

# Overview of Marxan functionality

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THE UNIVERSITY  
OF QUEENSLAND  
AUSTRALIA

αεδα

Applied Environmental Decision Analysis Commonwealth  
Environmental Research Facility

# Marxan developments

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- Free GIS decision support
- Optimised Marxan
- Multiple use zoning
- Probabilistic treatment of threats
- Probabilistic treatment of species
- Cluster analysis
- Asymmetric connectivity
- Teaching and learning

# Free GIS decision support

## Zonae Cogito;

- Decision support system using a free geographic information system
- Interactive conservation planning system
- Systematic conservation planning software for the developing world
- Adaptive calibration of scenarios



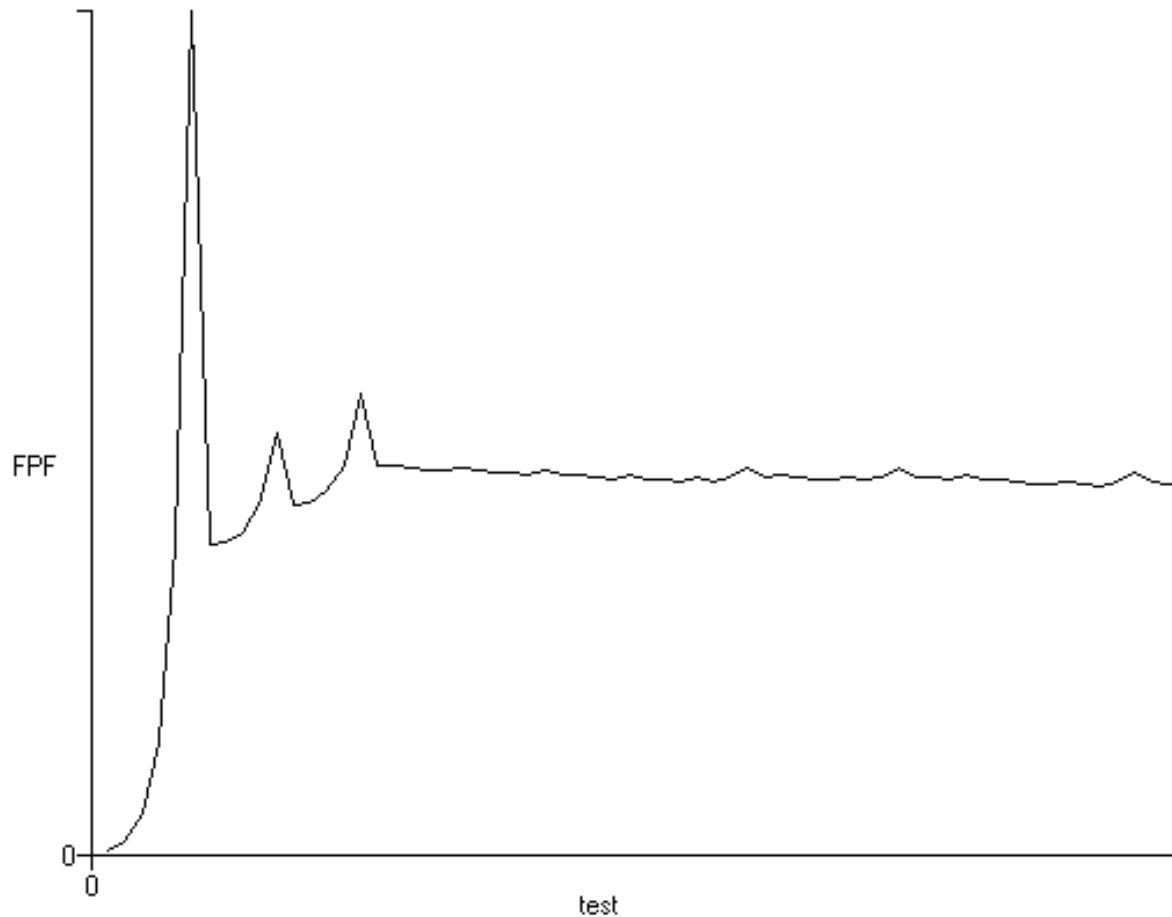
**Natural Heritage Trust**

*Helping Communities Helping Australia*

An Australian Government Initiative

# Free GIS decision support

- Adaptive calibration of penalty factors



# Free GIS decision support

- MapWindow open source GIS
- Flexible, powerful, adaptable, extensible, FREE!
- An ideal GIS platform for free EBM tools

