



Australian Biodiversity Genomics

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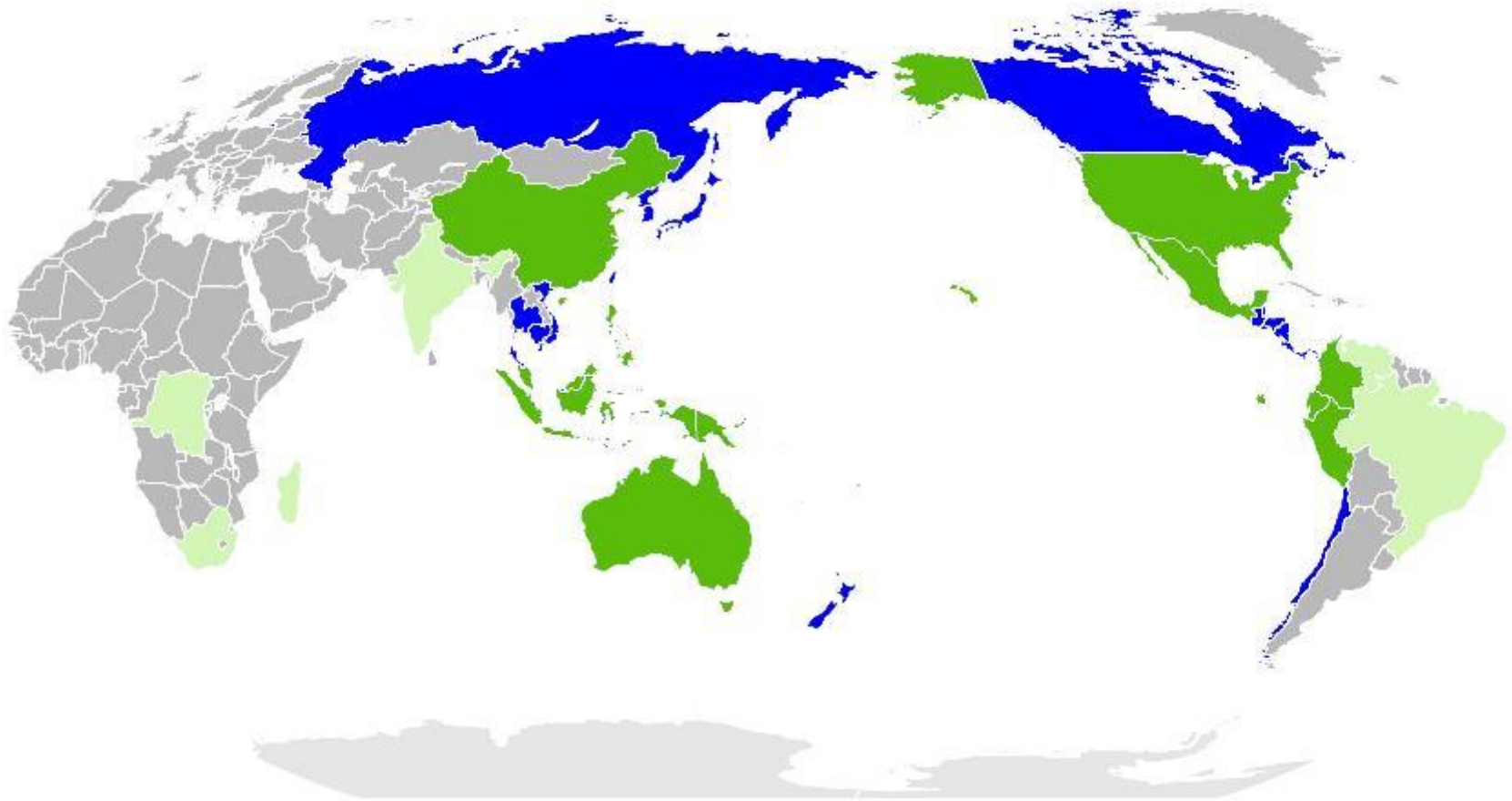
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Biodiversity & the Pacific Rim



Australia has

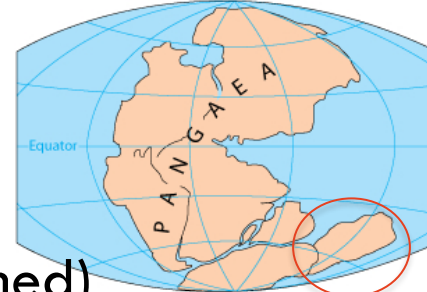
~8,128 vertebrates (403 threatened)

