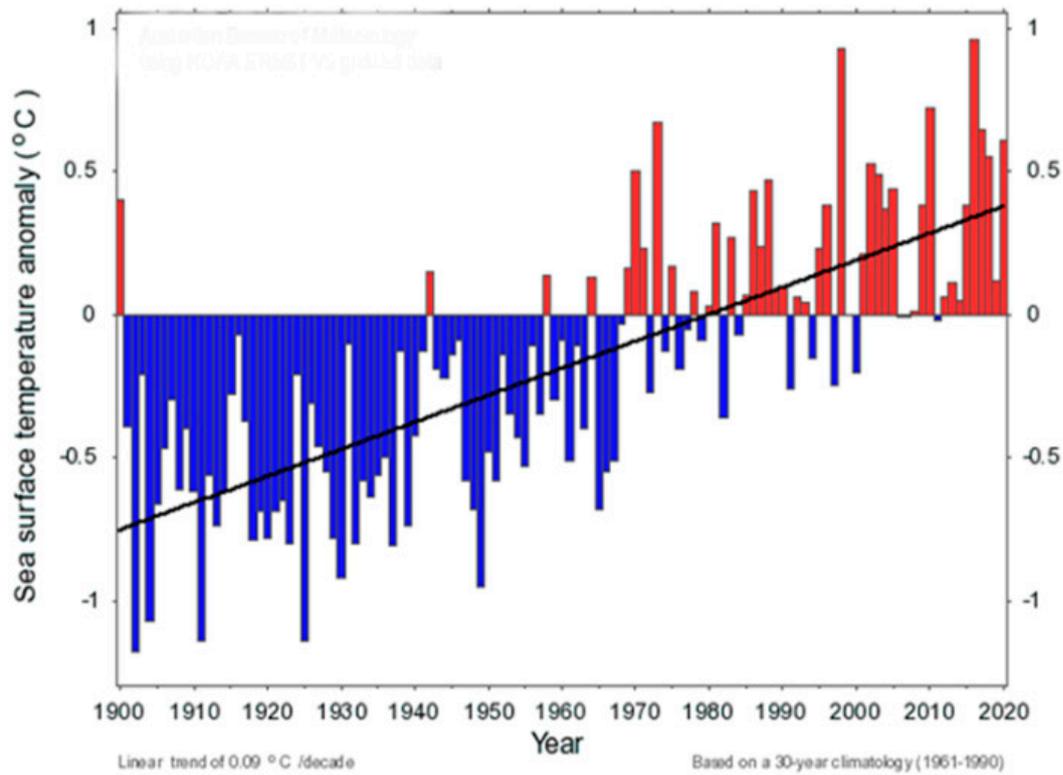
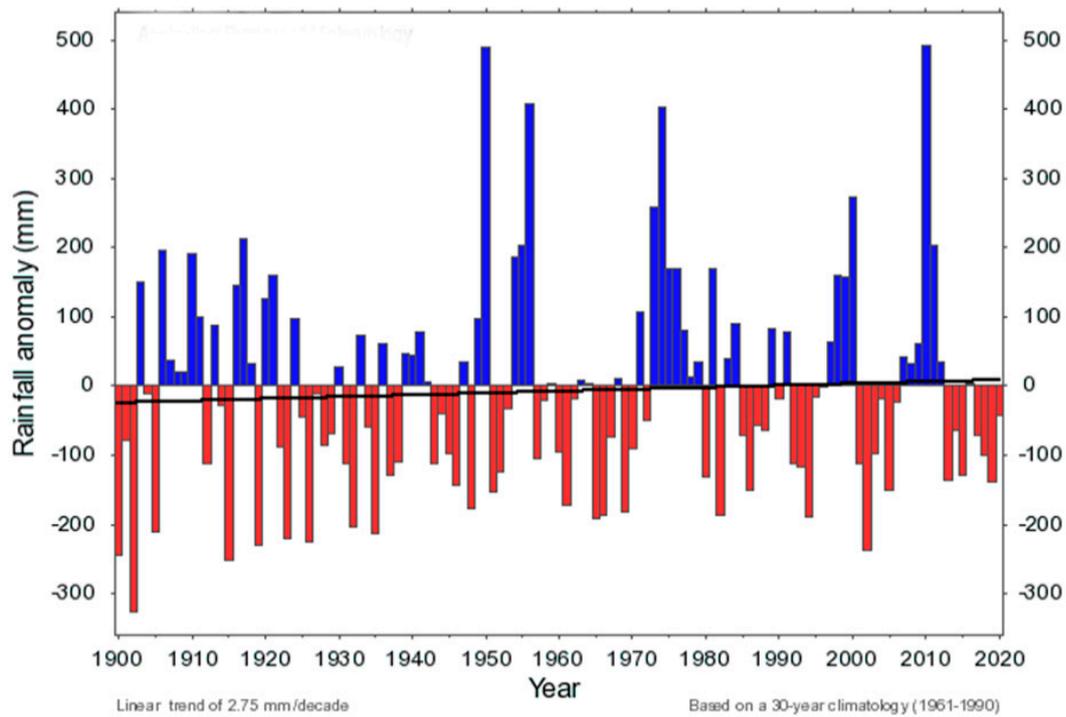


