Oral (Invited Symposium: The Effects of Frontier Expansion on the Aquatic Ecology and Biodiversity of the Amazon River; organizers: David G. Mcgrath & Robin Abell)

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ENVIRONMENTAL IMPACTS OF HYDROELECTRIC DAMS IN THE AMAZON

Hydroelectric reservoirs Aquatic ecosystems are radically changed by hydroelectric dams. Dams block migration of fish and turtles. Dams also retain sediments that would otherwise be deposited in floodplains. The water released from the turbines has little or no oxygen, making downstream river stretches inhospitable for many fish species. The change in flooding regime affects both natural and agricultural ecosystems in downstream floodplains. Many Amazonian dams have very large vertical drawdowns, thereby exposing vast areas of land at low water. The planned 6140 km^2 Altamira (formerly Babaquara) Dam on the Xingu River would have a vertical fluctuation of 23 m. At low water the drawdown zone at Altamira (Babaquara) would be 3580 km^2, larger than the entire Balbina reservoir! Soft vegetation grows rapidly in the drawdown zone, only to decompose under anaerobic conditions on the bottom of the reservoir when the water level subsequently rises. This provides a permanent source of methane, with a significant impact on global warming. A smaller source of renewable carbon comes from macrophytes growing in the reservoir. In the first years after reservoir filling, substantial carbon inputs come from non-renewable sources such as labile soil C stocks. In addition to methane, the non-renewable stocks generate CO_2, especially above-water decay of forest biomass. Total impact is substantial: the Belo Monte/Altamira (Babaquara) complex would have an annual average net release of CO_2-equivalent carbon over the first ten years that is larger than the current emission of the city of São Paulo.

Biodiversity, Dams, Deforestation, Hydroelectric Dams, Reservoirs, Greenhouse gases

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