

# Victorian Parliamentary Inquiry:

*biodiversity loss & ecosystem decline*



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Biologist  
(*Reproductive Biology, Biodiversity*)  
enRICHed Pursuits



# Overview

1. Background – *Biodiversity*
2. The Problem: *Biodiversity Emergency*
  - ❖ *3 Victorian Examples*
3. Solution: *tackle all drivers – coordinated strategy*

# 1. Biodiversity – more than plants & animals

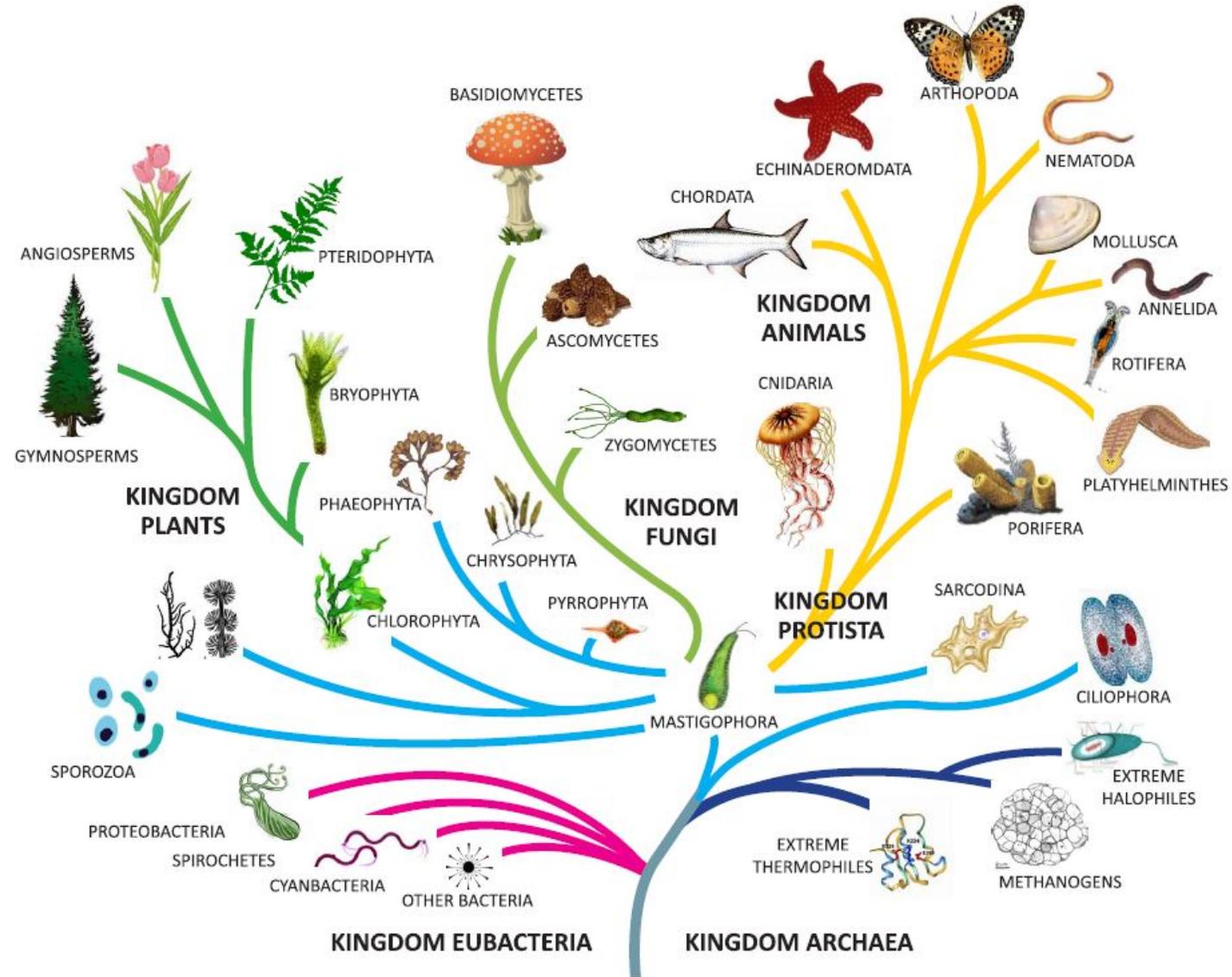
**Plants**

**Animals**

**Fungi**

**Microbes**  
*micro-organisms*

**E**



# 1. Biodiversity – *not just species - ecosystems*

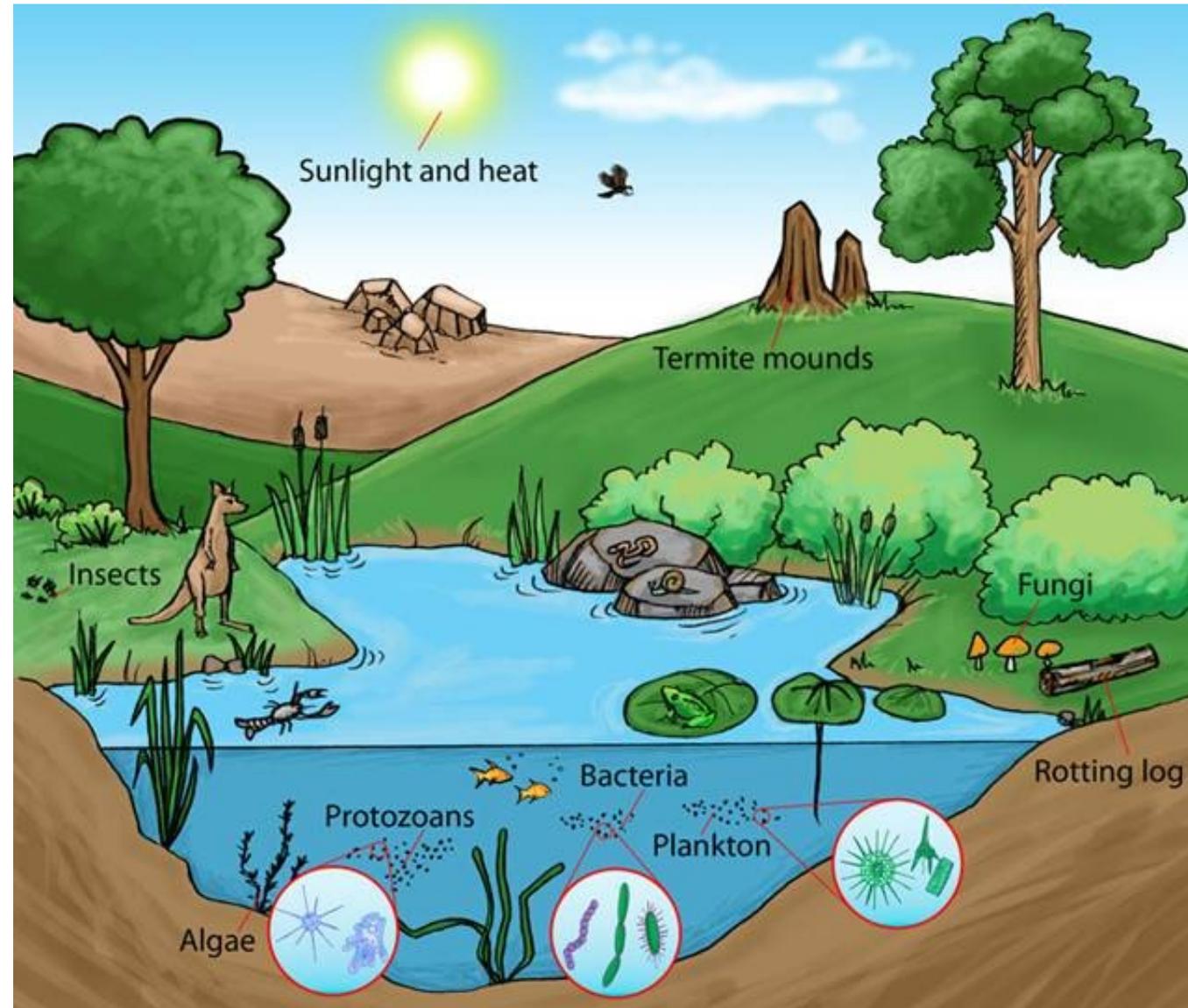
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*micro-organisms*

**Ecosystems**  
→ *interactions*



An ecosystem is an integrated system made up of living and nonliving components. *Image credits: Tsilia yotova.*