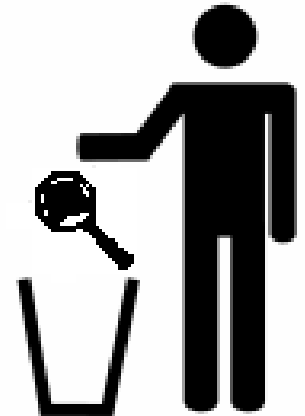


[www.mapwindow.com](http://www.mapwindow.com)

# Free GIS decision support

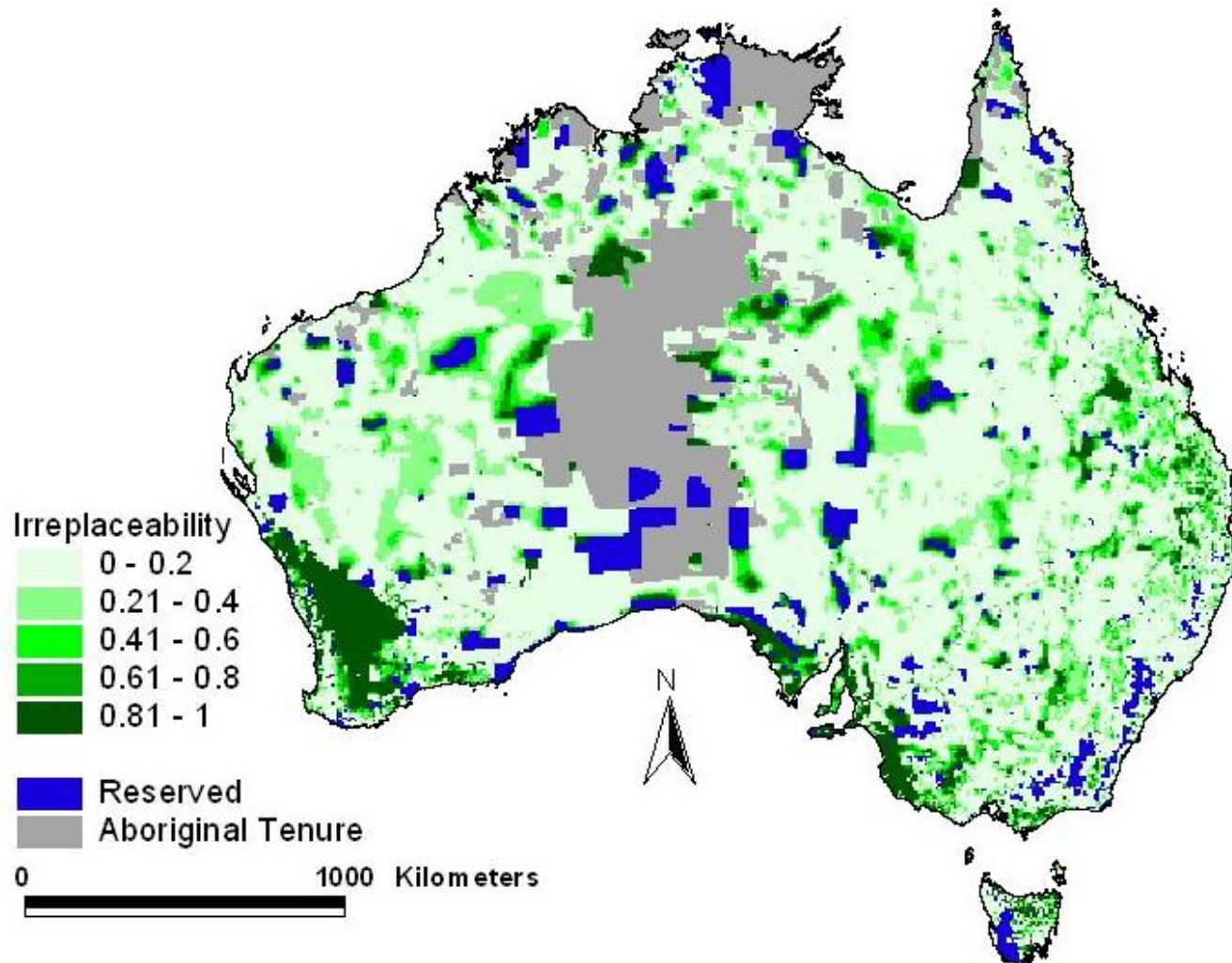
[opensourcegis.org](http://opensourcegis.org)

