Principles of Conservation Planning

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What is systematic conservation planning?

- Conservation planning: guides decisions about the location, configuration and management of conservation areas

- Conservation areas: areas managed for the persistence of biodiversity and other natural values

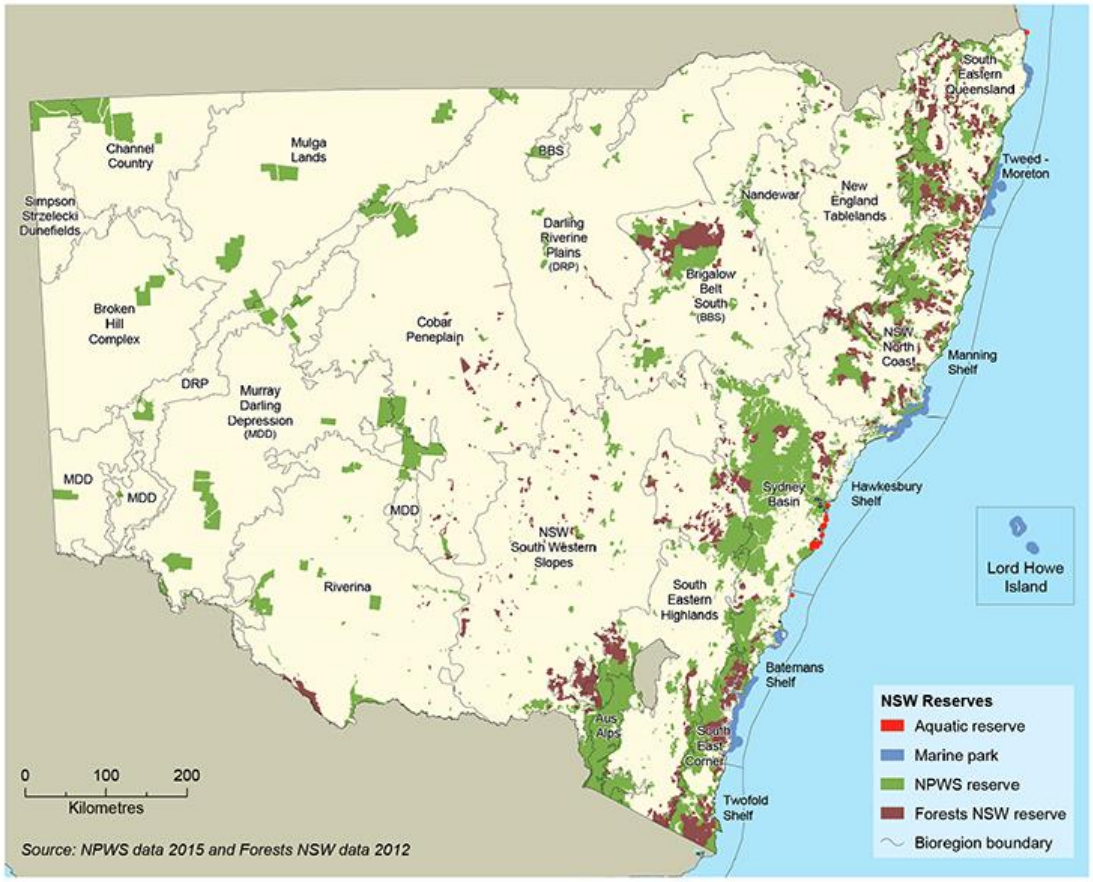
- Repeatable, transparent and equitable process for supporting conservation decisions

Systematic conservation planning

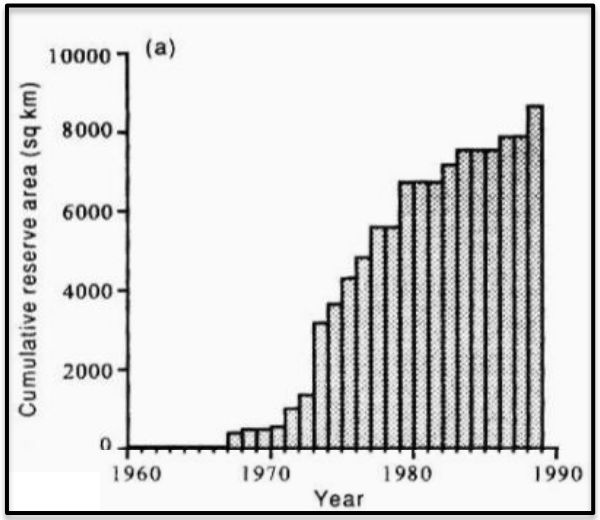
- Informed policy and legislation in terrestrial and marine environments (e.g. South Africa, Australia)
- Foundation of planning approaches of international non-government organisations (e.g. Conservation International, TNC)
- 1,000s of peer reviewed papers, cited many thousands of times

Why bother with all these complicated methods?

Map 14.1: NSW national parks and forest reserves, marine parks and aquatic reserves