# Supplementary Materials: Mangrove Forest Cover and Phenology with Landsat Dense Time Series in Central Queensland, Australia

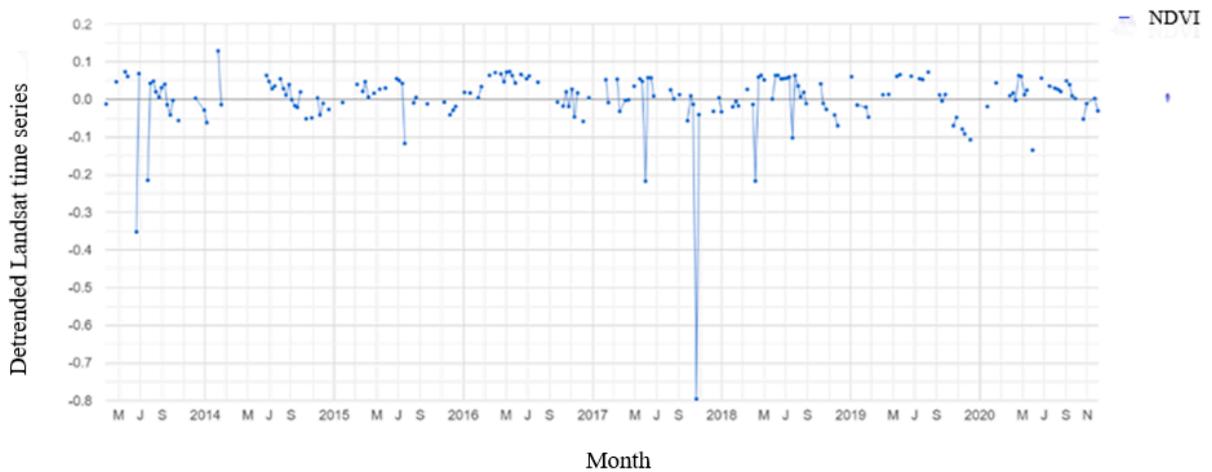
Debbie Chamberlain, Stuart Phinn and Hugh P. Possingham



