

Figure 1: Time series of total precipitation, salinity, pH, and phosphate for Bangs Lake, Grand Bay reserve. Vertical green bars indicate a heavy rain event in April 2005 and hurricane Isaac in August 2012. Salinity and pH include a loess smooth to reduce variability. Orthophosphate is colored by event categories in relation to the vertical green bars. E1A: event 1 acute, E1C: event 1 chronic, NI: non-impact, E2A: event 2 acute, E2C: event 2 chronic.

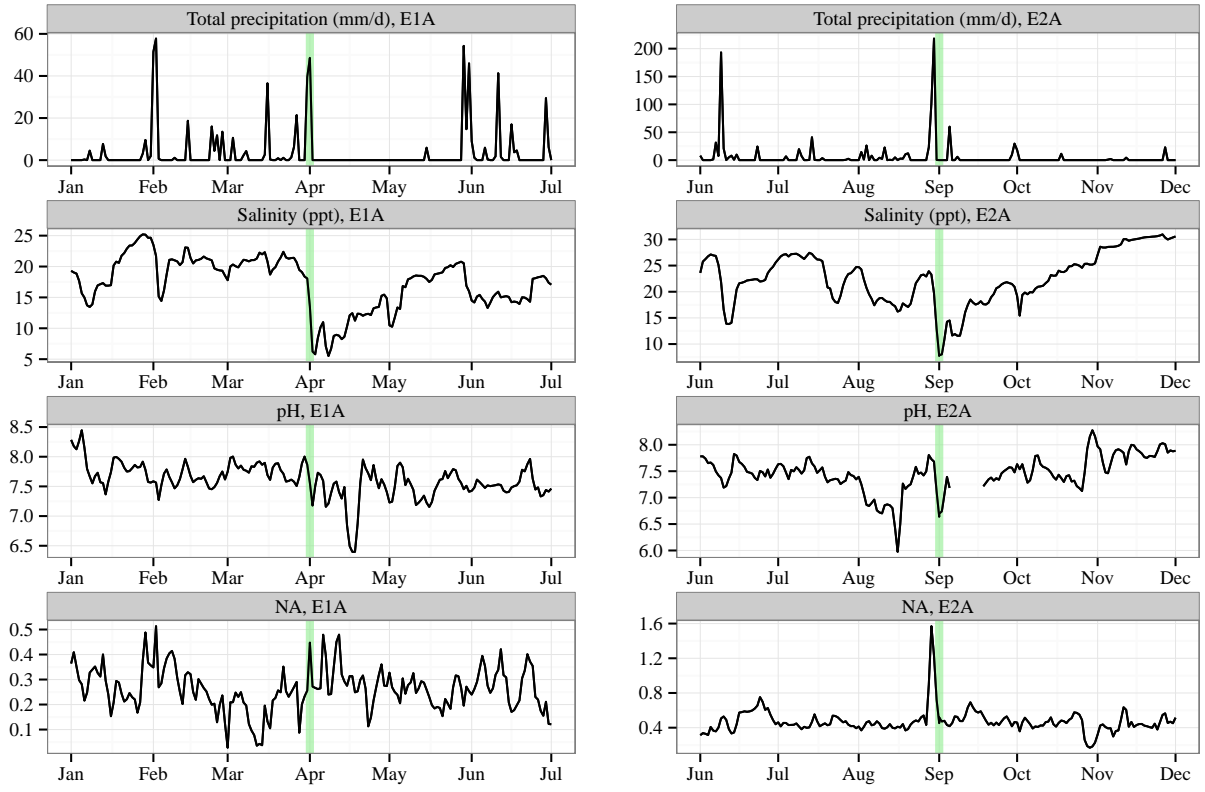


Figure 2: Time series of total precipitation, salinity, and pH for Bangs Lake, Grand Bay reserve. Plots show six month windows centered (green line) around a heavy rain event in April 2005 and hurricane Isaac in August 2012. E1A: event 1 acute, E2A: event 2 acute.