# 1. Biodiversity – *not just species - ecosystems*

*species are "cogs in a system"  
every species has a role*

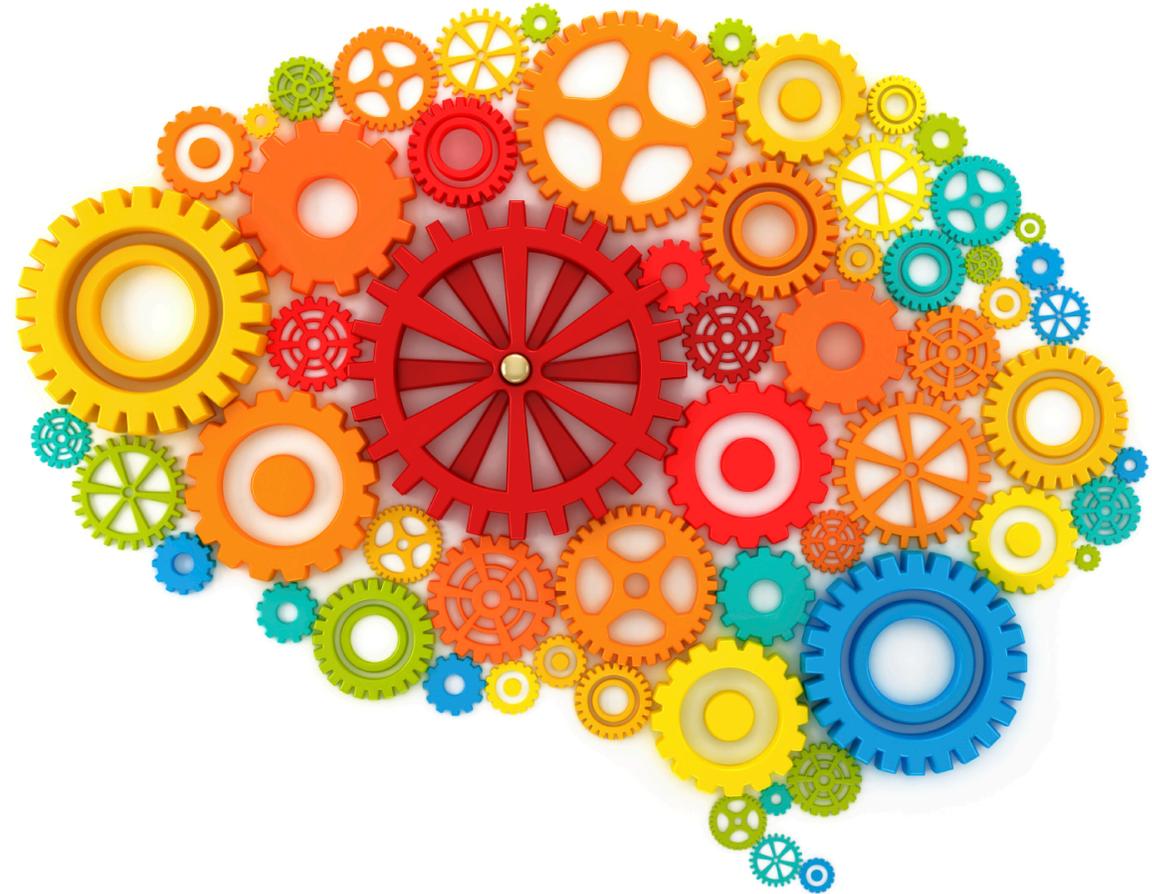
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# 1. Biodiversity – *survival - resources*

Basic resources needed to survive

→ All (almost) Species: *Animals, Plants, Fungi, Micro-organisms*

❖ *Food*

❖ *Water*

❖ *Air*

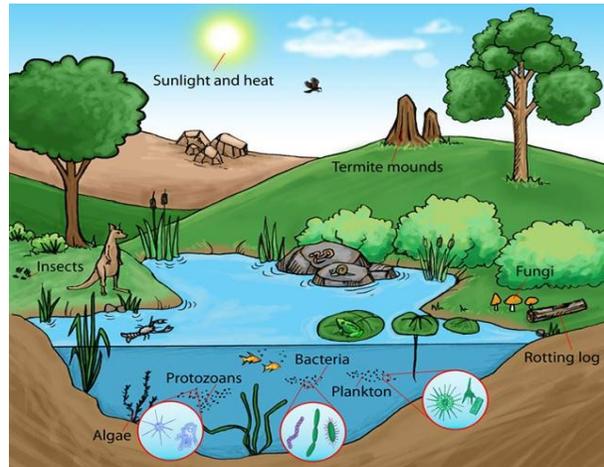
❖ *Shelter*

❖ *Energy (e.g. sun)*

# 1. Biodiversity – survival - resources

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Habitat

Territory

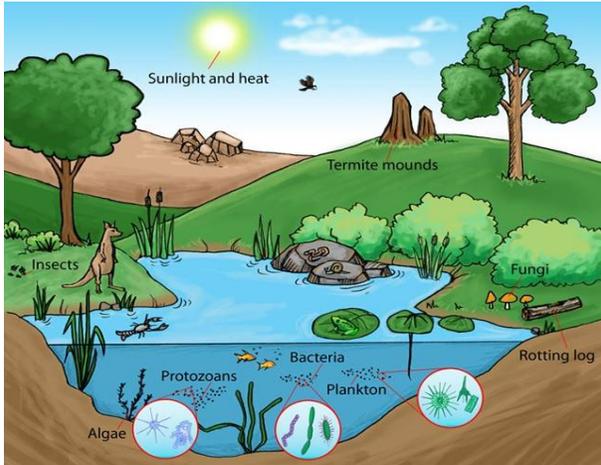
*e.g. Magpies*

- ❖ *Food*
- ❖ *Water*
- ❖ *Air*
- ❖ *Shelter*
- ❖ *Energy (e.g. sun)*

# 1. Biodiversity – survival - resources

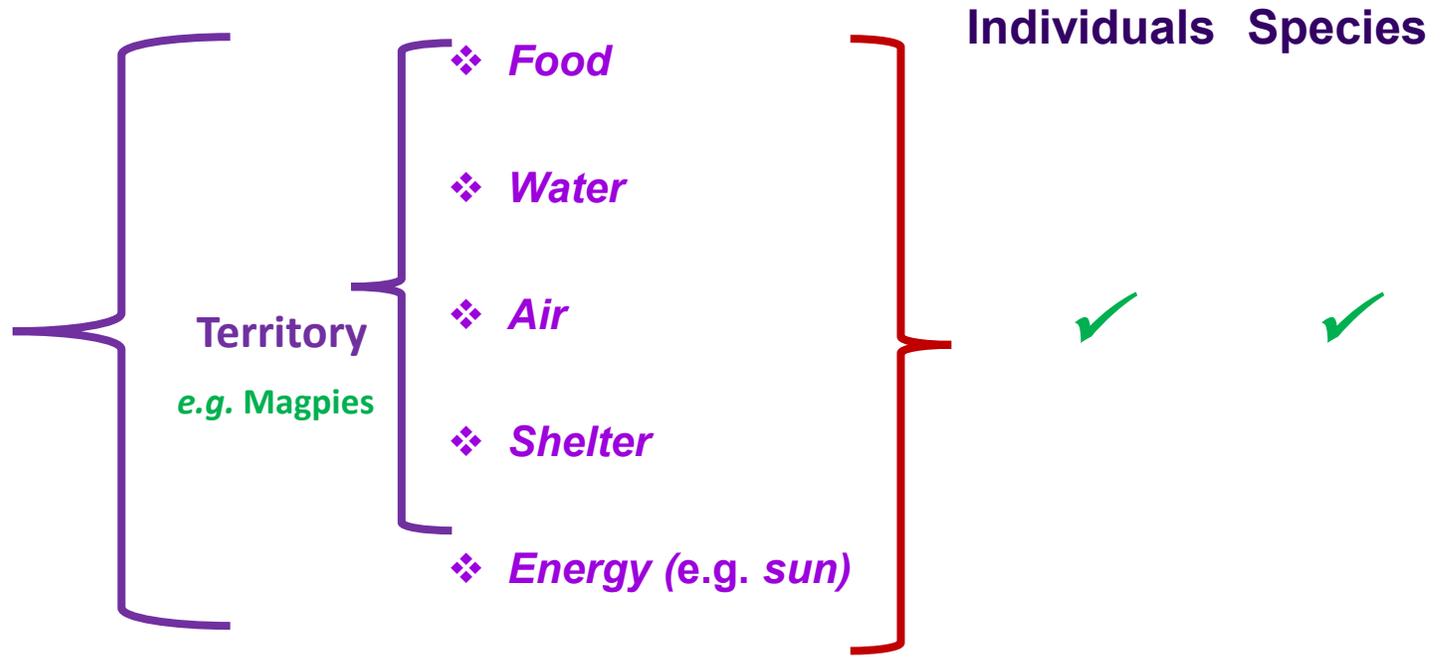
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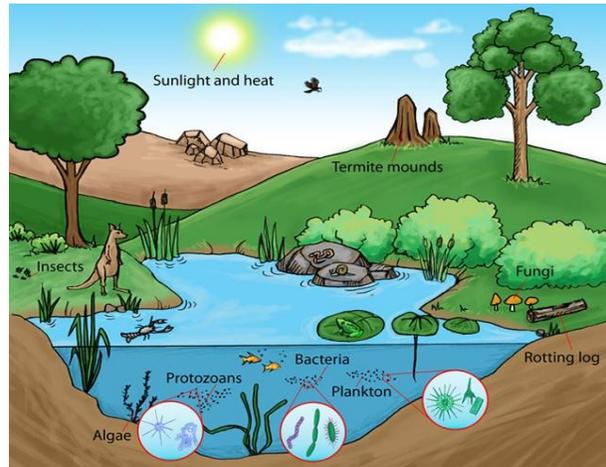
**Ecology**



