

Science for Environment Policy

Human population density explains alien species richness in protected areas

Protected areas near densely populated towns and cities have higher numbers of alien species than those in more isolated locations, research suggests. In a South African study, researchers examined a number of different environmental characteristics of national parks, and found that surrounding human population density best explained the number of alien species in each park.

There are many different factors that might affect the numbers of alien species in an area, but these are often specific to the particular pathway of introduction. For example, rivers have been found to be an important pathway for alien species, but only for [water](#)-borne species. Few studies have attempted to identify general drivers of invasion which can be applied to a range of different species across both animals and plants.

In this study, researchers examined alien species in 19 national parks across South Africa. To identify common factors that are associated with high numbers of alien species, researchers examined several environmental characteristics of the parks. These included the age of the park, the number of years since new land was added to the park, park area, data availability (for example, how often the park is surveyed for invasive or alien species), surrounding human population density, number of roads, number of rivers and indigenous plant species richness.

Of the 813 species of alien animals and plants recorded across all national parks, 181 were known to have negative effects on biodiversity. The results of a statistical analysis showed that, in general, parks with high numbers of alien species were surrounded by dense human populations. Local human population was the only characteristic that consistently reflected alien species abundance.

Numbers of alien species were also high in parks with high data availability, as greater survey efforts led to detection of a greater number of species. This highlights the importance of surveillance, the researchers stress. Alien species, especially plants, which are not yet established enough to cause harm, are likely to be overlooked unless thorough, regular surveys are undertaken.

Overall, the researchers conclude that although there are many different pathways for alien species, and exact quantification may require species-specific data, surrounding human population density is the single factor that can predict the risk of alien species in protected areas. They suggest that mitigation strategies could include buffer zones, better monitoring, particularly along park boundaries, and effective coordination with all surrounding land owners.



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