- 247 projects listed and counting!
- Global communities of tool developers and users



# Optimised Marxan

- 30 times more data, 12 times faster



# Multiple use zoning

Marxan with zones;

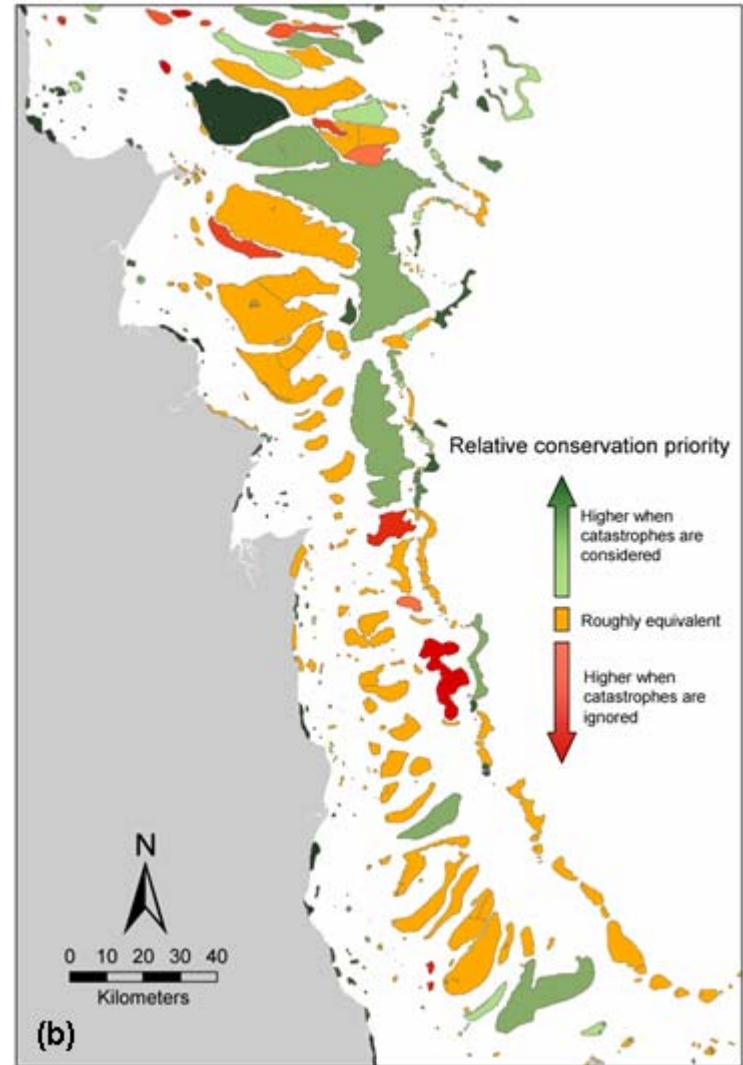
- The spectrum of human uses
- Economic, social and ecological constraints and objectives



