MarZone and its Application to California's Marine Life Protection Act Initiative

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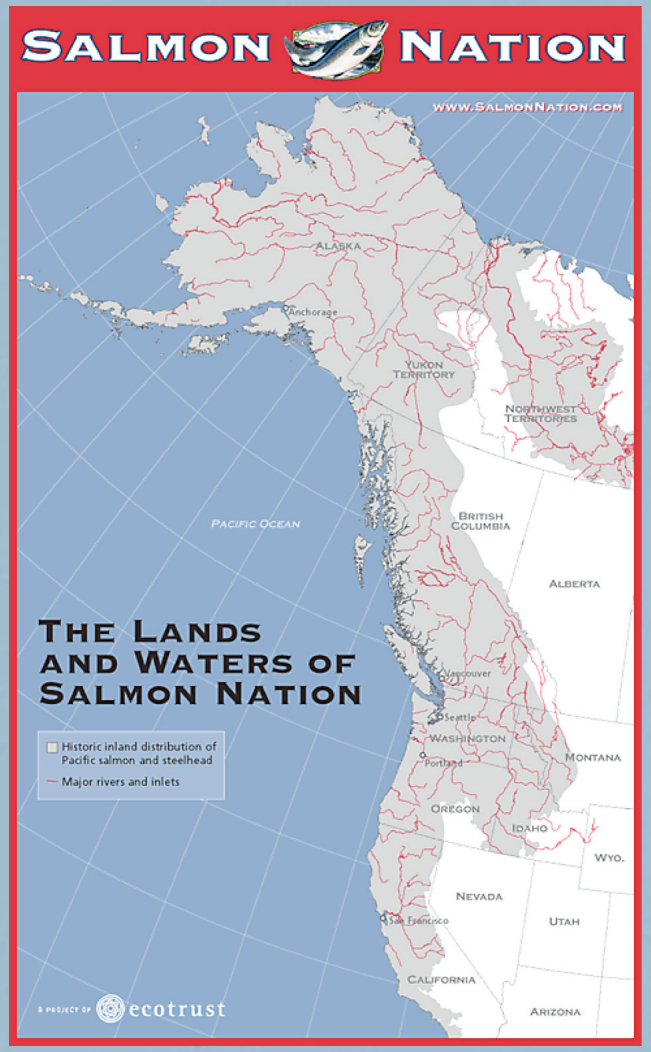
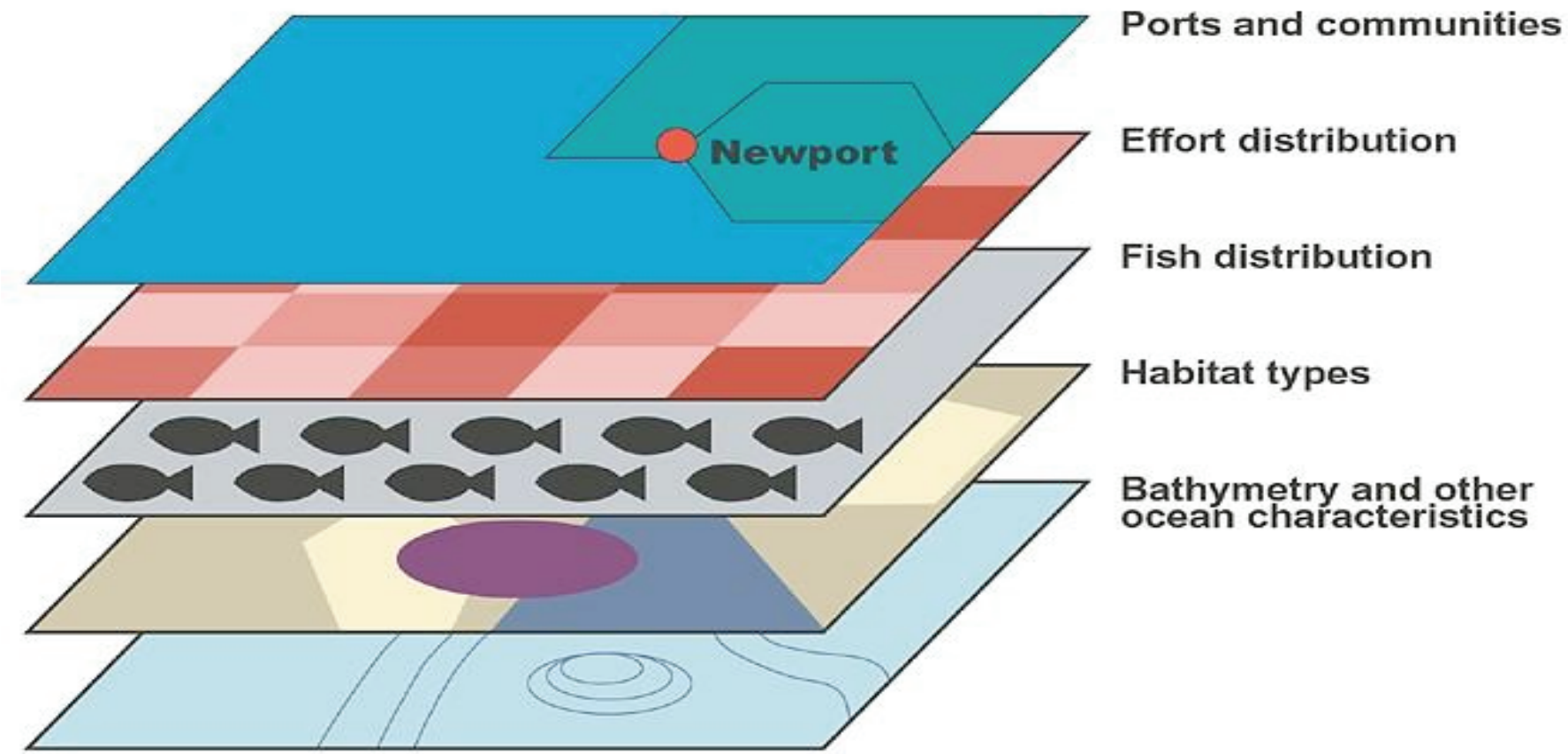
Ecotrust - Salmon Nation



