

## From burned forest to streams water: fire effects on water quality and nutrient fluxes

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**ABSTRACT** – The effects of fire on riparian zones and their consequences to freshwater ecosystem are a subject that is poorly studied. In Brazilian Cerrado, riparian zones can be more sensitive to fire than the other vegetation formations, due to a less evident vegetation adaptation, generating consequences to nutrient cycling and streams water quality. Given the critical importance of freshwater ecosystems to natural communities and human population, the main objectives of this study were to analyze how wildfires change the water quality of small streams and nutrient fluxes between terrestrial and aquatic ecosystems in an Environmental Protection Area (APA) in the Brazilian Cerrado during the dry and wet seasons. We collected samples of stream water, atmospheric deposition, runoff and groundwater in riparian forests related to five streams (Pitoco, Roncador, Taquara, Cabeça de Veado and Capetinga) and evaluated changes in nutrient concentrations (Na<sup>+</sup>, Ca<sup>+</sup>, Mg<sup>2+</sup>, K<sup>+</sup>, Fe<sup>2+</sup>, Si<sup>4+</sup>, SO<sub>4</sub><sup>-</sup>, NO<sub>2</sub><sup>-</sup>, NO<sub>3</sub><sup>-</sup>, PO<sub>4</sub><sup>-</sup>, Cl<sup>-</sup>, NH<sub>4</sub><sup>+</sup>) and water quality parameters (pH, conductivity and alkalinity) during 12 months after a wildfire (year 2011) that burned an area of about 140km<sup>2</sup>. We performed multiple Generalized Linear Models (GLM) using water quality parameters and nutrients concentration as dependent variables and streams, season and time since fire (months) as independent ones. Our results show that water pH, alkalinity and conductivity on all compartments and stream water were mainly affected by the time since fire (months) and wet season. The concentration of nitrogen dissolved inorganic forms are mainly affected by wet season on stream water and, the main effects on NO<sub>2</sub>-runoff solution concentration are affected by streams sites, showing that other differences among sites are important. In relation to anions, we observed that concentration on streams water are affected by the time since fire and, the phosphate concentration changes mainly in stream water and runoff solution. Cations concentration are significantly different in streams water, being the wet season the major driver of this changes. The changes on water quality and nutrient cycle are significantly affected by wet season and time since fire, showing that these factors are important to the ecosystem resilience after a wildfire of native riparian forest and small streams.

**Keywords:** Cerrado; ecosystem; freshwater; savannah; Wildfire

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