ecotrust

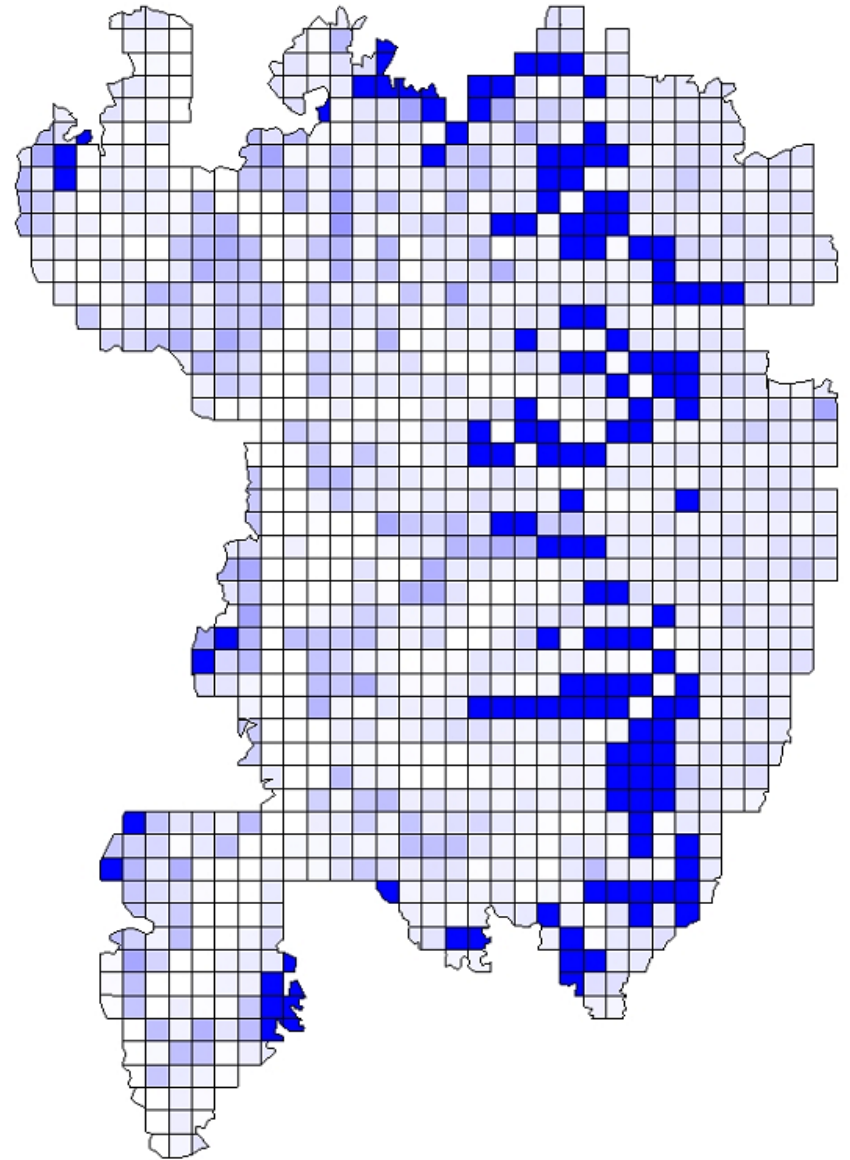
# Probabilistic treatment of threats

Increase the resilience of protected area networks



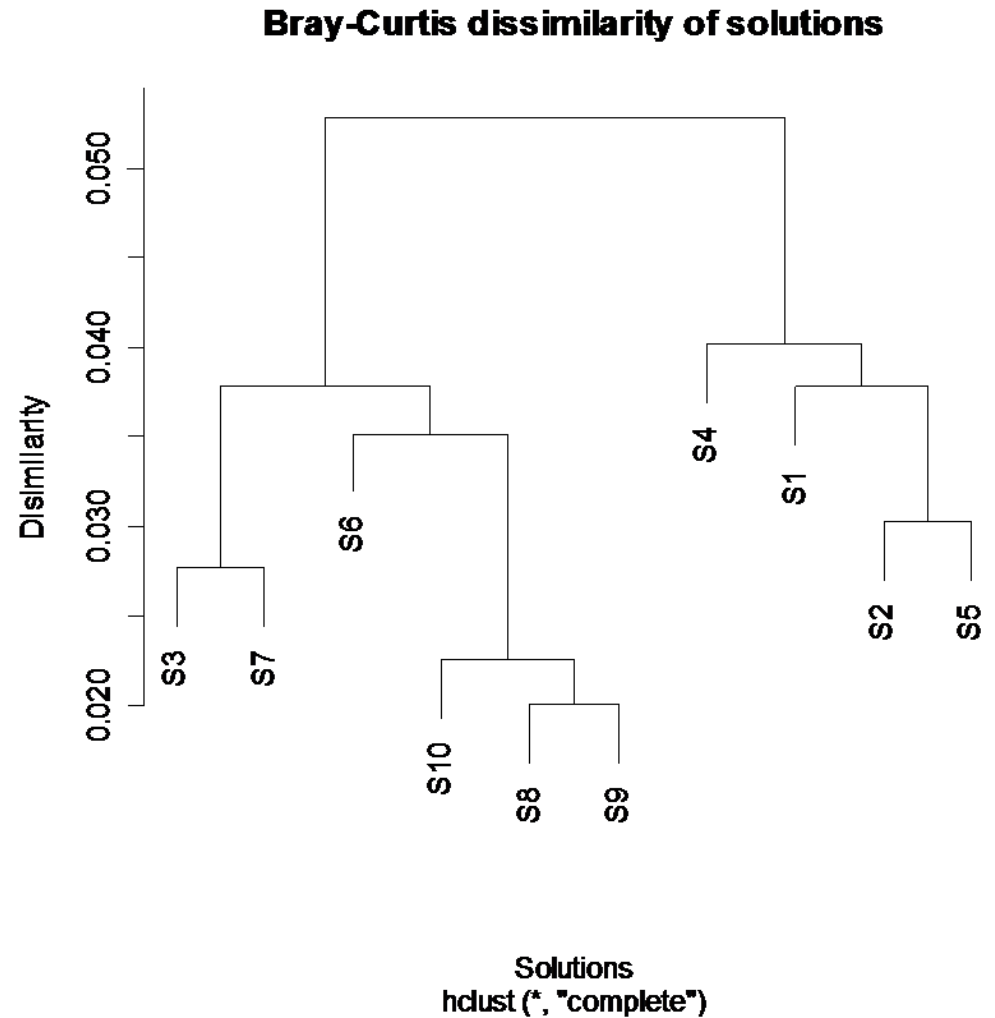
# Probabilistic treatment of species

Maximise the probability  
of the reserve network  
capturing species  
objectives



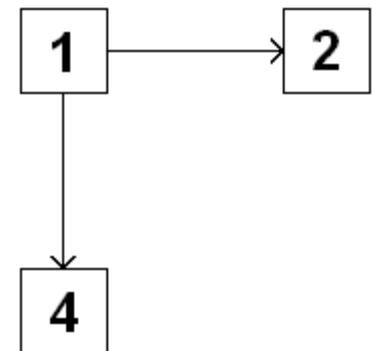
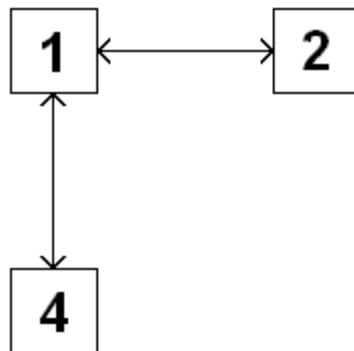
# Cluster analysis

- Similarity of reserve networks
- Find the most dissimilar networks



# Asymmetric connectivity

- Propagule dispersal occurs in one direction
- Marxan reduces the connectivity penalty by generating connected networks



# Teaching and learning

- Marxan courses; introduction, advanced, custom
- Redesigned web site
- Email list

[www.uq.edu.au/marxan](http://www.uq.edu.au/marxan)

# Acknowledgements

- Australian Department of Environment and Heritage
- Australian Natural Heritage Trust
- EcoTrust
- New Zealand Department of Conservation
- Ontario Ministry of Natural Resources
- The Nature Conservancy
- University of California
- University of Queensland



# Demonstration

## Rottnest Island Marine Park Scenarios

- 1) spatial clustering
- 2) targets and the reserve systems
- 3) Existing reserves and exclusions
- 4) Multiple use zoning: Combining economic and conservation objectives
- 5) Multiple use zoning: Zone targets

# Demonstration

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## Rottnest Island Marine Park Scenario 1

- Cluster analysis in R

# Demonstration

## Central California Coast multiple use zoning scenarios

1d) Economic fisheries information

2d) Social fisheries information

3d) Targeting economic fisheries features in a feature zone