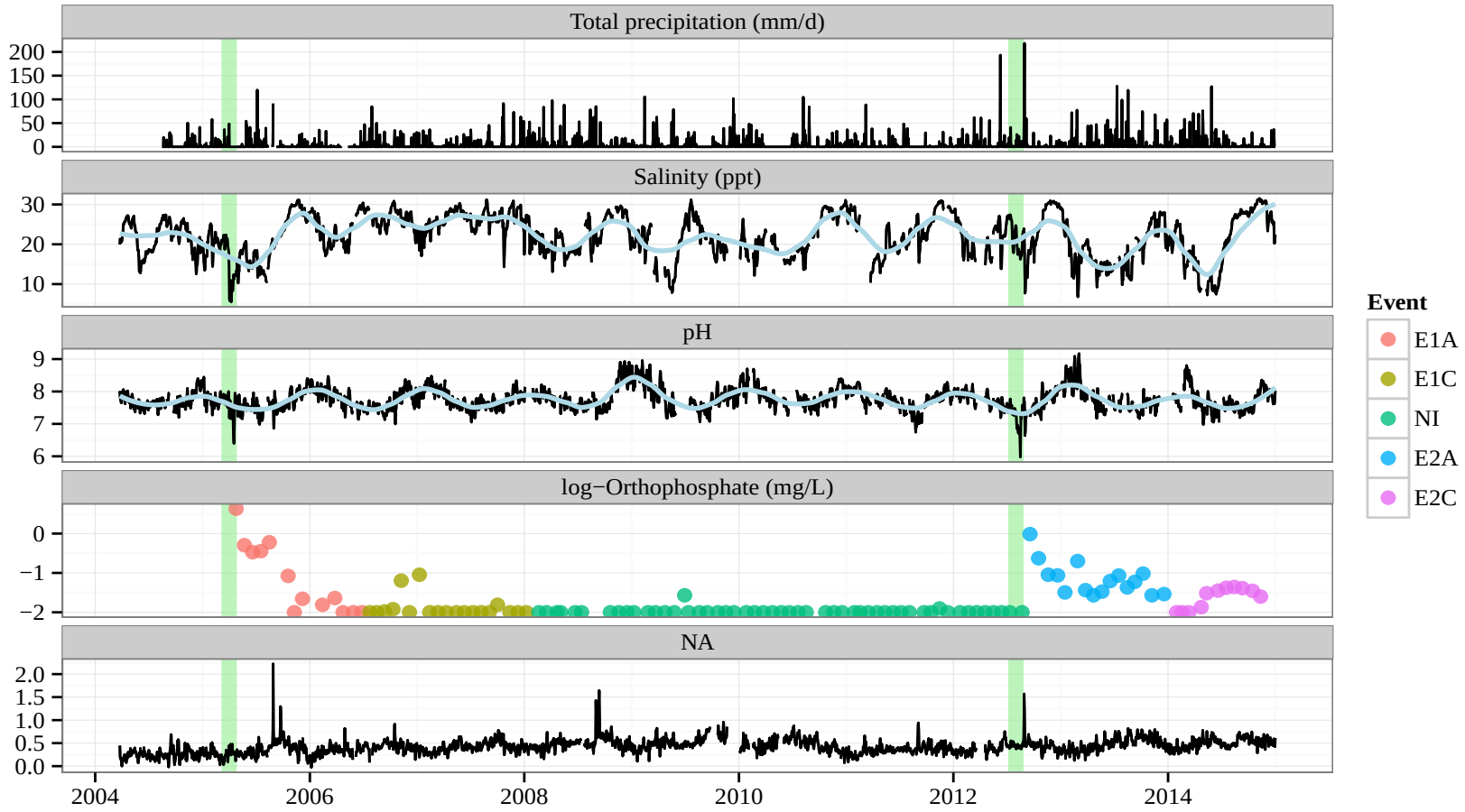

Figure 1: Time series of total precipitation, salinity, pH, and phosphate for Bangs Lake, Grand Bay reserve. Vertical green bars indicate a heavy rain event in April 2005 and hurricane Isaac in August 2012. Salinity and pH include a loess smooth to reduce variability. Orthophosphate is colored by event 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.