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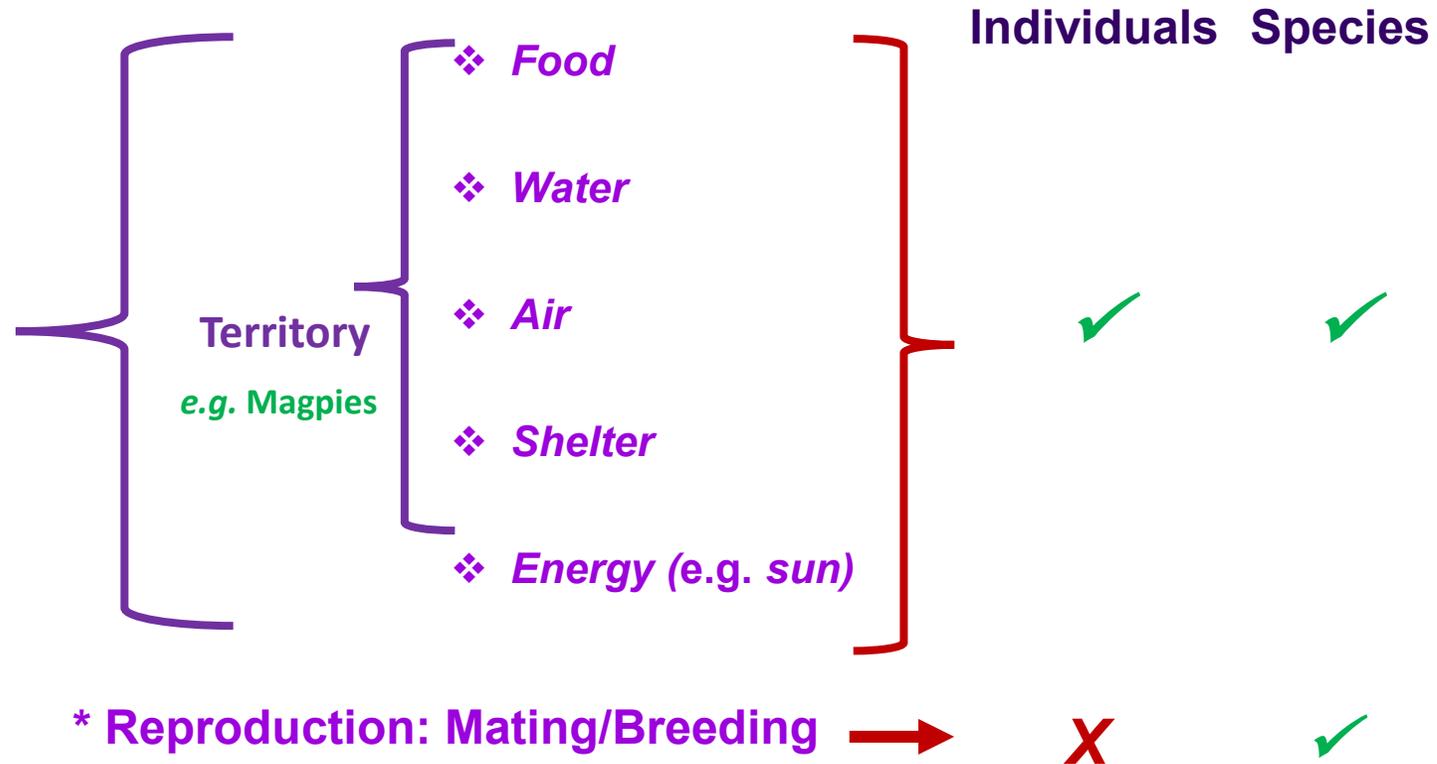
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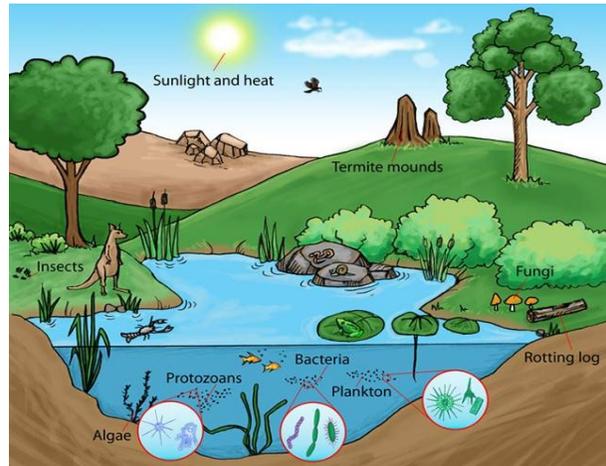
Reproductive Biology



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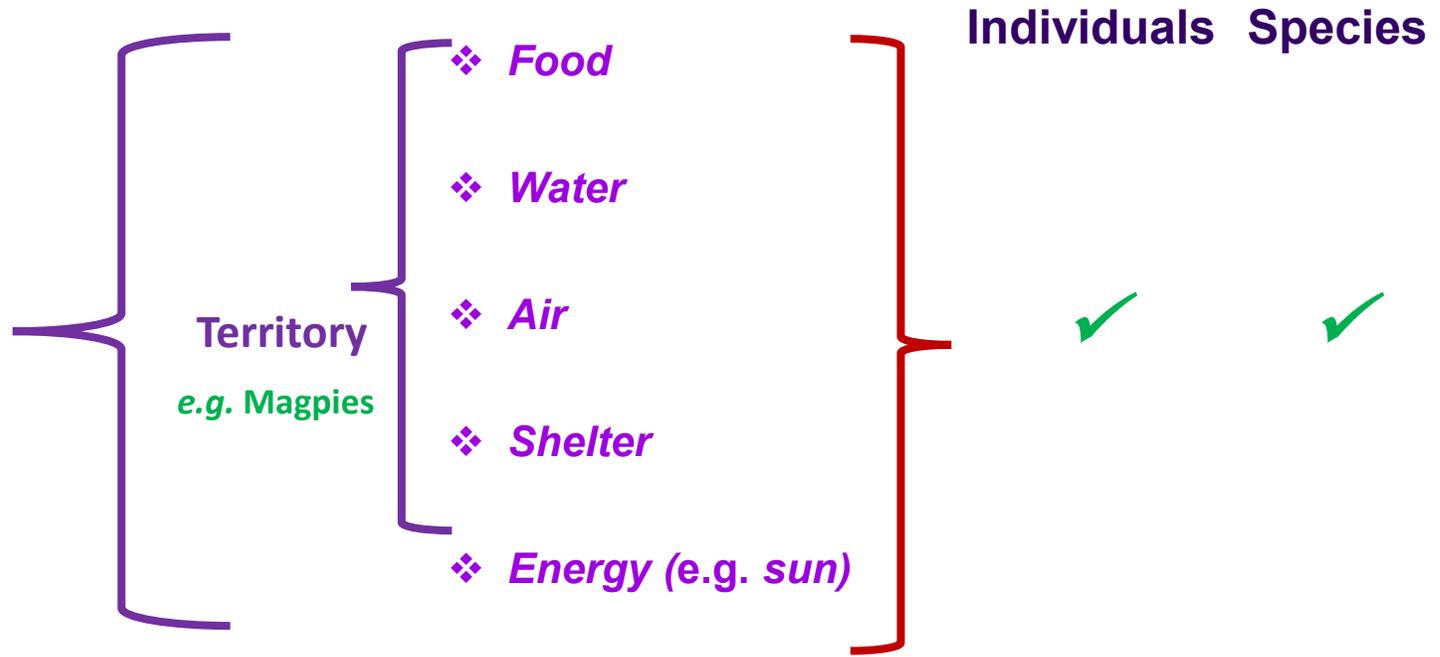
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Habitat

**Ecology**

**Reproductive Biology**



\* **Reproduction: Mating/Breeding** →    **X**                    ✓

**Species survival requires Habitat (for resources) & Breeding**



# 1. Biodiversity – *survival - breeding*

**Reproduction:**

*critical for species survival, not individuals*



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## Reproduction:

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## Breeding requires energy & commitment

→ *first system to shut down under stress = Reproductive System*

**Critical Point** → *contributes to loss of species* → *need contingencies*

## Breeding: indicator of a healthy habitat





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30 years in  
Reproduction & ART  
*Please ask me!*

