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Using REDD To Promote Biodiversity-sensitive Forest Fire Management Schemes

Alex Hoover

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*by Alex Hoover**

Fire is an integral element of healthy forest ecosystems.[1] Many plant and animal species naturally rely on fire to make room for new growth, encourage reproduction, and provide vital nutrients.[2] However, overly frequent or intense fires can inhibit a forest ecosystem's ability to rehabilitate, impoverishing the ecosystem's biodiversity.[3] In many cases, human activities disrupt natural fire frequency or intensity.[4]

At an international level, there is an institutional awareness of the nexus between forest fire management and biodiversity.[5] At a national level, however, fire management schemes are fragmented, overly complex, or lacking specificity, making it difficult to manage fire responsibly.[6] To bridge this gap, the international community should use funding mechanisms like the United Nations Reducing Emissions from Deforestation and Forest Degradation Program ("REDD") to encourage the implementation of biodiversity-sensitive forest fire management schemes. This article provides a brief explanation of fire's role in maintaining forest biodiversity and makes specific recommendations on how REDD can encourage better forest fire management.

Fire's effect on forest biodiversity varies depending on the type of forest, its intensity, and the frequency with which fires occur.[7] Semi-regular, low-intensity fires can have positive impacts on biodiversity in all types of forests. In temperate forests, many plant and animal species are dependent on regular fires of low intensity.[8] Studies show that aggressive fire suppression in North America caused a decline in grizzly bear populations, a result of fewer fire-dependent, berry-producing shrubs that support bear populations.[9]

In boreal forests, fire is an important mechanism to clear biomass from the forest floor.[10] A build-up of organic material due to fire suppression in boreal forests can prevent the melting of permafrost.[11] As a result, the forest maintains a thick layer of permafrost that impoverishes the soil and decreases productivity of plants.[12]

Tropical forests can also benefit from fire.[13] Some studies suggest that fire in tropical forests can increase the size and diversity of small animal populations.[14] Similarly, certain tree species in Southeast Asia exhibit fire-resistant traits, such as thick bark, an ability to heal fire scars, and re-sprouting.[15] The presence of regular, low-intensity fires during dry seasons can promote these fire-resistant traits and reduce the threat of larger forest fires in the long-term.[16]

On the other end of the scale, frequent or high-intensity fires are destructive across all forest types.[17] A boreal forest's ability to regenerate after a forest fire is limited by high intensity fires.[18] Severe fires in Russia's forests in 1998 destroyed the "ecological function" of roughly 2 million hectares of forest.[19]

In tropical forests, areas subject to frequent fires because of human activity like logging are more vulnerable to fires in the future.[20] Recurring fires can also reduce the size and density of surviving forest patches and can kill regenerating plant species.[21] The risk of forest fires is exasperated by slow rehabilitation in tropical forests, where as long as seventy years are necessary to recover from even moderately destructive fires.[22]

To promote fire management schemes that allow for natural fire cycles, the international community should encourage the use of biodiversity-sensitive practices through REDD. Very generally, REDD is an effort to prevent the degradation of forests as carbon sinks through national cooperation and financing.[23] To achieve this goal, REDD provides financing to developing nations in exchange for preservation of forests.[24] In its "REDD Plus" Program, the UN expands the scope of REDD to include sustainable management, conservation, and forest enhancement.[25] As world leaders seek to expand REDD to play a more active role in curbing global climate change,[26] they should prioritize maintaining biodiversity.

Current REDD projects in Brazil take into account biodiversity issues and briefly address the need to properly manage fire.[27] Within the context of the Amazon there are few benefits to fire, so a "no-burn" policy is appropriate. In fire-dependent forest ecosystems, a more nuanced approach is necessary. If REDD projects fail to adequately consider fire's role in maintaining biodiversity, they may incentivize the suppression of a forest's natural fire cycle.[28]

To avoid the risk of perverse incentives, REDD Project financing should promote biodiversity-sensitive fire management in member nations. Once proper management is in place, payments for forest preservation could be timed in a manner that recognizes the natural destruction and rehabilitation seen in regular fire cycles. Under such a system, a REDD Project would avoid situations in which nations were penalized with reduced funds because forests were allowed to naturally burn.

Too often, human activities such as fire suppression and land-use changes disrupt natural fire cycles, causing a decline in biodiversity. The international community should use financial mechanisms such as REDD to promote biodiversity-sensitive fire management schemes.