The NSW reserve system seemed to be going from strength to strength



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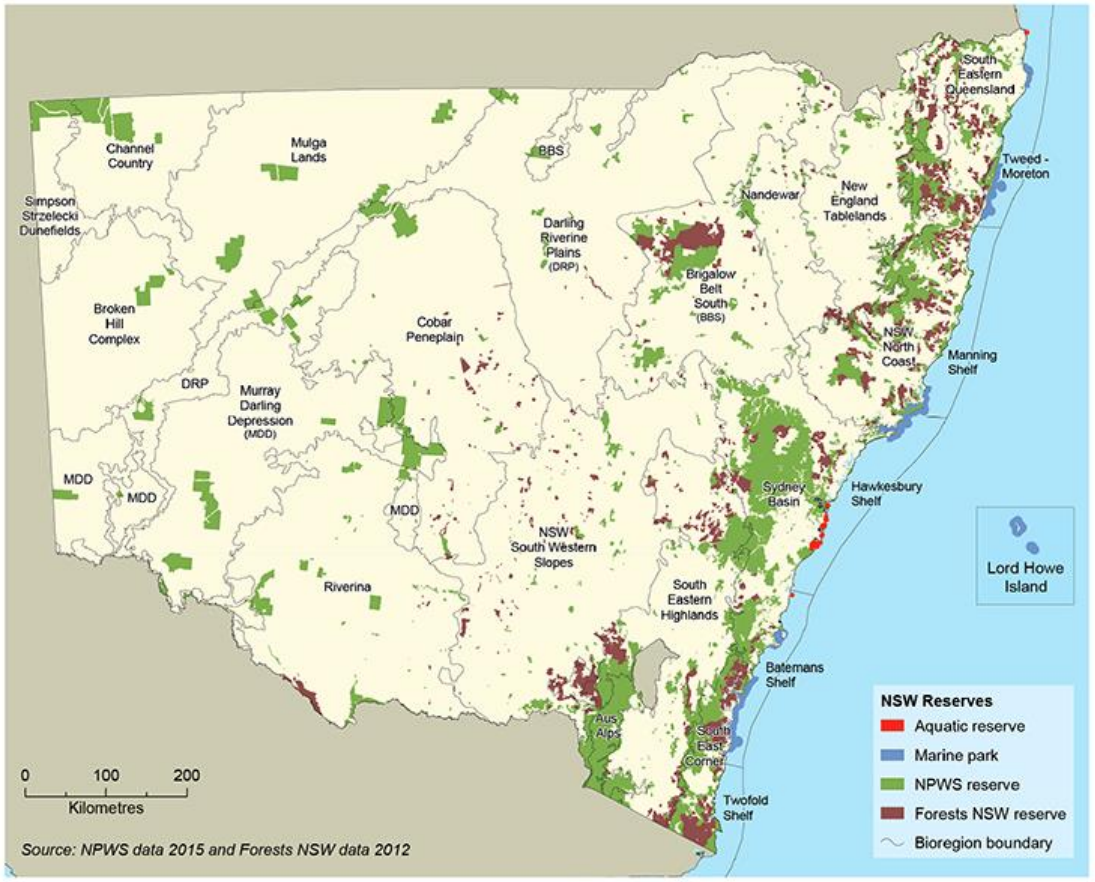
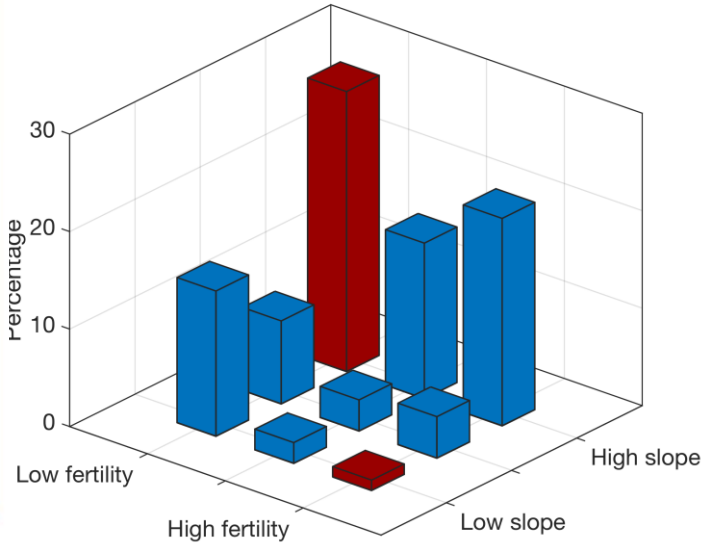
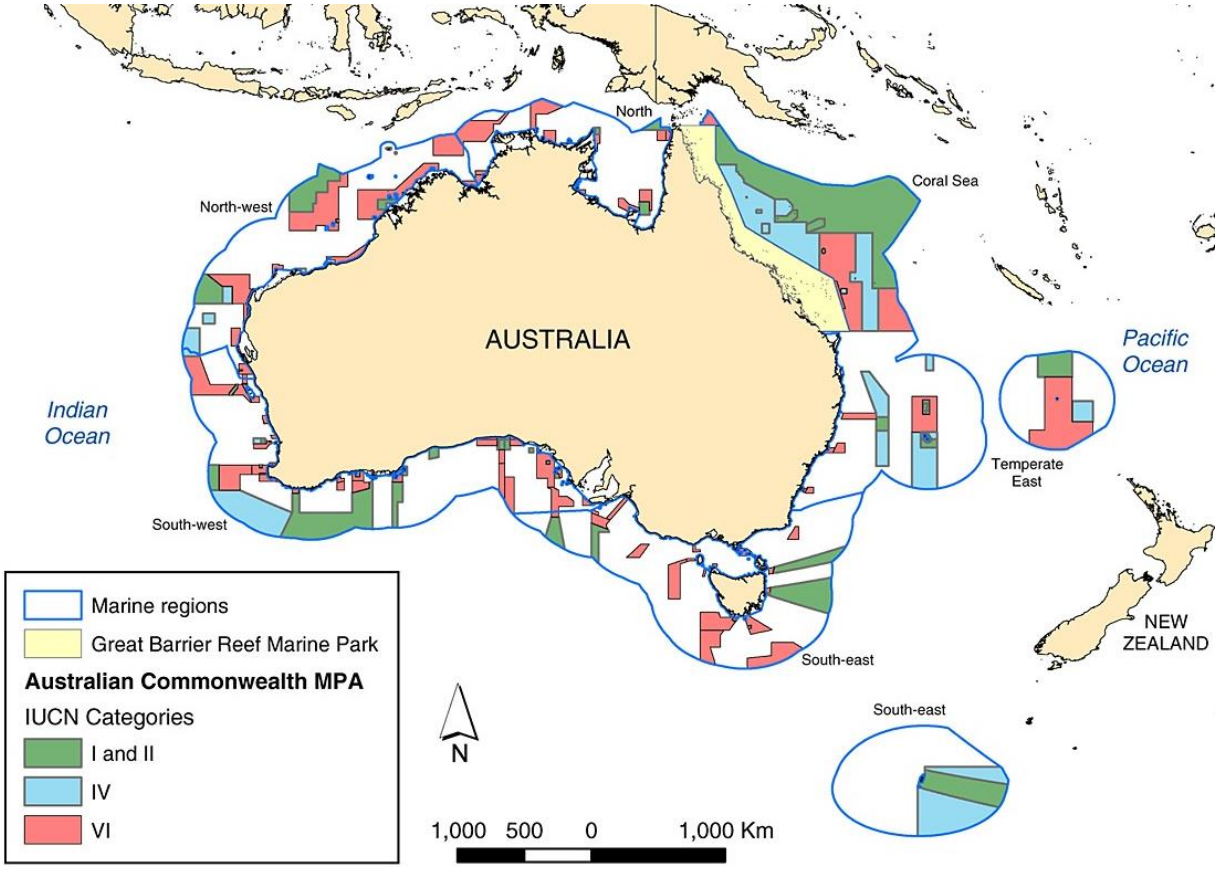


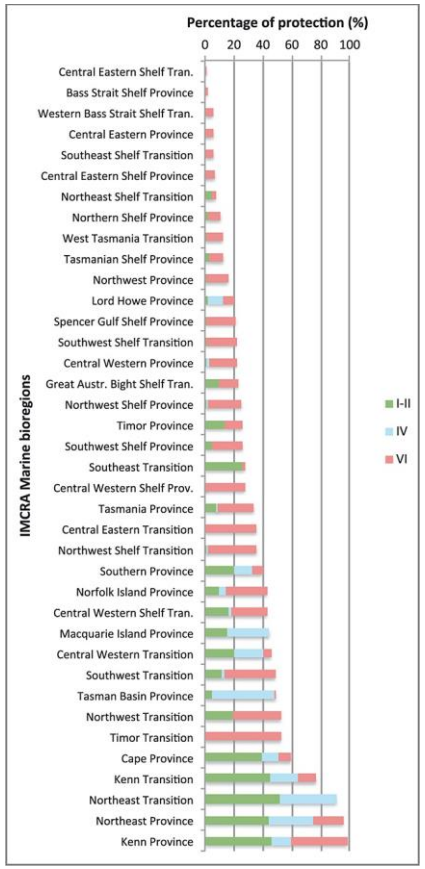
On systematic inspection, the protection was revealed to be highly biased.