## Breeding: indicator of a healthy habitat

## Conservation Solutions in Reproductive Biology (**NEEDS FUNDING!!**)

### ❖ Increase numbers → Threatened Species

- *Captive Breeding, Plant & Fungi Propagation, Assisted Reproductive Technology (ART)*

### ❖ Reduce numbers → Introduced Species

- *Fertility Control – possible for any animal species – needs funding!*





## 2. The Problem: *A Biodiversity Emergency*



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### PRIMARY DRIVERS

#### HABITAT LOSS

Thinning, fragmenting, or outright destruction of an ecosystem's plant, soil, hydrologic, and nutrient resources

#### INTRODUCED SPECIES

Any nonnative species that significantly modifies or disrupts the ecosystems it colonizes

#### EXPLOITATION

Process of removing too many aquatic or terrestrial species, which depletes the numbers of some species while driving others to extinction

#### POLLUTION

Addition of any substance or any form of energy to the environment at a rate faster than it can be rendered harmless

#### CLIMATE CHANGE ASSOCIATED WITH GLOBAL WARMING

Modification of Earth's climate associated with rising levels of greenhouse gases in the atmosphere over the past one to two centuries

**Climate Emergency**

### INFLUENCERS

- Human population growth
- Increasing consumption
- Reduced resource efficiency

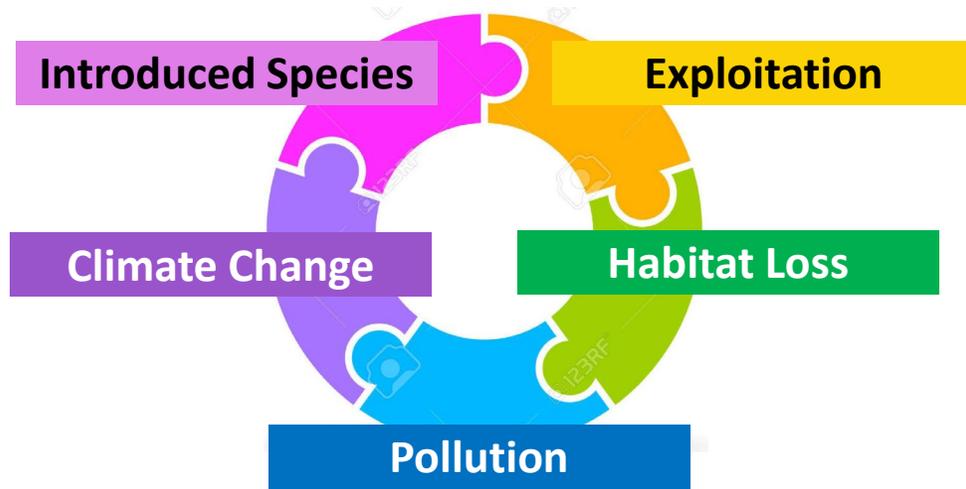
**Human Activity**

## BIODIVERSITY LOSS

Reduction in the number of genes, individual organisms, species, and ecosystems in a given area

## 2. The Problem: *A Biodiversity Emergency*

Nature: under stress & out of Balance → *Biodiversity Loss & Ecosystem Decline*

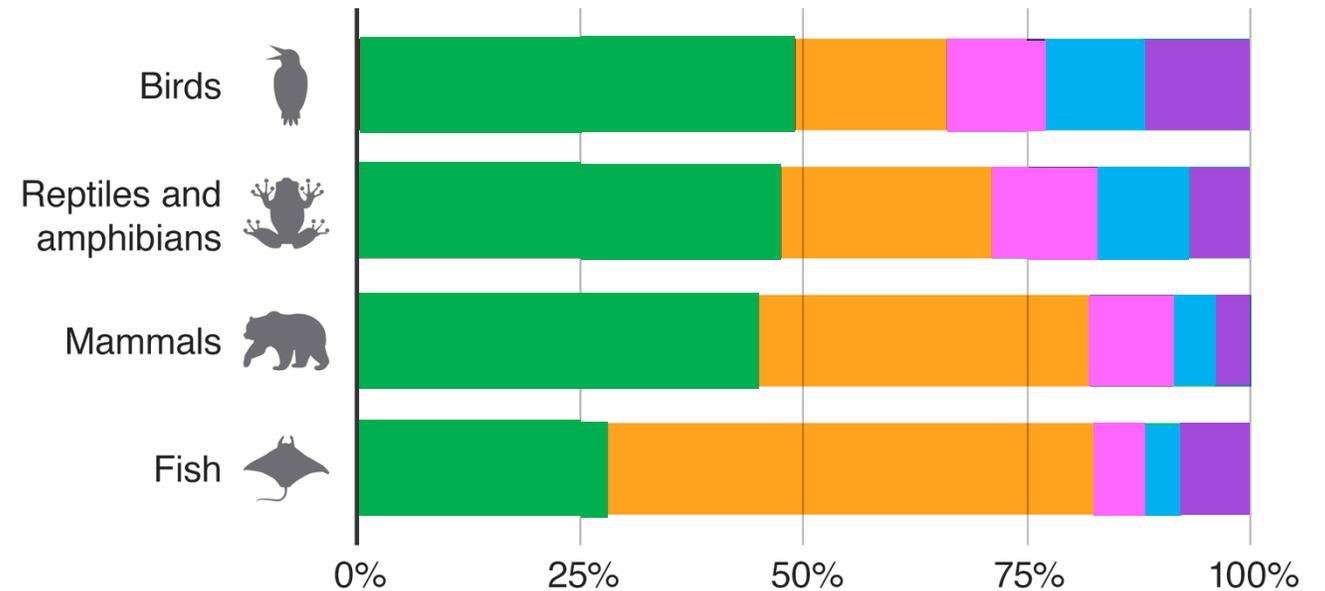
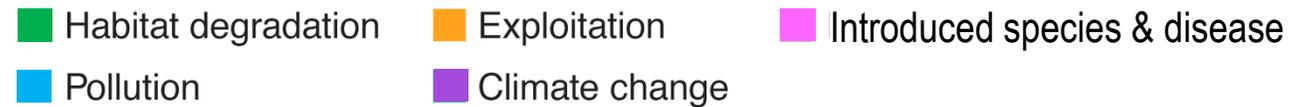


**Need integrated solutions**

*Not tokenistic or piece-meal attempts*

### Habitat loss is a major threat to biodiversity

The Living Planet Report assesses key drivers of species decline



Note: A sample of 3,789 populations evaluated by the Living Planet Index



# 2. The Problem: A Biodiversity Emergency

Nature: under stress & out of Balance → *Biodiversity Loss & Ecosystem Decline*

EXPLOITATION: use, abuse, disregard	Animals
	Habitats & Ecosystems
	Resource
HABITAT LOSS	Forests
	Grasslands & Woodlands
	Freshwater: Rivers, streams, lakes, ponds, marshes
	Marine: coast, estuaries, reefs, bays, open sea, sea bed
POLLUTION	Plastic: PET, HDPE, LDPE, PP, PS, EPS
	Chemicals
	Pharmaceuticals: antibiotics, hormones
	Land: General waste/land fill
	Water pollution
	Air Pollution: GHG emissions, VOCs
CLIMATE CHANGE	Animal Agriculture
	Land Clearing & Logging - loss of carbon-sequestering plants (esp. large trees)
	Fossil Fuels
NON-NATIVE (Introduced) SPECIES	Animals - farmed
	Animals - free-living
	Plants
	Micro-organisms: bacteria, viruses,



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→ *Impact Matrix (Appendix I, p.18 submission)*

### Human Activities

- ❖ Hunting, Shooting, Fishing, Trapping
- ❖ Animal Agriculture
- ❖ Plant Agriculture
- ❖ Logging
- ❖ Development (*The Built Environment*)
- ❖ Fossil Fuels: *mining & use*
- ❖ Mineral Mining
- ❖ Miscellaneous: *recreational activities, Bushfires*



