Study on the Establishment of a Marine Protected Area around the Îles de la Madeleine

Scientific Approach

UQAR

Organisation des Nations Unies pour l'éducation, la science et la culture
Chaire UNESCO en analyse intégrée des systèmes marins
Institut des sciences de la mer de Rimouski
Université du Québec à Rimouski (Canada)

CERMIM
Centre de recherche sur les milieux insulaires et maritimes
Affilié à l'UQAR

Study undertaken for

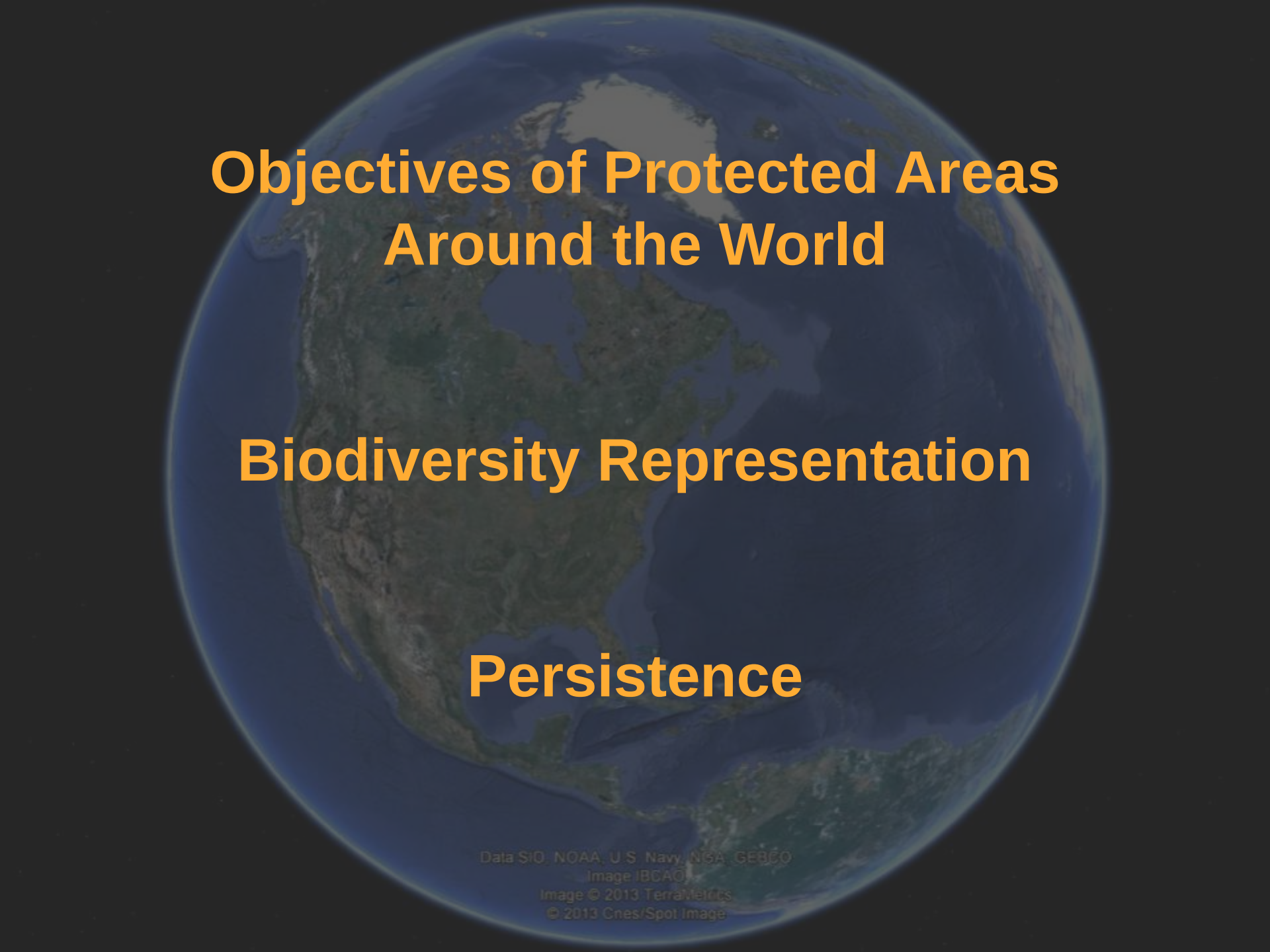
Parks Canada Parcs Canada

Développement durable, Environnement, Faune et Parcs
Québec

Scientific Approach

Ownership of Study

Comments and Suggestions



Objectives of Protected Areas Around the World

Biodiversity Representation

Persistence

History of Protected Area Designation

Biased sample of world biodiversity

Adapted from Ardron 2012

Systematic Conservation Planning

Identify, model and manage priority protected areas that represent the biodiversity of the regions concerned while taking into account local social, economic and cultural realities

Systematic Conservation Planning

1. Identify and involve ocean users
2. Identify goals and objectives
3. Compile data
4. Formulate conservation targets
5. Include existing protected sectors
6. Propose areas of interest and MPA scenarios
7. Carry out conservation actions
8. Maintain and manage

UQAR

Overlay of Uses and Attributes

Scenario – Boat Purchase

Fairly fast

Fairly comfortable

Fairly inexpensive