Does conservation planning still matter?

We're still making many of the same mistakes.





Devillers et al. (2014) *Aquatic Cons.*

Systematic Conservation Planning: The CARE principles

Comprehensive: Every biodiversity feature is protected

Adequate: Conserves the represented features indefinitely

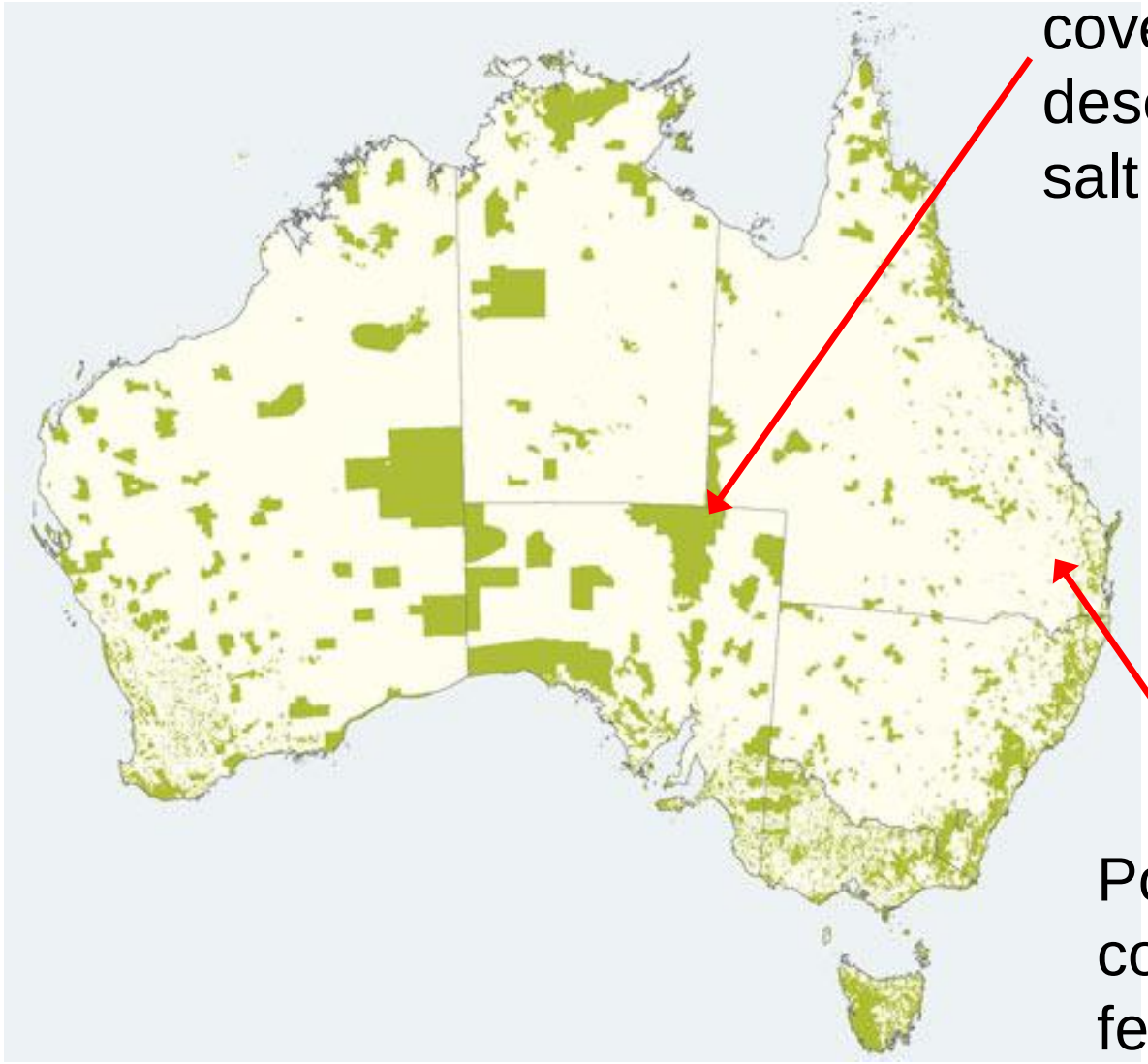
Representative: Protects the full range of variation within each species or ecosystem

Efficient: Has minimal cost

Comprehensive

- Principle: A sample of every kind of biodiversity should be protected

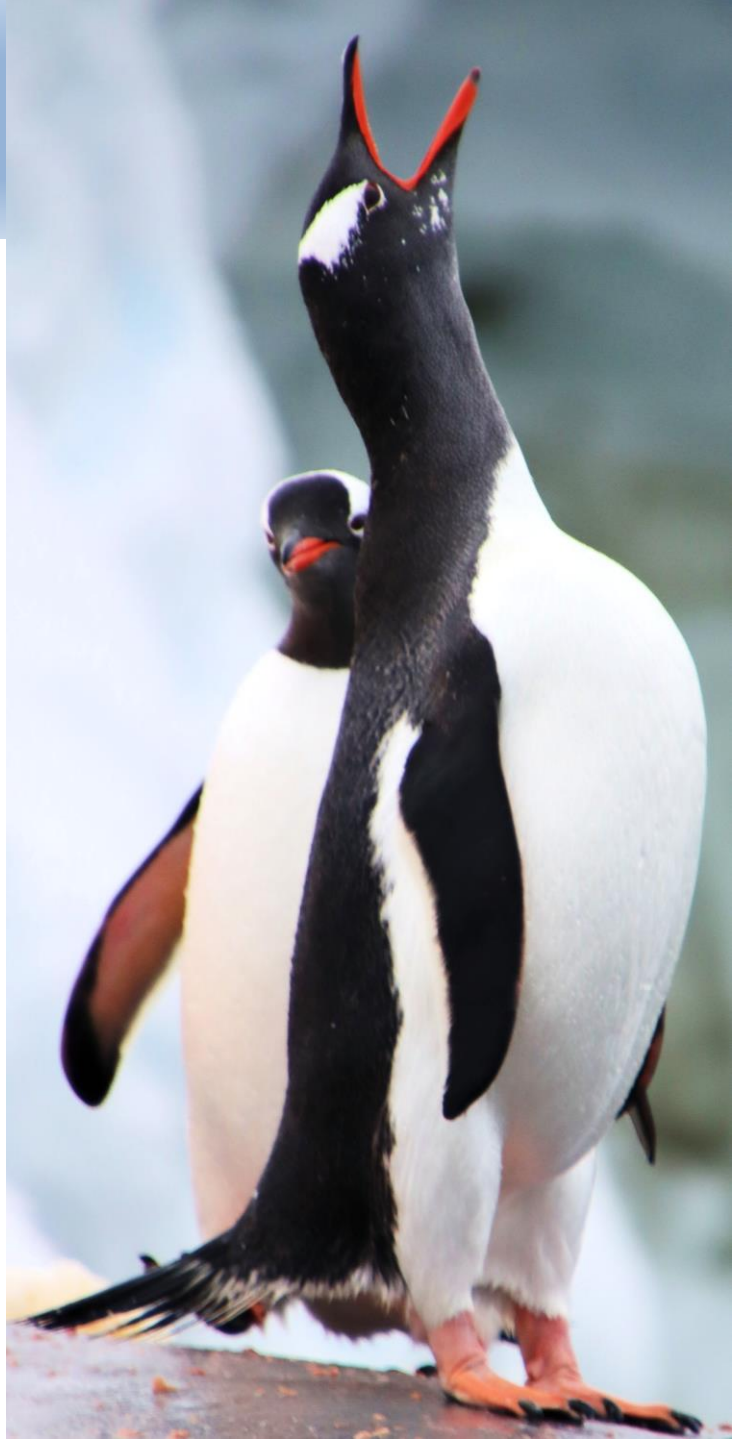
- Practice: capture as many as possible of:
  - Species
  - Ecosystems
  - Ecological processes


