Marine Protected Area Design for the North Pacific Coast, Canada

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MARINE PROTECTED AREA DESIGN

Jo Smith

Charlie Short, Steve Diggon, John Bones, Matthew Justice and Jo Smith
Marine Planning Partnership for the North Pacific Coast (MaPP)
MAPP STUDY AREA

MaPP
102,000 sq. km

North Pacific Coast
British Columbia, Canada
MARINE PLANNING PARTNERSHIP

• Co-led Provincial and 18 First Nations governments
• Nov 2011 – Jun 2014
• EBM framework
• Sub-regional Marine Plans
• Regional Priority Plan
• Zoning
• Recommendations to a marine protected area network in the Northern Shelf Bioregion
• Sub-regional Marine Plans
• Regional Priority Plan
• Zoning
• Recommendations to a marine protected area network in the Northern Shelf Bioregion

→ Identify high priority conservation areas

→ Marine protected area network design
IDENTIFY HIGH PRIORITY CONSERVATION AREAS IN MAPP STUDY AREA

- Marxan
- Used globally to inform planning and protected area networks
- Optimisation algorithm
- Data intensive
- Requires expertise
- Requires a decision on “targets”
- Generate multiple scenarios
- Output = solution sets to inform planning
BC Marine Conservation Analysis (BCMCA) 2006 – 2013
- Karin Bodter, Carrie Robb, Chris McDougall and others
- Rigorous analysis with > 200 features
- Expert workshops
- Thorough government and stakeholder review and input

→ Meet targets in minimum area
MaPP used BCMCA Project Team recommendations:

<table>
<thead>
<tr>
<th>Regional Scenarios</th>
<th>Project Team Target</th>
<th>Representative species &amp; habitats</th>
<th>Special or Rare</th>
<th>BLM* (clumping)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High</td>
<td>30%</td>
<td>60%</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>High</td>
<td>30%</td>
<td>60%</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>30%</td>
<td>60%</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>Low</td>
<td>10%</td>
<td>20%</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Low</td>
<td>10%</td>
<td>20%</td>
<td>12</td>
</tr>
</tbody>
</table>

*Input from MaPP Science Advisory Committee
5 Regional scenarios

• 588 planning units (1x1 km)
• 1,022 features
• Cost layers not used (e.g., human uses)
• Sum Solutions 100 runs and “Best” Solution
• Calculate # clumps, average size, and area
• 20 Sub-regional scenarios
IDENTIFY HIGH PRIORITY CONSERVATION AREAS IN MAPP STUDY AREA

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Project Team Target*</th>
<th># Clumps</th>
<th>Average ± SD Size (km²)</th>
<th>Total area (km²) in “best” solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High (30/60; 3)</td>
<td>240</td>
<td>167 ± 866</td>
<td>40,163</td>
</tr>
<tr>
<td>2</td>
<td>High (30/60; 8)</td>
<td>130</td>
<td>325 ± 1,176</td>
<td>42,246</td>
</tr>
<tr>
<td>3</td>
<td>High (30/60; 12)</td>
<td>119</td>
<td>360 ± 1,090</td>
<td>42,899</td>
</tr>
<tr>
<td>4</td>
<td>Low (10/20; 5)</td>
<td>191</td>
<td>70 ± 139</td>
<td>13,294</td>
</tr>
<tr>
<td>5</td>
<td>Low (10/20; 12)</td>
<td>160</td>
<td>87 ± 212</td>
<td>13,970</td>
</tr>
</tbody>
</table>

* (% representative/% special; boundary length modifier)
Low Target (10/20%) with medium clumping (BLM 12)
High Target (30/60%) with medium clumping (BLM 8)
All scenarios met designated targets for species & habitats
  - Plants, birds, invertebrates, fish, indices, mammals, abiotic

Consistent high value areas:

1. Cape St. James
2. Scott Islands
3. Hakai Pass
4. Broughton Archipelago
• Analyse existing protected areas
• Overlap with Marxan scenarios
• Inform Sub-regional Protection Management Zones
• Inform Regional network
## Existing marine protection

<table>
<thead>
<tr>
<th>Protection Type</th>
<th># Clumps</th>
<th>Average Size ± SD (km²)</th>
<th>Total area (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prov &amp; Fed protected areas</td>
<td>112</td>
<td>47± 330</td>
<td>5,262</td>
</tr>
<tr>
<td>Rockfish Conservation Areas</td>
<td>71</td>
<td>49 ± 84</td>
<td>3,494</td>
</tr>
<tr>
<td>Sponge Reef Closures</td>
<td>3</td>
<td>612</td>
<td>1,837</td>
</tr>
<tr>
<td>All Existing</td>
<td>186</td>
<td>57 ± 274</td>
<td>10,593</td>
</tr>
</tbody>
</table>
High Target (30/60%) with Existing Protected Areas

BCMCA/MaPP Marxan Project (map date: February 27, 2013)
This map presents a selection of the results of a project designed to use the Marxan decision support tool to identify areas of high conservation value within the MaPP study region. This scenario used the high targets set by the BCMCA project team (30% for regular features and 60% for special features) and a med-high clumping value (BLM 8). Also displayed are a variety of designations currently providing some degree of protection for marine areas: Marine Protected Areas (inc. conservancies, ecological reserves, national marine conservation areas and reserves, etc.), Rockfish Conservation Areas and Sponge Reef Fishing Closures. This overlay is for illustrative purposes only—the various protected area designations had no influence on the analysis itself.
Low Target (10/20%) with Existing Protected Areas
• Representation - biodiversity
• Replicate protection
• Special, distinct, unique, vulnerable sites or species
• Critical habitat for breeding, spawning, feeding, rearing
• Minimum and variable sizes 1-20 km²
• Connectivity – ensure linkages

• Apply best practices for designing protected areas:
  • straight lines
  • square, rectangular, hexagonal shapes
• Ecological effectiveness
• Social, Economic & Cultural

• *For example*:
  • Recognise range of uses, activities
  • Enhance management effectiveness
  • Mitigate human disturbances
SeaSketch
www.seasketch.org

317 Data Layers:
111 marine environment
120 human uses
29 Marxan
+ others
THANK YOU!

For more information:
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