

## Tropical cloud forests filter half of all surface water within dam watersheds

April 25 2013



The results of a four-year study, published in the journal *Ecosystem Services* this month, has revealed that cloud forests are responsible for filtering almost half of all surface water in tropical dam watersheds, despite covering just 4.4% of the tropical dam watersheds they inhabit globally. The data, which offers context to the relative productivity and importance of cloud forests to freshwater stores, energy production and biodiversity health, provides land managers and decision makers with critical information, which can be used to evaluate the high economic and ecologic value of cloud forests to healthy, sustainable societies. The study will also help to define priority areas for conservation within dam watersheds to optimize the natural benefits from cloud forests as well as the performance of dams.



Together, a team of scientists from Conservation International and King's College London mapped more than 20,000 dam locations throughout the tropics across Africa, Asia, Australia, Central America and South America as part of the King's College London Tropical Database of Dams (KCL-TDD) - including small dams that had never before been mapped. These smaller dams, researchers concluded, are pivotal to both the supply of freshwater in rural areas as well as in the development of low-impact, small-scale hydropower. Their inclusion in the study contributes to what is arguably the most comprehensive georeferenced dam census across <u>tropical areas</u> yet achieved.

"The volume of water that <u>cloud forests</u> are able to filter shows that their conservation can be part of a low-cost and high-reward strategy to improve the performance of dams," said lead author Dr. Leonardo Sáenz, Director of Eco-hydrology for Conservation International. "Demonstrating the value of cloud forests in terms of their ecosystem services is fundamental to create the real incentives and market signals that are needed to prevent their deforestation and to promote restoration".

As multifunctional ecosystems, cloud forests generate a wealth of natural capital benefits for the countries or regions where they thrive, providing fresh water, capturing and storing atmospheric carbon and supporting biological diversity. For example: although they vary continent-to-continent, cloud forests are among the richest places for flowering plant species, amphibians, birds, reptiles and are home to endangered species such as the Andean Spectacled Bear and the mountain tapir. At the same time, cloud forests are among the most threatened forest ecosystems of the planet due to global climate change, deforestation and conversion to pasture, with an estimated 55% of the world's cloud forests, over 2.7 million square kilometers – an area roughly the size of Argentina, lost to date.



"The relationship cloud forests have with dams is important because 41% of the global extent of cloud forests falls within tropical dam <u>watersheds</u>," Dr. Saenz said. "If these forests are degraded so too would be the effectiveness of these dams."

Cloud forest loss can be very damaging to the operation of dams. Their loss can increase the sedimentation of reservoirs and accelerate turbine damage, which can reduce economic performance. Dams - particularly in tropical climates - serve to provide power, irrigation for agriculture, flood control and drinking water. A follow up study on how the loss of cloud forests can significantly reduce the economic performance of hydropower projects is awaiting publication later this spring.

Dr. Mark Mulligan of King's College London and a co-author said, "Going forward, by recognizing that the supply to dams is from their upstream watersheds and facilitating better management by the often poor, marginal farming communities that occupy these steep tropical mountain sides, we can diversify livelihoods, reduce poverty, lessen agricultural pressure on the remaining cloud forests and at the same time improve the chances that our infrastructural investment pays off. The results of the study will allow local communities to recognize the service these forests provide and help to facilitate better forest management."

"Protection of cloud forests can be a very efficient and productive natural infrastructure solution to improve the effectiveness of dams," said Dr. Fabio Arjona, Executive Director of CI Colombia. According to the study Colombia has more than 170 dams, between large and small, of which around 10% are dedicated to hydropower, and an estimated 20,150 square kilometers cloud forests. "These findings can help countries, such as Colombia, optimize its current 10 gigawatt hydroelectric power capacity and produce more energy by protecting critical cloud forests and restoring them."



"Through solid science and strategic partnerships, CI is working to create a new development paradigm that places nature's value at the very center of decision making, which respects nature and unlocks the critical <u>ecosystem services</u> upon which people - often the poor – depend," Sáenz said. "We are reaching a point where we no longer have to choose between misperceptions of nature's needs versus people's needs. These are not mutually exclusive, and in fact, must be jointly considered in order to create and maintain healthy, lasting societies."

Provided by Conservation International

Citation: Tropical cloud forests filter half of all surface water within dam watersheds (2013, April 25) retrieved 27 April 2024 from <u>https://phys.org/news/2013-04-tropical-cloud-forests-filter-surface.html</u>

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