High % coverage in deserts and salt lakes
Poor % coverage flat, fertile, arable land

Adequacy

- Principle: Protect enough of each kind of biodiversity so that it persists forever

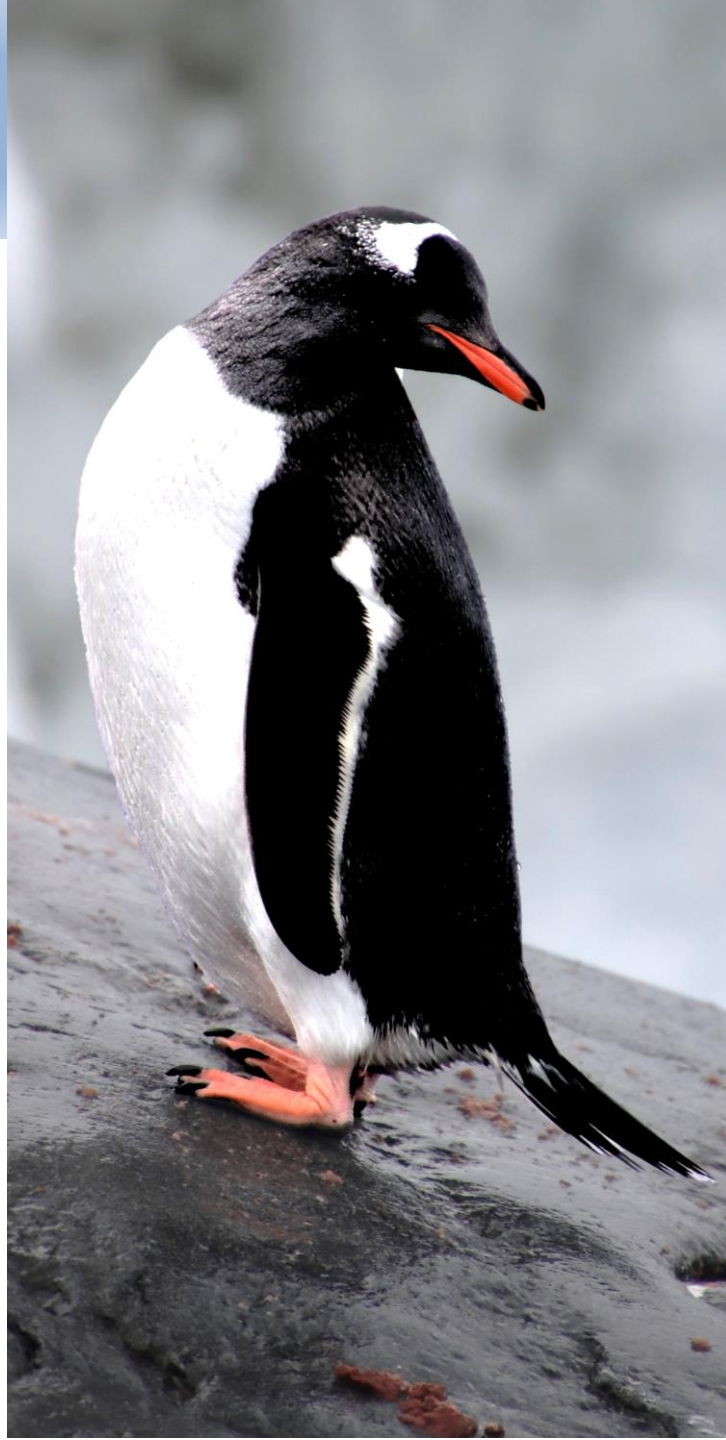
- Practice: this is tough!



Adequacy

- Practice: Make protected areas large, and cover lots of the distribution of each species or ecosystem

