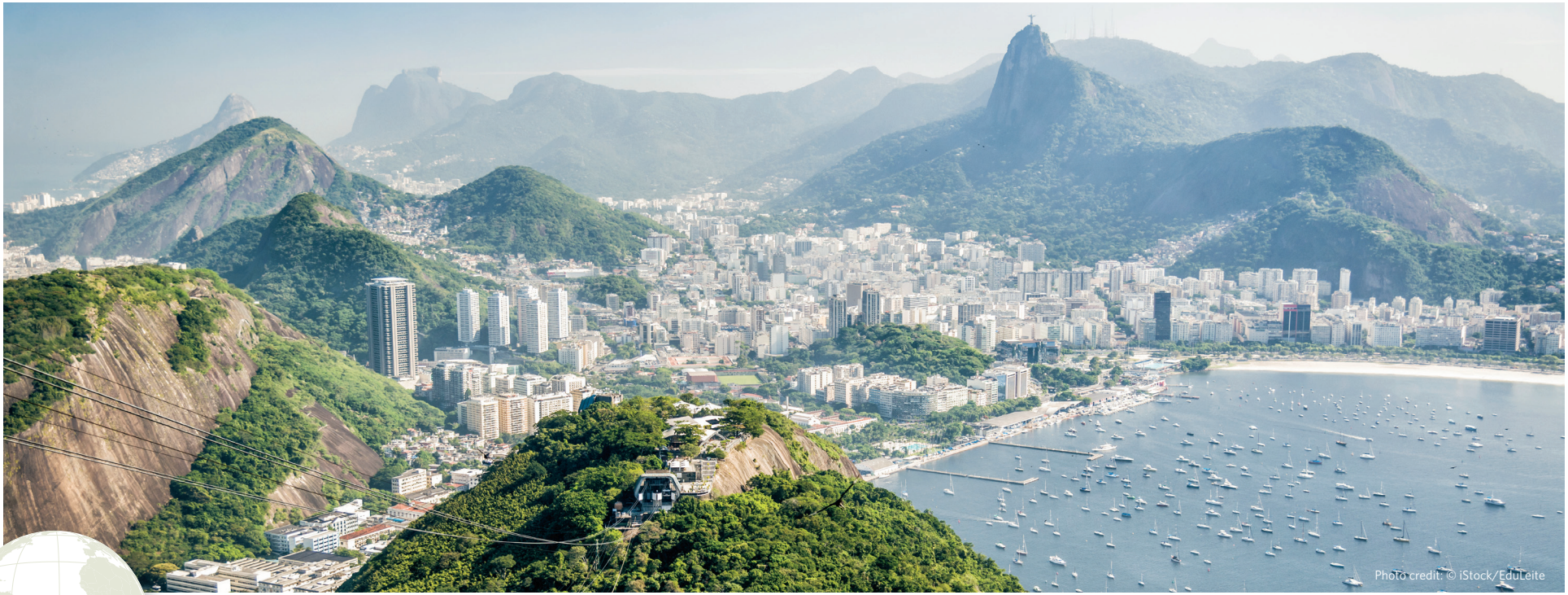
LOCAL SPOTLIGHT

Rio de Janeiro, Brazil—Measuring biodiversity and ecological integrity benefits



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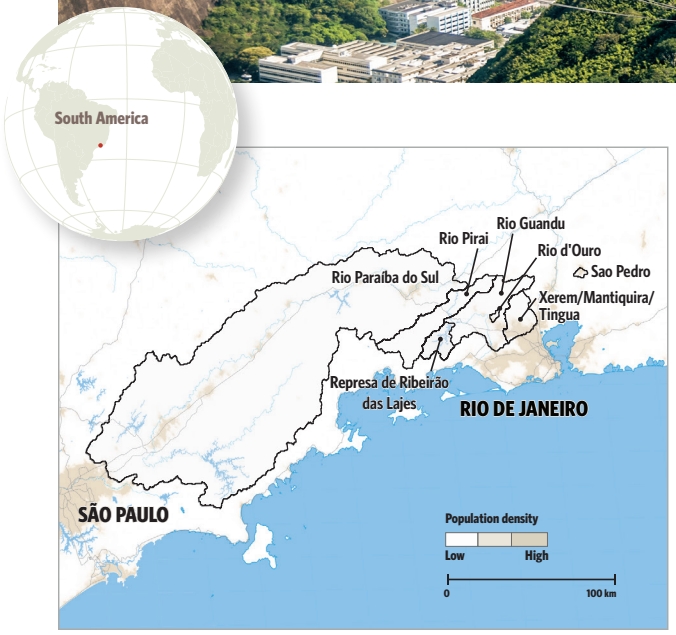

