Protected Areas Resilient to Climate Change, PARCC West Africa

2015

PARCC Project Training Manual
Module 6. Conservation Planning

ENGLISH

University of Kent

2015

The United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) is the specialist biodiversity assessment centre of the United Nations Environment Programme (UNEP), the world's foremost intergovernmental environmental organisation. The Centre has been in operation for over 30 years, combining scientific research with practical policy advice.

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Designing Protected Area networks and other conservation landscapes

Bob Smith

DICE University of Kent

In this workshop I will use protected area (PA) as shorthand for areas that are established to conserve their biodiversity.

However, a conservation land-use plan could include privately- and community-owned land, as well as formal PAs managed by the government. Land-use plans would also generally include designating land for the sustainable use of natural resources and biodiversity-friendly agricultural practices.

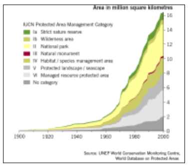
I will also focus on terrestrial conservation planning and land-use planning but the same methods can be applied to marine conservation.

An introduction to systematic conservation planning

Introduction

There has been a dramatic increase in the extent of the global coverage of protected areas (PAs).

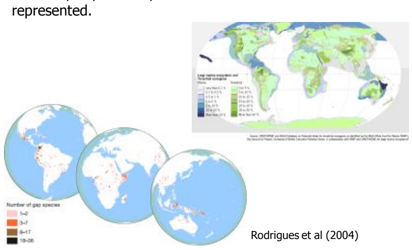
Protected Area networks now cover more than 12% of the terrestrial realm.



- Why do we need conservation land-use planning?
- What is systematic conservation planning?
- How should new areas be selected?
- The implementation crisis

Introduction

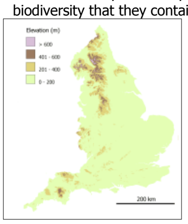
But many important species and habitats are under-represented.

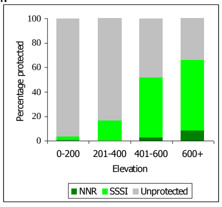


Rodrigues et al (2004)

Introduction

Most national protected area (PA) systems fail to represent their biodiversity and many PAs will fail to conserve the biodiversity that they contain.



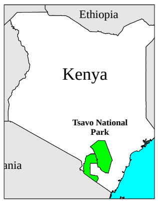


Oldfield et al (2003). Biological Conservation

Poor planning can also increase local community resentment by:

- Denying traditional access.
- Failing to incorporate information on resource use.
- Increasing human-wildlife conflict.

PAs are generally very unpopular with the people that are affected by them.



Many reserves were established to protect beautiful scenery and wilderness areas. Unfortunately, many of these areas have low levels of biodiversity.

In addition, PAs were located on "land that nobody wanted" and it was not uncommon for PAs to be de-gazetted if valuable resources were discovered within their boundaries.

So, many PAs fail to protect biodiversity and are found in areas that are least at risk of over-harvesting or habitat transformation.

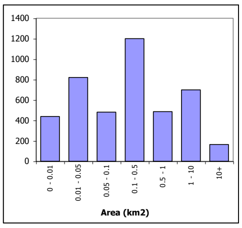
Based on this, it is now widely recognised that much of global biodiversity is threatened with extinction and so methods are needed to improve the conservation value of global PA systems.

Experts working in an area often have a great deal of knowledge about the biodiversity of a region and supplementing this with data collected in the field can be expensive.

For these reasons, it is common for a small group of experts to decide where to place PAs by drawing lines on maps.

In addition, poor planning has resulted in many PAs that are not viable and fail to maintain ecological processes.

For example, 80% of English PAs < 1 km^2. The smallest PA is the Sylvan House Barn in Gloucestershire that has an area of 45 m^2. It was established to protect the roost site for a group of lesser horseshoe bats.



Unfortunately, this has the following problems:

A) The PA systems tend to conserve areas that are favoured by one or two key people and lack general support.

B) They fail to set explicit targets and are easily derailed by lobbying from political or economic pressure groups.

C) It is difficult for people to incorporate a wide range of biodiversity and socio-economic data and so these exercises tend to focus on conserving a small number of biodiversity elements.

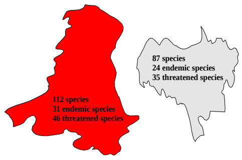
"A distinct advantage of the expert-driven approach is its incorporation of expert knowledge on biodiversity persistence and pragmatic management and implementation issues not normally included in biodiversity feature-site data matrices."

