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Encyclopedia of the Anthropocene

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Abstract

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The vast majority of earth's ecosystems are negatively affected by some form of invasive species. Human-assisted dispersal and translocation of species, both intentional and unintentional, across historical biogeographical barriers is leading to an unprecedented homogenization of the biosphere. As a result, nonnative species that become aggressive invaders in their introduced range are having tremendous ecological and economic impacts globally. Dramatically altered natural assemblages of species, threats to biological diversity, modified food-web dynamics, altered trophic interactions, disrupted critical ecosystem functions, and diminished valued goods and services necessary to human and nonhuman well-being are some of the greatest consequences of nonnative species invasions. While there are some common general patterns of growth, habitat expansion, and native species displacement exhibited by invasive species, there are no clearly identifiable characteristics or distinctive traits possessed by nonindigenous invaders that would allow for *a priori* screening of future potentially problematic species. Likewise, there do not appear to be universal mechanisms contributing to particular groups of species becoming invasive, but rather a variety of causes that may enhance their competitive ability and allow for expansion and exploitation of the ecosystems to which they have been introduced. Quantitative assessments of ecosystem impacts also vary considerably across different levels of diversity and ecological organization. While the causes and consequences of invasive species continue to be actively studied by research scientists, the magnitude, scope, and direction of invasive species effects on their recipient ecosystems are highly variable and strongly context dependent. In response, natural resource managers are urgently seeking effective strategies to reverse or mitigate the damage inflicted by troublesome invaders. Identifying practical control efforts that are ecologically effective, economically feasible, and sociopolitically acceptable remains a persistent challenge and management approaches vary tremendously. Difficult decisions regarding when, where, and how to confront invasive species problems will be an ongoing area of contentious debate and uncertainty as humans continue to alter the ecological and evolutionary dynamics of organisms through extraordinary global dispersal and habitat transformations. Nevertheless, invasive species pose undeniable threats to biological diversity and the long-term integrity and stability of ecosystem goods and services necessitating concerted and coordinated efforts to mitigate their negative ecological and economic impacts.

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