Fast Comfortable	Fast Inexpensive	Comfortable Inexpensive
		
~~Inexpensive~~	~~Comfortable~~	~~Fast~~

Adapted from Ardron 2012

Moral of the Story

Some problems are particularly difficult to solve

A single site is not likely to meet all the objectives

Decision support tools
can optimize the compromises

Adapted from Ardron 2012

Decision Support Tools

Multitude of **planning** tools for studying **problems** too complex for **human intuition** or **conventional approaches**

- Save time
- Work within established and recognized processes
- Reduce need for certain types of expertise
- Explore multiple options efficiently
- **Offer possible compromise options**

Adapted from Ardron 2012

Decision Support Tools

It is equally important to know what these planning tools **cannot** do:

- Provide a single answer to a question
- Eliminate the need for stakeholder interaction and collaboration
- Eliminate problems related to politics, mistrust, etc.
- Provide the data required for analyses
- Replace the need to conduct project-specific analyses

Adapted from Ardron 2012

Decision Support Tools

Marxan
Informing Conservation Decisions Globally

The University of Queensland
AUSTRALIA

Marxan is:

- Freely available software developed by the Ecology Centre at the University of Queensland in Australia

- **A spatially explicit** planning tool used to identify **groups of areas** that can satisfy **explicit objectives** as **efficiently** as possible, i.e., by **minimizing** the required space.