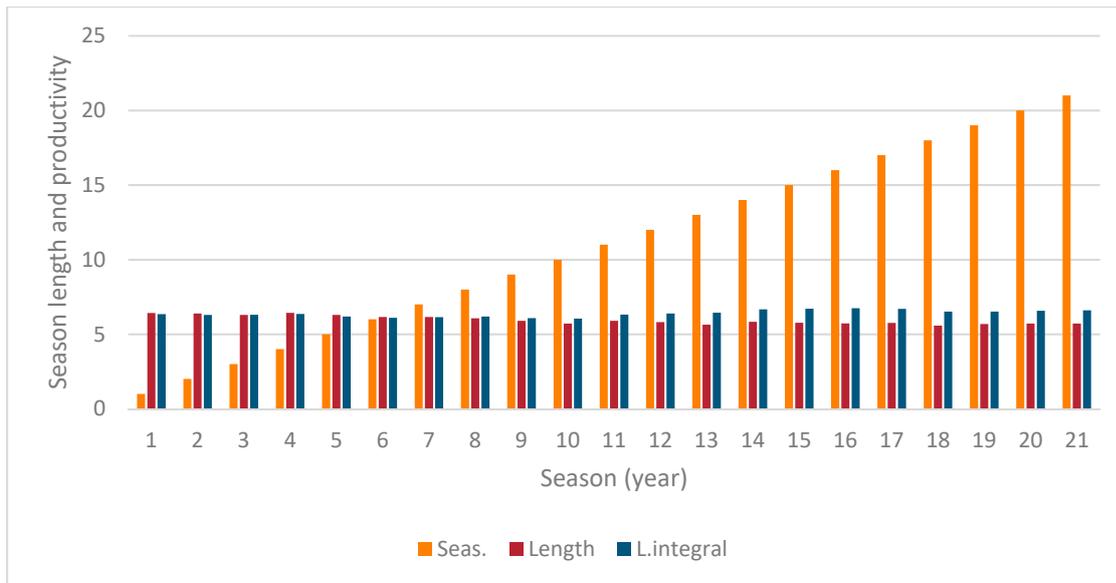
**Figure S1.** Annual sea surface temperature anomaly for the Great Barrier Reef (1999-2020) from Australian Bureau of Meteorology using NOAA ERSST V5 gridded data.



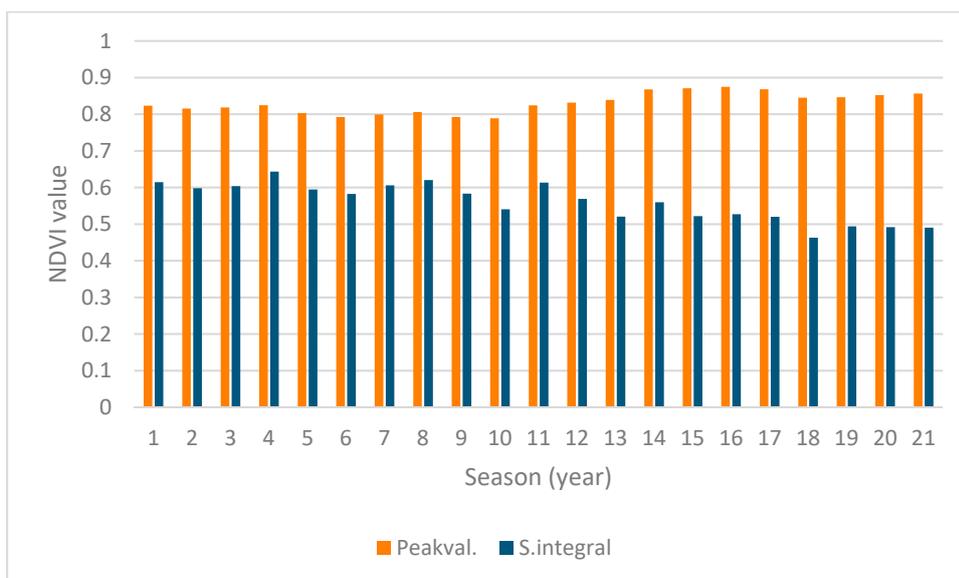
**Figure S2.** Annual rainfall anomaly for Queensland (1900-2020) from Australian Bureau of Meteorology.



