

Climate change doubles cost of conserving nature

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Hugging the coastline along the far southwestern tip of the African continent, the Cape Floristic region is one of the world's five Mediterranean biodiversity hotspots. The region is best known for its diversity of plant species, but it is also home to mammals such as the Chacma baboon (*Papio ursinus*). © Conservation International/photo by Tamino Castro

Climate change will make conservation of biodiversity, and all the associated human benefits such as clean water and clean air, more challenging and expensive, with costs increasing by more than 100 percent in some cases, according to three new studies by a group of international researchers convened by Conservation International. Researchers called the studies a "wake-up call" for cost-efficient biodiversity conservation and climate stabilization.

The researchers focused on species and [ecosystems](#) in [South Africa](#),

[Madagascar](#) and California. The results were presented in three papers published together in the journal *Conservation Biology* today under the title Conservation Focus: Costs of Adapting Conservation to Climate Change. The studies are among the first to estimate the costs of conserving biodiversity under the [effects of climate change](#).

"The specific effects of climate change on species in South Africa, Madagascar and California are very different, but the costs of conserving them will certainly increase considerably in all three regions under climate change," said lead author Lee Hannah, senior scientist for climate change biology at Conservation International. "We can have a healthy planet and keep extra costs to a minimum by acting quickly to cut emissions and incorporate climate change into conservation plans."

"This set of studies from around the world is a wake-up call," said Rebecca Shaw, a climate scientist and associate vice president for Environmental Defense Fund. "The truth is that we have been struggling to conserve the nature we depend on for clean air and clean water without climate change. These studies show it is going to get harder and more costly to conserve nature in the future. It is time to get much more creative about inspiring innovative and cost-effective private incentives for conservation to more efficiently sustain our planet's life-support system for our benefit and the benefit of our children."

"Conservation is expensive," said Belinda Reyers, Chief Scientist of Biodiversity and Ecosystem Services at the Council for Scientific and Industrial Research in South Africa, "and will probably become more so as climates change — but considering the existing investments already made in conservation, and the costs of inaction — the sooner we get going the better. Our messages are however, not all doom and gloom, in fact the South African case study highlighted the important role that new approaches to conservation and new partnerships can play in helping reduce these costs."

In Madagascar, one of the most biologically-rich countries in the world, where the vast majority of native forests have been lost, researchers predicted the ranges of where 74 endemic plant species could survive from 2000 to 2080. They found that as climate changes over time, species protected in today's forests will be pushed out into areas where forests are unprotected or gone — as could be the case with the Scott-Elliot capuron (*Rhopalocarpus coriaceus*), a native tree of Madagascar. Restoring forests to avoid extinction of species like this one, they concluded, is harder and more expensive than maintaining existing forest wherever possible. Maintaining existing forests in community-managed areas costs about \$160-576 per hectare, while restoring forests in the same areas would cost six times as much.

"By protecting the plants and animals of its forests, Madagascar is protecting the sources of life-saving medicines, [clean water](#) for agriculture, and jobs for people in tourism," said Jonah Busch, climate and forest economist at Conservation International and lead author of *Climate Change and the Cost of Conserving Species in Madagascar*. "The top conservation priority is to stop ongoing deforestation of the island's last remaining forests to protect its many unique species from climate change."

In California, researchers picked 11 species that occur within a conservation area in the Central Coast of California and projected the costs of conserving those species through 2050 and 2100 under realistic climate change scenarios. The results show that the boundaries of the conservation area would have to be dramatically expanded and that many species will need interventions such as captive breeding and relocation to achieve today's conservation goals in the future under climate change. The costs of achieving these goals were estimated at close to 150 percent of the cost of reaching the same goals with no climate change by 2050, and up to 220 percent by 2100 — at a cost of \$2.63 billion. Even so, some species will not be able to survive the change. "Diverse

conservation strategies that keep working lands open for wildlife to move are important today and will be critical in the future for cost-effective conservation," said Kirk Klausmeyer, a conservation planner for The Nature Conservancy of California.

In South Africa, researchers explored costs associated with options to expand protected areas in the Cape Floristic biodiversity hotspot to safeguard the survival of 316 species of the unique Proteaceae family of flowering plants. A treasure trove of biodiversity of plants, mammals, birds, and other vertebrates and invertebrates found nowhere else in the world, this region has a long and proud history of conservation now under threat from climate and other environmental changes. The study found that protecting sufficient habitat for this family of the Cape Floristic region to be more resilient to climate change could cost over \$1 billion, however by forging contracts with landowners and exploring more cost-efficient avenues to manage habitat, these costs could be reduced significantly.

"Urgent choices need to be made regarding the balance between development and nature that future generations will inherit," said Russell Wise, climate and sustainability economist at CSIRO's Ecosystem Sciences (formerly at the CSIR in South Africa) and lead author of [Costs of Expanding the Network of Protected Areas as a Response to Climate Change](#) in the Cape Floristic Region. "Improving the likelihood of species survival in the Cape Floristic Region over the next few decades will require cost-effective, innovative public-private partnerships and community-based mechanisms that will ensure not only the conservation of this region's amazing wealth of biodiversity, but also the delivery of ecosystem goods and services underpinned by the biodiversity in protected areas."

The three studies were conducted by authors in the following institutions (in alphabetical order): [Conservation](#) International, Council for

Scientific and Industrial Research South Africa, Environmental Defense Fund, Missouri Botanical Garden, Queen's University Belfast, South African National Biodiversity Institute, The Nature Conservancy, University of California Berkeley and University of California Santa Barbara. Financial support was provided by the U.S. National Science Foundation. The studies were published in advance of two major United Nations conferences this year — Rio+20 taking place in Rio de Janeiro, Brazil from June 20-22, 2012, to secure political commitment to poverty alleviation and sustainable development, and the Convention on Biological Diversity in Hyderabad, India from October 8 – 19, 2012, where discussions are to be centered on targets to stop the current species extinction crisis.

"If world leaders want to be effective in both slowing the rate of environmental degradation and helping the poor to prosper now and in the future, they should place [biodiversity conservation](#) at the top of their agendas," Hannah said.

More information: [onlinelibrary.wiley.com/doi/10.1002/1097-4714\(201204\)12:1<1012::10124.x>3.0.CO;2-1](http://onlinelibrary.wiley.com/doi/10.1002/1097-4714(201204)12:1<1012::10124.x>3.0.CO;2-1)

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