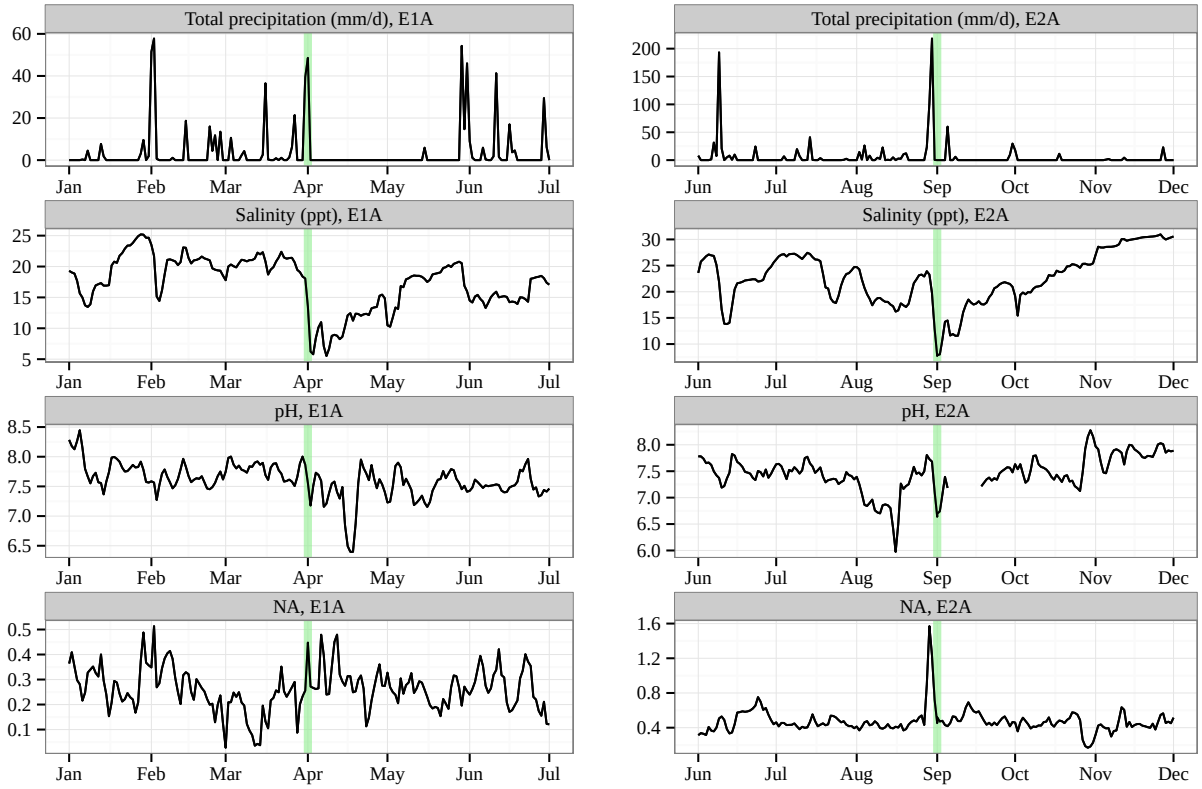

Figure 2: Time series of total precipitation, salinity, and pH for Bangs Lake, Grand Bay reserve. Plots show six month windows centered (green line) around a heavy rain event in April 2005 and hurricane Isaac in August 2012. E1A: event 1 acute, E2A: event 2 acute.

