CAMBODIA

STUDENT NUMBER: 3650805
BDC332 PRACTICAL
FACULTY
NOVEMBER 2018
BIODIVERSITY DESCRIPTION AND THREATS

- The **wildlife of Cambodia** is very diverse with a registered 212 mammal species, 536 bird species, 176 reptile species.

- Cambodia possesses some of the most valuable biodiversity in South East Asia. Its forests still hold (although in decreasing numbers) threatened species such as the Siamese crocodile and Asian elephant that are no longer found in the wild in neighboring countries.

- Cambodia's large variety of habitats both on land and in water are home to a significant diversity of threatened wildlife species.

- However, a lack of effective patrolling and law enforcement, according to a report, has led to increased illegal encroachment, settlement, logging and hunting in the forest.
• Some areas of important biodiversity have legal protection, such as Mondulkiri’s Seima Biodiversity Conservation Area and the Central Cardamom Mountains Protected Forest.

• Apart from the legal structures of protected areas, a common protection means is an agreement signed between the Royal Government of Cambodia and NGOs to implement specific projects for nature protection.

• According to Cambodia’s National Report on Protected Areas and Development, the seven biodiversity management regions across the country are (1) south-western coastal ranges and marine waters, (2) northern plains, (3) north-eastern forest, (4) Kampong Cham, (5) Mekong Delta region, (6) Tonle Sap floodplain, and (7) north-western region.

• The role of protected areas becomes increasingly significant for managing and developing the environment and biodiversity protection in Cambodia. Cambodia has four Ramsar sites designated as ‘Wetlands of International Importance’, with a total area of 75,942 hectares.
Megophrys auralensis

Source: Creative commons
CONSERVATION planning units (ecological)

Hylarana faber

Source: Creative commons
Philautus cardamonous

Species being unavailable on creative commons
Chiromantis samkosensis

Source: Creative commons
Megophrys damrei
Garrulax ferrarus

Source: Creative commons
<table>
<thead>
<tr>
<th><strong>Target %</strong></th>
<th><strong>Values</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Target %</td>
<td>40</td>
</tr>
<tr>
<td>SPF</td>
<td>10</td>
</tr>
<tr>
<td>Total area of reserves</td>
<td>37469</td>
</tr>
<tr>
<td>Total area of existing reserves</td>
<td>38985</td>
</tr>
<tr>
<td>Total area of newly reserved</td>
<td>848</td>
</tr>
</tbody>
</table>
Conservation Planning

EXPLAINING MARXAN
• **MARXAN:**
It is a software program which delivers decision support for reserve system design. It solves minimum set problems to achieve: Maximum representation of biodiversity at the most minimum cost. Its efficiency depends on Human involvement, adoption of sound ecological principles and establishment of scientifically defensible conservation goals and 7 targets. Also, it forms vital factor of systematic conservation planning.
SYSTEMATIC CONSERVATION PLANNING:

- Focuses on locating, designing & managing protected areas that represent biodiversity of each region. In addition, it involves selecting & designing protected area network that functions to together to meet region wide conservation goals.

Purpose of Marxan in SCP:

- Marxan identifies sets of areas that meet conservation targets at minimal cost. It helps evaluate how well conservation and socio-economic objectives are met and minimizes cost whilst meeting user defined biodiversity targets.
MARXAN:
IT IS A SOFTWARE PROGRAM WHICH DELIVERS DECISION SUPPORT FOR RESERVE SYSTEM DESIGN. IT SOLVES MINIMUM SET PROBLEMS TO ACHIEVE: MAXIMUM REPRESENTATION OF BIODIVERSITY AT THE MOST MINIMUM COST. ITS EFFICIENCY DEPENDS ON HUMAN INVOLVEMENT, ADOPTION OF SOUND ECOLOGICAL PRINCIPLES AND ESTABLISHMENT OF SCIENTIFICALLY DEFENSIBLE CONSERVATION GOALS AND 7 TARGETS. ALSO, IT FORMS VITAL FACTOR OF SYSTEMATIC CONSERVATION PLANNING.

SYSTEMATIC CONSERVATION PLANNING:
FOCUSES ON LOCATING, DESIGNING & MANAGING PROTECTED AREAS THAT REPRESENT BIODIVERSITY OF EACH REGION. IN ADDITION, IT INVOLVES SELECTING & DESIGNING PROTECTED AREA NETWORK THAT FUNCTIONS TOGETHER TO MEET REGION WIDE CONSERVATION GOALS.

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The first step is to open arcview GIS and add a theme which will be the admin0 layer. In arcview go to file extensions- click on the repeating shapes extension.

Select the Honeycomb icon and select all records. Once this has been highlighted a set of parameters will come up and ask you to locate the repeating shapes file. In the parameters we have values from 0.005 to 0.125.

Insert a value of 0.025 which will automatically change the rest of the parameters. This may be adjusted but the goal here is to produce a series of repeating shapes with a total number of 2000 and minimum number of 800.

Once this is done, the admin0 layer will effectively be converted into a series of repeating shapes (hexagons). Give this file a name and export it such that it can be imported into Idrisi.
CONSERVATION PLANNING (EXPLAINING MARXAN)

STEP 1
In order to run Marxan one first has to create ecological niche model of the of the identified target species in your country for conservation.

STEP 2
Ecological niche models are generated in DIVA GIS and then imported into idrisi SELVA. Once imported into idrisi ensure that all ecological models has the same reference system as the landcover and that all the dimensions correspond to the landcover this important when running Marxan.

STEP 3
To access Marxan go to 1. Modelling/Environmental Simulation Modelling/Land Change Modeller). 2. select the Planning TAB 3. Click on the first downward arrow named Marxan as well as the second.

STEP 4
NB! You need to search you specific PC to find “marxan”. On my PC it is located in the following folder: C:/ Program Files (x86)/IRDRISI Selva/Tutorial Data/IDRISI Tutorial Data/LCM/Marxan.

STEP 5
Planning Unit raster file (and in this case it is made from a Land Cover and a Catchment layer so is representative of an Ecological Planning Unit selected in the box requesting for the Planning unit layer.

STEP 6
Species niche models are entered into Species distribution layers.

STEP 7
You then have to set your conservation target as well as the penalty for not meeting targets.
CONSERVATION PLANNING (EXPLAINING MARXAN)

STEP 8
The protected areas tenure file consisting of the countries current protected areas, artificial areas (i.e. roads and railways), and the remaining natural open space is selected in the box requesting for Planning Unit tenure layer under Optional input files.

STEP 9
Output prefix (you run assess_current_pu
Ensure that under Marxan Parameter you have set proportion of target to be reached (percentage of target set that should be reached.

Run mode set to: Use a Heuristic and heuristic set to Greedy
You can now run marxan to assess current protected areas.

STEP 10
Now you need to identify what Planning Units need to be added to the existing Protected Areas Network so as to develop a systematic conservation plan.

STEP 11
• Under Marxan Parameters set:
  • Boundary length modifier to 2
  • Repeat runs: 1000
  • Species missing if proportion lower than: 100
  • Run mode: Apply stimulated annealing flowed by iterative improvement
  • Number of iterations: 10000
  • Temperature decreases: 1000
  • Ensure adaptive annealing tick box is checked
  • Iterative improvement type: Normal Iterative improvement
  • Ensure threshold enabled is ticked
  • Threshold: 1600
  • Penalty factor A: 9
  • Penalty factor B: 2
  • Run marxan for additional protected areas
SOURCES OF DATA, ATTRIBUTION AND ACKNOWLEDGEMENTS

- https://opendevelopmentcambodia.net/topics/biodiversity/