Marxan provides **near-optimal** solutions

Marxan

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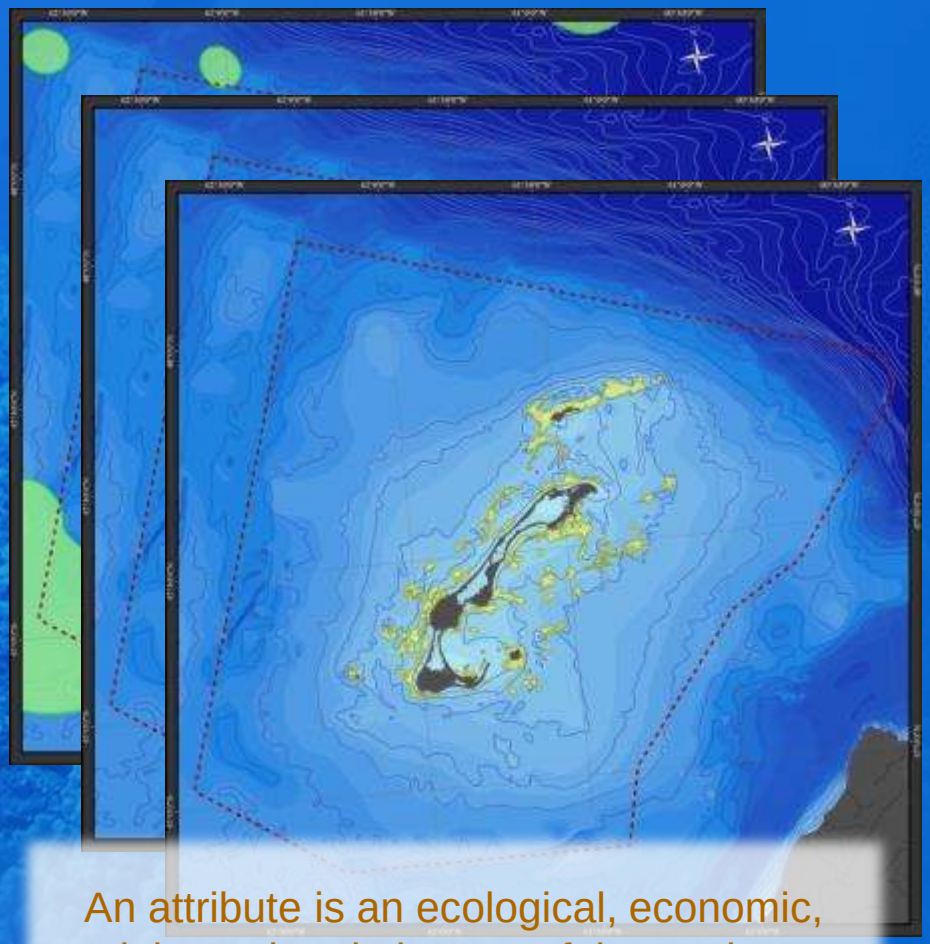
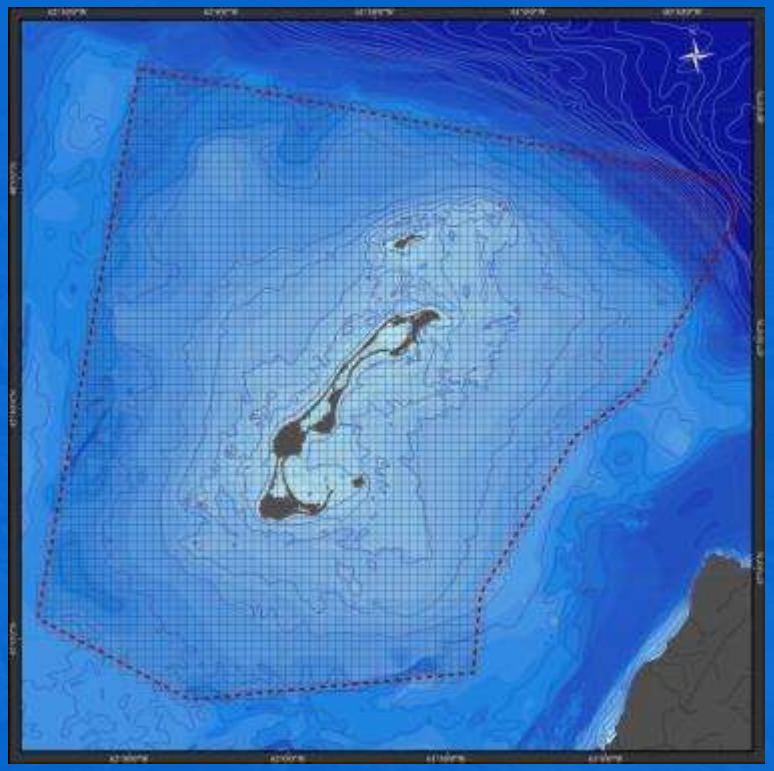
Attributes of region



Study grid



An attribute is an ecological, economic, social or cultural element of the study area