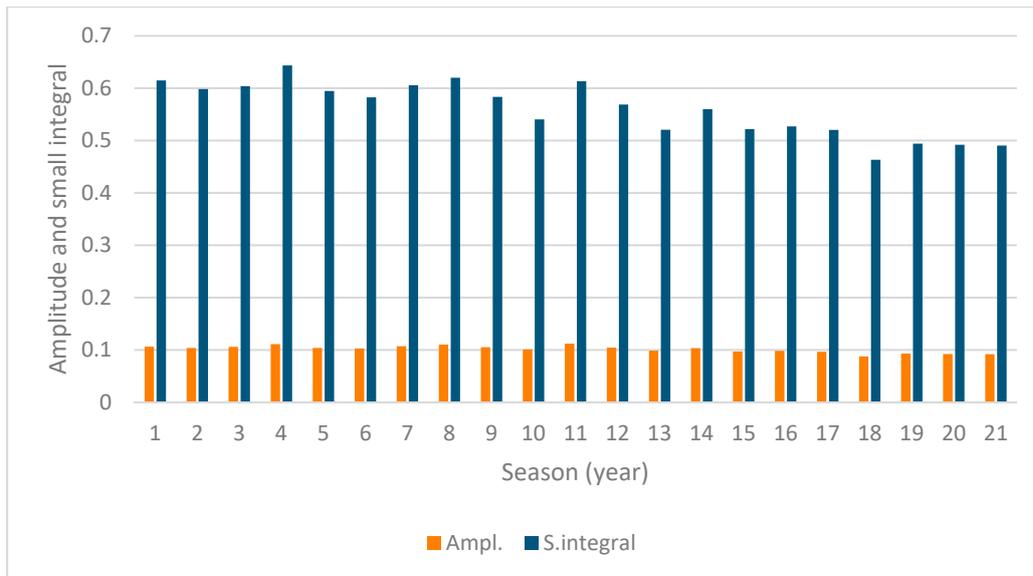
**Figure S3.** Linear regression detrended time series of all available (2012-2020) Landsat 8 imagery with NDVI for the mid-section of the study region, Bowen to Shoalwater and Corio Bays Area Ramsar Wetland, Central Queensland.



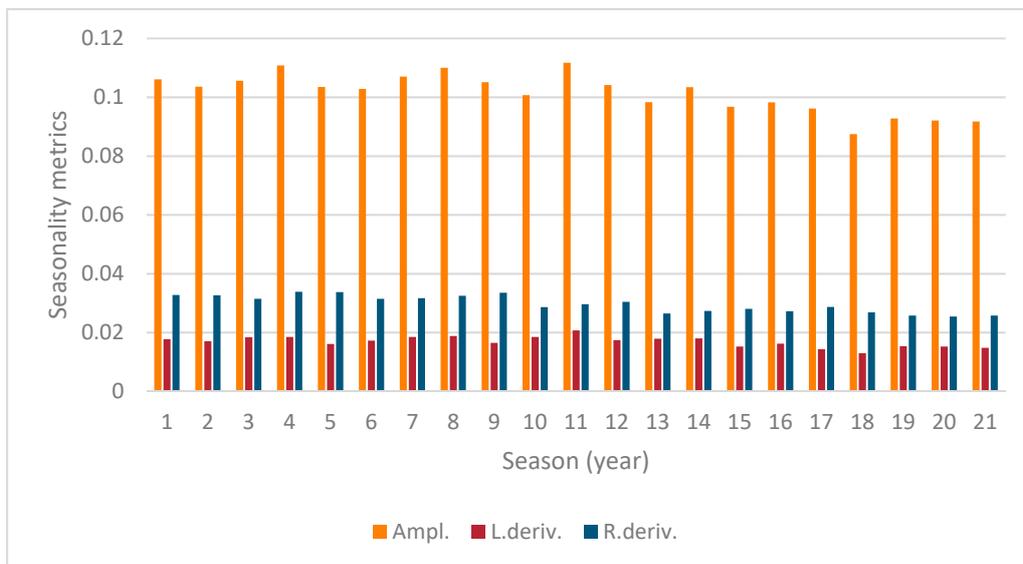
**Figure S4.** Length of season and large integral (total productivity in the annual cycle) in the time series (1999-2020) for the mid-section of our study region, Bowen to Shoalwater and Corio Bays Area Ramsar Wetland, Central Queensland.



