



Proposed legislation in Brazil could compromise conservation efforts in the Cerrado.

Edited by Jennifer Sills

Brazil's protected areas under threat

Brazil has relished a reputation of international leadership in biodiversity conservation. The country not only ranks first in megadiversity (1) but has one of the most extensive protected area (PA) networks (2). PAs protect biodiversity and ecosystem services (3), mitigating climate change (4). However, a recently proposed law (5) aims to repeal the legal status of newly established strict PAs (which allow only conservation-related use) for which land ownership conflicts are not resolved within 5 years of PA creation. If the law is passed, all future PAs will be affected, as well as many current PAs. The retroactive effect of this law could compromise both terrestrial and marine PAs, including those in the Amazon and in two biodiversity hotspots: the Cerrado and the Atlantic Forest. In practice, the law would prevent the expansion of the PA network because socioeconomic conflicts take much longer than 5 years to be fully settled in Brazil. This setback has no precedent.

This law is in conflict with Article 225 of the Brazilian constitution, which states that “all have the right to an ecologically balanced environment” (6), and represents the culmination of a long-standing series of attacks on Brazil's biodiversity PA network (6). Such actions are at odds with scientific evidence suggesting the need for expanding, rather than decreasing, PAs (7). Recently, the nontechnical

appointment of a candidate for president of the Instituto Chico Mendes de Conservação da Biodiversidade (the national PA authority) resulted in a nationwide protest organized by PA staff across Brazil (8). Ill-informed policies jeopardize Brazilian international leadership in conservation, pose substantial global threats to our ability to mitigate climatic change and secure ecosystem services, and undermine attempts to achieve the goals established by the Convention on Biological Diversity (9). We urge Brazil's legislators and decision-makers to turn down this unseemly proposal.

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British Columbia's wildlife model reform

British Columbia (BC), Canada—a continental hotspot of wildlife (1) and a Canadian hotspot of endangered species (2)—recently committed an unprecedented \$14 million to reassess their wildlife management approach (3). The province's justifications for reform are laudable, including implementing the United Nations Declaration on the Rights of Indigenous Peoples (4), addressing changing societal expectations about wildlife, and engaging a broad spectrum of the public. This shift in strategy would mark a substantial departure from the prevailing focus in North America, where wildlife is managed primarily for hunters (5). Drawing on the diverse perspectives, rights, and rich knowledge of numerous other members of the public who also value wildlife—including indigenous peoples, conservationists, scientists—could provide a unique opportunity for transformation.

Reassessing the fundamental scientific underpinnings of wildlife management would also provide continental leadership. Measurable objectives, evidence, transparency, and independent review are often missing from wildlife management across Canada and the United States (6). Ushering these important characteristics of research into practice would substantially improve the rigor in BC and make the province a model for elsewhere.

Translating BC's aspirations into tangible change will require independent oversight.

Engaging citizens interested in cultural and other nonconsumptive values of wildlife could help to prevent the small subset of the population who hunt recreationally and its powerful lobbies from unduly influencing the government's decisions. Although this would entail bringing together often discordant groups, common interests already exist. For example, hunting advocates disagreed with conservation groups and most of the BC public about whether the recently banned grizzly bear hunt was acceptable (7), but agree about the importance of securing habitat amidst unrelenting pressures from extractive industries [e.g., (8, 9)].

BC stands at an historic moment where foresighted wildlife management reform could be imminent. The needed ingredients for transformation are available, including considerable untapped insight from a diverse and keen public and a framework for more rigorous wildlife management (6). Whether the potential of this moment is seized or squandered will have important ramifications for wildlife across North America for years to come.

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Canada begins a great ganja experiment

Countries worldwide struggle to manage the societal impacts of illicit drug consumption, and limited research is available to inform policy because scientists encounter



The legalization of recreational marijuana in Canada represents an important research opportunity.

difficulties acquiring drugs and conducting experiments (1). With the passage of the Cannabis Act (2), Canada becomes the first major economy to legalize marijuana for recreational use.

Canada seeks to prevent marijuana access to youth, promote public health and safety, and reduce strain on the criminal justice system by reversing the prohibitionist system currently in effect worldwide (2). Marijuana advocates have long argued that legalization of recreational use could lessen black market sales, decrease the power of criminal organizations, reduce incarcerations, save on enforcement costs for drugs, improve product safety, and provide jobs and revenue (3, 4). It has been difficult to find evidence to confirm or refute these claims, because for decades, marijuana research and access to materials representative of those on the underground market have been thwarted by governmental regulations (1).

With a substantial research budget (5), Canada can now become a trailblazer of marijuana studies. Federal legalization permits investigations into policy effects on crime, changes in user consumption, and the economics of marijuana, areas previously recalcitrant to research. Researchers will have access to more diverse germplasm for exploring medical applications, elucidating basic marijuana biology, and breeding improved industrial hemp varieties for the agriculture sector. Research should begin soon; without the establishment of strong baseline data, the opportunity to fully investigate transformations instigated by the new policy could be squandered.

Canadians are forging a new path in marijuana regulation, access, and research. However, permitting recreational drug use violates international treaties (6), to which Canada remains a party. The severity of United Nations sanctions on Canada, if

any, will dictate whether other countries give marijuana legalization a chance. How long this opportunity to research key tenets of marijuana policy will remain viable is unknown. Researchers should exploit this opportunity to conduct politically unbiased studies, prioritizing those that accurately assess claims made by both advocates and opponents of legalizing recreational marijuana.

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TECHNICAL COMMENT ABSTRACTS

Comment on "Genomic signals of selection predict climate-driven population declines in a migratory bird"

Matthew C. Fitzpatrick, Stephen R. Keller, Katie E. Lotterhos

Bay *et al.* (Reports, 5 January 2018, p. 83) combine genomics, spatial modeling, and future climate scenarios to examine yellow warbler population trends in response to climate change, and they suggest that their methods can inform conservation. We discuss problems in their statistical analyses and explain why the concept of "genomic vulnerability" needs further validation before application to real-world conservation problems.

Full text: dx.doi.org/10.1126/science.aat7279

Response to Comment on "Genomic signals of selection predict climate-driven population declines in a migratory bird"

Rachael A. Bay, Ryan J. Harrigan, Wolfgang Buermann, Vinh Le Underwood, H. Lisle Gibbs, Thomas B. Smith, Kristen Ruegg

Fitzpatrick *et al.* discuss issues that they had with analyses and interpretation in our recent manuscript on genomic correlates of climate in yellow warblers. We provide evidence that our findings would not change with different analysis and maintain that our study represents a promising direction for integrating the potential for climate adaptation as one of many tools in conservation management.

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