"Overall, the wishlist reflected a desire by managers to improve management efficiency and facilitate rapid implementation by expanding existing, largely montane reserves into low-priority areas where land tenure is sympathetic to conservation. Consequently, it was not very effective and efficient in achieving pattern and process targets, and it excluded large areas of vulnerable and inadequately conserved lowland habitat - the areas currently in most need of conservation action."

Cowling et al 2003 Biological Conservation **112**, 147-167

1) Scoring systems

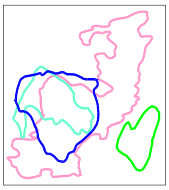
Rigorous scoring systems have been developed based on data collected on the biodiversity value of an area. Such systems also often included data on a range of physical, aesthetic, cultural and socio-economic factors.



Score = (1.5 * Species No.) + (2.4 * Endemic species No.)

Methods for identifying priority areas

1) Scoring systems

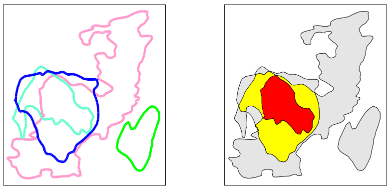


Two main systems have developed to identify where new PAs should be located or where existing PAs should be modified. These are based on the following concepts:

1) Scoring systems

2) Complementarity

1) Scoring systems



1) Scoring systems

Produce a list of important species and/or habitats

Identify sites that are important for conserving those features

JOINT NATURE CONSERVATION COMMITTEE

NATURA 2000

1) Scoring systems - disadvantages of scoring systems:

A) Inefficient

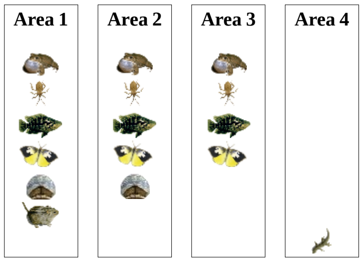
This is a significant problem as has been amply illustrated in the conservation planning literature.

1) Scoring systems - advantages of scoring systems:

A. They are simple to develop and adapt.

B. They do not rely on complicated computer software.

An example of a reserve selection exercise:

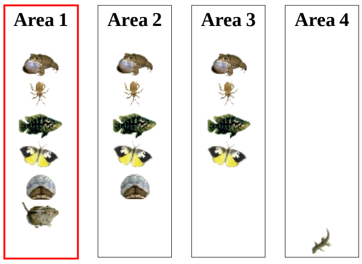


1) Scoring systems - disadvantages of scoring systems:

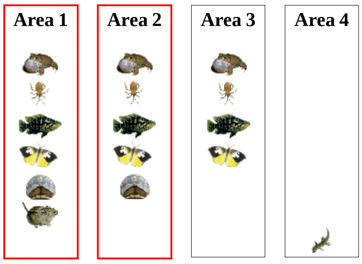
A. The areas they select are inefficient in representing biodiversity.

B. They fail to set explicit targets for each conservation feature, so might not effectively conserve the focal biodiversity elements.

An example of a reserve selection exercise:



An example of a reserve selection exercise:

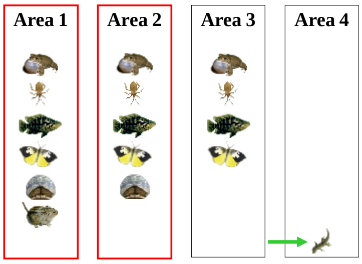


1) Scoring systems - disadvantages of scoring systems:

B) Fail to set explicit targets

The number of high-scoring sites that are conserved is rarely set to ensure the long-term persistence of the focal taxa. This means that political or economic factors may influence which sites are selected and the final system may be ineffective.

An example of a reserve selection exercise:



1) Scoring systems - disadvantages of scoring systems:

B) Fail to set explicit targets

The number of high-scoring sites that are conserved is rarely set to ensure the long-term persistence of the focal taxa. This means that political or economic factors may influence which sites are selected and the final system may be ineffective.

1) Scoring systems

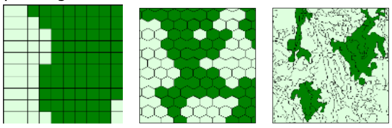
Particular problem with regional-scale conservation assessments

Systematic conservation planning

1. Spatially explicit
2. Ensures representation and persistence
3. Target driven
4. Based on the concept of complementarity
5. Minimises conflict with other land-users

Spatially explicit

Systematic conservation planning involves dividing the planning region into a number of different planning units.



ALL of the data in the conservation planning system must then be related to these planning units.

