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.**

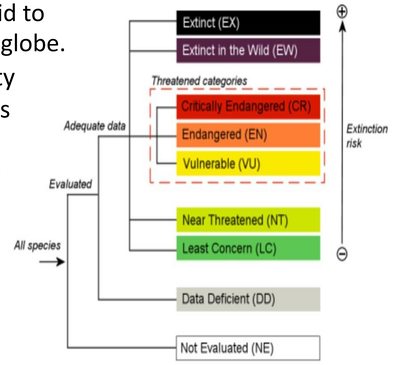

Figure 1: IUCN Red List Status

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 rredlist 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 Threated (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

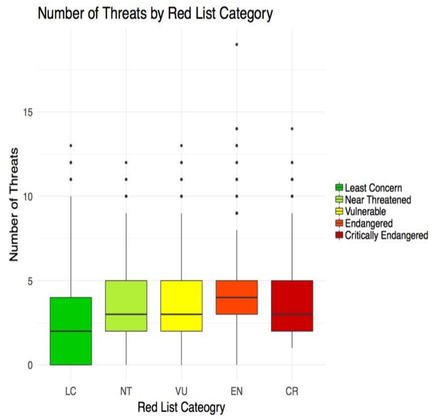

Figure 2: Number of Threats by Red List Category

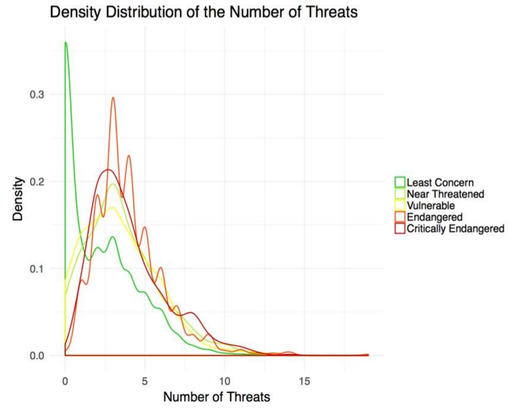

Figure 3: Density Distribution of the Number of Threats

Vulnerable Amphibians in Southeast Asia

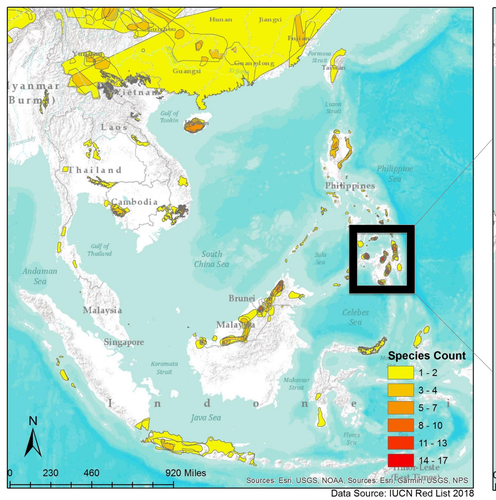

Figure 4: Vulnerable Amphibians In Southeast Asia

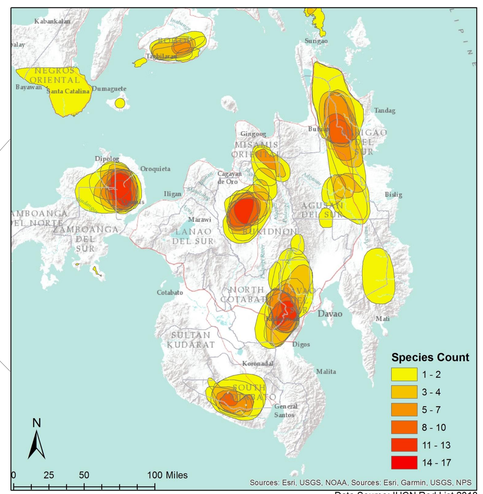

Figure 5: Vulnerable Amphibians of the Mindanao Island, Philippines

Results cont.

Amphibian Threats in Southeast Asia

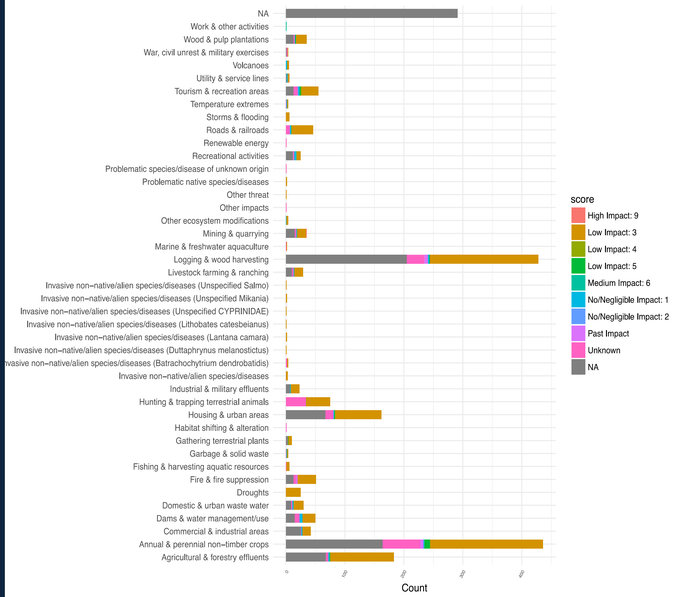

Figure 6: Threats affecting Southeast Asian Amphibians

- 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.