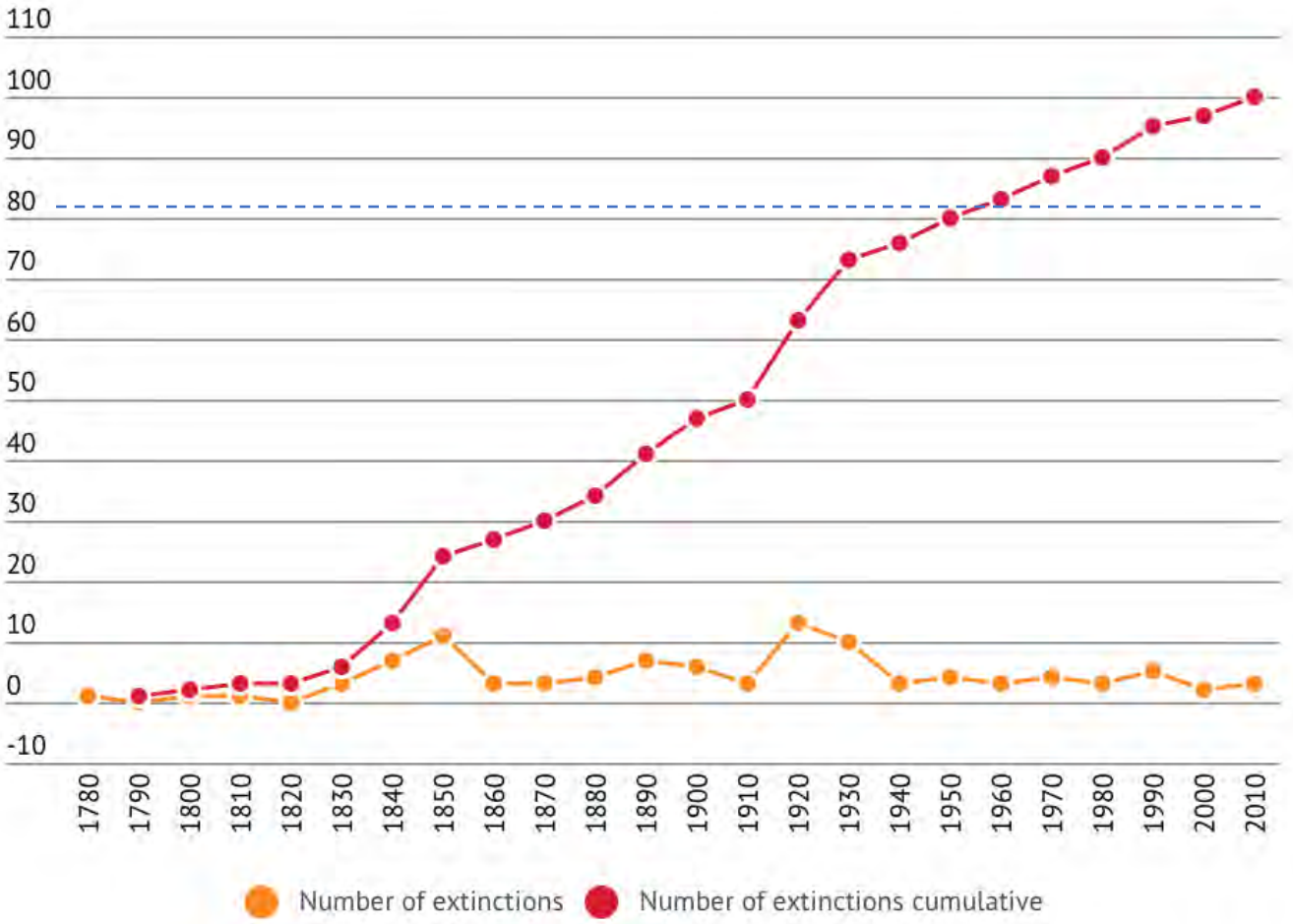

C EXTINCTION RATE
2.5
2.0
1.5
1.0
0.5
0
Background rate (0.1–2 extinctions per million species per year)
CUMULATIVE % OF SPECIES THAT BECAME EXTINCT
Amphibians
Mammals
Birds
Reptiles
Fishes
1500
1600
1700
1800
1900
2018
YEAR

Meanwhile in Australia...