Based on the concept of complementarity

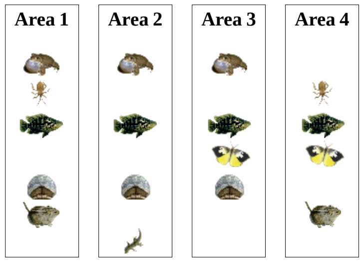
Complementarity is the concept of choosing planning units to maximise the amount of biodiversity that is protected when combined.

Ensures representation and persistence

Aims to represent all biodiversity (species, habitats, ecological processes etc) but has to rely on surrogates.

Aims to conserve viable populations of each species and to maintain ecosystem function.

An example of a reserve selection exercise:



Target driven

Systematic conservation planning involves setting explicit, quantitative targets for each conservation feature in the planning system.

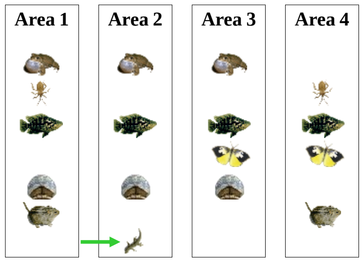
E.g. 124 km^2 of *Acacia tortilis* woodland

3 populations of at least 25 black rhinos

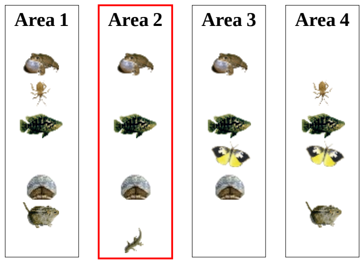
1 sand dispersal corridor

These targets need to be based on the best available research and should ensure the long-term persistence. The process is designed to avoid political derailment.

An example of a reserve selection exercise:

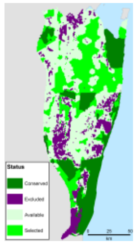


An example of a reserve selection exercise:

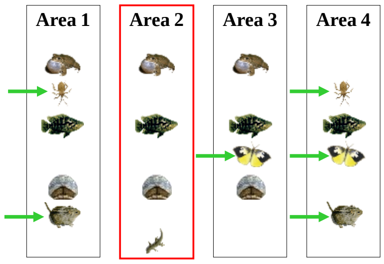


Based on the concept of complementarity

An initial problem with complementarity-based analyses was that the results only showed planning as either belonging or not belonging to the proposed PA system.



An example of a reserve selection exercise:



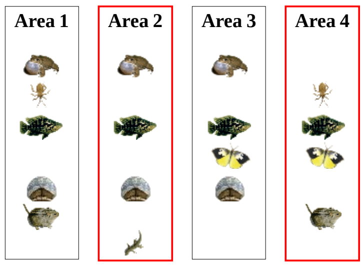
Irreplaceability

So a new idea was developed called irreplaceability. This gives a score to each planning unit based on the extent to which a planning unit could be swapped for another.

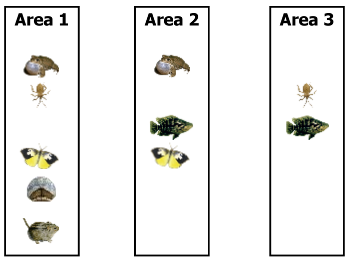
Irreplaceable units are always needed to meet the targets.

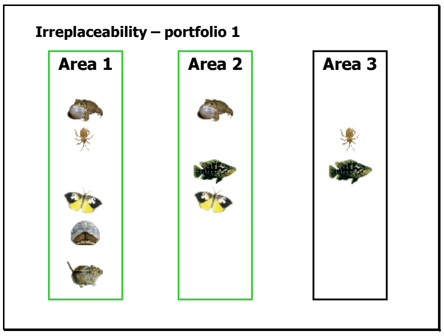
Units will low irreplaceability scores are still often needed to meet the targets. Their low score just means that there are many other units that contain the same biodiversity.