OCEAN

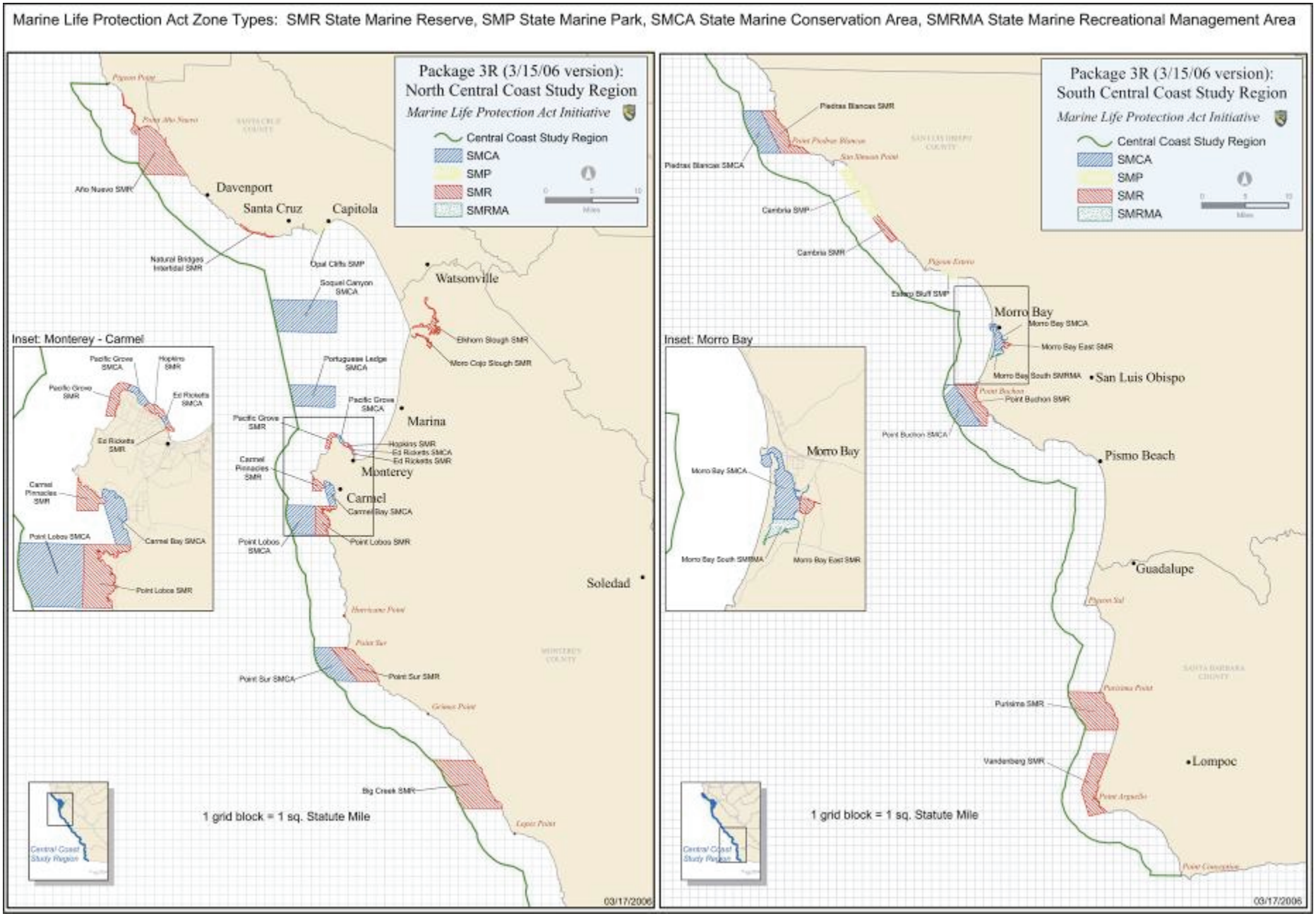
Ocean Communities Equity Ecology Economy Analysis