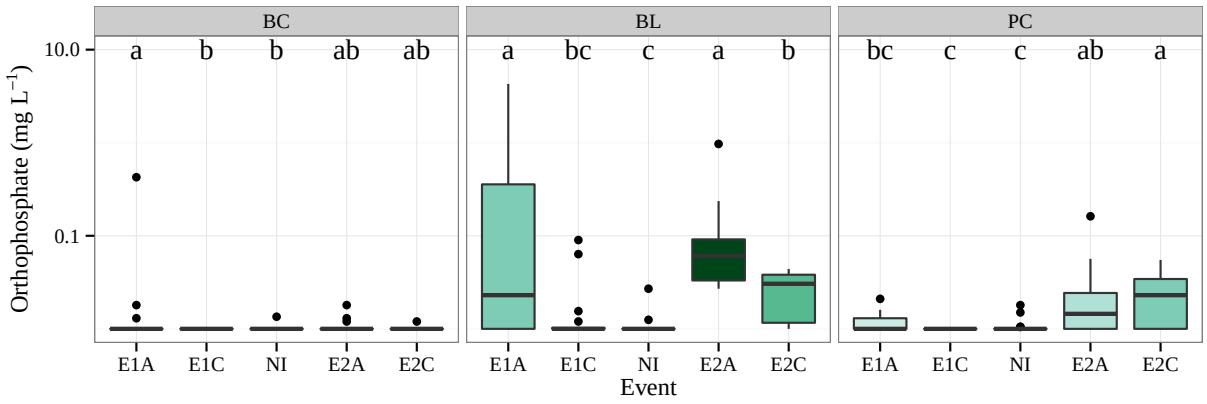

Figure 3: Boxplot summaries by event of monthly orthophosphate data at Bayou Cumbest (BC), Bangs Lake (BL), and Point aux Chenes (PC) sites in Grand Bay. Letters indicate events with significantly different events based on Tukey multiple comparison analysis within each site. Boxes represent the interquartile range (IQR, 25$^{\text{th}}$ to 75$^{\text{th}}$ percentile) with the median as the middle horizonal 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 for generalized least squares models of pH as a function of salinity and station, including interactions. The constant value is the intercept term defined as mean salinity at Bayou Cumbust (BC) with all other coefficients describing the change in ph from the intercept in relation to each fixed parameter. One model was created for each time frame. A first-order autoregressive structure conditional on station was used to account for time-dependent correlation among model residuals.

	Dependent variable:		
	ph		
	E1A	NI	E2A
	(1)	(2)	(3)
sal	0.057***	0.047***	0.053***
	(0.002)	(0.001)	(0.003)
StationBL	0.629***	0.578***	0.290
	(0.130)	(0.096)	(0.187)
StationPC	1.931***	0.607***	0.917***
	(0.172)	(0.091)	(0.164)
sal:StationBL	−0.017***	−0.016***	−0.007
	(0.005)	(0.003)	(0.007)
sal:StationPC	−0.059***	−0.011***	−0.028***
	(0.006)	(0.002)	(0.005)
Constant	6.199***	6.522***	6.479***
	(0.070)	(0.060)	(0.110)
Observations	1,983	4,937	1,556
Log Likelihood	1,471.083	2,944.468	705.973
Akaike Inf. Crit.	−2,926.167	−5,872.935	−1,395.947
Bayesian Inf. Crit.	−2,881.452	−5,820.909	−1,353.179
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 2: 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
Tidal height				
BC - BL	0	0.97	0	0.99
BC - PC	1	0.95	1	0.70
BL - PC	1	0.94	1	0.68
pH				
BC - BL	1	0.54	0	0.52
BC - PC	1	0.30	0	0.45
BL - PC	0	0.60	1	0.58
Salinity				
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 3: 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
pH				
BC - BL	1	0.54	1	0.21
BC - PC	4	0.18	−1	0.14
BL - PC	−1	0.48	−2	0.40
Salinity				
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 4: 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
Chlorophyll a				
BC - BL	0	0.61	−1	0.49
BC - PC	0	0.58	−1	0.53
BL - PC	0	0.98	0	0.87
Ammonium				
BC - BL	0	0.96	−2	0.55
BC - PC	0	0.89	−4	0.37
BL - PC	0	0.84	0	0.71
Nitrite + Nitrate				
BC - BL	0	0.83	0	0.04
BC - PC	0	0.58	6	0.98
BL - PC	−3	0.39	−5	0.98
Orthophosphate				
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 5: 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
Chlorophyll a				
BC - BL	−7	0.44	0	0.29
BC - PC	3	0.59	−8	0.31
BL - PC	0	0.15	−6	0.96
Ammonium				
BC - BL	0	0.91	0	0.58
BC - PC	0	0.81	0	0.58
BL - PC	0	0.74	0	0.78
Nitrite + Nitrate				
BC - BL	0	0.84	0	0.83
BC - PC	−3	0.48	6	0.43
BL - PC	−3	0.53	9	0.31
Orthophosphate				
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