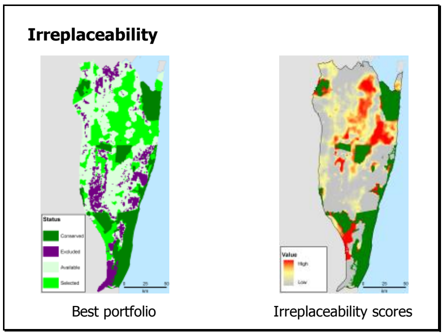
An example of a reserve selection exercise:

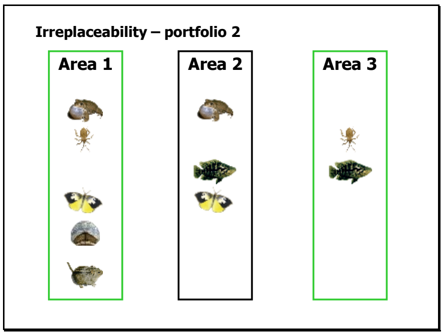


Irreplaceability







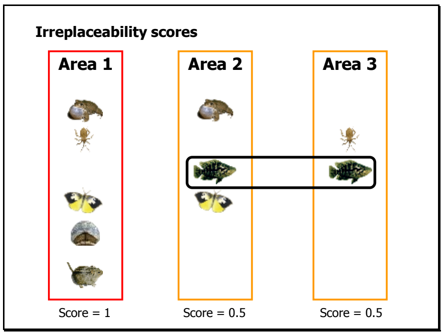


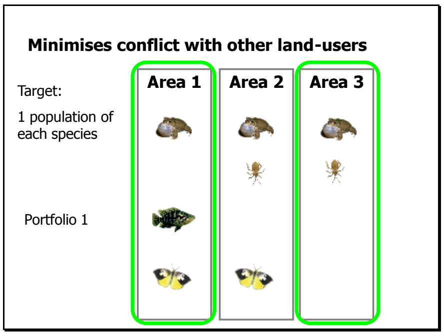
Minimises conflict with other land-users

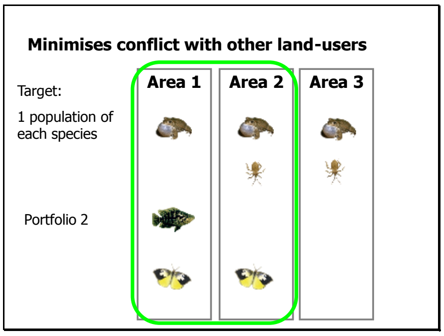
Each planning unit can be given a value based on its value for other land-uses or its risk of being cleared for agriculture or development.

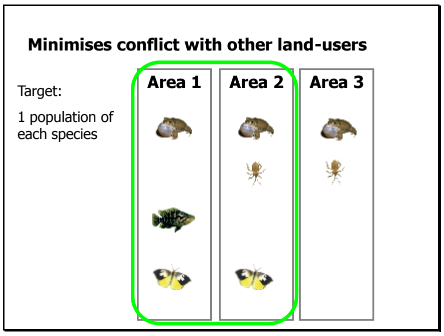
Software then identifies conservation landscapes that meet the targets, whilst minimising the conflict with other user groups.

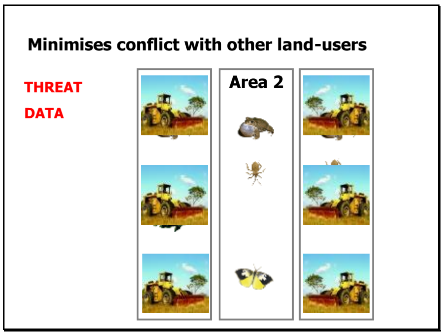
The opportunity and constraint data is included at the beginning of the process.

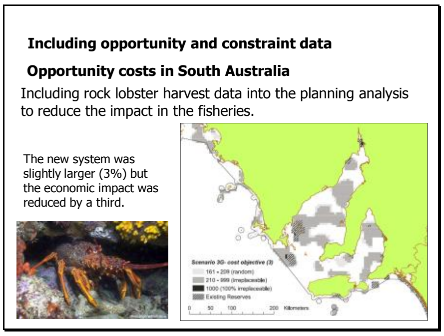


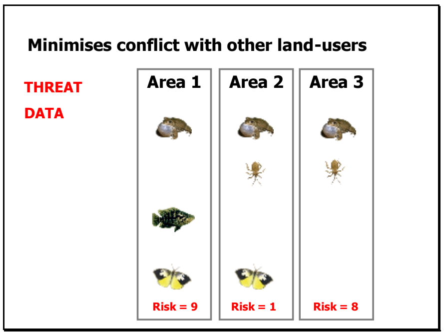


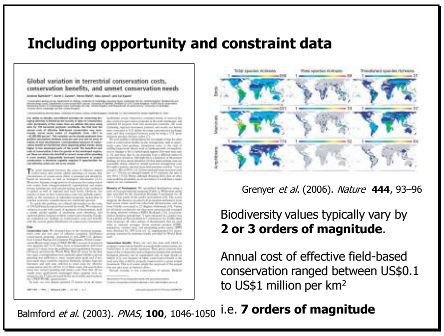

Minimises conflict with other land-users
Target:
1 population of each species
Portfolio 2
Area 1
Area 2
Area 3