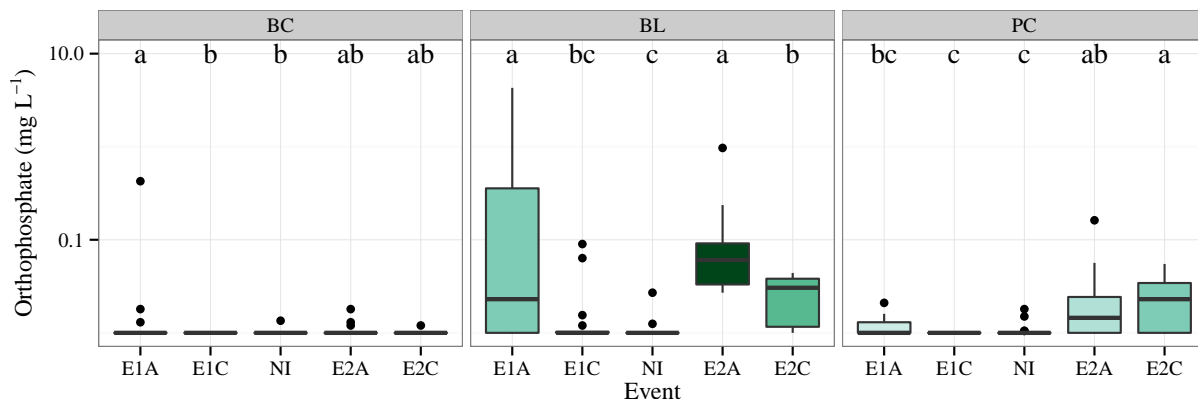


Figure 3: Boxplot summaries by event of monthly orthophosphate data at Bayou Cumbest (BC), Bangs Lake (BL), and Point aux Chenes (PC) sites in Grand Bay. Letters indicate events with significantly different events based on Tukey multiple comparison analysis within each site. Boxes represent the interquartile range (IQR, 25<sup>th</sup> to 75<sup>th</sup> percentile) with the median as the middle horizontal line. Outliers are present beyond whiskers (1.5·IQR). Boxes are shaded by medians between sites. E1A: event 1 acute, E1C: event 1 chronic, NI: non-impact, E2A: event 2 acute, E2C: event 2 chronic.

Table 1: Results of cross-correlation analyses comparing water quality time series between sites at Grand Bay during the two acute event periods. Values for tidal height (m), pH, and salinity (ppt) are the lags in the compared time series between sites at which the maximum correlation was observed. Negative lags indicate observations were leading at the first site relative to the second, whereas positive lags indicate observations lagged at the first site relative to the second. One lag is thirty minutes.

Site comparisons	First acute event (E1A)		Second acute event (E2A)	
	Lag	Correlation	Lag	Correlation
<b>Tidal height</b>				
BC - BL	0	0.97	0	0.99
BC - PC	1	0.95	1	0.70
BL - PC	1	0.94	1	0.68
<b>pH</b>				
BC - BL	1	0.54	0	0.52
BC - PC	1	0.30	0	0.45
BL - PC	0	0.60	1	0.58
<b>Salinity</b>				
BC - BL	0	0.85	0	0.91
BC - PC	3	0.58	40	0.67
BL - PC	6	0.87	40	0.81

BC: Bayou Cumbest, BL: Bangs Lake, PC: Point aux Chenes

Table 2: Results of cross-correlation analyses comparing water quality time series between sites at Grand Bay during the two acute event periods. Seasonal components of each time series are removed. Values for pH and salinity (ppt) are the lags in the compared time series between sites at which the maximum correlation was observed. Negative lags indicate observations were leading at the first site relative to the second, whereas positive lags indicate observations lagged at the first site relative to the second. One lag is thirty minutes.

Site comparisons	First acute event (E1A)		Second acute event (E2A)	
	Lag	Correlation	Lag	Correlation
<b>pH</b>				
BC - BL	1	0.54	1	0.21
BC - PC	4	0.18	-1	0.14
BL - PC	-1	0.48	-2	0.40
<b>Salinity</b>				
BC - BL	0	0.86	0	0.84
BC - PC	7	0.54	40	0.44
BL - PC	1	0.83	40	0.64

BC: Bayou Cumbest, BL: Bangs Lake, PC: Point aux Chenes

Table 3: Results of cross-correlation analyses comparing nutrient time series between sites at Grand Bay during the two acute event periods. Values are the lags for each nutrient variable in the compared time series between sites at which the maximum correlation was observed. Negative lags indicate observations were leading at the first site relative to the second, whereas positive lags indicate observations lagged at the first site relative to the second. One lag is one month.

Site comparisons	First acute event (E1A)		Second acute event (E2A)	
	Lag	Correlation	Lag	Correlation
<b>Chlorophyll a</b>				
BC - BL	0	0.61	-1	0.49
BC - PC	0	0.58	-1	0.53
BL - PC	0	0.98	0	0.87
<b>Ammonium</b>				
BC - BL	0	0.96	-2	0.55
BC - PC	0	0.89	-4	0.37
BL - PC	0	0.84	0	0.71
<b>Nitrite + Nitrate</b>				
BC - BL	0	0.83	0	0.04
BC - PC	0	0.58	6	0.98
BL - PC	-3	0.39	-5	0.98
<b>Orthophosphate</b>				
BC - BL	0	0.62	1	0.73
BC - PC	0	0.80	1	0.76
BL - PC	-2	0.82	0	0.79

BC: Bayou Cumbest, BL: Bangs Lake, PC: Point aux Chenes

Table 4: Results of cross-correlation analyses comparing nutrient time series between sites at Grand Bay during the two acute event periods. Nutrient time series were decomposed to remove the seasonal component. Values are the lags for each nutrient variable in the compared time series between sites at which the maximum correlation was observed. Negative lags indicate observations were leading at the first site relative to the second, whereas positive lags indicate observations lagged at the first site relative to the second. One lag is one month.

