
Quantifying the magnitude of biological invasions using total biomass

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Abstract

Biological invasions rank among the greatest anthropogenic threats to global biodiversity and ecosystem functioning, yet measuring and comparing their relative magnitudes across regions and taxa pose significant challenges. This absence of a unified metric hinders scientific advancement, public awareness, and policy development. We propose a simple, standard metric to quantify and communicate the magnitude of biological invasions: total biomass of non-native species. This metric approximates the amount of native biomass displaced, consumed, or replaced by the populations of invasive species. We illustrate how this metric can be applied to different research themes and contexts such as temporal and spatial invasion dynamics, management strategies, and invasion forecasts. We discuss the advantages and limitations of the metric, as well as the data requirements and assumptions involved in its estimation. The total biomass can provide a common currency to assess the magnitude of biological invasions, facilitating comparisons, syntheses, and innovations across invasion science.

Keywords: conservation, displacement, invasive alien species, management, quantitative metric

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