Minimises conflict with other land-users
Target:
1 population of each species
Area 1
Area 2
Area 3

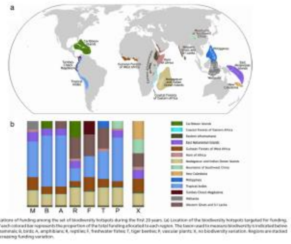

Minimises conflict with other land-users
THREAT
DATA
Area 2


Including opportunity and constraint data
Opportunity costs in South Australia
Including rock lobster harvest data into the planning analysis to reduce the impact in the fisheries.
The new system was slightly larger (3%) but the economic impact was reduced by a third.


Minimises conflict with other land-users
THREAT
DATA
Area 1
Area 2
Area 3
Risk = 9
Risk = 1
Risk = 8


Including opportunity and constraint data
Grenyer et al. (2006). Nature 444, 93–96
Biodiversity values typically vary by 2 or 3 orders of magnitude.
Annual cost of effective field-based conservation ranged between US$0.1 to US$1 million per km²
Balmford et al. (2003). PNAS, 100, 1046-1050
i.e. 7 orders of magnitude

Including opportunity and constraint data



Bode et al (2008) PNAS

The implementation crisis

Suggested stages in systematic conservation planning

1) Identifying and involving key stakeholders
2) Identifying broad goals for conservation planning
3) Gathering and evaluating data
4) Formulating targets for biodiversity features
5) Reviewing target achievement in existing conservation areas
6) Selecting additional conservation areas
7) Implementing conservation action in selected areas
8) Maintaining and monitoring established conservation areas

Pressey et al. (2003)

The implementation crisis

Most conservation planning exercises produce results that are ignored by implementation agencies. This has been termed the "*implementation crisis*" (Knight et al., 2006). This has led to some new definitions that help clarify the process:

A **social assessment** is a short-term activity for understanding the social context and helping to develop an implementation framework

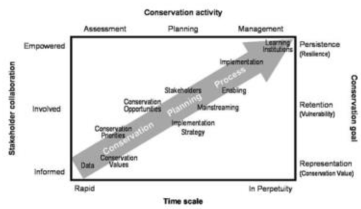
A **conservation assessment** is a short-term activity for identifying spatially-explicit priority areas for conservation action

Conservation planning is as a long-term process which involves a conservation assessment with a process for developing an implementation strategy with relevant stakeholders.

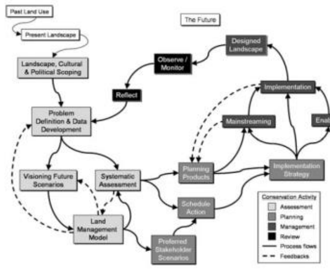
The practicalities of running systematic conservation planning exercises involve:

1) Dividing the planning region into a number of units.
2) Listing the abundance of each conservation feature in each planning unit.
3) Setting representation targets for each conservation feature.
4) Assigning a cost value for each planning unit
5) Measuring the effectiveness of the present PA system
6) Using computer software to identify new planning units to be incorporated into the system based on complementarity.

The implementation crisis



The implementation crisis



Conservation agencies and priority setting

National and international academic scientists need to play a key role in filling capacity gaps:

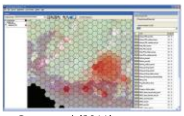
Expertise

Training

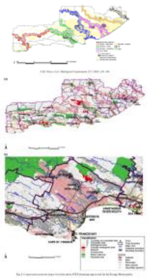
Institutional memory

Accessing funds

Conservation agencies and priority setting



Game et al (2011).
Conservation Letters



Conservation agencies and priority setting

We need social learning institutions to help inform priority setting.

Brings together conservation agencies, NGOs and academics.

Funding should be given directly to these institutions, with appropriate oversight.

Will help produce more interesting and relevant research.

Conservation agencies and priority setting

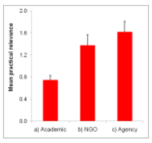
How useful are published prioritisation exercises?

☑ Range of biodiversity data	1 point
☑ Incorporated implementation or opportunity costs	1 point
☑ Fine-scale maps	1 point
TOTAL =	**0 to 3 points**

a) Academic

b) NGO

c) Conservation agency



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