INTRODUCTION

Anthropogenic effects on wildlife, such as habitat loss and habitat fragmentation, are leading contributors to species decline and loss of biodiversity. Of particular concern is the loss of wetland ecosystems in the Caribbean as these areas provide habitat for millions of resident and migrant birds. The ability to accurately estimate future land cover changes (for example, predicted wetland loss) would be invaluable for land and conservation managers. With this information, areas that are identified as at-risk of conversion could be prioritized based on the quantity or species of birds they support, among other factors. Using Puerto Rico as a model, this study investigates land cover change predictions and one method of how future land cover information can be applied to determine conservation priorities.

OBJECTIVES

1. generate future land cover map based on observed changes
2. identify high priority at-risk wetlands for conservation

RESULTS

Transition potentials for each land cover combination used in the Markov Chain prediction are listed in the table at left. The automated calculations for transition potential were edited to zero if potentials were implausible (e.g., urban to forest: 0.25) and other transitions in the row were adjusted in order for each row to equal 1.

Predicted Puerto Rico land cover for the year 2021 is displayed in Figure 1 with details in Figure 4. Overall, urban and agricultural land cover is predicted to expanded by 555 and 650 km², respectively, while forested areas are predicted to decrease by 1148 km² and wetlands by 56 km² (Fig. 2). Wetlands are expected to be primarily converted to agricultural land, followed by conversion to urban development (Fig. 3).

CONCLUSIONS

Land cover change prediction analysis of Puerto Rico revealed a trend of increased urbanization and agricultural land use and a decrease in existing forests and wetlands. As of 2006, there were 125 km² of wetlands, one of the most bird species rich habitat types. Of this area, 56 km² are predicted to disappear by 2021. A conservation priority analysis was conducted which identified 15 km² of high priority at-risk wetlands across the island to recommend for protection. Limitations to this study include the potential for error in the analysis. For example, standardizing raster pixel size, reducing the variety of land cover types, using different driver variables, editing the transition matrix, and reclassifying and weighting species richness all have the potential to introduce error.

Data:
- Graphics: free pik.com, vecteesy.com, vector.me