

# Robust baselines of mangrove extent do not exist for conservation policy

D.A. Friess<sup>1,2</sup> & E.L. Webb<sup>3</sup>

<sup>1</sup>Department of Geography, National University of Singapore, 1 Arts Link, Singapore 117570. E-mail: [dan.friess@nus.edu.sg](mailto:dan.friess@nus.edu.sg)

<sup>2</sup>Singapore-Delft Water Alliance, National University of Singapore, Engineering Drive 2, Singapore 117576.

<sup>3</sup>Department of Biological Sciences, National University of Singapore, Science Drive 2, Singapore 117543.

## Abstract

Conservation policies that financially incentivize the protection of ecosystem services require accounting mechanisms based on accurate data of ecosystem extent. Conservation may fail if uncertain ‘evidence’ is used to set inappropriate goals. However, an extensive literature review and statistical analysis shows that robust data does not exist for many ecosystems, especially mangroves. Instead, a huge range of uncertainty exists in mangrove statistics from different sources – such uncertainty means a solid baseline of mangrove loss cannot be determined. For example, estimates of Indonesia’s mangrove extent differ between 24 237 km<sup>2</sup> (15% of global mangrove cover) and 40 000 km<sup>2</sup> (31% of global mangrove cover) within the same year. Also, predictions of mangrove loss in The Philippines vary from 0% per year to a decline in area of 12.44% per year. Due to such uncertainty, trends can be cherry-picked to bolster arguments that favour no, low or excessive conservation of mangroves. We identify four causes of information uncertainty affecting mangrove statistics: a) lack of robust monitoring methodology, b) lack of transparency when reporting secondary literature, c) data assumptions, and d) propagation of erroneous results through the literature. We require greater transparency and traceability when reporting mangrove area statistics, and greater collaboration between the academic and government researchers producing national-level mangrove estimates. A regional, standardized remote sensing methodology will allow, for example, ASEAN nations to rapidly assess their mangrove resources for their better protection, will increase the transparency of produced environmental statistics, and ultimately increase acceptance by decision-makers.

## Keywords

deforestation, Landsat, REDD+, trend, uncertainty, UNFCCC