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Amazonian manatee threatened with extinction by massive dam-building plan in the Amazon

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Main Text:

In their Policy Forum “Balancing hydropower and biodiversity in the Amazon, Congo, and Mekong” (8 January p. 128-129), K.O. Winemiller et al. call for more ‘sophisticated and holistic hydropower planning’ in the Amazon, Congo and Mekong basins (1). This is indeed incredibly important, because as it is now these very complex ecosystems are being managed in a highly reductionist manner – a socio-environmental disaster is the natural future scenario of current actions. In *Tropical dams: To build or not to build?* (29 January p. 456), P. Fearnside goes deeper in the matter by arguing that ‘it is essential to face whether such a massive dam-building plan should exist’, given its large and fundamentally irreversible environmental and social impacts and small regional benefits (2). With regards to the Amazon basin, the plan includes dams or dam cascades in virtually all large and most medium-size rivers (1–3). We think P. Fearnside poses a very important point that must not be overlooked, and here we present an additional reason for reconsidering this massive dam-building plan in the Amazon: the threat of putting Amazonian manatees (*Trichechus inunguis*) on a direct path to extinction in the wild.

Amazonian manatees are aquatic and range throughout lowland Amazon basin (4). In typical droughts, the lowland basin transforms into disconnected and shallow water bodies, so manatees take refuge in rias (naturally blocked river stretches) or large perennial lakes (5–7). While migrating to or within refuges, they are commonly hunted. In extreme droughts, when refuges become shallower, mass slaughtering occur – as in 1963, 2005 and 2010 (5, 6, pers. obs.).

Once abundant (8), after 200 years of commercial slaughter this slow-breeding mammal (9) suffered a population collapse (10) and is now vulnerable to extinction (4). Current threats include habitat loss and degradation, climate change, increasing calf mortality and hunting that sometimes involves new and sophisticated techniques (4).

If implemented, the massive dam-building plan would partition the species into many small and confined populations. Each small population would suffer from inbreeding, loss of evolutionary potential (11) and increased vulnerability to slaughter, especially during natural or

dam-induced extreme droughts. The dynamics of flooding would be substantially controlled by the dams, and it is unreasonable to assume that biodiversity would be favored over energy production in years of extreme droughts or floods. Overall, habitat deterioration would hugely intensify (12), further impacting manatee survival. It is not hard to see that this would create a perfect setting for pervasive local extinctions of the small and confined Amazonian manatee populations. The natural outcome would be a second species-level population collapse, from which recovery would be unlikely given that local socio-economic-environmental conditions will also have deteriorated further.

The Amazon without the iconic Amazonian manatee is as the Arctic without Polar bears or Savannas without African lions. The pursuit of economic growth by South America in general, and Brazil in particular, should not come at the expense of the extinction of the Amazonian manatee. More broadly, it is imperative and urgent to discuss ways of developing the region that appreciate the myriad values (monetary and non-monetary) of one of the greatest natural treasures that still exist on our planet.

References and Notes:

1. K. O. Winemiller *et al.*, Balancing hydropower and biodiversity in the Amazon, Congo, and Mekong. *Science* **351**, 128–129 (2016).
2. [P. M. Fearnside, Environmental and Social Impacts of Hydroelectric Dams in Brazilian Amazonia: Implications for the Aluminum Industry. *World Dev.* **77**, 48–65 \(2016\).](#)
3. Brazil, Programa para Aceleração do Crescimento - PAC-II, Eixo Energia (Program for the Acceleration of Growth, Energy Component). *Federal Government, Ministry of Planning* (2016), (available at <http://www.pac.gov.br/infraestrutura-energetica>).
4. M. Marmontel, “*Trichechus inunguis*. The IUCN Red List of Threatened Species. Version 2008. www.iucnredlist.org. Accessed 10 January 2016.” (2008), (available at www.iucnredlist.org).
5. J. Thornback, M. Jenkins, *THE IUCN MAMMAL RED DATA BOOK Part 1: Threatened mammalian taxa of the Americas and the Australasian zoogeographic region (excluding Cetacea)* (The International Union for Conservation of Nature (IUCN) and United Nations Environment Program (UNEP), Gland, Switzerland, 1982; <https://portals.iucn.org/library/node/5841>).
6. E. M. Arraut *et al.*, The lesser of two evils: seasonal migrations of Amazonian manatees in the Western Amazon. *J. Zool.* **280**, 247–256 (2010).
7. M. Marmontel, M. G. Guterres, A. C. O. Meirelles, J. Calvimontes, F. Rosas, paper presented in the *X Reunión de Trabajo de Especialistas en Mamíferos Acuáticos y 4o Congreso de la Sociedad Latinoamericana de Especialistas em Mamíferos Acuáticos*, Valdivia, Chile, 2002.
8. C. Acuña, *Nuevo descubrimiento del Gran Rio de Las Amazonas*. Imprensa do Reino, Madri, 1641).
9. [F. C. W. Rosas, Biology, conservation and status of the Amazonian manatee *Trichechus inunguis*. *Mamm. Rev.* **24**, 49–59 \(1994\).](#)

10. [D. P. Domning, Commercial exploitation of manatees *Trichechus* in Brazil c. 1785–1973. *Biol Conserv.* **22**, 101–126 \(1982\).](#)
11. [R. Frankham, C. J. A. Bradshaw, B. W. Brook, Genetics in conservation management: Revised recommendations for the 50/500 rules, Red List criteria and population viability analyses. *Biol. Conserv.* **170**, 56–63 \(2014\).](#)
12. [W. J. Junk, Current state of knowledge regarding South America wetlands and their future under global climate change. *Aquat. Sci.* **75**, 113–131 \(2013\).](#)