

## Assessing Prescribed Burn Severity in the Wetlands of the Paraná River - Argentina

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**Abstract :** Latin America stands at the front of climate change impacts, with forecasts projecting accelerated temperature and sea level rises compared to the global average. These changes are set to trigger a cascade of effects, including coastal retreat, intensified droughts in some nations, and heightened flood risks in others. In Argentina, wildfires historically affected forests, but since 2004, wetland fires have emerged as a pressing concern. By 2021, the wetlands of the Paraná River faced a dangerous situation. In fact, during the year 2021, a high-risk scenario was naturally formed in the wetlands of the Paraná River, in Argentina. Very low water levels in the rivers, and excessive standing dead plant material (fuel), triggered most of the fires recorded in the vast wetland region of the Paraná during 2020-2021. During 2008 fire events devastated nearly 15% of the Paraná Delta, and by late 2021 new fires burned more than 300,000 ha of these same wetlands. Therefore, the goal of this work is to explore remote sensing tools to monitor environmental conditions and the severity of prescribed burns in the Paraná River wetlands. Thus, two prescribed burning experiments were carried out in the study area (31°40' 05'' S, 60° 34' 40'' W) during September 2023. The first experiment was carried out on Sept. 13th, in a plot of 0.5 ha which dominant vegetation were *Echinochloa* sp., and *Thalia*, while the second trial was done on Sept 29th in a plot of 0.7 ha, next to the first burned parcel; here the dominant vegetation species were *Echinochloa* sp. and *Solanum glaucophyllum*. Field campaigns were conducted between September 8th and November 8th to assess the severity of the prescribed burns. Flight surveys were conducted utilizing a DJI® Inspire II drone equipped with a Sentera® NDVI camera. Then, burn severity was quantified by analyzing images captured by the Sentera camera along with data from the Sentinel 2 satellite mission. This involved subtracting the NDVI images obtained before and after the burn experiments. The results from both data sources demonstrate a highly heterogeneous impact of fire within the patch. Mean severity values obtained with drone NDVI images of the first experience were about 0.16 and 0.18 with Sentinel images. For the second experiment, mean values obtained with the drone were approximately 0.17 and 0.16 with Sentinel images. Thus, most of the pixels showed low fire severity and only a few pixels presented moderated burn severity, based on the wildfire scale. The undisturbed plots maintained consistent mean NDVI values throughout the experiments. Moreover, the severity assessment of each experiment revealed that the vegetation was not completely dry, despite experiencing extreme drought conditions.

**Keywords :** prescribed-burn, severity, NDVI, wetlands

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