Endnotes: Using REDD to Promote Biodiversity-Sensitive Forest Fire Management Schemes *continued on page 53*

* *Alex Hoover is a J.D. candidate, May 2010, at American University Washington College of Law.*

[1] U.N. FAO, FIRE MANAGEMENT: VOLUNTARY GUIDELINES 11 (FAO 2006), *available at* www.fao.org/forestry/site/35853/en [hereinafter VOLUNTARY GUIDELINES].

[2] SECRETARIAT OF THE CONVENTION ON BIOLOGICAL DIVERSITY, IMPACT OF HUMAN-CAUSED FIRES ON BIODIVERSITY AND ECOSYSTEM FUNCTIONING, AND THEIR CAUSES IN TROPICAL, TEMPERATE AND BOREAL FOREST BIOMES 14 (2001), *available at* http://www.cbd.int/doc/publications/cbd-ts-05.pdf [hereinafter IMPACT OF HUMAN-CAUSED FIRES ON BIODIVERSITY].

[3] VOLUNTARY GUIDELINES, *supra* note 1, at 3.

[4] U.N. FAO, FIRE MANAGEMENT GLOBAL ASSESSMENT 2006 x (FAO 2007), *available at* ftp://ftp.fao.org/docrep/fao/009/A0969E/A0969E00.pdf.

[5] U.N. FAO, *Fire Management: Forests and Fire*, March 6, 2010, http://www.fao.org/forestry/firemanagement/en/ (last visited April 20, 2010) ("Although fire has been the primary agent of forest degradation, as a natural process it serves an important function in maintaining the health of certain ecosystems.").

[6] ELISA MORGERA & MARIA TERESA CIRELLI, U.N. FAO, FOREST FIRES AND THE LAW: A GUIDE TO NATIONAL DRAFTERS BASED ON FIRE MANAGEMENT VOLUNTARY GUIDES 9-10 (2009), *available at* ftp://ftp.fao.org/docrep/fao/011/i0488e/i0488e00.pdf.

[7] IMPACT OF HUMAN-CAUSED FIRES ON BIODIVERSITY, *supra* note 2, at 8.

[8] *See id*. at 14.

[9] *See* Robert Nasi et al., *Forest Fire and Biological Diversity*, 53 UNASYLVA 36, 39 (2002), *available at* ftp://ftp.fao.org/docrep/fao/004/y3582e/y3582e05.pdf.

[10] *See id*.

[11] IMPACT OF HUMAN-CAUSED FIRES ON BIODIVERSITY, *supra* note 2, at 17.

[12] *Id.*

[13] Mark A. Cochrane, *Fire Science for Rainforests*, 421 NATURE 913, 913 (2003), *available at* http://goes.msu.edu/publications/pdfs_ps/CGCEO%2079.pdf.

[14] *Id*.

[15] IMPACT OF HUMAN-CAUSED FIRES ON BIODIVERSITY, *supra* note 2, at 17.

[16] *Id*. at 9.

[17] *See id.* at 17(boreal); *id.* at 15 (temperate); *id.* at 10 (tropical).

[18] *See id.* at 17.

[19] *See id.*

[20] *See* Cochrane, *supra* note 13, at 915, box 2 (explaining that increased logging can give rise to frequent fires by reducing canopy cover, which releases moisture, and increasing presence of dead biomass).

[21] *Id*. at 913.

[22] IMPACT OF HUMAN-CAUSED FIRES ON BIODIVERSITY, *supra* note 2, at 11.

[23] UN-REDD PROGRAMME SECRETARIAT, UN REDD YEAR IN REVIEW 2 (2009), *available at* http://www.un-redd.org/NewsCentre/2009_Year_In_Review/tabid/3499/language/en-US/Default.aspx.

[24] *See id.* at 4.

[25] *See id.*

[26] *See* Copenhagen Accord art. 6, Dec. 18, 2009, FCCC/CP/2009/11/Add.1, Decision 2/CP.15 (expressing non-binding support for the expansion of REDD plus).

[27] AMAZONAS SUSTAINABLE FOUNDATION, THE JUMA SUSTAINABLE DEVELOPMENT RESERVE PROJECT: REDUCING GREENHOUSE GAS EMISSIONS FROM DEFORESTATION IN THE STATE OF AMAZONAS, BRAZIL 114 (2008), *available at* http://www.climate-standards.org/projects/files/juma/PDD_Juma_Reserve_RED_Project_v5_0.pdf.

[28] Alan Grainger et al., *Biodiversity and REDD at Copenhagen*, 19 CURRENT BIOLOGY 974, 975 (2009), *available at* http://download.cell.com/current-biology/pdf/PIIS096098220901776X.pdf (advocating the use of biodiversity assessments in REDD national plans to avoid REDD policies that harm biodiversity).