Extinction in Australia

Including 34 mammals
10% of pre-European mammal species
30% of global mammal extinctions



Lindy Lumsden

Extinction in Australia...


Lindy Lumsden

- 110 extinctions since European invasion
- 35% of all modern global mammal extinctions
- 1800 now listed as at high risk
- 1/3 of listed species are not monitored
- 40% have no recovery plan


Australian Geographi

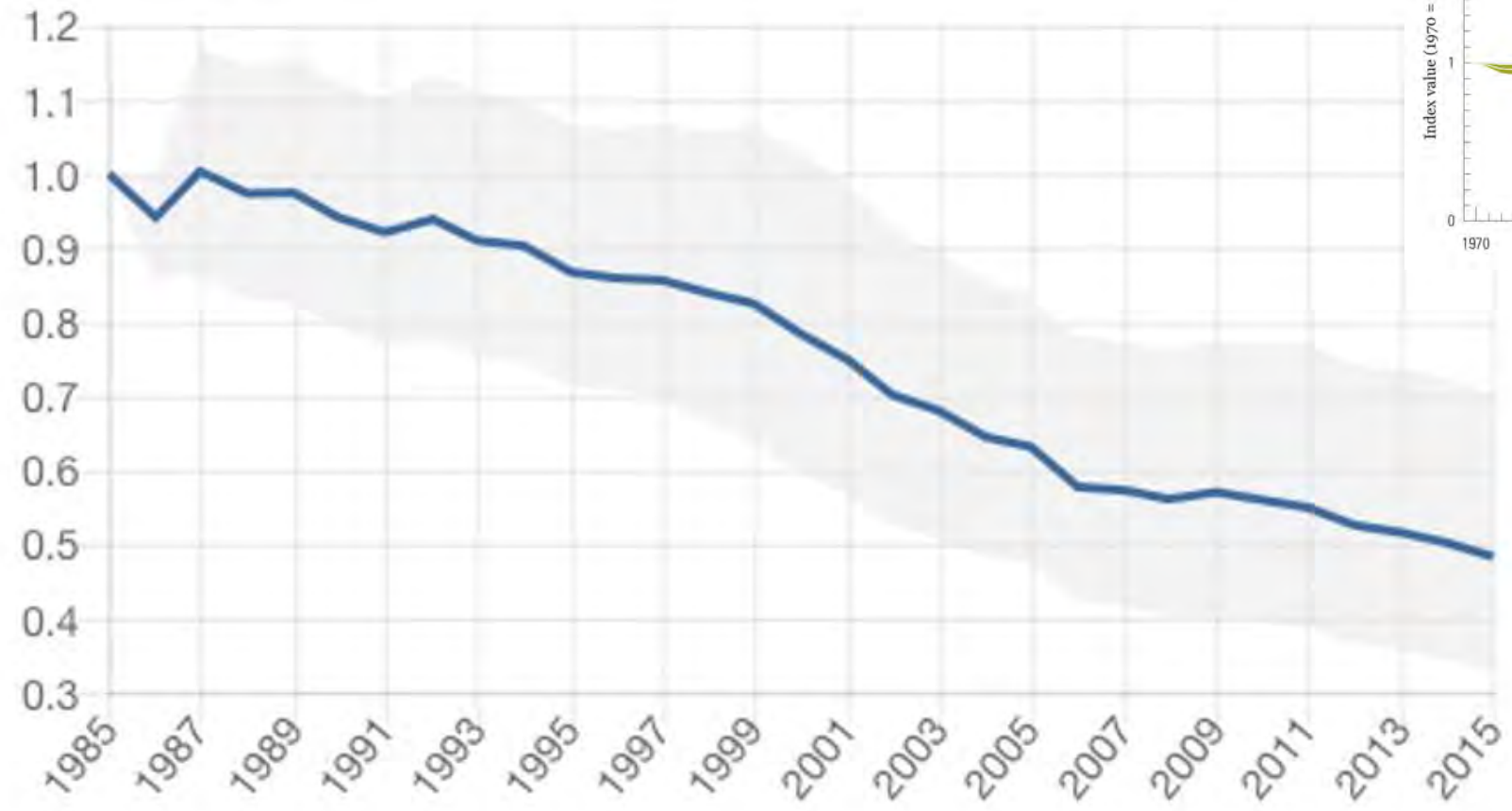
The Australian Threatened Species Index – Part 1: Birds