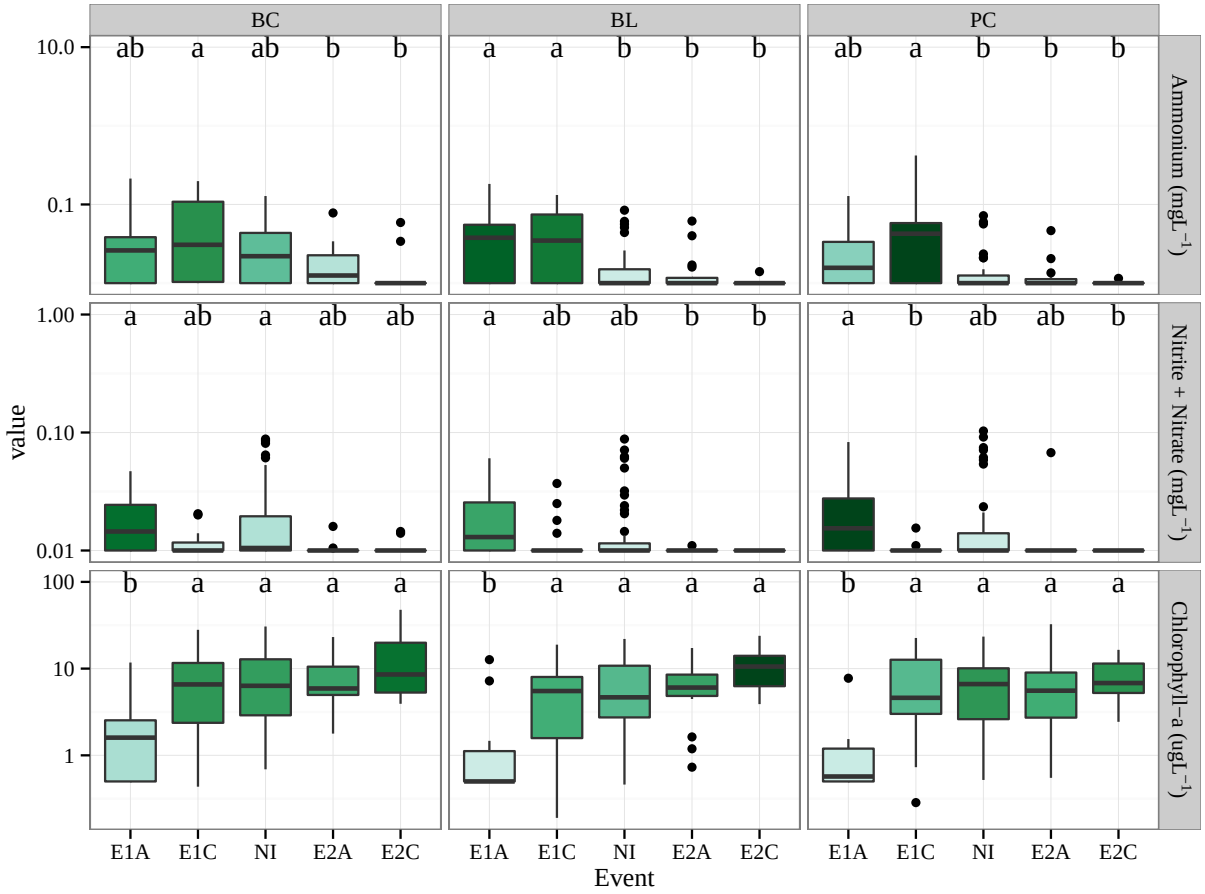

Figure 4: Boxplot summaries by event of nutrient data at Bayou Cumbest (BC), Bangs Lake (BL), and Point aux Chenes (PC) sites at Grand Bay. Letters indicate significantly different events based on Tukey multiple comparison analyses for each unique site and nutrient value combination. Boxes represent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