Seeing Red: Analyzing the IUCN Red List Data of Amphibians in Southeast Asia

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Introduction

- Over 7,500 amphibian species are listed on the IUCN Red List (an assessment tool which provides species’ conservation status, perceived threats, and distribution range). Figure 1
- Of these 7,500 amphibians, 1/3 are classified as threatened.
- This data, however, is not easily accessible for wide-scale analyses. This is especially the case for Southeast Asian amphibians, of which much less attention has been paid to compared to other parts of the globe.
- Because SE Asia is a biodiversity hotspot, it was the focus of this research.
- The aims of this project were as follows: (1) utilize bioinformatics to increase accessibility to IUCN Red List data, (2) analyze the IUCN data repository to identify trends in Southeast Asian amphibians, and (3) plot IUCN threat data.

Methods

Data Collection and Accessibility
- Southeast Asian amphibian data collected from the IUCN Red List (2018) and AmphibiO.
- R version 3.3.2 (2016-10-31) – “Sincere Pumpkin Patch” utilized for scripting and statistical analysis.
- Scripted code works off of package redlist created by Scott Chamberlain.
- Developed code available at https://github.com/gonzabio/Thesis

Data Analysis
- All Statistical analyses performed in R version 3.3.2.
- Logistic regression models created.
  - Red List Categories divided in two: Threatened (Critically Endangered, Endangered, Vulnerable) or Not Threatened (Least Concern, Near Threatened).
  - Third category threats excluded from the analyses.

Threat Visualization
- Red List status and amphibian threats plotted using ArcGIS Desktop 10.6.

Results

Amphibian Threats Worldwide

- Figure 2: Number of Threats by Red List Category
- Figure 3: Density Distribution of the Number of Threats

Vulnerable Amphibians in Southeast Asia

- Figure 4: Vulnerable Amphibians in Southeast Asia
- Figure 5: Vulnerable Amphibians of the Mindanao Island, Philippines

Results cont.

- The three most prominent threats affecting Southeast Asian amphibians are (1) Logging & wood harvesting, (2) Annual & perennial non-timer crops, and (3) Agricultural & forestry effluents.
- The majority of threats are listed as Low Impact or NA.

Conclusion

- Across amphibians worldwide, the number of threats alone does not solely contribute to IUCN Red List Status.
- Species extinction risk is more complicated than analyzing singular threats.
- In SE Asia there are concentrated pockets of Vulnerable amphibians
- IUCN Red List Status appears to be location-specific. [likely due to sampling efforts]
- Increasing the accessibility of IUCN Red List data can enable researchers to create more holistic conservation models.
- Mapping IUCN Red List Status and threat types can illustrate endangered areas to target through conservation.