~320,000 invertebrates (~67 threatened)

~24,000 plants (1353 threatened)

Endemic species

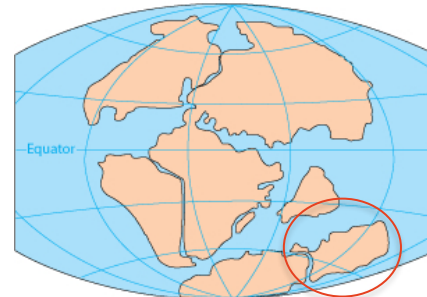
- 87% mammals
- 45% birds
- 93% reptiles
- 94% amphibians
- ~65% invertebrates
- 92% plants



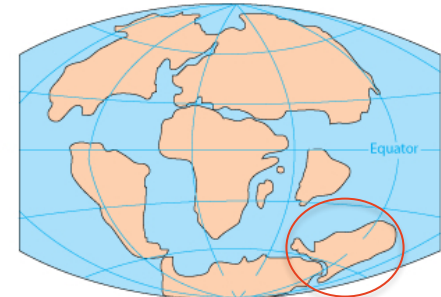
PERMIAN
250 million years ago



TRIASSIC
200 million years ago



JURASSIC
145 million years ago



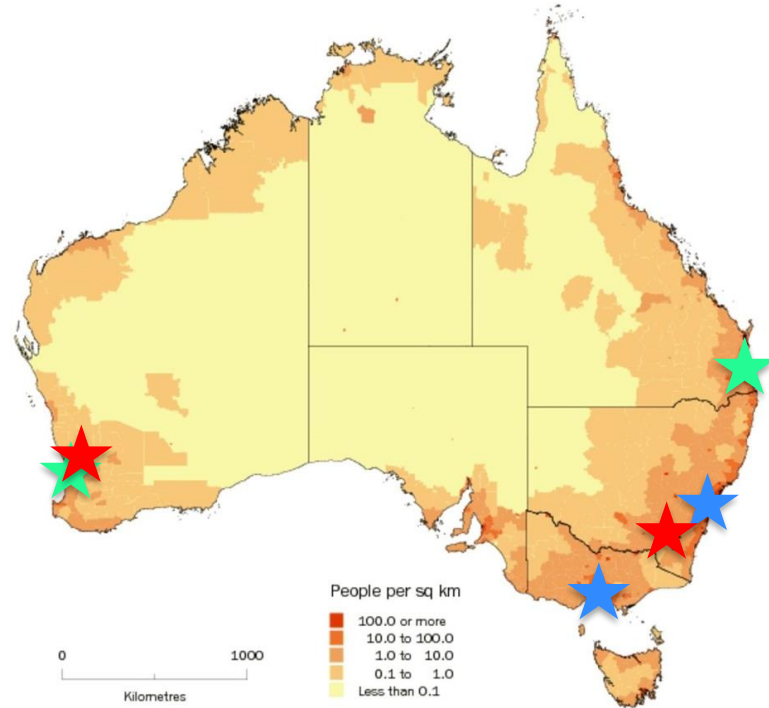
CRETACEOUS
65 million years ago



PRESENT DAY

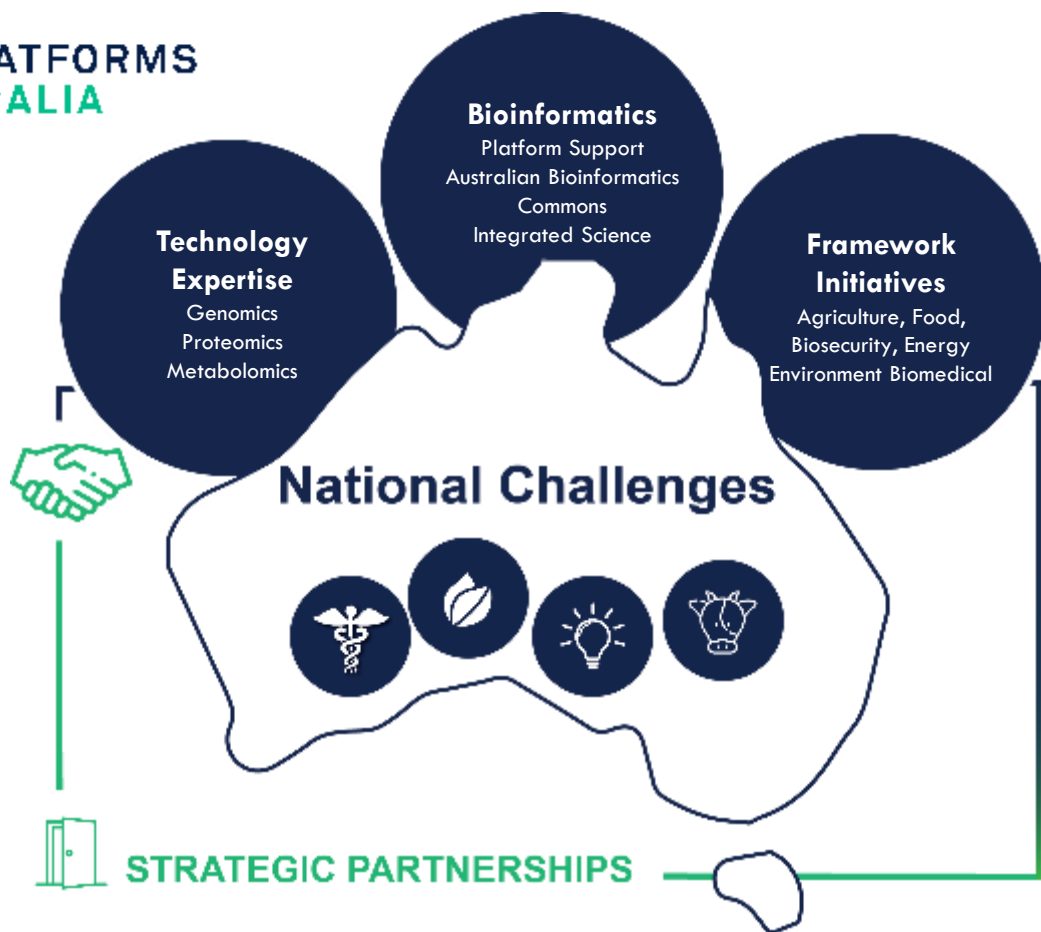
Biodiversity Genomics Challenges

- Sample collection: remoteness & LN available
- Sequencing: PacBio, ONT & HiC
- Compute: supercomputers or cloud
- Skills:
 - bioinformaticians (assembly & annotation)
 - application for biodiversity conservation