Each attribute is inserted into a grid which subdivides the study area

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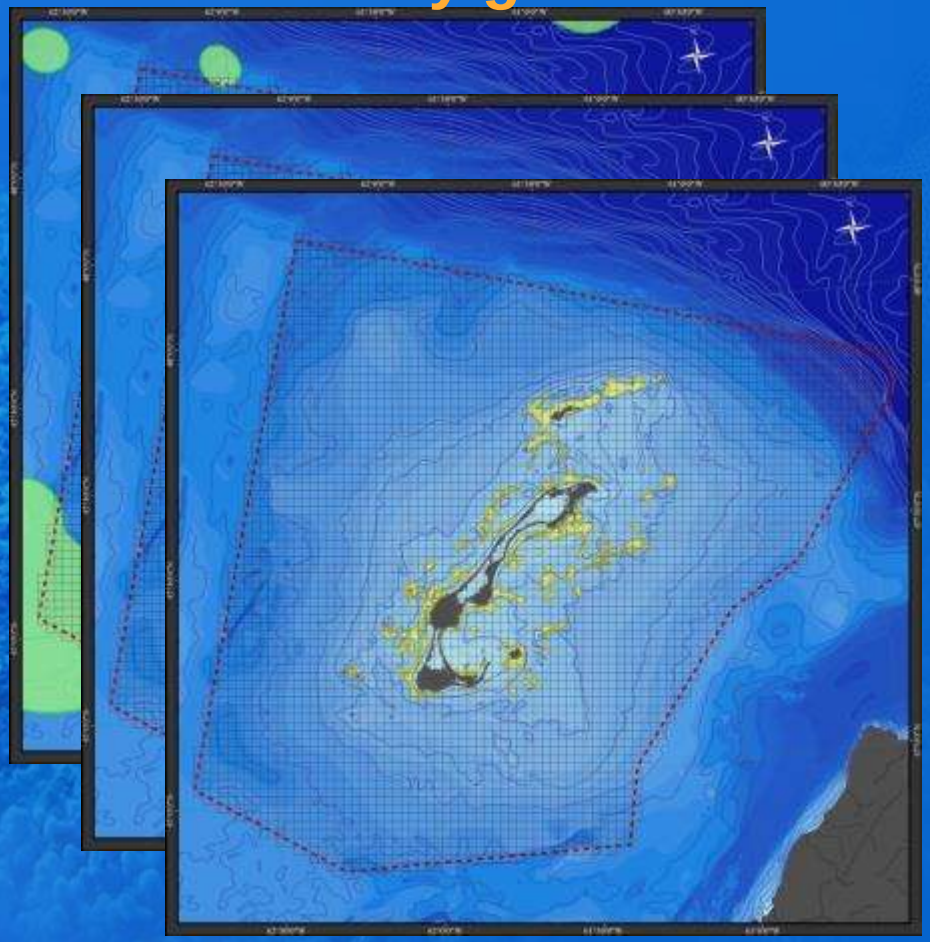
Data integrated into the study grid



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Individual targets

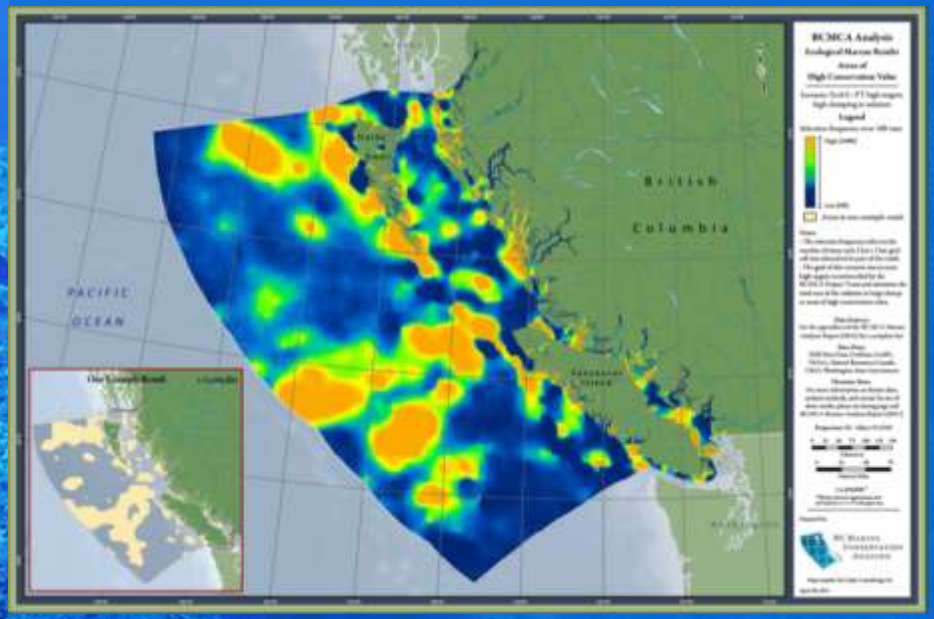
Attributes of study area	Targets
Attribute 1	30%
Attribute 2	10%
Attribute 3	25%