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DRIVERS		HUMAN ACTIVITIES							
		Hunting, Shooting, Fishing, Trapping	Animal Agriculture	Plant Agriculture	Logging	Development (The Built Environment)	Fossil Fuels: mining & use	Mineral Mining	Miscellaneous: recreational activities, Bushfires
CLIMATE CHANGE	Animal Agriculture		Methane emissions from animals, especially ruminants the number of animals augments the effect, so Factory Farming/intensive farming causes more damage; contributing to GHGs & Global Warming						
	Land Clearing & Logging - loss of carbon-sequestering plants (esp. large trees)		Land Clearing: most Land Clearing is done to facilitate Animal Agriculture, including food crops: Loss of carbon-sequestering plants (esp. large trees) contributes to GHGs & Global Warming	Land Clearing: for plant agriculture Agriculture; Loss of carbon-sequestering plants (esp. large trees) contributes to GHGs & Global Warming	Loss of carbon-sequestering plants (esp. large trees); changing landscape and terrestrial architecture & hydrology; post-logging burn-off destroys soil health; water pollution from run-off after burning	Land Clearing: destruction of plants (esp. trees) for development; Loss of carbon-sequestering plants (esp. large trees) contributes to GHGs & Global Warming	Land Clearing: destruction of plants (esp. trees) for mining for fossil fuels; Loss of carbon-sequestering plants (esp. large trees) contributes to GHGs & Global Warming	Land Clearing: destruction of plants (esp. trees) for mining for minerals; Loss of carbon-sequestering plants (esp. large trees) contributes to GHGs & Global Warming	
	Fossil Fuels		fueling farm machinery and animal transport trucks; contributes to GHG emissions	Fueling farm machinery and transport; contributes to GHG emissions	Fueling logging machinery & trucks; contributes to GHG emissions	fueling machinery for manufacture & construction and transport vehicles; contributes to GHG emissions	EVERYTHING; Land Clearing; Habitat Destruction; contributes to GHG emissions & Global Warming	fueling machinery for mining & transport vehicles; contribute s to GHG emissions	



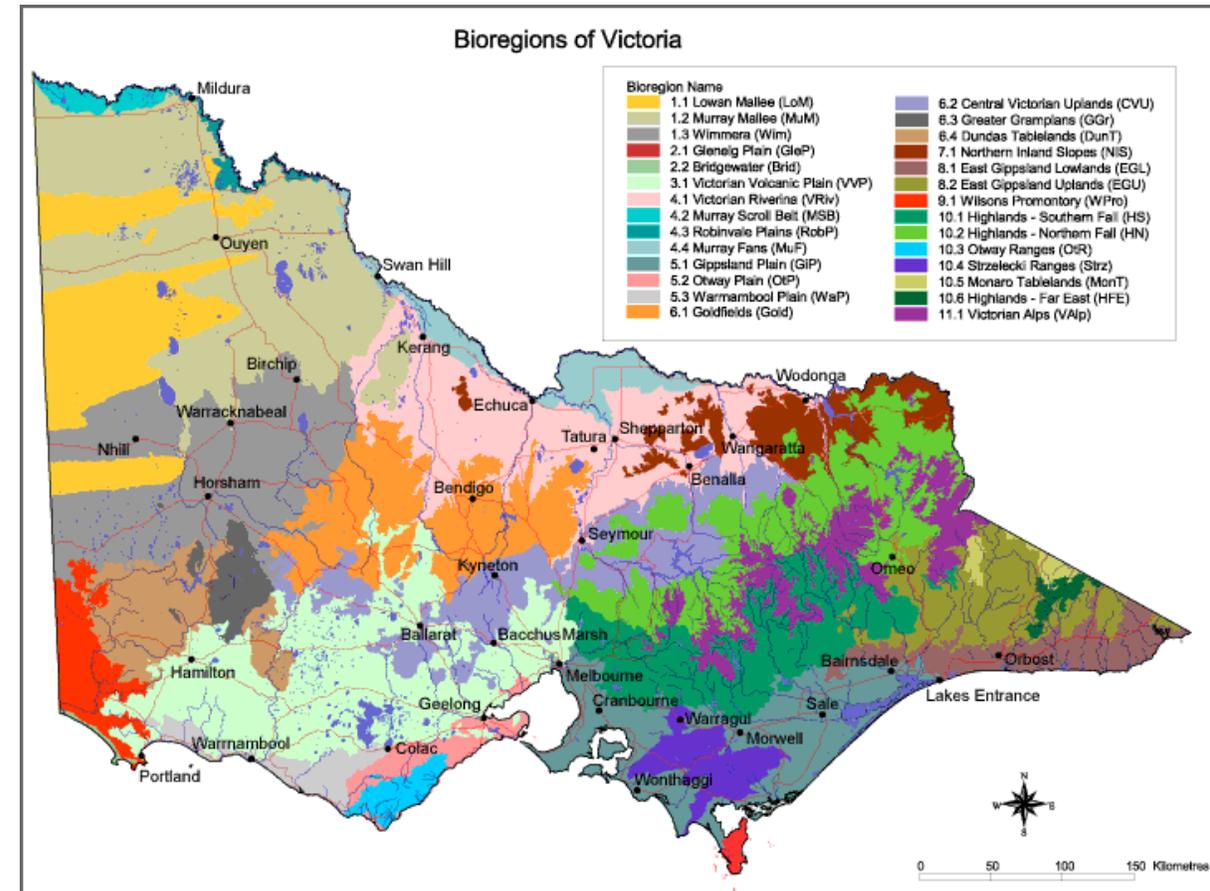
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➔ Critically endangered (*Federal & State Listed*)

*Less than 5% remains; less than 1% of high quality*



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***Save every last patch!***

small reserves are  
significant & valuable

Kendal D *et al.* (2017):

<https://www.sciencedirect.com/science/article/abs/pii/S0006320716306747>

Volenec Z & Dobson A (2019)

<https://conbio.onlinelibrary.wiley.com/doi/pdf/10.1111/cobi.13308>



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### *Dumbarton Street Grassland (Reservoir)*

- VVP grassland - surveyed
- Critically endangered *Dianella amoena*
- State-government owned
- Plans for housing development

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#### ***Darebin Council offer***

- *Operational & financial management*
- *Find land elsewhere in Darebin*
- *Better amenities for social housing*

***VicGov – No***



## 2. The Problem: *A Threatened Ecosystem*

### Victorian Volcanic Plains Grasslands – *VVP Grasslands*

**Life Loses...**  
Development &  
Planning win again!

→ Critically endangered (*Federal & State Listed*)

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#### **WHY? Please explain**

- *Ignorance? Incompetence? Negligence?*
- *have promises been made to developers?*
- *Political donations? e.g. Casey Council corruption*

<https://www.abc.net.au/news/2019-12-07/analysis-ibac-hearings-have-shone-light-on-donations-problems/11773838>



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**VicGov – No**

**Please change this decision**



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**City of Knox, 2021**



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### Blue-billed Duck (*Oxyura australis*)

→ requires deep water for feeding & breeding

→ many sites destroyed → lost habitat

→ In Victoria - *threatened*

→ Globally - IUCN Red List – *near threatened*



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Highly significant!!

*Only 17 breeding sites on record (data is poor)*

*11 sites – single records!*

***New Site!!! → No. 18!!!***

***→ Lake Knox in outer eastern suburbs***



## 2. The Problem: *A Threatened Species*



Photos by Nalini Scarfe

### Lake Knox

- public land, (*old DPI site*)
- constructed dam; naturalised to lake, fenced
- established wetland, (*31ML, deepest 3-4m*)
- Listed species & ecological communities

KES: <https://www.kes.org.au/home/campaigns/lakeknox>

iNaturalist: <https://www.inaturalist.org/projects/wildlife-of-lake-knox>



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*Nalini's Wildlife Photography*

Photos by Nalini Scarfe

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**Life Loses...  
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**Problem:** Vic Gov → sell site for housing  
→ drain lake and in-fill it (*claim "it's a hazard"*)

### 3 government bodies involved

- **Development Victoria** → create "new wetland"?!
- **DELWP** → offices on the other end of the site?!
- **Melbourne Water** → must approve wetland plan

*AND accountable to Action Plan*

**Where's biodiversity consideration?**

See submission 634 – for more details



2. T

**Knox Community tested State Govt's plan to remove Lake Knox?**

**DEVELOPMENT VICTORIA**

**FAIL**

**species**



Photos by Nalini Scarfe

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## Here are Key Findings from Wetland Ecologist Professor Paul Boon

- **Plan is scientifically questionable**
- **Ecological guarantees unfounded**
- **Government lacks ecological expertise to replace habitat**
- **Plan has no project KPI's or resourcing**
  - **Science favours retaining and enhancing Lake Knox**

**READ PROFESSOR BOON'S FULL REPORT**  
<https://tinyurl.com/y62qyjv>

site for housing

in-fill it (*claim "it's a hazard"*)

involved

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re details



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*Kangaroos are only found in Australia; if we don't change the way we treat them, they won't be found anywhere.*



### **Kangaroos**

- Australia for 3 million years; *ancestors 25 million years*
- Native animal listed as a "pest"
- ACTWs - *little oversight; too easy to get a permit*

### ***Pet Food Trial***

- ignored Department's recommendation "*not sustainable*" (report)
- *Commercial Industry broadened*



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- Now human consumption

- *IPBES – Workshop on Biodiversity & Pandemics*

***"The trade and consumption of wildlife is a globally important risk for future pandemics."***



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*Kangaroos are only found in Australia; if we don't change the way we treat them, they won't be found anywhere.*