Site comparisons	First acute event (E1A)		Second acute event (E2A)	
	Lag	Correlation	Lag	Correlation
<b>Chlorophyll a</b>				
BC - BL	-7	0.44	0	0.29
BC - PC	3	0.59	-8	0.31
BL - PC	0	0.15	-6	0.96
<b>Ammonium</b>				
BC - BL	0	0.91	0	0.58
BC - PC	0	0.81	0	0.58
BL - PC	0	0.74	0	0.78
<b>Nitrite + Nitrate</b>				
BC - BL	0	0.84	0	0.83
BC - PC	-3	0.48	6	0.43
BL - PC	-3	0.53	9	0.31
<b>Orthophosphate</b>				
BC - BL	0	0.67	1	0.59
BC - PC	-1	0.40	1	0.66
BL - PC	-2	0.64	0	0.77

BC: Bayou Cumbest, BL: Bangs Lake, PC: Point aux Chenes

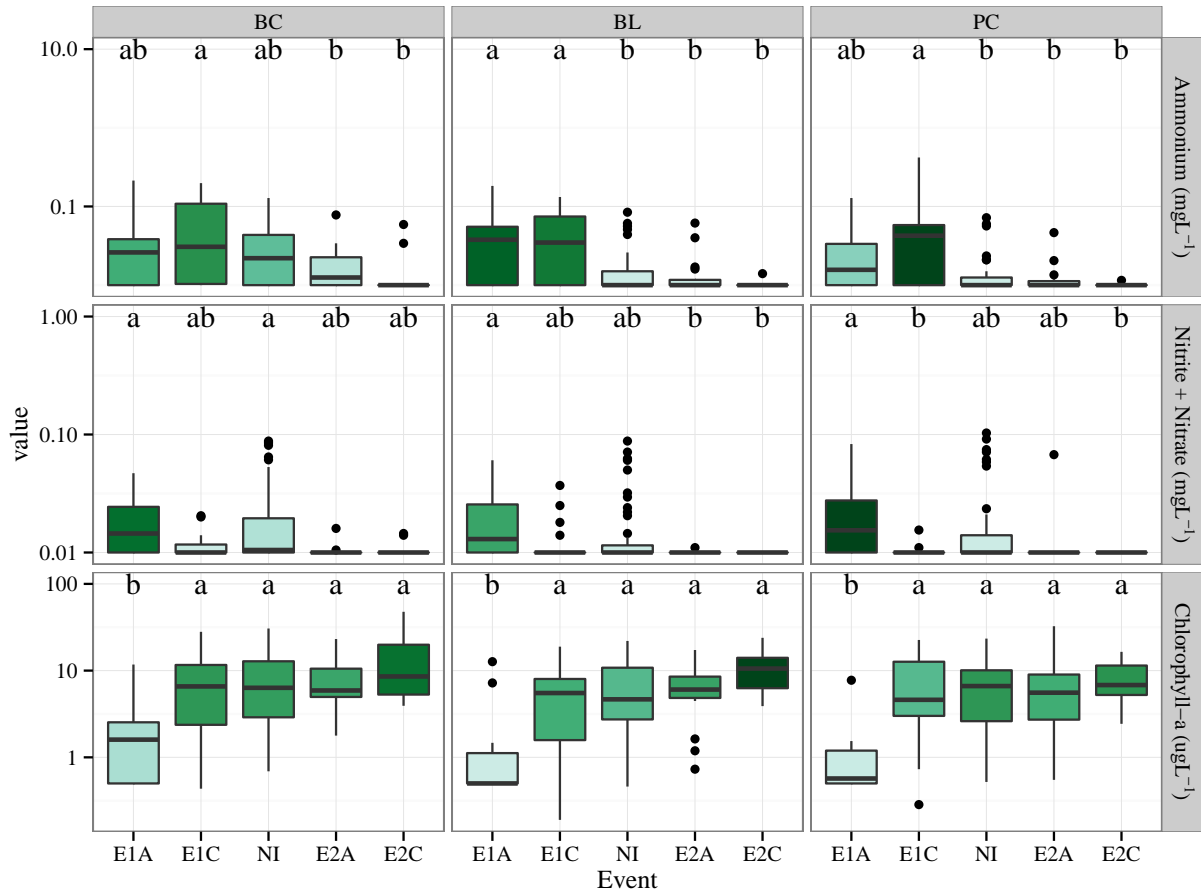


Figure 4: Boxplot summaries by event of nutrient data at Bayou Cumbest (BC), Bangs Lake (BL), and Point aux Chenes (PC) sites at Grand Bay. Letters indicate significantly different events based on Tukey multiple comparison analyses for each unique site and nutrient value combination. Boxes represent the interquartile range (IQR, 25<sup>th</sup> to 75<sup>th</sup> percentile) with the median as the middle horizontal line. Boxes are colored by relative median nutrients between sites. Outliers are present beyond whiskers ( $1.5 \cdot \text{IQR}$ ). E1A: event 1 acute, E1C: event 1 chronic, NI: non-impact, E2A: event 2 acute, E2C: event 2 chronic.