A conservation target is determined for each attribute within the study grid.

Examples of Areas of Interest

Ecological

Socio-economic



BCMCA – British Columbia Marine Conservation Analysis. 2012

The orange sectors correspond to important ecological and socio-economic areas of interest identified in British Columbia.

Decision Support Tools

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Why use Marxan?

- Internationally recognized
- Use of a large amount of data of various types
- Guided by explicit objectives and targets
- May be used at various stages in systematic conservation planning
- Efficient, transparent, reproducible
- Defensible

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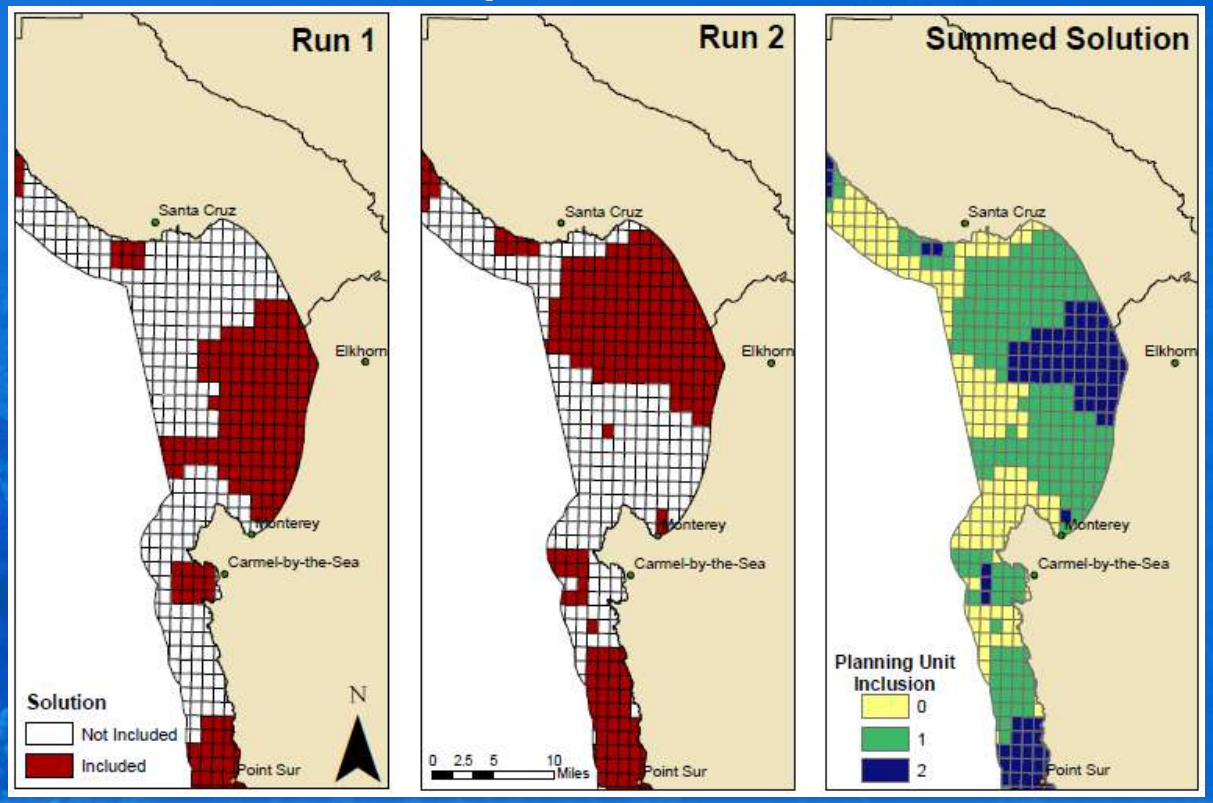
Optimization algorithm with iteration process