### **Kangaroos - Misinformation**

#### **Numbers**

- covered by Peter Hylands (*hearing, submission*)
- Numbers killed drastically under-estimated
  - *Young are not included in numbers*

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### **Kangaroos - Misinformation**

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#### **Breeding**

- "*Population explosions*"; "*Breed like rabbits*"
- ***Biology does not support this*** → Breed like kangaroos
- In the best conditions:
  - *1 young to independence in 12-18 months*
  - *just 1... in the best conditions...if they're not predated*

***NSW Parliamentary Inquiry: Health and wellbeing of kangaroos***



## 3. Solutions

**Solution → *tackle the cause = tackle all drivers***

**Approach: *Strategic, coordinated, all-of-government***



# 3. Solutions

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## Global Action

### IPBES:

- **Transformative Change**
- <https://ipbes.net/transformative-change>



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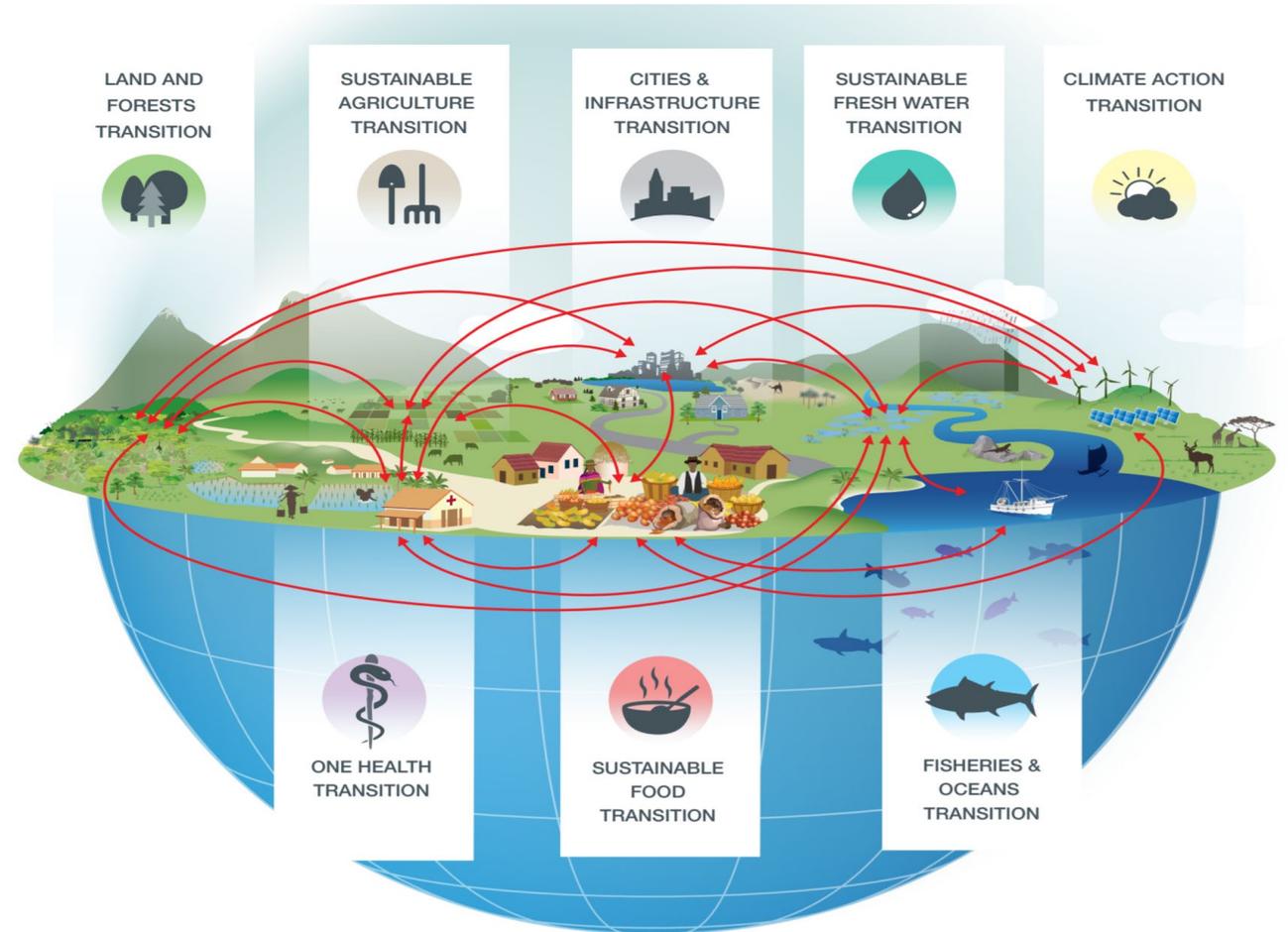
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### UN Global Biodiversity Outlook 5

- **8 Transition Pathways → relate to drivers**
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#### Scientists Alliance (>13,500)

- **6-point Climate Emergency plan**
- <https://academic.oup.com/bioscience/article/70/1/8/5610806>
- <https://www.scientistswarning.org/2021/01/09/massive-scale-mobilization-necessary-for-addressing-climate-change-scientists-warn/>

#### **Evidence-based Climate Emergency plan:**

- 1. Nature:** *protect and restore the planet's ecosystems*
- 2. Food:** *eat mostly plant eat less animal products*
- 3. Energy:** *low-carbon, renewable energy*
- 4. Human Population:** *stabilise, then gradually reduce*
- 5. Economy:** *develop a carbon-free economy*
- 6. Short-lived Pollutants:** *urgently reduce*

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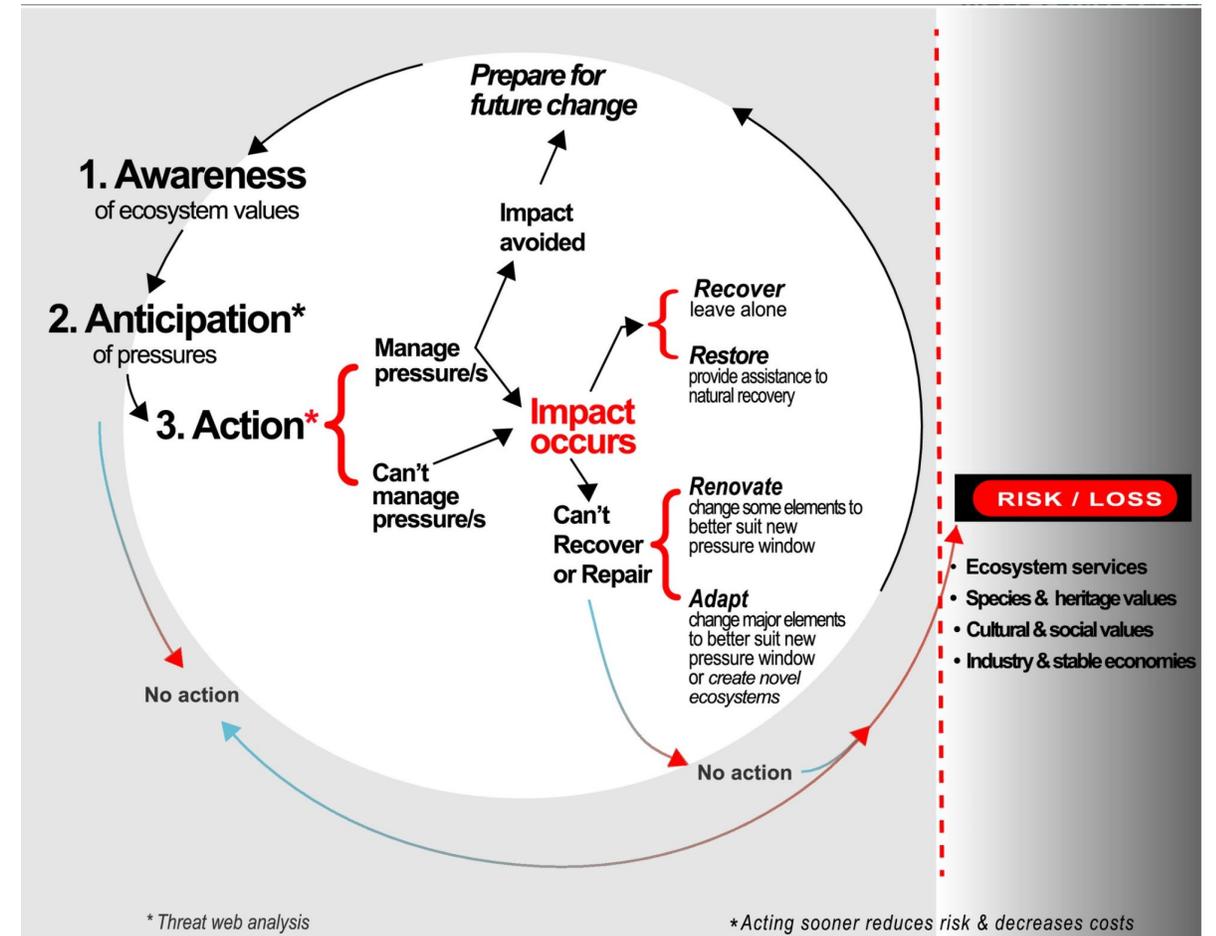
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## Australia's Scientists