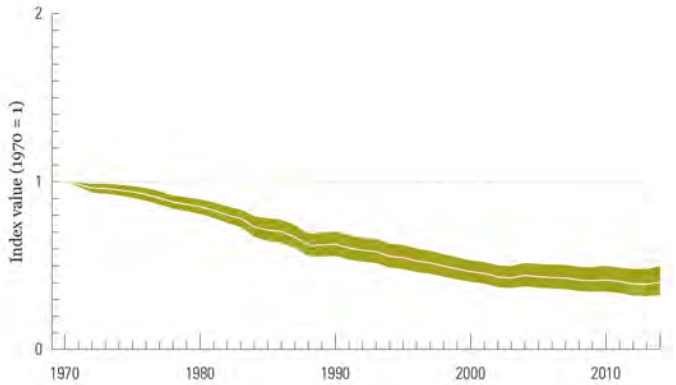
birdlife AUSTRALIA

Threatened Species Recovery Hub

National Environmental Science Programme

Main index



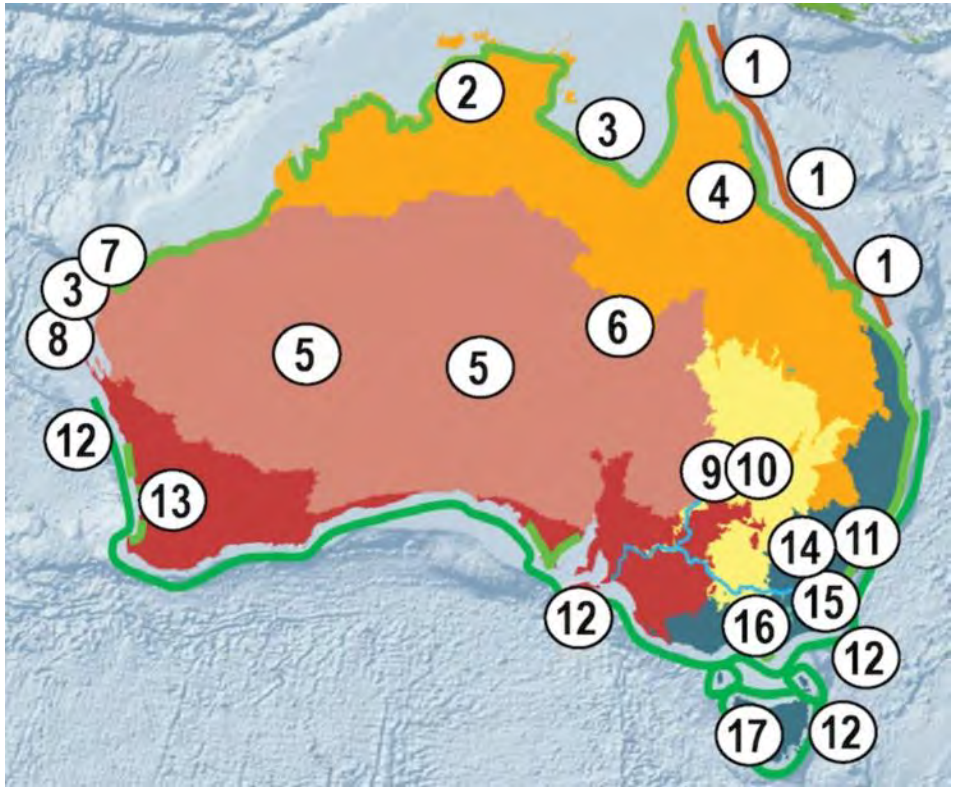


Global Change Biology

OPINION | Free Access

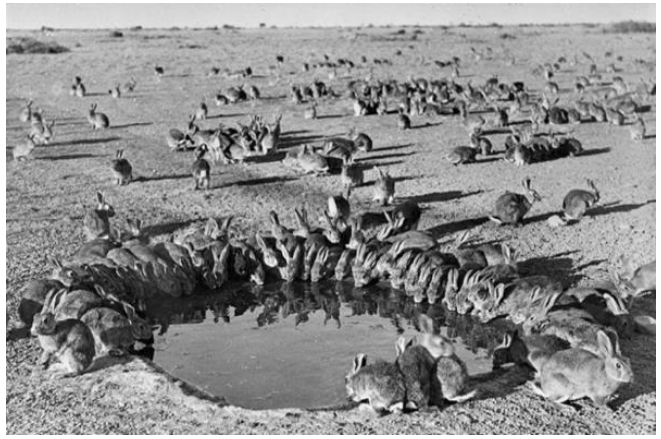
Combating ecosystem collapse from the tropics to the Antarctic

Dana M. Bergstrom, Barbara C. Wienecke, John van den Hoff, Lesley Hughes, David B. Lindenmayer, Tracy D. Ainsworth, Christopher M. Baker, Lucie Bland, David M. J. S. Bowman ... See all authors



Habitat loss and degradation

Invasive species



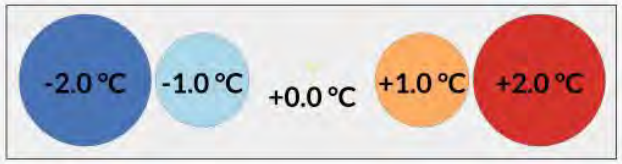
Changing temperatures and rainfall

Overuse of resources, pollution

Novel diseases

Temperature Anomalies by Country
Years 1880 - 2017

1880



Afghanistan Albania Algeria Andorra Angola Antarctica Argentina Armenia Australia Austria Azerbaijan Bahamas, The Bahrain Bangladesh Barbados Belarus