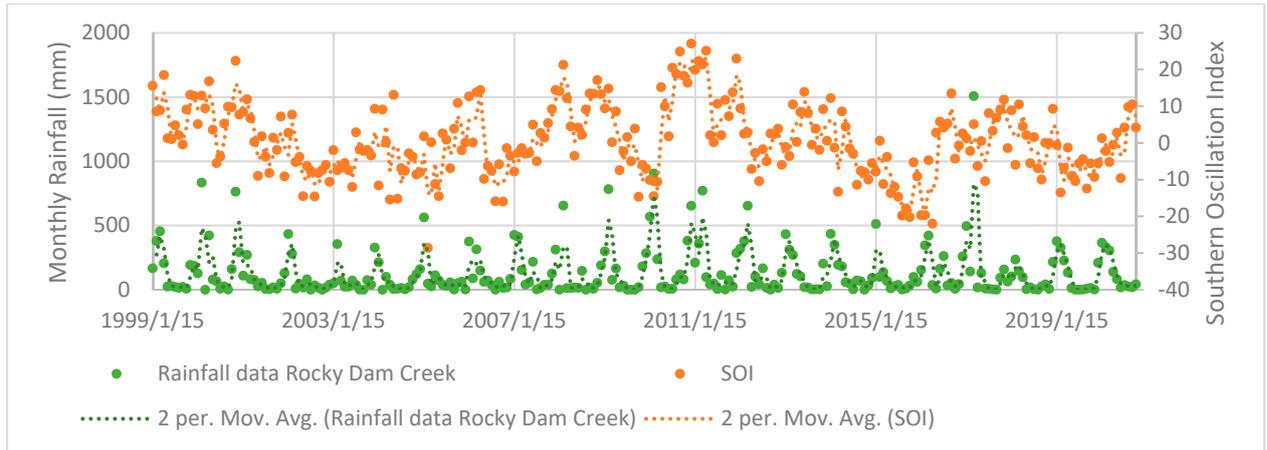
**Figure S5.** The peak NDVI value (maximum recorded NDVI value in the time series) and small integral (the difference between the function describing the season and the base level from season start to end) in the time series (1999-2020) for the mid-section of our study region, Bowen to Shoalwater and Corio Bays Area Ramsar Wetland.



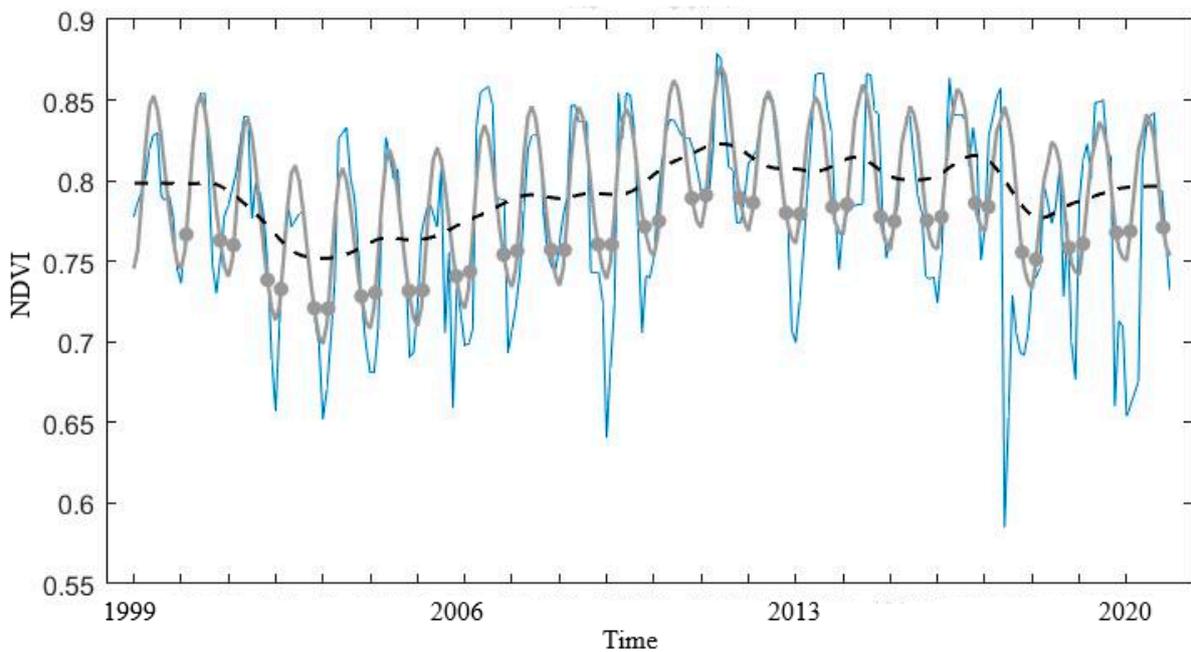
**Figure S6.** Amplitude (the range between the maximum NDVI and the base level or the maximum increase in canopy photosynthetic activity above the baseline) and the small integral (the difference between the function describing the season and the base level from season start to end) in the time series (1999-2020) for the mid-section of our study region, Bowen to Shoalwater and Corio Bays Area Ramsar Wetland.