### 3As Pathway to tackle Ecosystem Decline

1. Awareness
2. Anticipation
3. Action

• <https://onlinelibrary.wiley.com/doi/10.1111/gcb.15539>



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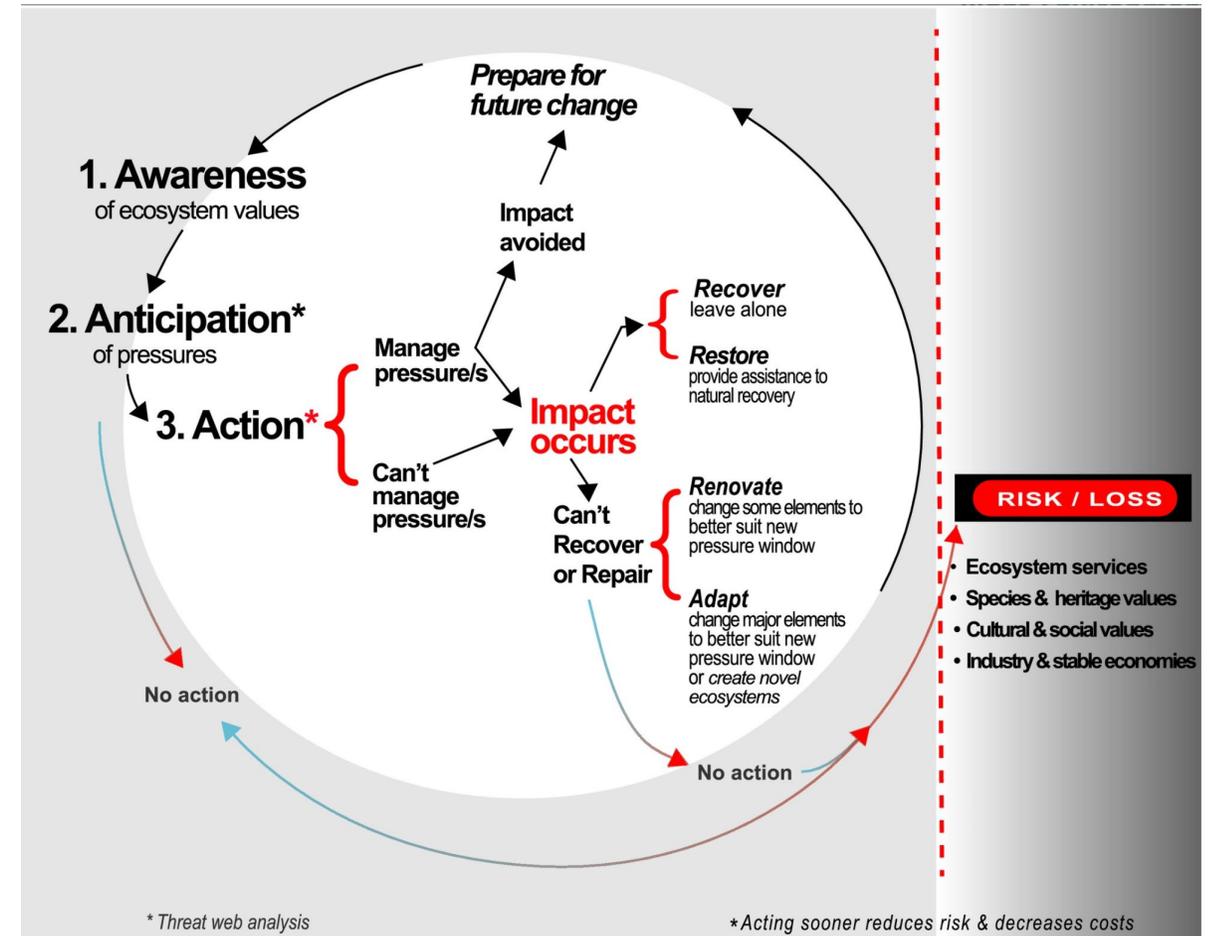
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**Accountability**



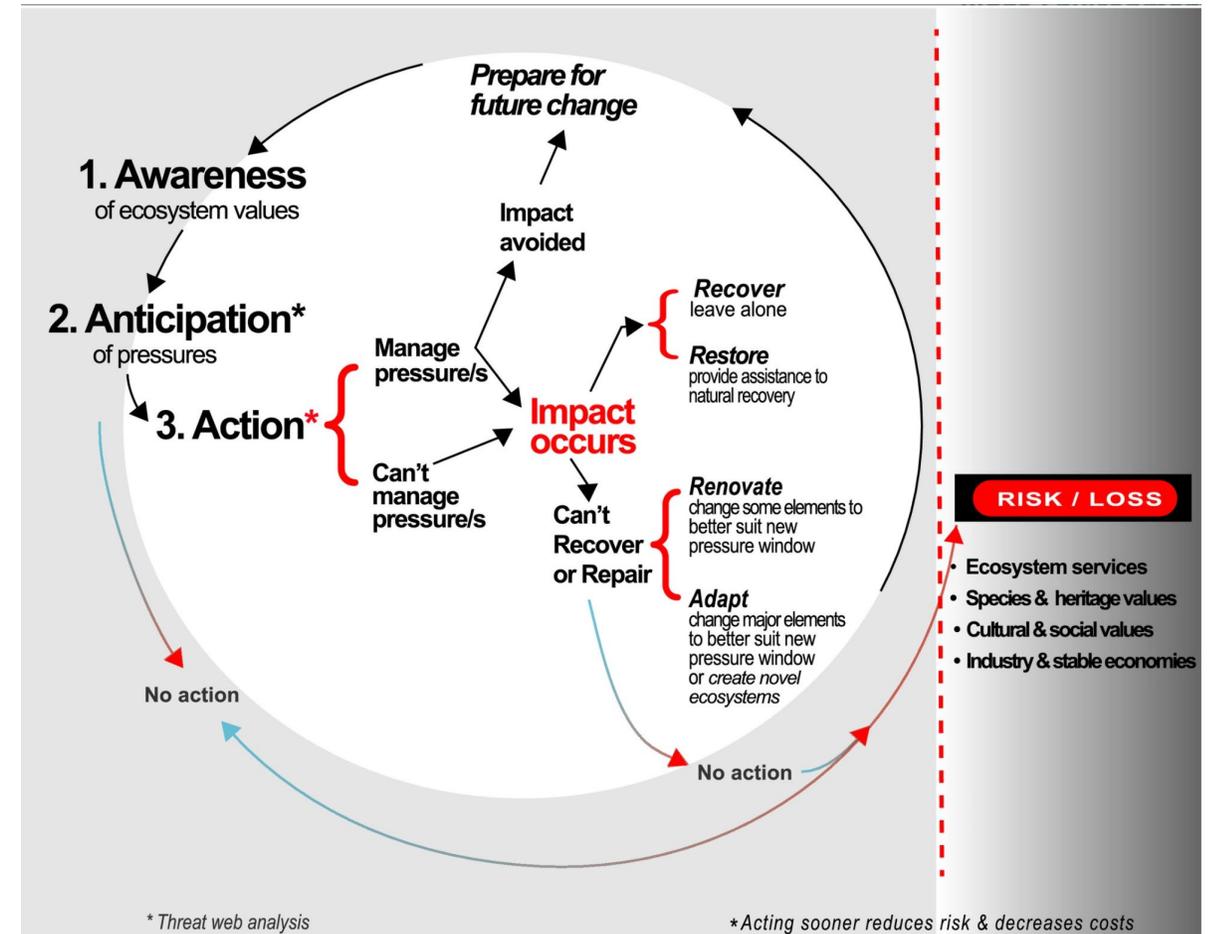
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- Acknowledge importance of Biodiversity to health
  - declare a right to a healthy environment



