CONSERVATION PLAN FOR THE KINGDOM OF CAMBODIA

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Figure 1: Overview map showing the location of Cambodia and its neighboring countries Thailand, Laos and Vietnam as well as their respective capital cities.
BIODIVERSITY DESCRIPTION AND THREATS

• Forms part of the Indo-Burma biodiversity hotspot [1]
• Part of the top 5 most threatened hotspots in the world
• Threats include:[2]
  • illegal wildlife trade and loss of habitat
• Threats are made more severe due to:[2]
  • lack of political will,
  • Resources
  • incentives for effective law enforcement,
  • conservation planning and
  • action.
• Threatened species:[2]
  • **Saola**
    IUCN Red List of Threatened Species™ Status: *Critically Endangered*
  • **Eld’s deer**
    Red List Status: *Endangered*
  • **Cat Ba langur**
    Red List Status: *Critically Endangered*
  • **Fishing cat**
    Red List Status: *Endangered*
  • **Giant ibis**
    Red List Status: *Critically Endangered*
  • **Mekong giant catfish**
    Red List Status: *Critically Endangered*
CURRENT PROTECTED AREAS

Figure 2 showing the current protected areas (in green) in the country of Cambodia.
CONSERVATION TARGETS  PERCENTAGE AND SPECIES PENALTY FACTORS

Figure 3 showing the species distribution of *Chiromantis cardamonus* as a conservation target with the species penalty factor of 10.
Figure 4 showing the distribution of *Ophryophrone synoria* as a conservation target with SPF 10

Figure 5 showing the distribution of *Orthotomus chaktomuk* as a conservation target with SPF 10
Figure 6 showing the distribution of *Garrulax ferrarius* as a conservation target with SPF 10

Figure 7 showing the distribution of *Hylarana faber* as a conservation target with SPF 10
Figure 8 showing the distribution of *Megophrys auralensis* as a conservation target with SPF 10.

Figure 9 showing the distribution of *Enhydris longicauda* as a conservation target with SPF 10.
Figure 10 showing the distribution of *Leptolalax malicus* as a conservation target with SPF 10

Figure 11 showing the distribution of *Megophrys damrei* as a conservation target with SPF 10
Figure 12 showing the distribution of *Philautus cardamonius* as a conservation target with SPF 10.
CONSERVATION planning units (ecological)

**Methods**

- Load the Water basin, Terrestrial Eco-region and the respective countries Admin(0) – or country boundary.
- Make the Country Boundary unfilled and emphasise the line using Layer properties.
- Clip out all areas that fall outside of country boundaries.
- Geo-processing is added to extensions and this is the default.
- Open up the Geoprocessing wizard. The first function is to use clip to cut out all areas outside the Country of Interest. Make sure to use the right order when doing this procedure.
- Ensure to save the file in the same folder as input files.
- The same is done for Water Basin.
- Two layers should now be present and the best way to find the intersects of these two layers is to use the “Union” feature.

**Figure 13** showing the Ecological planning unit
CONSERVATION planning units (Systematic)

Figure 14 showing the systematic planning unit for the country of Cambodia
Figure 15 showing the conservation planning tenures map assessing the efficiency of the existing protected area network.
Figure 15 showing the tenure map to assess the existing protected areas network with the presence of roads and rails.
Figure 16: The flow diagram above shows the basic overview of what MARXAN aims to achieve as well as its core concepts.
SYSTEMATIC CONSERVATION PLANNING  EXPLAINING MARXAN

Marxan parameters

- Boundary length modifier: 2
- Repeat runs: 1000
- Species missing if proportion of target lower than: 0.95
- Run mode: Apply simulated annealing followed by iterative improvement
- Annealing controls
  - Number of iterations: 10 000
  - Temperature decreases: 1000
- Iterative improvement type: normal iterative improvement
- Cost threshold
  - Threshold Enabled
  - Threshold: 1600
- Penalty factor A: 9
- Penalty factor B: 2
- Starting proportion is 0
- RUN MARXAN
## Systematic CONSERVATION planning

<table>
<thead>
<tr>
<th>FILE NAME</th>
<th>DESCRIPTION</th>
<th>How the file is used by marxan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution for each run</td>
<td>Lists planning units, identifies if it is part of the protected area, Planning units selected because it has irreplaceable conservation features</td>
<td>Protected area system displayed in a GIS, SPATIALLY COMPARES PROTECTED AREAS</td>
</tr>
<tr>
<td>Summed solution</td>
<td>Shows how many times each planning unit is selected across all the protected areas, Non selected PU's have a frequency of zero while selected ones have a frequency same as total number of runs</td>
<td>Displays how often a PU is selected, Used as part of a stakeholder involvement process</td>
</tr>
<tr>
<td>Missing value information</td>
<td>Provides information on how well each solution meets the conservation targets, Info such as target amount how much was conserved and if the target was met</td>
<td>Determines which feature was met and by how much, Sets the species penalty factor</td>
</tr>
<tr>
<td>Summary information</td>
<td>Shows info about each run such as objective function score, cost number of PU's selected, boundary length, species penalty shortfall, and number of features that do not meet their targets</td>
<td>Compares the performance of the solutions.</td>
</tr>
</tbody>
</table>

Table 1 above shows the MARXAN outputs and the descriptions of each of these files as well as how MARXAN uses them. [2]
Figure 16 shows an example of the results yielded by MARXAN using the various outputs indicated on the next slide[3]
• MARXAN INPUTS AND OUTPUTS
• Planning unit layer: hexagon of country
• Add raster group of your conservation target
• Select target percentage
• Penalty factor (spf): 10
• Auto fill spec.type
• Enable planning unit layer (tenure + transformed layer)
• Boundary length file enabled
• Output prefix is marxan conservation %