- How much is ‘lots’? We don’t know, but more is generally better



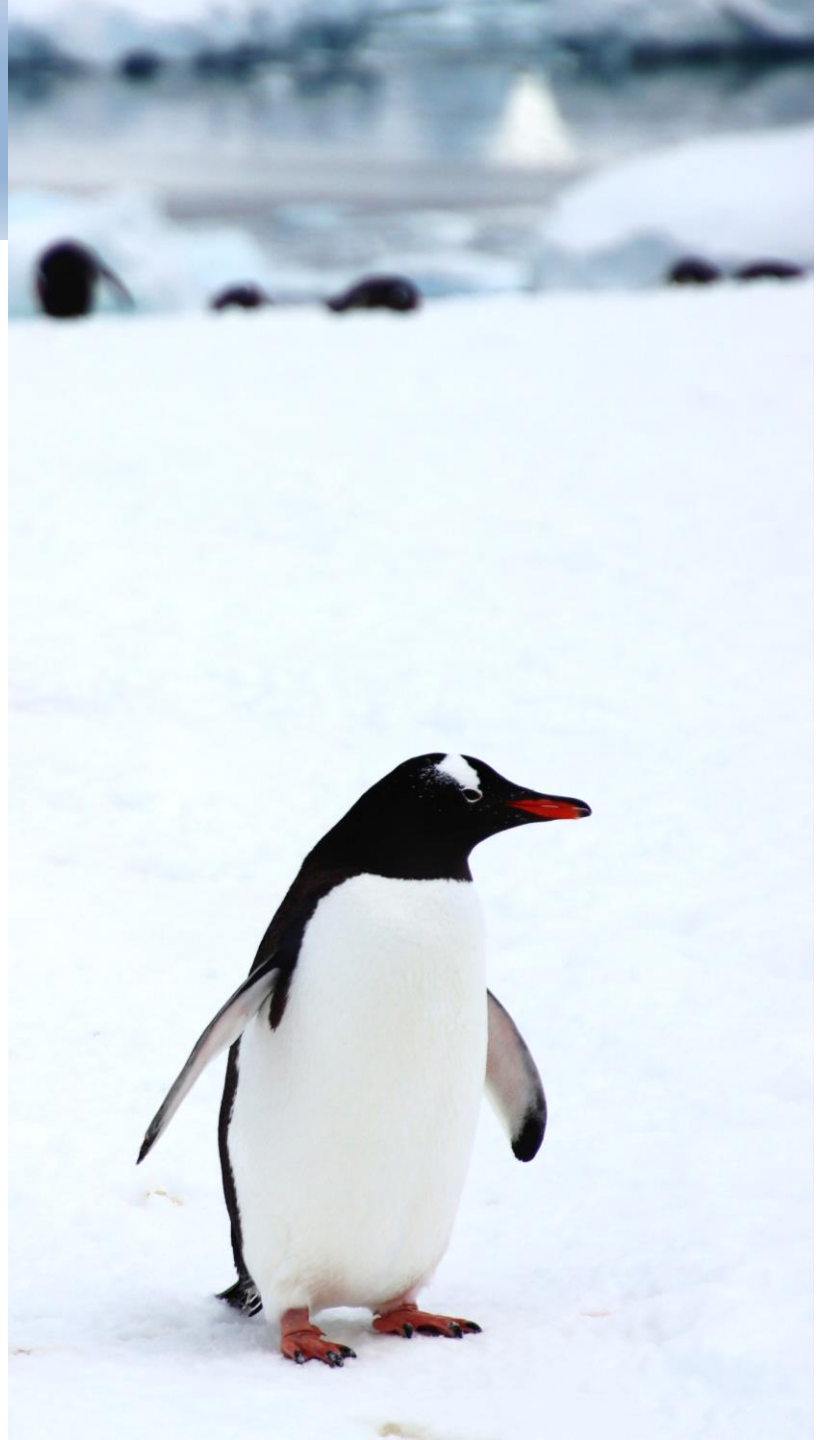
Adequacy

- Determine required connectivity and spatial configuration (minumum patch size)
- Population viability analysis = probabilities of persistence (risk) and minimum viable population
- Metapopulation models (local extinction and colonisation of habitat patches): links landscape pattern and species viability
- Trade-offs between species

Representative

- Principle: Protect the full range of variation within each species or ecosystem

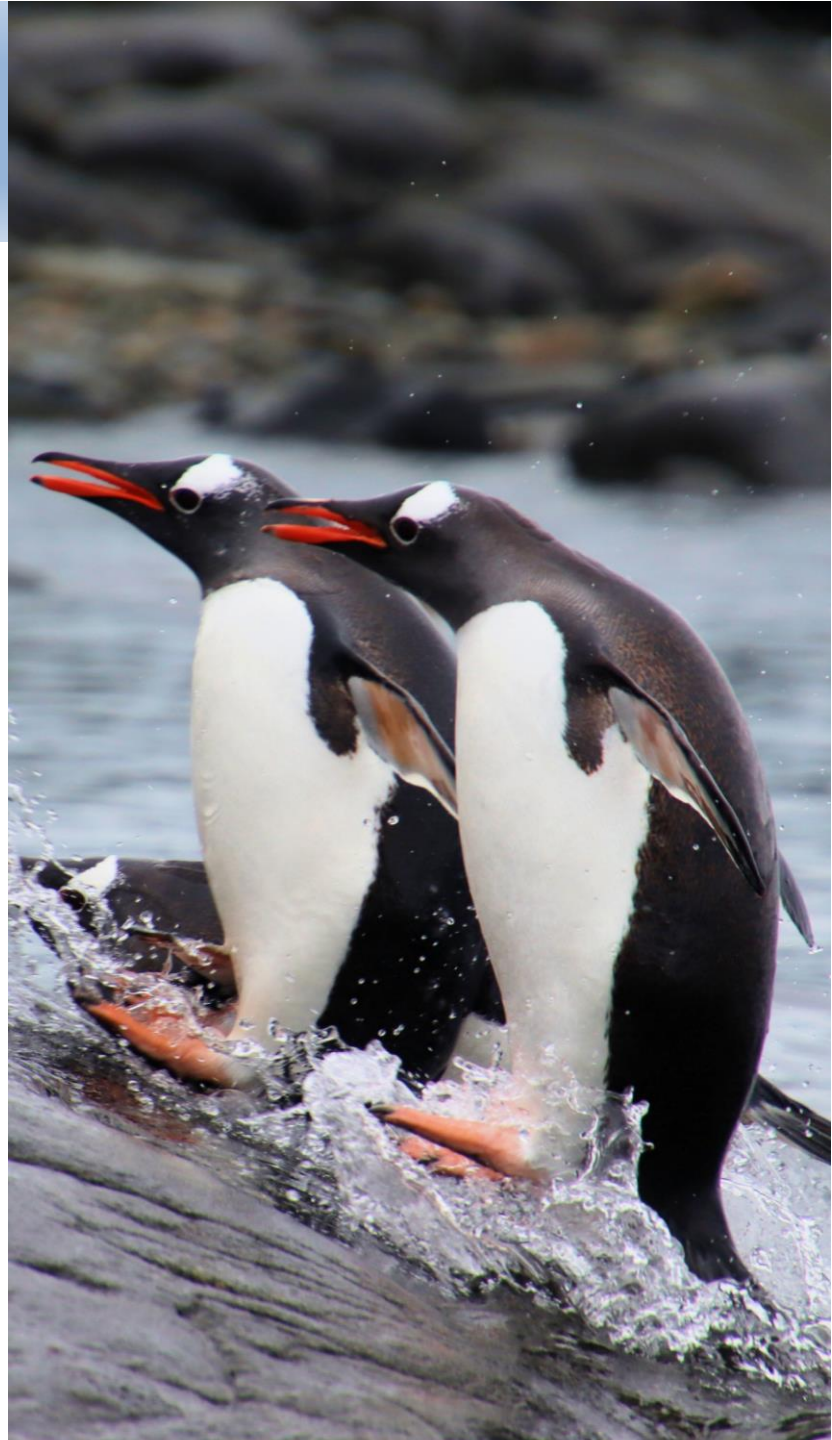
- For example, protect a particular vegetation type at a range of altitudes, represent genetic variation across a species



Efficiency

- Principle: do all of the above for the least cost

- Practice, minimise
  - Acquisition cost
  - Management cost
  - Social cost



How to get an efficient, comprehensive system of conservation areas

- The minimum set problem: Minimise the cost of the system of conservation areas, subject to the constraints that all targets are met
- The maximum coverage problem: Protect as much biodiversity as possible given a fixed budget
- The key is **good problem formulation**

Integer linear programming (ILP) formulation – minimum set problem

Minimise $\sum_{j=1}^{n} x_j c_j$

Subject to $\sum_{j=1}^{n} a_{ij} x_j \geq 1$ $i = 1, \ldots$

 if the site is conserved

$a_{ij} = 1$ if species *i* occurs in site *j*

C_j = the cost of planning unit I

Spatial problems

- There is more to the cost of a protected area system than its area
- Boundary length and shape can be important
- We can introduce rules about minimising boundary length (edge effects), ensuring there is a minimal size (adequacy), in addition to minimising the cost of land, forgone development opportunities etc