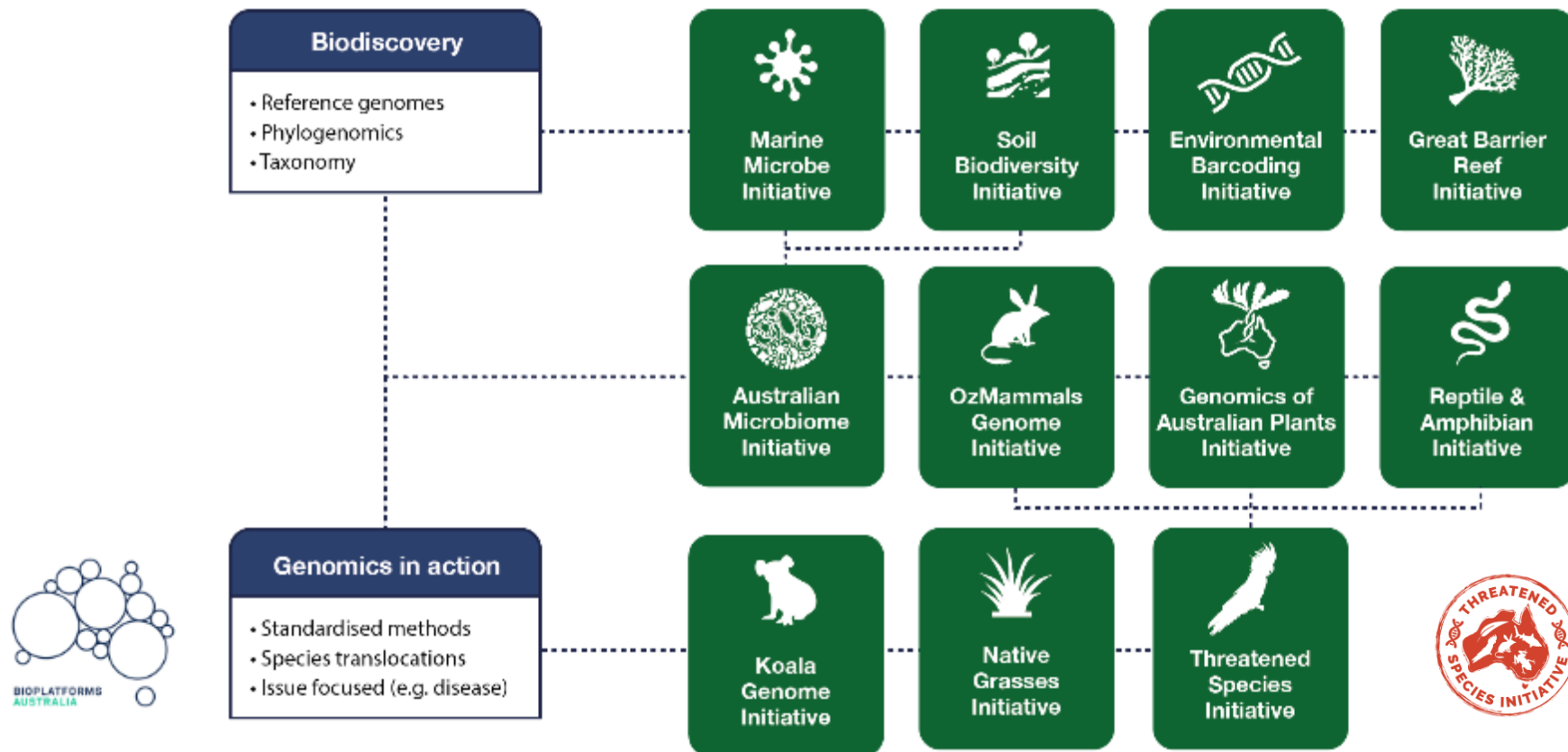




BIOPLATFORMS AUSTRALIA

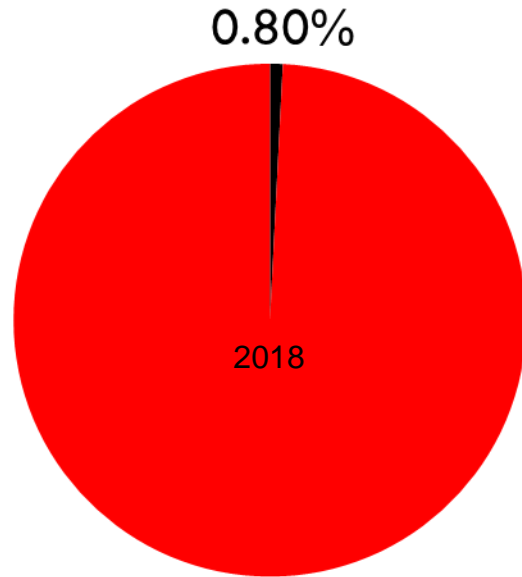


Environmental theme

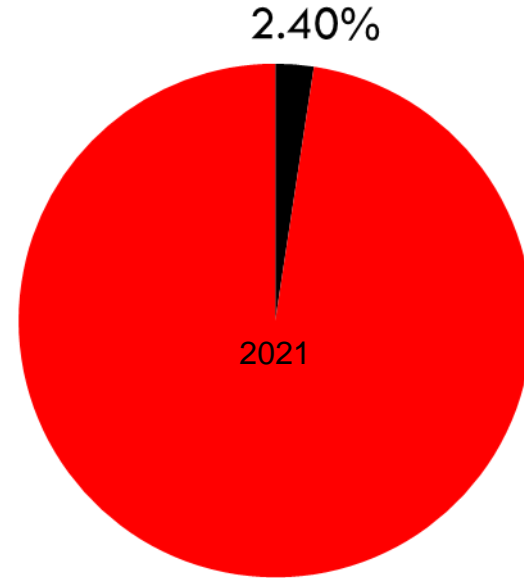


IUCN Red List

15,521 animal species listed as threatened (CR, EN, VU)



■ w/ Genome ■ w/o Genome
Brandies *et al.* 2019



■ w/ Genome ■ w/o Genome
Hogg *et al.* under review

Managers know genetic diversity is important!