Several possible solutions



California's Central Coast Marine Protected Areas Projet, 2006

For a given scenario, each Marxan analysis is repeated several times (at least 100), which produces several good solutions. These solutions can be summed to identify which zones were selected most often.

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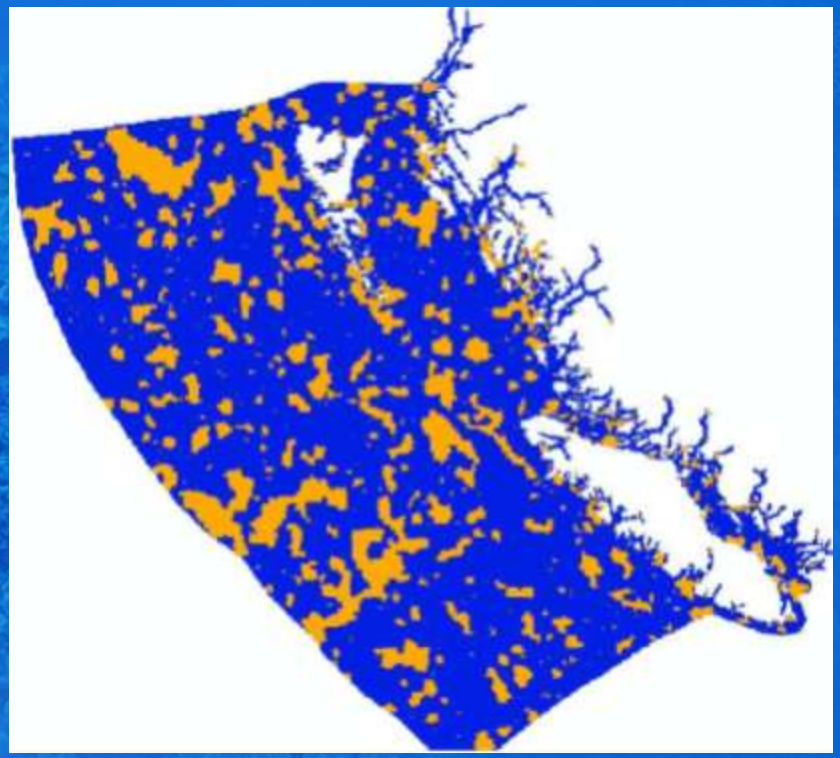
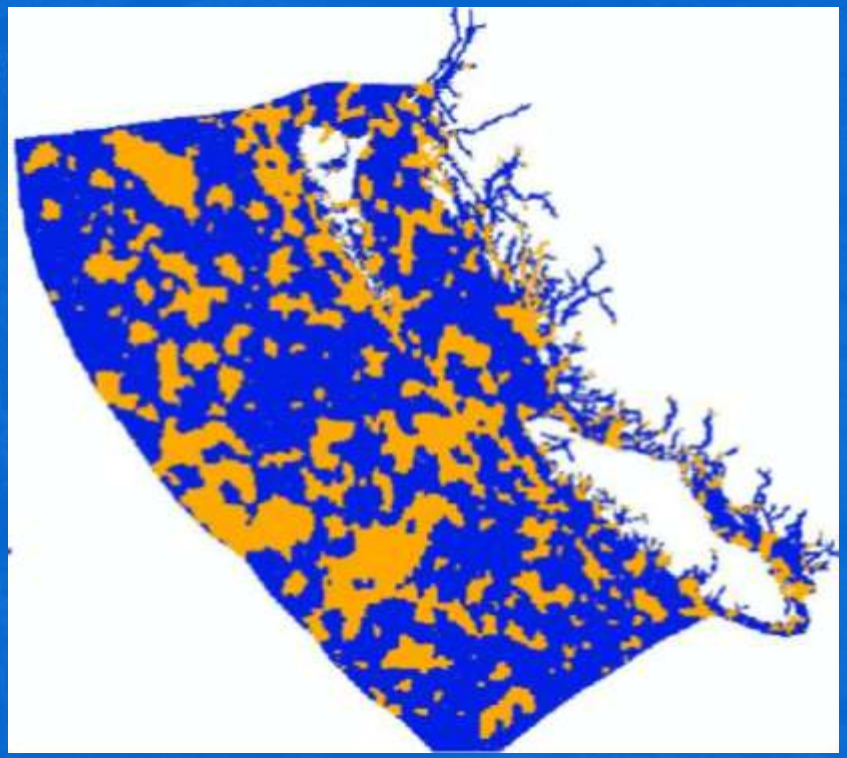
Flexibility of Analysis

