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## **ADVANCEMENTS IN MATHEMATICAL AND REMOTE SENSING TECHNIQUES FOR ECOLOGICAL MODELLING AND ENVIRONMENTAL IMPACT ASSESSMENT, A SYSTEMATIC REVIEW (2014-2024)**

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### **ABSTRACT**

Understanding the complex dynamics of ecosystems and evaluating the long-term impacts of human activities is a significant and challenging task. Recent advancements in mathematical modelling have led to the development of more complex and accurate ecological models, which have the potential to revolutionize our understanding of ecosystems. Remote sensing technologies have improved to provide high-resolution data on ecosystem changes, offering unprecedented insights. Data analytics techniques have advanced to handle large and complex environmental datasets, opening up new possibilities for understanding and managing our environment. This paper reviews these and other recent advancements in 39 research papers from 2014 to 2024, highlighting their potential to impact ecological and environmental research profoundly. By integrating these techniques, researchers can enhance predictions of ecological changes and inform more effective conservation strategies, thereby shaping the future of our planet.

**Keywords:** Ecosystems, Mathematical Modelling, Remote Sensing, Data Analytics, Environmental Impact.