Belize Benin Bhutan Bolivia Bosnia and H. Botswana Brazil Brunei Bulgaria Burkina Faso Burundi Cabo Verde Cambodia Cameroon Canada Central African Rep.

Chad Chile China Colombia Comoros Congo, DR Congo, R Costa Rica Croatia Cuba Cyprus Czechia Côte d'Ivoire Denmark Djibouti Dominica

Dominican Republic Ecuador Egypt, Arab Rep. El Salvador Equatorial Guinea Eritrea Estonia eSwatini Ethiopia Fiji Finland France Gabon Gambia, The Georgia Germany

Ghana Greece Grenada Guatemala Guinea Guinea-Bissau Guyana Haiti Honduras Hungary Iceland India Indonesia Iran, Islamic Rep. Iraq Ireland

Israel Italy Jamaica Japan Jordan Kazakhstan Kenya Kiribati Korea, DPR Korea Kosovo Kuwait Kyrgyz Republic Lao PDR Latvia Lebanon

Lesotho Liberia Libya Liechtenstein Lithuania Luxembourg Macedonia, FYR Madagascar Malawi Malaysia Maldives Mali Malta Marshall Islands Mauritania Mauritius

Mexico Micronesia Moldova Monaco Mongolia Montenegro Morocco Mozambique Myanmar Namibia Nauru Nepal Netherlands New Zealand Nicaragua Niger