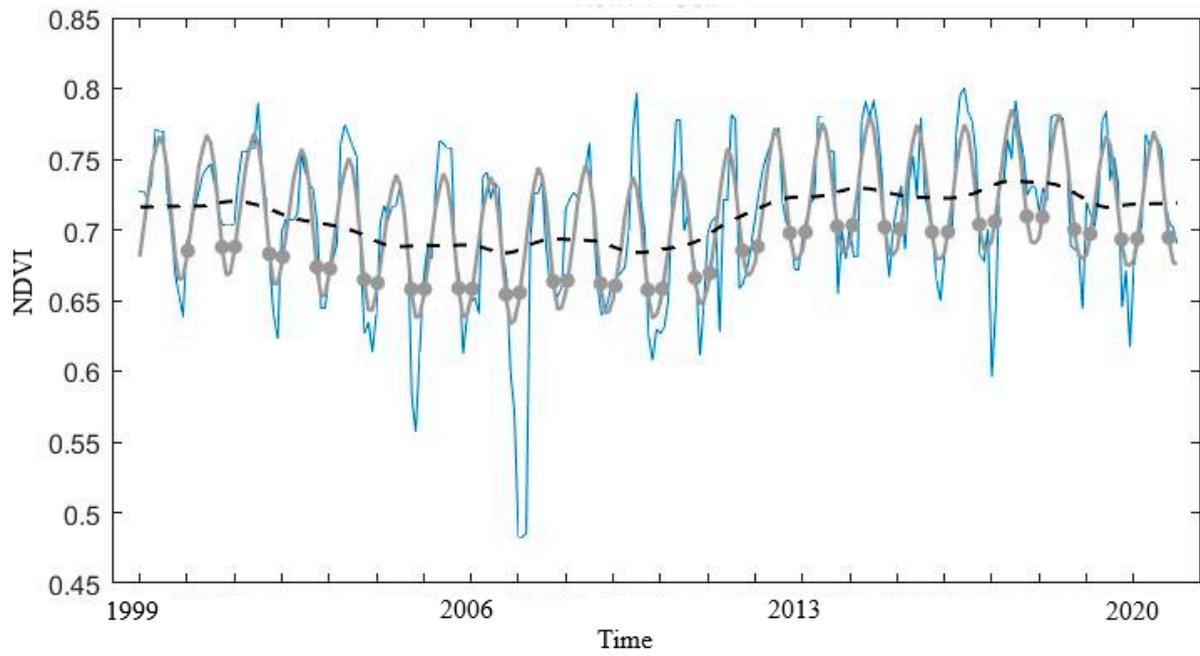
**Figure S7.** Season year (1999-2020) with seasonal metrics from the Savitzky-Golay filter in TIMESAT, Ampl. (amplitude), L.deriv. (growth rate), R.deriv. (rate of senescence) for the mid-section of our study region, Bowen to Shoalwater and Corio Bays Area Ramsar Wetland.



**Figure S8.** Southern Oscillation Index and rainfall trendlines for the mid-section of our study region, Rocky Dam Creek/Cape Palmerston National Park, rainfall data gathered from Koumala Station (station number: 33038).



**Figure S9.** Mangrove forest seasonal trend decomposition in TIMESAT with Landsat NDVI data and dense time-series 1999-2020, northern section of our study region, Repulse Bay, black line indicates the seasonal trend, grey dots display the start and end of the growing season, Central Queensland.



**Figure S10.** Mangrove forest seasonal trend decomposition in TIMESAT with Landsat NDVI data and dense time-series 1999-2020, southern section of our study region, Herbert Creek bordering Shoalwater and Corio Bays Area Ramsar Wetland, black line indicates the seasonal trend, grey dots display the start and end of the growing season, Central Queensland.