



## Coastal reef restoration in temperate waters: counteracting fish habitat loss with the construction of artificial stone reefs

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## Targeted action to restore populations of threatened plant species in the Cape Floristic Region

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South Africa's floristic diversity is incredibly rich with some 20,942 species recorded, two thirds of these are endemic, and found nowhere else in the world. South Africa contains one of the world's six floral Kingdoms and hosts three biological hotspots, including the Cape Floristic Region. In 1726, Dutch Minister and Naturalist, François Valentyn said of the Cape Lowlands: "There is nothing more amazing than to see whole fields of flowers growing wild here of which the colours are so unusually bright and fine that it is pity that they cannot be drawn from life by a skilled artist." Sadly, this is no longer the case, as much of the natural vegetation in this area has been lost or fragmented and associated vegetation types are now Critically Endangered. Nearly a quarter of our plant species are threatened, and we are losing species at an alarming rate, and so, with limited resources and time available, priorities have to be set and action taken for species that require immediate attention for conservation and restoration. SANBI is implementing Target 8 of the South African National Strategy for Plant Conservation through an integrated conservation programme that aims to facilitate a comprehensive approach of integrated conservation strategies, including ex situ living collections, and in situ restoration projects. Examples of this work and of restoration protocols and processes used to restore threatened species will be presented, highlighting the need to prioritise, and work together, to both safeguard and restore these species before they are lost forever."

## Coastal reef restoration in temperate waters: Counteracting fish habitat loss with the construction of artificial stone reefs

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Coastal marine ecosystems are facing increasing levels of degradation worldwide as a consequence of anthropogenic activities. The extraction of marine substrate is particularly damaging as it permanently alters the seabed structure, and recovery is unlikely to occur without human intervention. In Denmark, large-scaled extraction of marine boulders occurred for over a century until it was banned in 2010. Since then, a number of restoration projects have been initiated in an attempt to recover this important habitat type and its functions. In this study, we restored a series of coastal stone reefs in Flensborg Fjord, South Denmark. Field sites were monitored with the use of remote underwater video stations (RUVS) in a before-after control-impact (BACI) experimental design. Artificial reefs were constructed either as a large dense reef or as multiple scattered reefs in an attempt to address the ongoing "Single Large or Several Small" (SLOSS) debate in conservation biology. Our results show that the reef restoration efforts had a significant positive effect on total fish abundance. Species richness was also higher on artificial reefs compared to control sites. In terms of reef design, the single dense reefs promoted the abundance of commercially important species, e.g. codfishes (Gadidae), whereas overall species diversity was higher on scattered reefs. Our study provides pertinent information for future marine habitat assessments and emphasizes the importance of considering reef design when constructing artificial reefs. Efforts to recover important fish habitat worldwide are increasing, highlighting the need for effective restoration methodologies.