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Geospatial technology based alligator snapping turtles habitat suitability analysis in southern Georgia for preservation decision support

Alligator Snapping Turtles (AST) are a species found in the southeastern part of North America. Specific to climate, soil, water depth, elevation and land cover, ASTs can only live in particular habitats. This species is not endangered but threatened showing that this type of turtle should be better protected as for fear of extinction. Studies are needed to determine AST preserves. Our area of interest (AOI) was the southern counties of the state of Georgia. Geospatial Technology (GIS, Remote Sensing, GPS and Information Technology) is considered as the most efficient tools for flora and fauna habitat suitability analysis for better protection of biodiversity. The objectives of the study are to: Conduct a thorough literature review on the ASTs to understand their habitat, food source, external threats, diseases and other living related parameters; Obtain and preprocess the geospatial data for the AST habitat suitability model development and develop automated geospatial model to indicate most suitable locations for the AST habitat for preservation decision support. A thorough literature review was conducted on the ASTs' living parameters and thus the types of geospatial data responsible for its habitat suitability analysis. Geospatial data like Georgia counties (determining the AOI), major rivers (finding suitability for AST breeding and living), major roads (finding threats for AST movement), Digital Elevation Model (obtaining slope map to determine if female turtle can climb the slope for laying eggs), Georgia Land Use Trend (GLUT) (Finding suitable landuses in Georgia for AST suitable habitat including Beaches/Dunes/Mud class), STATSGO soil (developing suitable drainage and bulk-density rasters for easy AST habitat) were obtained from authentic sources, preprocessed in ArcGIS 10.2 software. An automated geospatial model was developed in ArcGIS 10.2 Model Builder for one click processing of all the data to provide the most suitable location information in South Georgia for AST Conservation/Preservation decision support. The model was developed by converting all geospatial data into rasters of two classes (Suitable (1) and unsuitable (0)) and then overlaying them together with Weighted Sum. The weights provided to individual AST habitat suitability analysis were developed with thorough team deliberation using the DELPHI procedure. Finally, the current conservation areas in the state geospatial data were taken into consideration to determine the suggested new preservation area for AST habitat. Our study result could be used by Georgia Department of Natural Resources to take AST preservation decision. The automated geospatial model developed for this study can be replicated for any other biodiversity habitat suitability analysis by just changing the input data suitable. This study was set out to explain and show the areas that are best suitable for Alligator Snapping Turtles to live reproduce and sustain a healthy life.

Biography

Sudhanshu Sekhar Panda is an Associate Professor of GIS/Environmental Science in the Institute of Environmental Spatial Analysis of University of North Georgia, USA. He has completed his BS Degree in Agricultural Engineering from Orissa University of Agriculture and Technology, Orissa, India; M.S degree is in Environmental Remote Sensing for Geoinformation Development from Asian Institute of Technology, Thailand and PhD in Agricultural Engineering from North Dakota State University, USA. In his 27 years of professional life, he has experiences working in federal government, company and academia. He is an Avid Researcher along with his present professional responsibility of a Fulltime Teaching Faculty. Most of his research includes automated model development for environmental management decision support. He is Editor-in-Chief of O/S Journal of Spatial Hydrology and Editor of Journal of Biodiversity & Endangered Species and Journal of Ecosystem & Ecography. He has published more than 32 book chapters along with peer-reviewed journals and conference proceedings. Above all, he aspires and working towards to be one of the best teachers who makes life changing improvement in disadvantaged students.

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