Colombia's tropical alpine ecosystems (páramos) are at risk.

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Mining threatens Colombian ecosystems

The American tropics are home to about 10% of Earth's species and several biodiversity hotspots of global importance for conservation (*1*, *2*), including high-elevation tropical alpine ecosystems (páramos) and Andean forests. These ecosystems deliver numerous services, such as providing water to millions of people (*3*). They are also extremely sensitive to perturbations and difficult to restore (*4*). Despite their importance and fragility, a goldmining company has proposed a project that will put Colombia's montane and páramos environments at risk.

Minesa goldmining company plans to build one of the world's largest underground mines in Santurbán, Santander, Colombia (*5*, *6*). The goal of the megamining project is to extract 255 million grams of gold over 20 years, and the extractive company claims that the sale of this gold will bring about U.S.$2 billion in taxes to Colombia (*7*). However, an environmental impact assessment (*8*) shows that those benefits come with a cost: The study forecasts involuntary displacement of human settlements and large-scale habitat fragmentation and loss (*8*), thus threatening endemic flora and fauna with extinction. Similar large-scale extractive projects in Latin America have produced a severe negative impact on farming communities, affected water and air quality, and led to violent social conflicts (*9*).

Recent environmental policies in Colombia have fostered unparalleled conservation of remote and species-rich areas (*10*). However, the biodiverse sites threatened by deforestation and mining, including most of the Andean cloud forests and páramos, are disproportionately excluded from the country's protected areas (*10*). We urge environmental authorities to take the necessary action to stop the Santurbán goldmining project and instead promote the active preservation and restoration of the páramos and Andean forests, particularly in this biologically important area of the country.

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Ocean deoxygenation: Time for action

In their Review "Declining oxygen in the global ocean and coastal waters" (5 January, p. 46), D. Breitburg *et al.* summarize evidence showing that oxygen has declined in the open ocean and in coastal waters over the past 50 years as a result of increased greenhouse gas emissions and nutrient discharges to coastal waters. We also urgently need more data on the role and speed of microbial engagement, including how deoxygenation is altering microbial pathways and rates of processes within the water column and the deep ocean (*1*). Given that more than half of

the oxygen produced on Earth is derived from phytoplankton, decline of oxygen in the ocean concerns life on land as well. We cannot afford to wait before taking action.

Breitburg *et al.* call for a "raised awareness" of the deoxygenation phenomenon. We contend that such awareness must extend to all facets of society, beyond the pages of scientific journals. Intuitive, interactive, dynamic online maps and visualizations (*2, 3*) will be key to generating the societal and political will toward the effective management needed to ultimately reverse deoxygenation. The global trend by nations of securing large areas of ocean as "blue parks" (*4*) is cause for hope because protecting nature protects our existence.

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Amazon sugar cane: A threat to the forest

Amazonia's vegetation ranges from dense forests to savanna areas, and the region's forests and their biodiversity are vulnerable to the ongoing advance of land-use change for agriculture and ranching (*1*). In Brazil, cultivation of sugar cane is currently prohibited in the Mato Grosso wetlands (pantanal) and Amazonia regions (*2*). The number of sugar cane plantations has vastly increased during the past decade, and Brazil is the world's largest sugar cane producer (*3*). The cane plantations are projected to increase due to demand for biofuels (*4*). Sugar cane plantations have been shown to threaten biodiversity, their effects extending beyond the cultivated areas to adjacent forests (*5*). The Brazilian Senate has scheduled a decision for 2018 on a bill that proposes opening the Amazon region to sugar cane (*6*). This crop would supposedly be planted in degraded fields, in natural Amazonian grasslands, and in the biodiversity hotspots of the central Brazilian savannas (cerrado). Because of the potential catastrophic effects on the Amazonian forest, the biodiversity and ecosystem services of South America, and the agricultural productivity of Brazil, we urge the President to veto this bill.

The threat of sugar cane is just one among Amazonia's many strong drivers of destruction (*4*). Amazonian forests play an important role in the climate of South America, with substantial rainfall

Brazil may decide to expand sugar cane production.

contributions to agriculture in southeastern Brazil (*7, 8*). In the medium and long term, forest loss would threaten Brazil's own agricultural and biofuel production, given that the area with the greatest agricultural production is in the south and southeast of the country (*9*) and depends on water vapor from the Amazon region (*7, 8*). Political decision-makers and national and international institutions that fund large agricultural enterprises should not be fooled by the sweet taste of a new agricultural frontier to be exploited. They should instead be guided by the need to avoid loss of Amazonia's biodiversity, genetic heritage, and valuable ecosystem services, including climate regulation for the area with the largest population and agricultural production in South America (*9, 10*).

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TECHNICAL COMMENT ABSTRACTS

Comment on "Enhanced water permeability and tunable ion selectivity in subnanometer carbon nanotube porins"

Andreas Horner and Peter Pohl

Tunuguntla *et al.* (Reports, 25 August 2017, p. 792) report that permeation of single-file water occurs faster through carbon nanotubes than through aquaporins. We show that this conclusion violates fundamental thermodynamic laws: Because of its much lower activation energy, aquaporin-mediated water transport must be orders of magnitude faster. Leakage at the nanotube-membrane interface may explain the discrepancy.
Full text: dx.doi.org/10.1126/science.aap9173

Response to Comment on "Enhanced water permeability and tunable ion selectivity in subnanometer carbon nanotube porins"

Ramya H. Tunuguntla, Yuliang Zhang, Robert Y. Henley, Yun-Chiao Yao, T. Anh Pham, Meni Wanunu, Aleksandr Noy

Horner and Pohl argue that high water transport rates reported for carbon nanotube porins (CNTPs) originate from leakage at the nanotube-bilayer interface. Our results and new experimental evidence are consistent with transport through the nanotube pores and rule out a defect-mediated transport mechanism. Mechanistic origins of the high Arrhenius factor that we reported for narrow CNTPs at pH 8 require further investigation.
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