Nigeria Norway Oman Pakistan Palau Panama Papua New Guinea Paraguay Peru Philippines Poland Portugal Qatar Romania Russia Rwanda

Samoa San Marino Sao Tome and P. Saudi Arabia Senegal Seychelles Sierra Leone Singapore Slovak Republic Slovenia Solomon Islands Somalia South Africa South Sudan Spain Sri Lanka

St. Kitts and Nevis St. Lucia St. V. and the G. Sudan Suriname Sweden Switzerland Syria Taiwan Tajikistan Thailand Timor-Leste Togo Tonga Trinidad and Tobago Tunisia

Turkey Turkmenistan Tuvalu Uganda Ukraine United Arab Emirates Uruguay USA Uzbekistan Vanuatu Venezuela, RB Vietnam Yemen, Rep. Zambia Zimbabwe

Data Source:
NASA GISS, GISTEMP Land-Ocean Temperature Index (LOTI), ERSSTv5, 1200km smoothing
https://data.giss.nasa.gov/gistemp/
Average of monthly temperature anomalies. GISTEMP base period 1951–1980.

Disasters, changing and extreme weather


What can we do?


Cultural fire and land management

Biodiversity sensitive urban design

Biodiverse plantings and dam restoration on farms

Nature as a climate solution

Country, culture and nature-based solutions for mitigating climate change

Keeping dogs on leash in natural areas is a great way to help native animals and plants. Image: Karen Arnold, CCO 1.0

Australian nature is in trouble and needs all the help it can get. Many people want to make a difference but it can be hard to know what to do. And if you can only make a few small changes which ones would

Why did we undertake this research?

Human behaviour is a major driver of the threats to nature. This means that how we act can also play an important role in supporting nature.

Many programs exist that promote actions like saving energy and water, and recycling, but before this study there was little guidance about how

1. Choose MSC and ASC certified seafood products
2. Keep your dog on a leash in natural areas including beaches, unless it is a designated dog off leash area.
3. Reduce beef and lamb consumption
4. Donate to private land protection organisations
5. Choose biodiversity-friendly investments (e.g. sustainable super funds).

Keeping dogs on leash in natural areas is a great way to help native animals and plants. Image: Karen Arnold, CCO 1.0

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6. Donate to organisations that focus on threatened species and ecosystem advocacy
7. Plant and maintain a wildlife garden.
8. Vote for political candidates based on environmental policies.
9. Responsible cat ownership — keep your cat fully contained.
10. Advocate publicly for pest animal control

CASE STUDY: MANLY AYAH

VEGETATION MANAGEMENT PLAN AND ASSET PROTECTION ZONE IMPLEMENTATION

Toolijooa
environmental restoration

CLIENT: Fugen Pty Ltd
DATE: July 2021 - Ongoing
LOCATION: Manly – Northern Beaches LGA

BACKGROUND

Toolijooa was engaged to implement the management &

PROJECT OBJECTIVES

- Undertake environmentally sensitive APZ Establishment & Management to meet NSW RFS APZ standards.
- Removal of priority & exotic weeds to restore & rehabilitate degraded bushland & areas of significant vegetation.
- Conduct APZ compliant native revegetation, to maintain &

APZ & VMP MANAGEMENT WORKS

- Erosion & sediment controls installed, comprising of jute matting, coir logs, wooden logs, sediment fencing.
- APZ compliant revegetation consisting of locally indigenous, fire-resistant species to the densities allowed within the APZ, to enhance Bandicoot habitat & enhance bushland condition.
- Ongoing APZ monitoring & maintenance – broad-scale general fuel management & fine-scale bush regeneration to ensure APZ areas continue to fully meet APZ standards.

Area around accommodation requiring APZ establishment. High weed infestations required a strategic approach, including erosion mitigation, consideration of fauna habitat, & APZ specific revegetation.