The challenge

As the most visited city in the southern hemisphere, Rio de Janeiro (Rio) is known around the world for its majestic coastline, vibrant culture and the exceptional biodiversity that surrounds it. Such attractions are important drivers of tourism, which can produce a wide range of economic benefits at local, regional and national scales. However, tourism can also make an already thirsty city even thirstier. In Rio, 10 million urban residents each consume almost 300 liters of water each day—well over the national and global averages. The increasing demand for water plays an important role for an already stressed water source. About 80 percent of the water used in Rio is supplied by the Guandu River System, but more than 50 percent of this is lost to leakages and other faults in the transfer system.

The Guandu River watershed's importance as a water source is matched by its importance for sustaining globally significant biodiversity. Rio is surrounded by remnants of the Atlantic Forest, one of the most biologically diverse ecoregions of the world with more than 20,000 species of plants and 2,200 species of mammals, birds, reptiles, amphibians and freshwater fishes (hundreds of which are endemic to the area). Forest loss threatens these species and their habitat. Centuries of agriculture, cattle ranching and urban development have led to the deforestation of almost 90 percent of this ecoregion and have caused intensive sedimentation of water sources. The urgent need for forest protection in the Atlantic Forest is underscored by the current status of the country's endangered species. Approximately 60 percent of all threatened animals in Brazil reside within this ecoregion.

Brazil's challenges are daunting, but the opportunity is clear: the downstream demand for the water services that the upstream watersheds provide can direct financial investments to those areas to reduce water risk, while also protecting the ecological integrity of these biologically diverse regions.

Action and opportunity

While extensive deforestation continues to degrade the Atlantic Forest habitat that supports many endangered species and further threatens Rio's water security, there is a strategic opportunity that can address both risks. The Upper Piraí watershed, where natural vegetation remains relatively intact, directly contributes to the Guandu system and ultimately supplies the city of Rio with 12 percent of its water. To maintain reliable supplies of clean water from this source, The Nature Conservancy and its partners supported the Brazilian National Water Agency and the Guandu Watershed Committee in creating a water fund to compensate local landowners for conserving and restoring forests in the headwater catchments. Over the course of about seven years, the Rio de Janeiro water fund (Water and Forest Producer Project) has distributed US$110,000 to 62 landowners for reforesting almost 500 hectares of degraded land and for protecting an additional 3,000 hectares of existing forest.

While maintaining base flows and reducing sediment loads were priority objectives for the water fund's stakeholders, the fund's managers also recognized the importance of investing in a robust biodiversity monitoring program. Surveys indicated the high biological value of these watersheds and the significant benefits that could be achieved through source water protection. Monitoring to date has focused on describing baseline conditions at the start of the water fund's activity implementation.

Endangered fish species

The National Museum of Rio de Janeiro has conducted baseline surveys to inventory fish species at 15 sites across the upper Piraí watershed. Among the survey findings were several species found only in the region and a thriving population of an endangered fish species.

Threatened bird species

The National Museum has also been conducting bird surveys in the watershed. A total of 291 bird species have been documented, including 10 that are globally threatened and 38 that had never been observed previously in the region. Importantly, the survey also documented 32 bird species in forest corridors that had been restored, 11 of which were forest-restricted birds and six being typical understory species. These findings indicate the potential for biodiversity conservation as a result of restoration interventions. Part of that success is linked to the presence of intact forest remnants that are able to serve as seed sources for the recolonization of restored tracts.

Terrestrial plant species

Monitoring of plant species in remnant native forest and restoration plots has recorded a total of 374 species representing 64 families of trees and shrubs, of which two are rare species and one is a potentially new undescribed species. A comparison of satellite imagery from 2004 and 2009 has shown an initial increase in the extent of secondary stage vegetation, signaling movement toward forest ecosystems able to support native forest-adapted species.

Investments in monitoring are critical to measuring the impacts of source water protection activities and to learning how to improve the design and implementation of those activities in the future. Future monitoring in the Guandu watershed will benefit the water fund as it adaptively manages its program, and it should generate findings of relevance to other forest restoration efforts in the region and elsewhere in the world.

RIO DE JANEIRO DASHBOARD

Water fund start date	Number of upstream participants to date	Number of potential downstream beneficiaries	Number of partners to date	Primary funding sources	Activities	Anticipated co-benefits
2009	46	Between 1,000,000 and 5,000,000	6	Private NGO/Foundation National Water Agency Public (Charging for use of water and other sources)