

MEASURING CHANGES TO FLOODPLAINS AFTER SERIAL DAMMING OF THE TOCANTINS RIVER IN THE EASTERN AMAZON

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Riparian forests are critical ecotones linking aquatic and terrestrial habitats, providing ecosystem services including sediment control and nutrient regulation. Riparian forest function is intimately linked to river hydrology and floodplain dynamics. The Tocantins River in the eastern Amazon currently has 7 mega-dams along its course with 2 more proposed. As these dams alter the hydrology of the river, it is expected that the riparian vegetation will respond to these hydrological alterations. To understand large-scale and cumulative impacts of multiple dams on floodplains of the Tocantins, we quantify the landscape scale changes in floodplain extent, flood timing, and hydroperiod near the Peixe Angical Dam. Because riparian forests are also impacted by climate and land use change, we developed linear models to examine the impacts of these drivers in addition to dams. We use water level data collected by the Agencia Nacional das Aguas from the 1970s to the present to create daily floodplain maps. We then compared these maps before and after damming to determine whether significant changes occurred. Additionally, we monitored precipitation and land cover change throughout the study area during the same period to control for effects of climate and land cover change.

Preliminary analysis shows that after installation of the Serra da Mesa dam, 1.41 million square meters of the study area no longer flooded, and an addition 1.38 million square meters of the floodplain was inundated for less time. These changes were also spatially and temporally explicit. During the dry season, 190,800 square meters was inundated for an extra eight days after the installation of the upstream impoundment dam while in the wet season, the floodplain became drier. These changes were not linked to changes in precipitation as the climate did not significantly change within the region of interest during the study period.

PRESENTER BIO: Christine Swanson is a PhD candidate in Forest Resources and Conservation. Her research links hydrology to forest change within Amazonian riparian forests. Her current work is sponsored by the Future Investigators in NASA Earth and Space Science grant, the UF Water Institute, and the UF Informatics Institute.