ACCOMPLISHMENTS

Toolijooa proactively worked with the client, other relevant stakeholders, and contractors to ensure project outcomes were met efficiently and to the highest of standards to promote long term sustainability of the site.

- APZ areas established – Bushfire Compliance Certificate successfully issued to client.
- Strategic weed control using best-practice techniques successful in reducing environmental & priority weeds.
- Erosion & sediment controls successful in maintaining & improving soil stability in VMP areas.
- Bandicoot habitat revegetation works successful in rehabilitating degraded bushland & enhancing habitat for fauna.
- Successful protection of Endangered Acacia terminalis subsp. terminalis (Sunshine Wattle), Syzygium paniculatum (Magenta Lilly Pilly) & enhancement the EEC Coastal Upland Swamp vegetation community

SOUTHWEST SYDNEY KOALA PROJECT

A Greater Sydney Landcare Program

GSL has received funding from the NSW Government to help deliver the NSW Koala Strategy across the Campbelltown and Appin/Wilton areas.

Southwest Sydney Koala Project

About

This project includes conservation efforts such as encouraging connectivity with corridor plantings that include preferred koala food trees on private and public property. Extension plantings will also be encouraged in this program, to widen existing corridors for the safe passage of Koalas, with the inclusion of larger koala hubs within such corridors, for optimal mating opportunities.

All koala plantings will be carried out to optimal nutritional standards, with a diversity of species and genetics in mind, through seed collection from local areas known to house healthy koala populations. Numerous other conservation actions will be carried out in this partnership program for the next 3.5 years, including road kill mitigation, wildlife carer support, community engagement and awareness raising and education.

operationposeidonia.com

livingseawalls.com.au

THE SOLUTION

Living Seawalls has shown that despite marine construction being a large part of the problem, it can also be part of the solution. By blending ecological concepts and engineering in creative design, our team is reviving our increasingly urbanised oceans through the development of affordable, adaptable and scalable methods of ecologically enhancing structures.

Science

Our project builds on over 20 years of research by our team and others, demonstrating that incorporating ecologically friendly principles into new and existing construction can have significant

Design

By combining cutting edge industrial design techniques with ecological research, Living Seawalls produces bespoke habitat units that are both aesthetically pleasing and ecologically