Variation in targets

20%



30%



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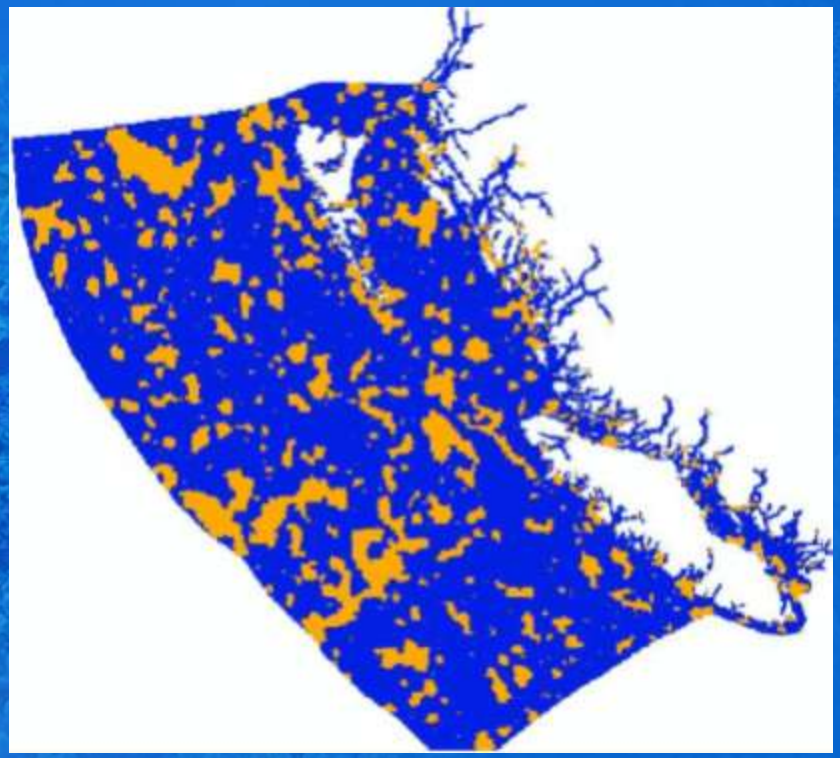
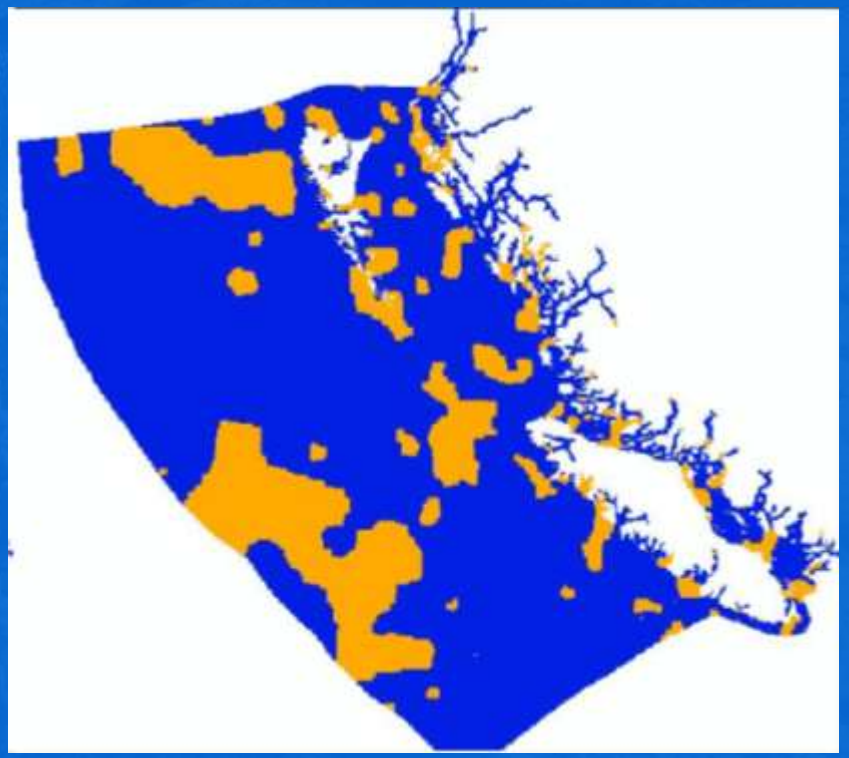
Flexibility of Analysis

