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Fire regimes and vegetation change in tropical northern Australia during the late-Holocene

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This study explores the impact of human occupation and abandonment on fire regimes and vegetation communities in the South Wellesley Islands, Gulf of Carpentaria, tropical northern Australia, using charcoal and pollen analysis from four sediment records. Pollen analysis from wetland sediments reveal vegetation succession from mangrove communities to hypersaline mudflats and open woodlands occurred during the late-Holocene. Aquatic species replaced salt tolerant species as the prograding shoreline and dune development formed the Marralda wetlands by 800 cal a BP on the south east coast of Bentinck Island. Wetlands developed on the north and west coast by 500 and 450 cal a BP, respectively. The timing of wetland initiation indicates localised late-Holocene sea level regression, stabilisation and coastal plain development in the Gulf of Carpentaria.

Wetland initiation encouraged permanent human occupation of the South Wellesley archipelago, with ongoing archaeological research finding permanent occupation in the last 1500 years, followed by a significant increase in sites from 700 years ago, which peaks over the last 300 years. Macro-charcoal (>125μm) accumulation rates provide a record of fire intensity and frequency across the Island. Both local and regional fire events increase in the last 700 years as traditional owners occupied the Island, with local fires occurring every 104 and 74 years on average (N= 4 and 5 respectively). In the 1950's traditional Indigenous Kaiadilt fire management practices ceased, with the frequency and peak magnitude of fire events significantly increasing and vegetation communities becoming more open. The South Wellesley Islands were unoccupied until the 1980's and were not influenced by European occupation. This study of an Island ecosystem during the late-Holocene provides insight into the effect of human presence and fire regimes on vegetation composition and distribution in a fire resilient environment.