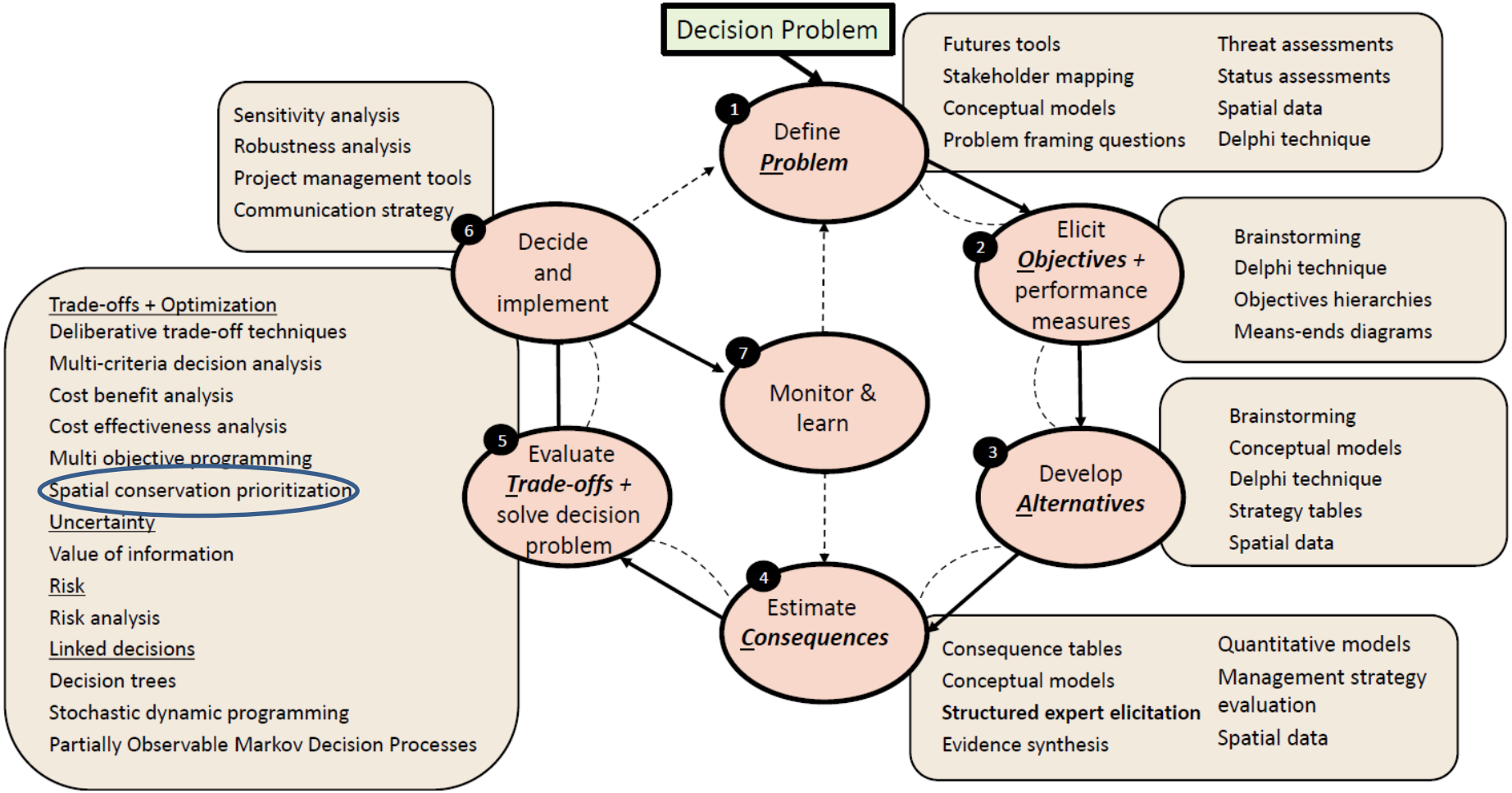
Flexibility

- Conservation plans need to be socially and politically feasible
- **Irreplaceability:**

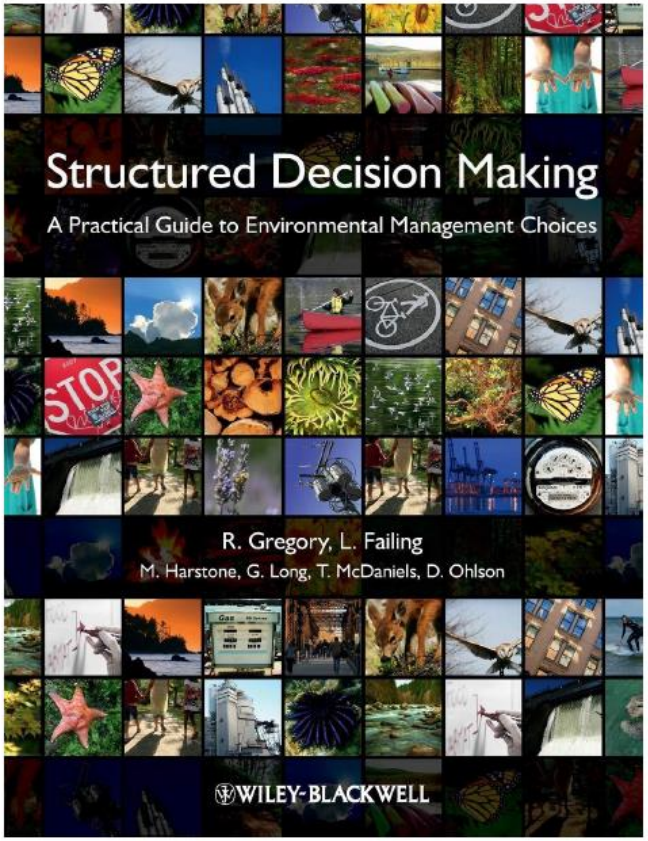
  High: a particular site is essential to meet conservation objectives

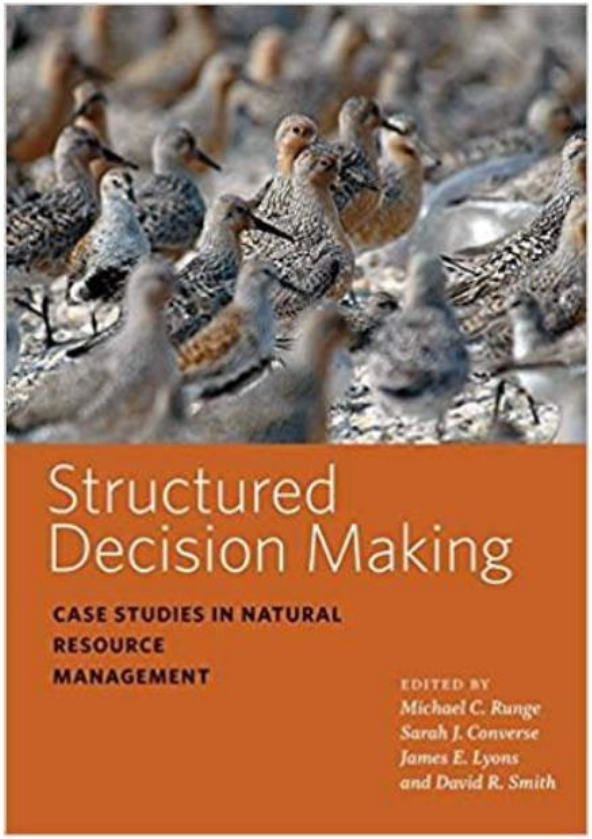
  Low: a particular site can be substituted with another

Decision Support Tools



How do we better inform decisions by accounting for al uncertainties, values and perspectives of diverse decision-makers, titleholders and stakeholders?