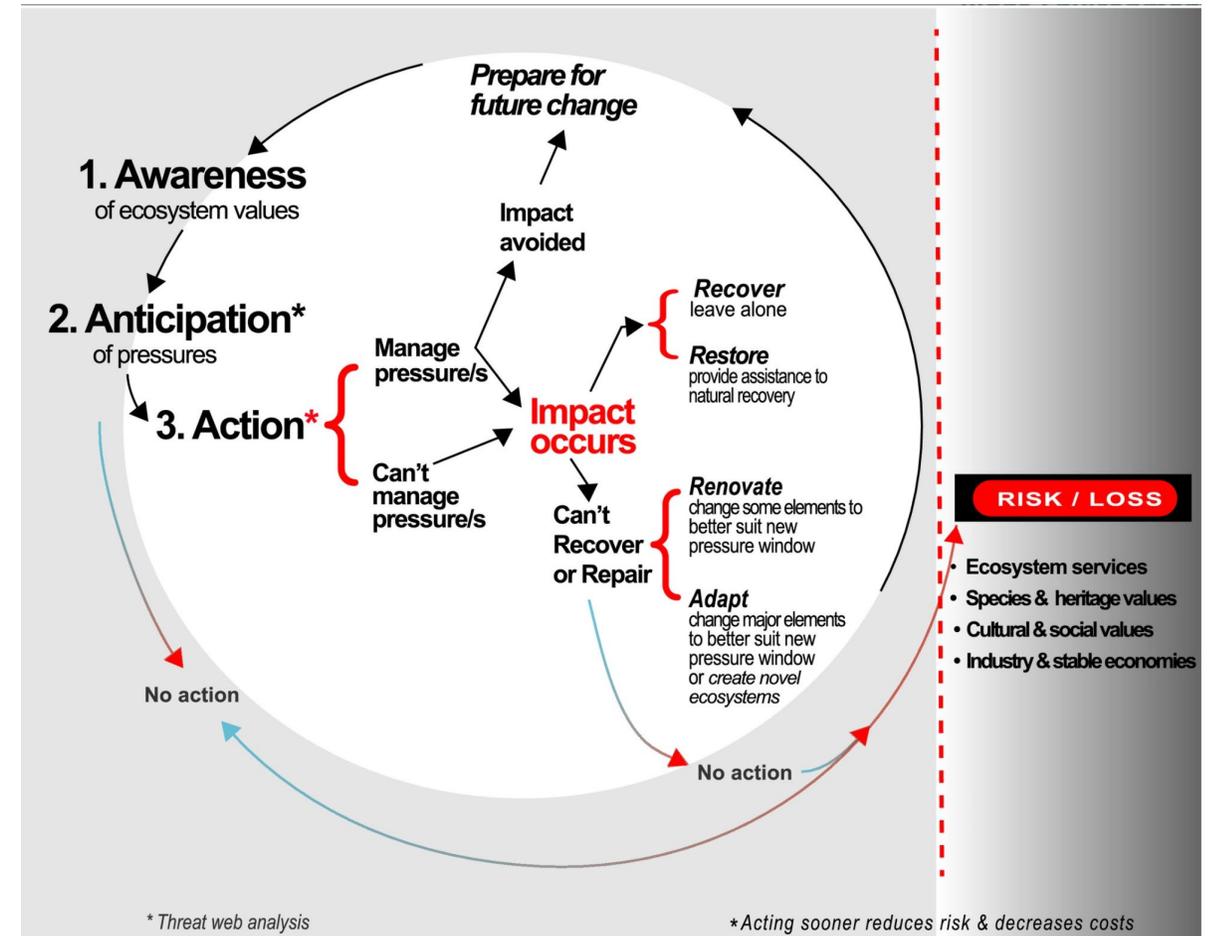
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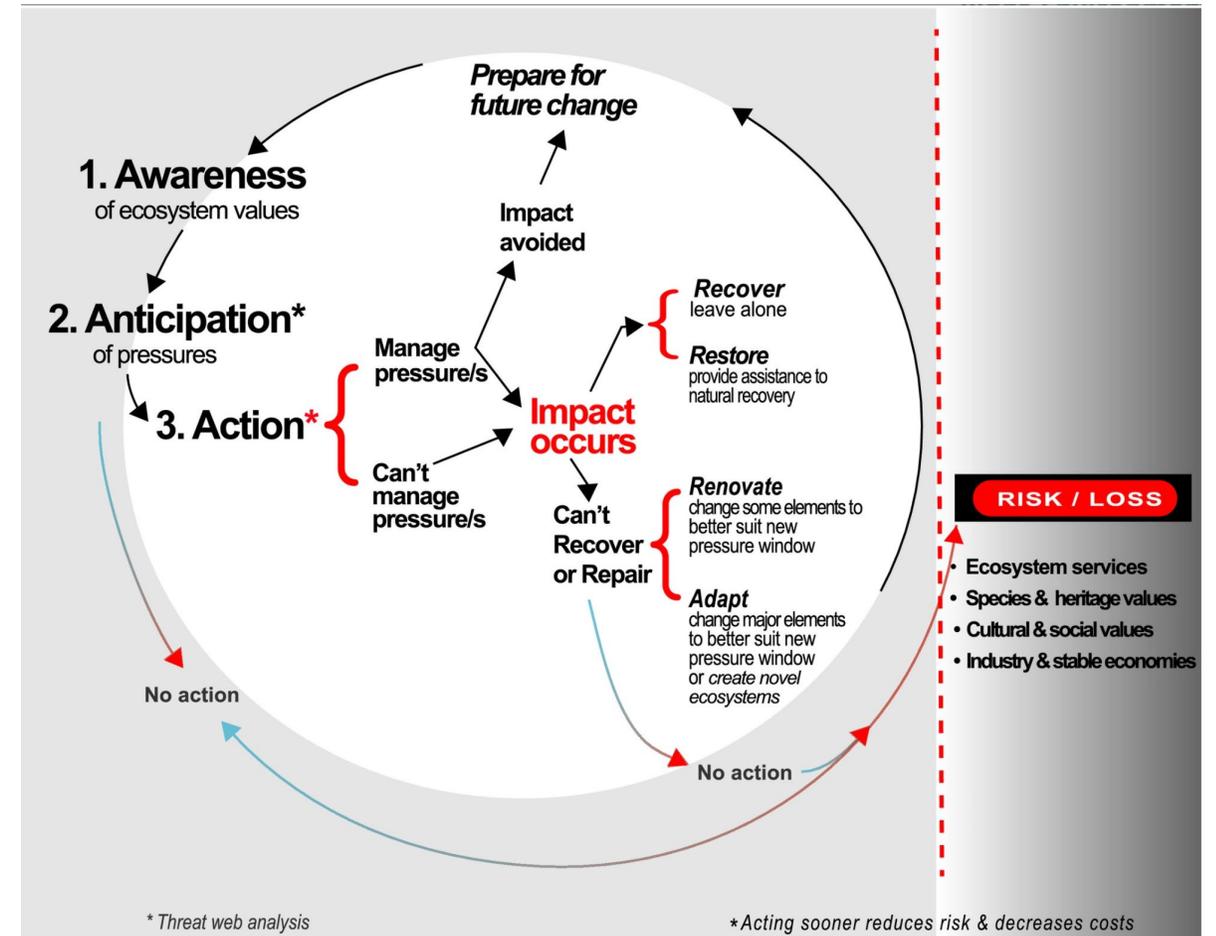
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- Sacrosanct Laws
  - Review of issues by Dr Bruce Lindsay, Professor Lee Godden
- Meaningful action; genuine intent
  - not tokenistic – tackle all drivers
- Fund data collection & Research
  - Threatened Species & Ecosystems; Solutions





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- Fund data collection & Research
  - *Threatened Species & Ecosystems; Solutions*
- Biodiversity across all-of-government policy
  - *City of Darebin – Council Plan*  
→ *Darebin Nature Trust*

**Ask me!!**

### Council Plan

**A progressive and liveable city must acknowledge and address global existential crises that are impacting local communities - *Biodiversity Emergency, Climate Emergency, Emerging Diseases.***

### Strategies in Key areas:

- *Sustainability*
- *Health & wellbeing*
- *Economy*
- *Development*
- *Equity & Diversity*
- *Decision-making*



## 3. Solutions

**Solution → tackle the cause = tackle all drivers**

**Approach: Strategic, coordinated, all-of-government**

### **Action**

- 1. Stop the Destruction**
- 2. Repair the Damage**
- 3. Contingency Plans**
  - Relocation - e.g. Eastern bristlebird



# 3. Solutions

**Solution → tackle the cause = tackle all drivers**

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## Action

1. Stop the Destruction
2. Repair the Damage
3. Contingency Plans
  - Relocation - e.g. Eastern bristlebird
  - Captive Breeding, Plant & Fungi Propagation
  - Assisted Breeding
    - ART: *Biobanking; Artificial Insemination, embryo transfer*

**30 years in  
Reproduction & ART  
Please ask me!**

**Needs funding!**

Table in Submission of many other actions





# My Background

1. **Biologist**
  - *Reproductive Biology*
  - *Biodiversity*
2. **enRICHed Pursuits**
  - *Knowledge Broker: connecting science and society*
  - *City of Darebin - Darebin Nature Trust*
3. **Monash University - Academic (Reproductive Biology, Assisted Reproduction)**
4. **Victorian Parliament - Electorate Officer (Andy Meddick MLC)**
5. **Contributed to 3 Submissions for Biodiversity Inquiry**
  - *enRICHed Pursuits*
  - *City of Darebin*
  - *Animal Justice Party*