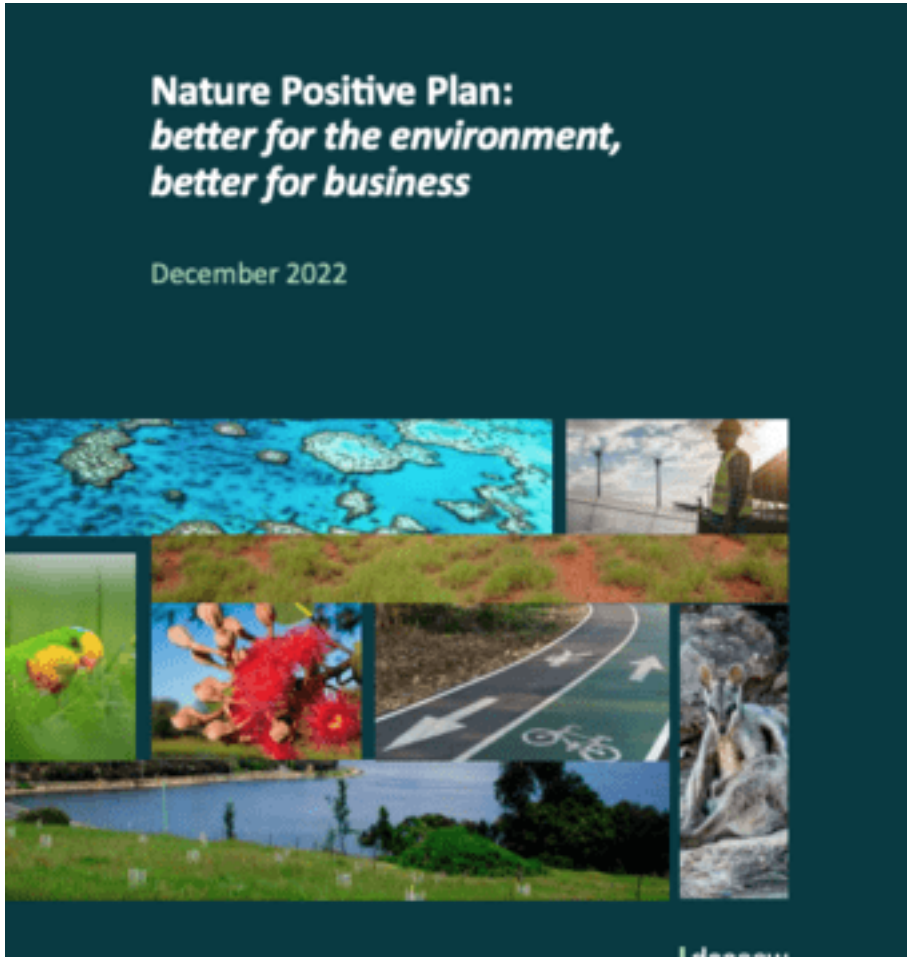
Outreach

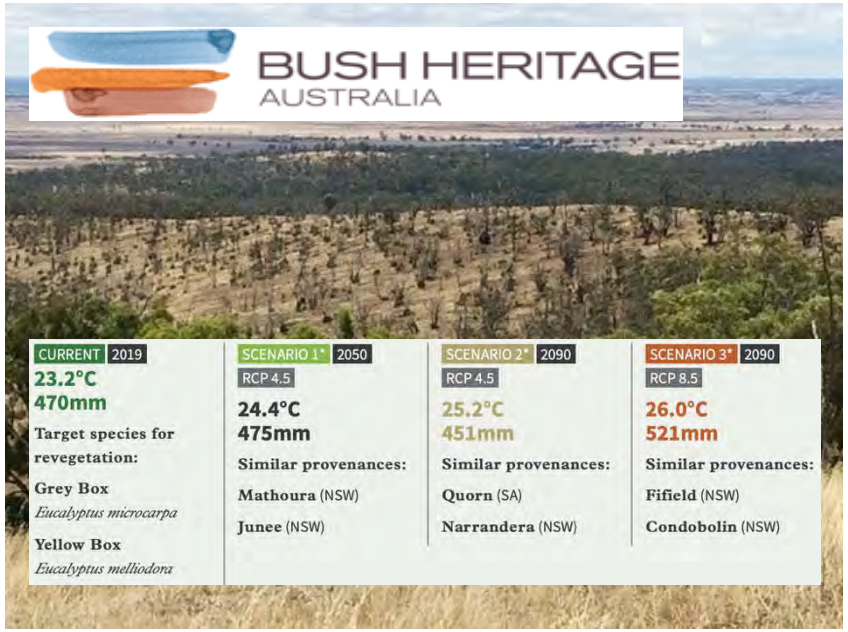
Living Seawalls is committed to communicating science. From schools to the general public we have an education and outreach programme for a variety of audiences.

Services

Living Seawalls combines the knowledge of Marine Ecologists and Industrial Designers. We offer a range of services that include ecological consulting and product design and sales.

Calling for stronger laws and adequate funding





COP15: Governments send a strong signal to businesses that the time to act on nature is now

READ OUR ANALYSIS OF TARGET 15

STATEMENT ON COP15 OUTCOMES

More than 400 business and finance institutions from 52 countries

Helped convince governments at the UN Biodiversity COP15 to adopt requirements for all large businesses and financial institutions to assess and disclose their risks, impacts and dependencies on nature

MAKE IT MANDATORY

Crucial role for faith-based groups and individuals

Thank you

Follow us at: biodiversitycouncil.org.au

Reach out to me:

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Image: Nicolas Rakotopare

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