Key messages

- Systematic conservation planning aims to provide a repeatable, transparent and equitable process for supporting conservation decisions.
- Core principles of systematic conservation planning are: comprehensive, adequate, representative and efficient (CARE).
- Decision support tools can don't make decisions or come with perfect data

References

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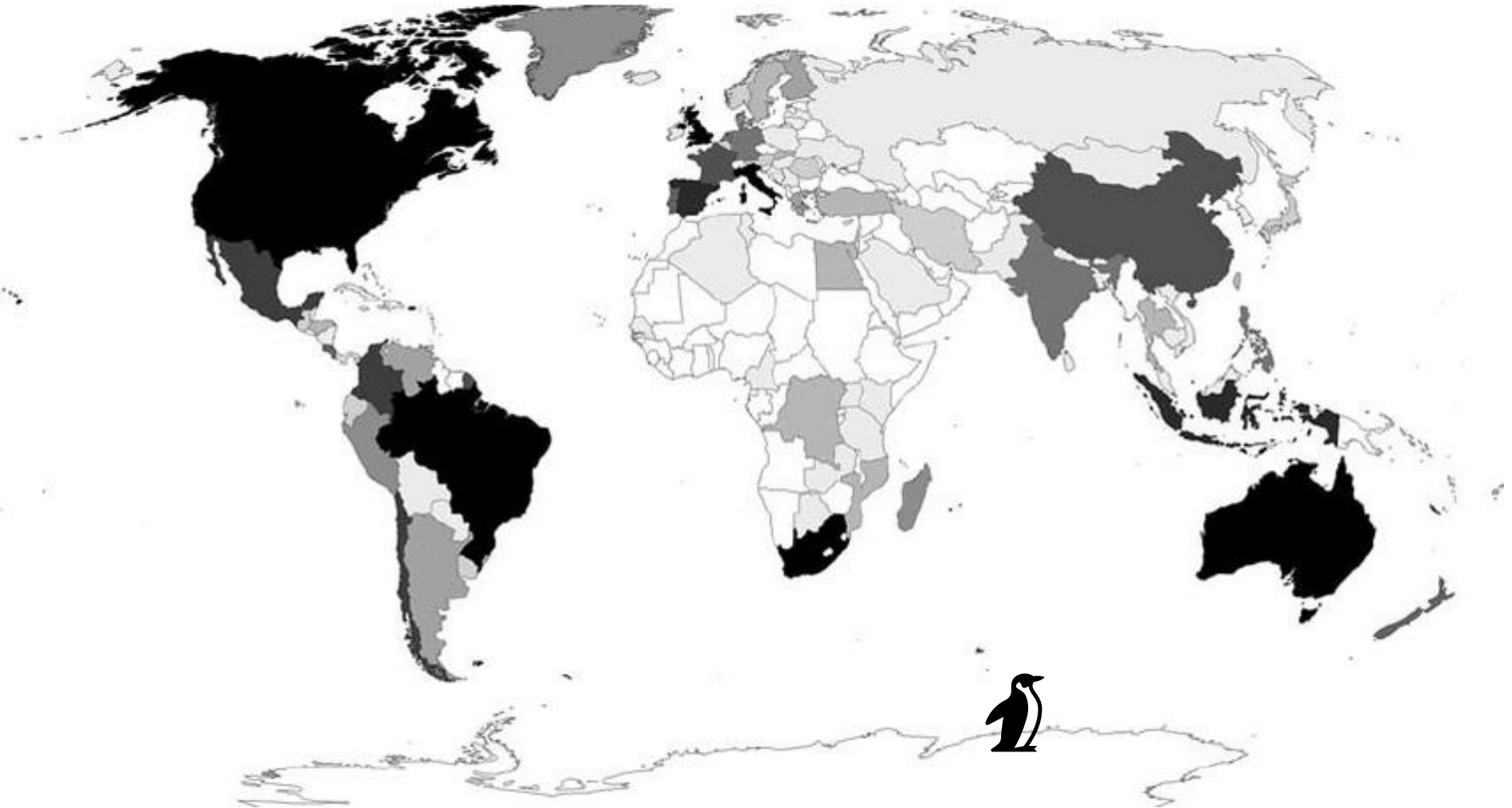
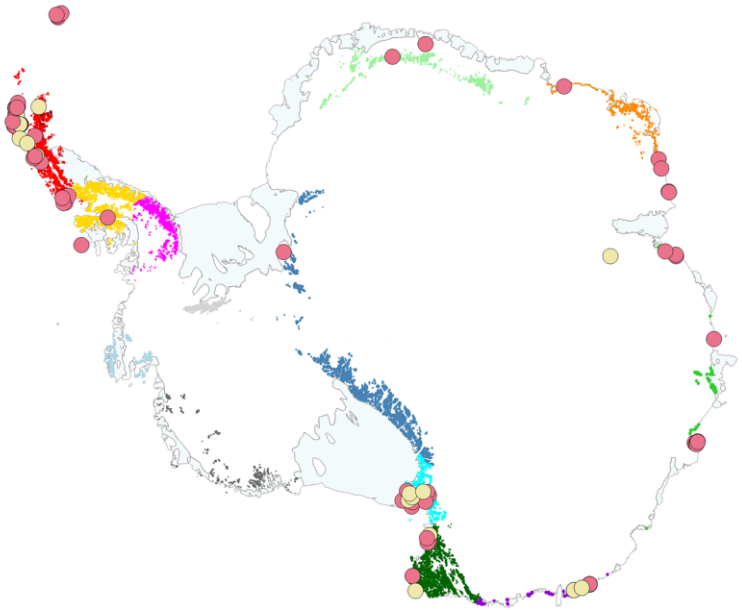
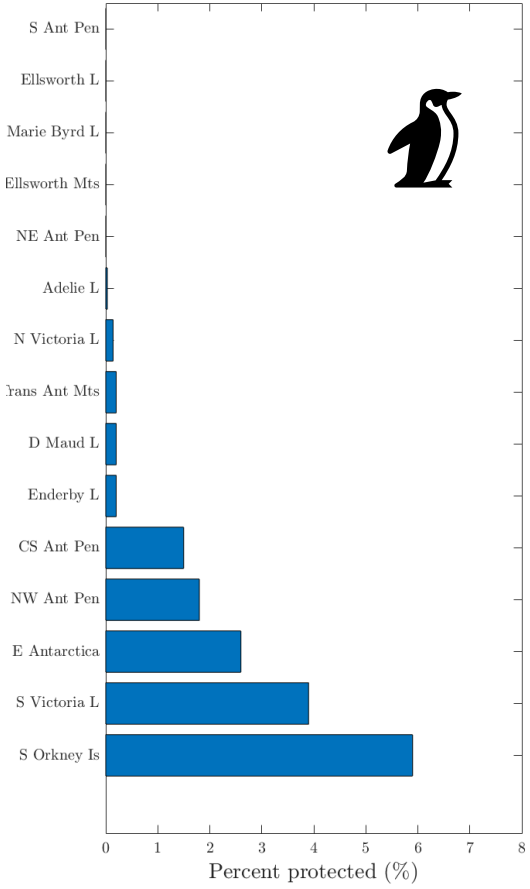
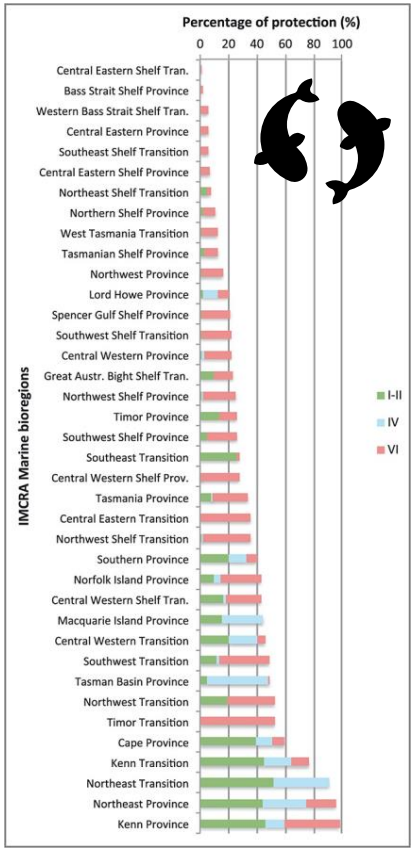
Worldwide reach



