

CLIMATE CHANGE IMPACT ON THE DISTRIBUTION OF HIGHLAND ENDEMIC BIRDS IN SRI LANKA

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Changing climate will have adverse effects on to islands rather than large landmasses. Both the physical and biological characters can be altered by the direct and indirect causes of climate change. Islands such as Sri Lanka, where much endemic biological diversity is trapped on a small piece of land are more prone to these adverse effects since there is no alternative refuge. In this study we have selected five endemic birds which are exclusively found in highlands of Sri Lanka and predict the climatic suitability for 2020, 2050 and 2080. We have used secondary data stored in Birdlife International database for species' occurrence data. Climatic data was downloaded from the Intergovernmental Panel on Climate Change Data center derived from the model UKMO:HADCM3, emissions scenario A1B for 4th Assessment Report. These climatic data were then derived in to 19 bioclimatic variables under the guidelines given by the United States Geological Survey (USGS). Elevation data was downloaded from the U.S. Geological Survey, Earth Resources Observation and Science Center and using elevation data layer, slope and aspect ratio layers were created. We used Maxent (Maximum Entropy) as the modeling algorithm to create the predictive models for the 5 species. The predictive environmental data layers: 19 bioclimatic layers, elevation, slope and aspect ratio were in 30 arc second resolution. We converted the result output from the Maxent to probability maps using GIS techniques. We used QGIS 2.8.2 as the GIS platform in this study. In the results, Sri Lanka Bush warbler showed an overall increase in area with more than 50% climatic suitability over the period from 2000 to 2080. Other four species showed a reduction in the area with more than 50% climatic suitability over time. The most significant reduction occurs in the Yellow-eared Bulbul (*Pycnonotus penicillatus*) where by 2050 the overall climatic suitability drops down to less than 30 %. Our predictions suggest that the highland endemic birds might be severely affected from the reduction of areas with suitable climate. Central hills of Sri Lanka are the only remaining refuge for these montane specialists. However these models do not consider the changes in vegetation occurring due to the change in climate or the changes in land use. Therefore, the actual effects might be much higher than these current predictions.