Variation in the fragmentation index





BCMCA – British Columbia Marine Conservation Analysis. 2012

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For more information:

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

School of Biological Sciences
The Ecology Centre

http://www.uq.edu.au/marxan/

PacMARA

pacmara.org

Review of Results Obtained

Reminder:

Decision support tools **do not provide** answers to problems

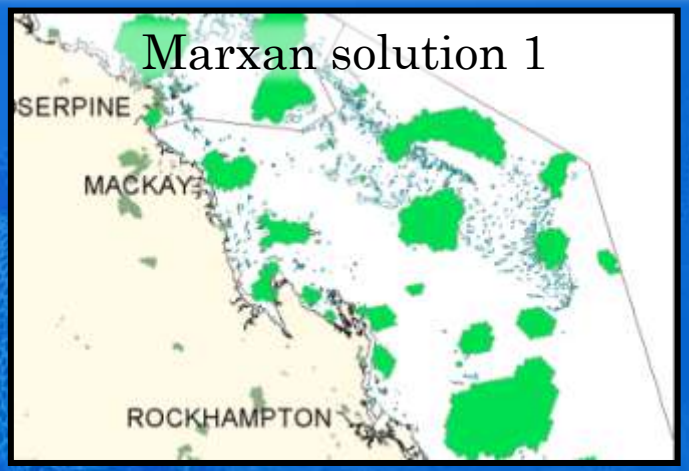
They generate near-optimal solutions limited by the quality of the data used

They solve problems that are much too complex for the human brain

Interpretation of solutions is not only possible, but necessary!

Review of Results Obtained

The results of a Marxan analysis do not provide a final answer. Rather, they present different solutions which achieve clear and quantifiable goals, thus facilitating the determination of a final solution.



Great Barrier Reef, Australia,
Adapted from Jon Day, GBRMP

Conclusion

- Why systematic conservation planning?
  - Systematic process
  - Explicit consideration of social, economic and cultural aspects of the area of interest
  - Transparent, open, reproducible, flexible, defensible
  - Decisions related to management and designation are based on robust and objective information (mapping)

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Thank you