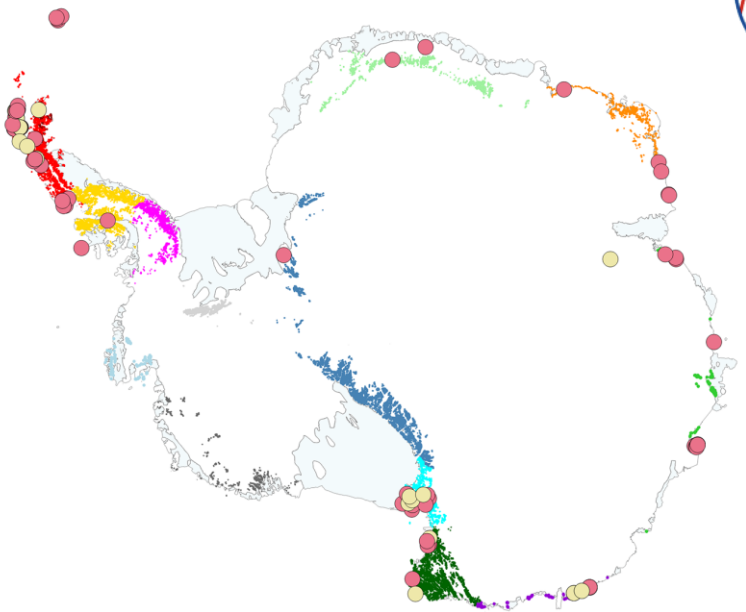
Antarctica’s protected areas







Planning for expansion



XLII Antarctic Treaty Consultative Meeting
Prague • Czech Republic • 2019

IP 134

ENG

Agenda Item: CEP 9e
Presented by: ASOC
Original: English
Submitted: 31/5/2019

IP 165

ENG

Agenda Item: CEP 9e
Presented by: Australia, Czech Republic, SCAR, United States
Original: English
Submitted: 29/6/2019

Systematic expansion of the Antarctic protected areas network

Recommendation 4:

That the CEP initiates a program of work involving close engagement with SCAR and other stakeholders (e.g. COMNAP, IAATO, ASOC), to develop a framework for systematically developing the protected area system (e.g. to identify goals/objectives, related science requirements, priorities for actions to be taken by the CEP and Parties, timeframe for action, measures to evaluate progress).

Boot up the laptop!

MARXAN
conservation solutions

mattwatts/**cplan**

C-Plan: The Conservation Planning System

1 Contributor 0 Issues 1 Star 0 Forks

ZONATION
Conservation planning software

prioritizr/
prioritizrdata

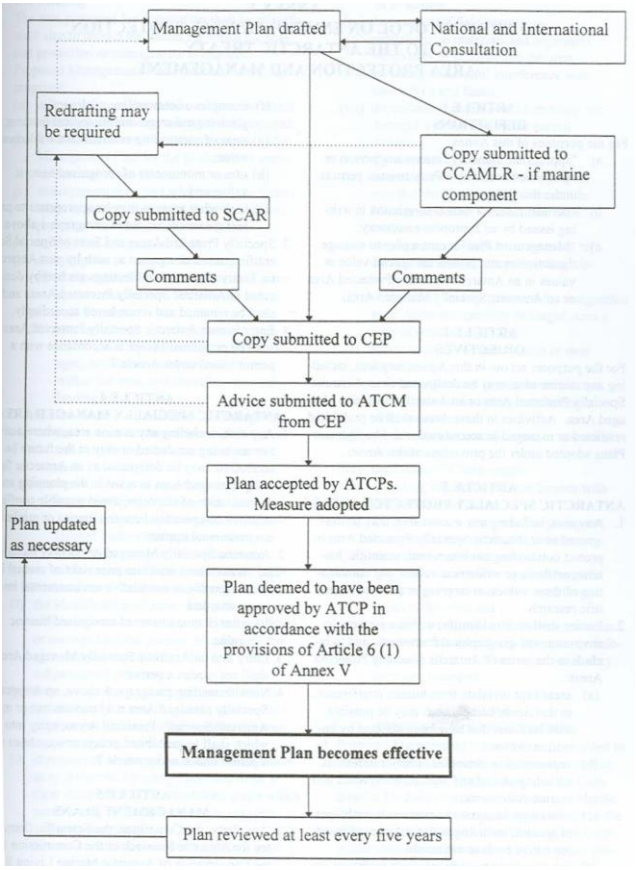
Conservation planning data sets

3 Contributors 0 Issues 1 Star 0 Forks

InVEST

integrated valuation of ecosystem services and tradeoffs

But wait …


Management Plan drafted
National and International Consultation
Redrafting may be required
Copy submitted to CCAMLR - if marine component
Copy submitted to SCAR
Comments
Comments
Copy submitted to CEP
Advice submitted to ATCM from CEP
Plan accepted by ATCPs. Measure adopted
Plan updated as necessary
Plan deemed to have been approved by ATCP in accordance with the provisions of Article 6 (1) of Annex V
Management Plan becomes effective
Plan reviewed at least every five years

But wait …


South Orkney Islands
Southern Shelf MPA
Weddell Sea MPA
Proposal (Phase 1)
Weddell Sea MPA
Proposal (Phase 2)
Antarctic Peninsula
MPA Proposal
East Antarctic
MPA Proposal
ANTARCTICA
Ross Sea
Region MPA
East Antarctic
MPA Proposal