- Genetic diversity and inbreeding are inversely related
- Maintain adaptive potential for future change
- Maintain fitness of individuals to ensure survival



Photo: Melburnian – Self-photographed CC BY 3.0



Photo: D. Stojanovic



Photo: SDZG



BRIDGING THE GAP IS KEY TO
LOWERING EXCTINCTION RATES

Geneticists

Genome
Biologists



Green Humour

Ecologists

Conservation
Practitioners

Policy Makers



Green Humour

Geneticists

Genome
Biologists

Ecologists

Conservation
Practitioners

Policy Makers



- Genomic resources for Australia's threatened species
- Associated population data
- Applied Conservation Genomics Portal: online toolkit for conservation managers



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Australian Government
Department of Agriculture,
Water and the Environment



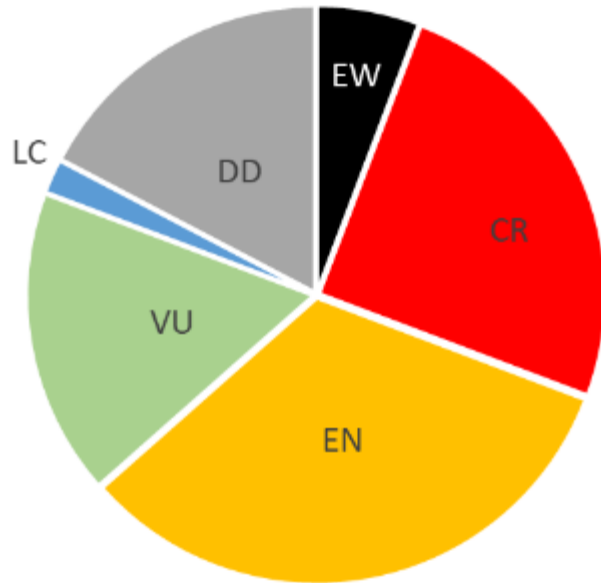
Department of Biodiversity,
Conservation and Attractions



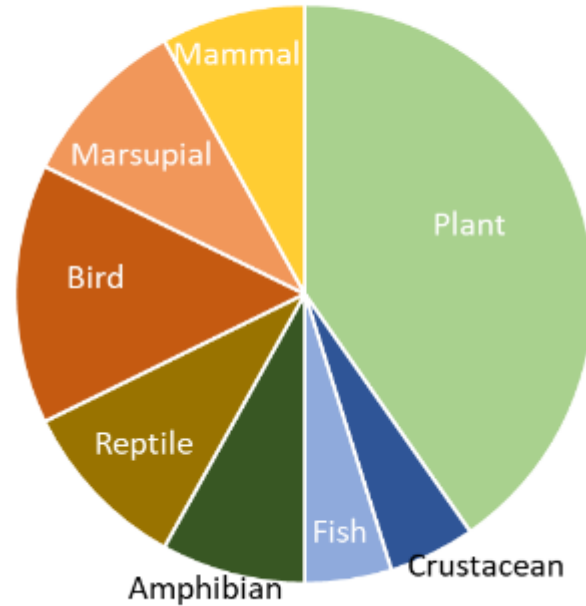
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62 species (40 projects)

TSI species by threat status



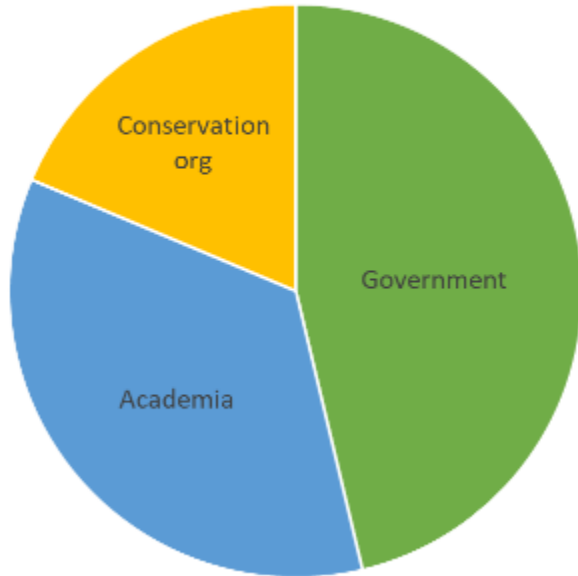
TSI species by taxon group



National Consortium (120 collaborators)

Christmas
Island
N=2

TSI Collaborators





Australian Government
Department of Agriculture,
Water and the Environment



Government of South Australia
Department of Environment
and Natural Resources

Department of
Biodiversity, Conservation
and Attractions



Ramaciotti Centre
for Genomics



Australian Government
Australian Research Council



RONIN



illumina



QUESTIONS

