

ScienceDirect.com - Journal of Environmental Management - A biome-scale assessment of the impact of invasive alien plants on ecosystem services in South Africa

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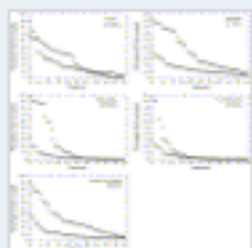
Coral Reef

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alien plant species

Table 3



2.3. Selection of important ecosystem services

2.4. Impacts on surface water runoff

2.5. Impacts on groundwater recharge

2.6. Impacts on grazing

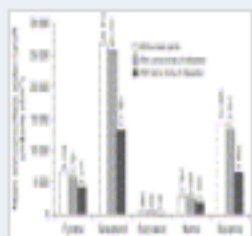
2.7. Impacts on biodiversity

3. Results

3.1. Determination of area at risk from invasion

3.2. Selection of important invasive alien plant species

3.3. Impacts on surface water runoff



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Abstract

This paper reports an assessment of the current and potential impacts of invasive alien plants on selected ecosystem services in South Africa. We used data on the current and potential future distribution of 56 invasive alien plant species to estimate their impact on four services (surface water runoff, groundwater recharge, livestock production and biodiversity) in five terrestrial biomes. The estimated reductions in surface water runoff as a result of current invasions were >3000 million m³ (about 7% of the national total), most of which is from the fynbos (shrubland) and grassland biomes; the potential reductions would be more than eight times greater if invasive alien plants were to occupy the full extent of their potential range. Impacts on groundwater recharge would be less severe, potentially amounting to approximately 1.5% of the estimated maximum reductions in surface water runoff. Reductions in grazing capacity as a result of current levels of invasion amounted to just over 1% of the potential number of livestock that could be supported. However, future impacts could increase to 71%. A 'biodiversity intactness index' (the remaining proportion of pre-modern populations) ranged from 89% to 71% for the five biomes. With the exception of the fynbos biome, current invasions have almost no impact on biodiversity intactness. Under future levels of invasion, however, these intactness values decrease to around 30% for the savanna, fynbos and grassland biomes, but to even lower values (13% and 4%) for the two karoo biomes. Thus, while the current impacts of invasive alien plants are relatively low (with the exception of those on surface water runoff), the future impacts could be very high. While the errors in these estimates are likely to be substantial, the predicted impacts are sufficiently large to suggest that there is serious cause for concern.

Keywords

Biodiversity; Fynbos; Grassland; Grazing; Groundwater; Hydrology; Karoo; Savanna; Water yield

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