Science Advisory Team Needs

- How to best evaluate the performance of marine protected area network proposals in the context of the goals set forth by the Marine Life Protection Act Initiative (MLPAI)?
- An interactive and real time decision support system that would;
  - Be able to simulate reserve networks based on varying influence of different goals that
  - Results function as a baseline to assess and evaluate Marine protected area proposals developed by regional stake-holders
  - The system must be able to take into account connectivity, notably by estimating the spatial distribution of abundance and yield for any proposed spatial structure of Marine protected areas, and over a range of larval dispersal distances.

Marine Life Protection Act Zone Types: SMR State Marine Reserve, SMP State Marine Park, SMCA State Marine Conservation Area, SMRMA State Marine Recreational Management Area



Enter UQ

- Multiple zones
- Multiple costs
- Optimize for ecological connectivity

MARXAN

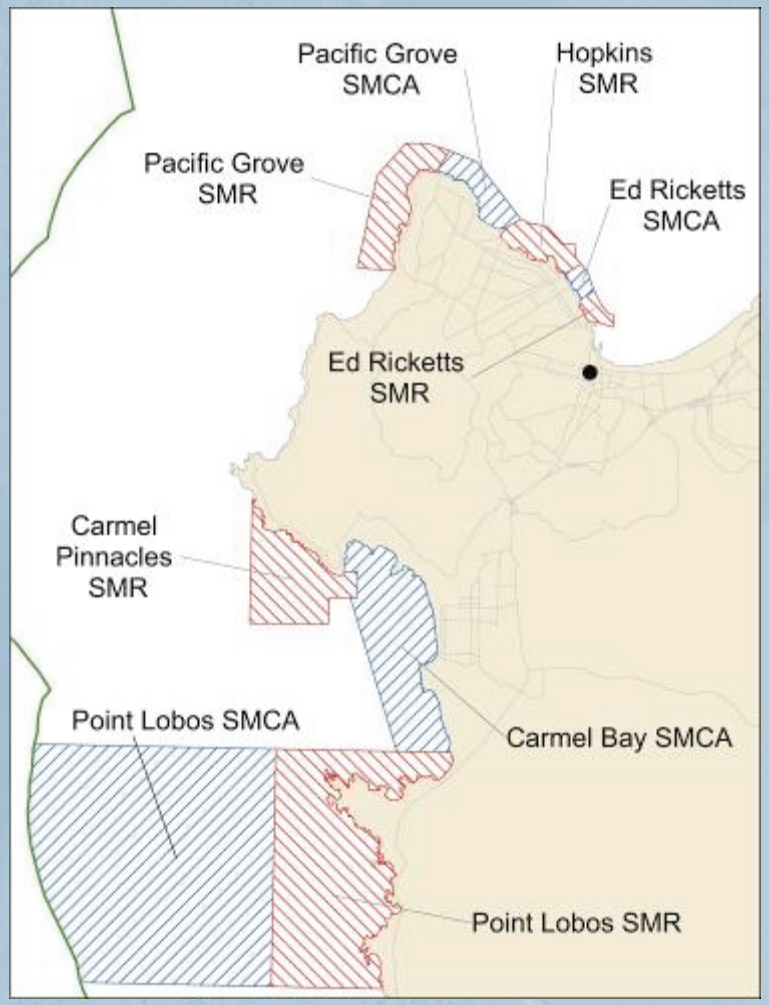
- Siman: The University of Adelaide
- Spexan: Environment Australia
- SITES: Spexan linked to Arcview
- Marxan: Great Barrier Reef Marine Park Authority and National Marine Fisheries Services
- MarZone: The University of Queensland, Ecotrust and The University of California
- Currently, over 1,100 users from more than 95 countries and at least 600 organizations

Brief Overview of MARXAN

- Objective – minimize cost and boundary length subject to the constraint that targets are met.
- Simulated annealing
- Spatial design constraints – BLM
- Setting priorities – selection frequency
- Flexibility – many good solutions quickly

Differences: MARXAN vs. MarZone

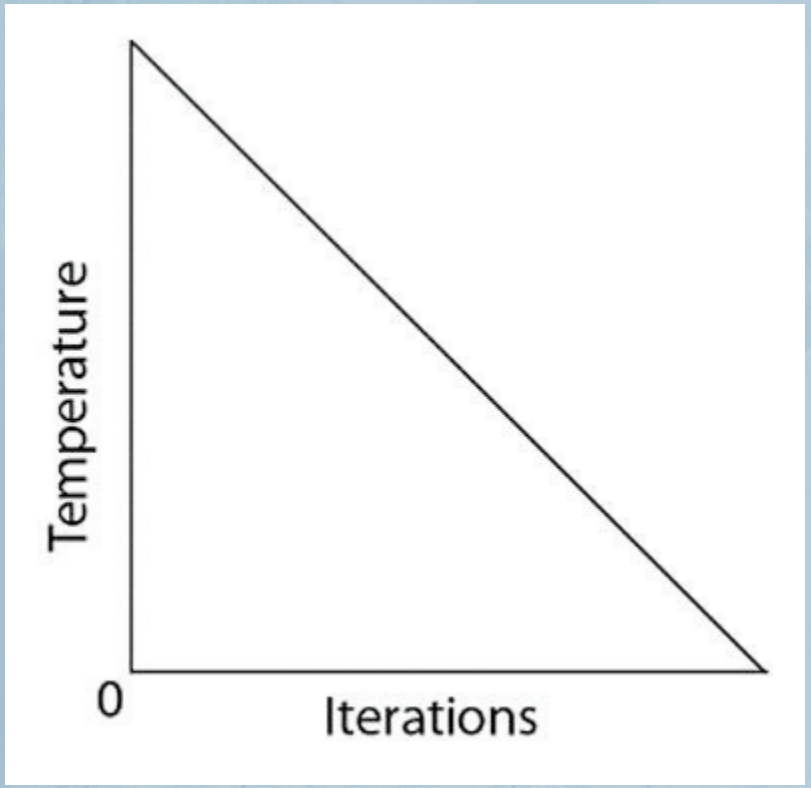
- Multiple Zones & Costs
  - Marine Reserve
    - Cost – All commercial and recreational fishing
  - Marine Park
    - Cost – All commercial and some recreational fishing, enforcement
  - Conservation Area
    - Cost – some commercial and some recreational fishing, enforcement
  - Available (Unreserved)



Simulated Annealing

Objective Function = Cost + Penalty + Boundary

- Number of iterations
- Temperature
- Number of runs



MARXAN Data Structures

- Planning units: area, cost and status
- Features: targets and penalty factors
- Planning units versus features matrix
- Boundary length

MarZone Data Structures

- Zones
- Costs
- Targets
- Contributions

Implications of Marzone

- Increased complexity
- Increased data requirements
- More assumptions
- More iterations needed
- Many advantages

Availability of MARXAN

www.ecology.uq.edu.au/marxan.htm

- Free to download
- Ask that appropriate credit is given to The Ecology Centre, University of Queensland
- Contact Hugh Possingham about any applications, funding, and publications

Next Steps

- Multiple costs and zones to be added by early July
- Definition of parameters to be completed by September
- MarZone and connectivity modeling to be embedded in OCEAN Q1 – Q2 2007
- Public release of MarZone - ??????????????????

Project Team

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