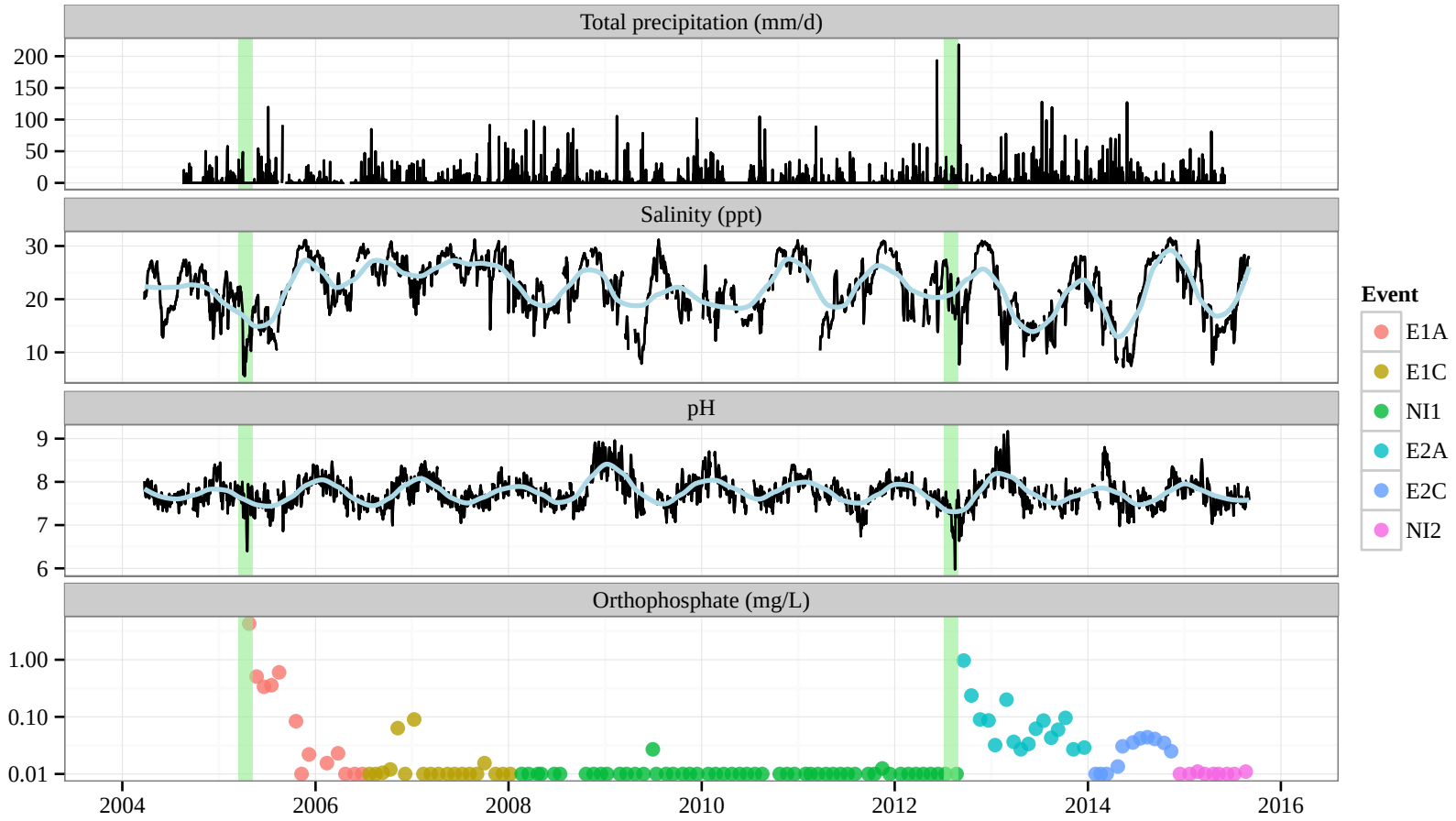

Figure 2: Time series of total precipitation, salinity, pH, and phosphate for Bangs Lake, Grand Bay reserve. All observations are daily averages, excluding phosphate which was sampled monthly. Vertical green bars indicate a heavy rain event in April 2005 and hurricane Isaac in August 2012. Salinity and 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, NI1: non-impact 1, E2A: event 2 acute, E2C: event 2 chronic, and NI2: non-impact 2.

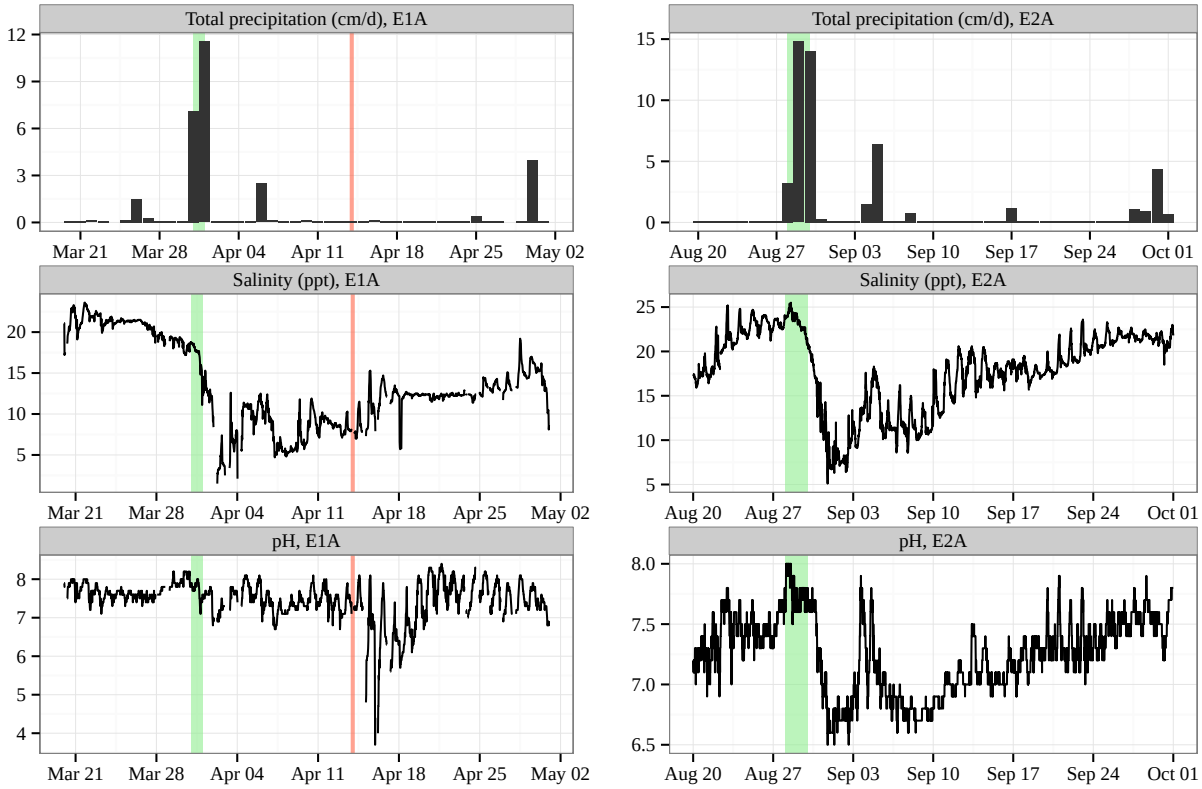

Figure 3: Time series of daily precipitation, salinity, and pH for Bangs Lake, Grand Bay reserve. Precipitation data are daily totals from the Pascagoula International Airport. Salinity and pH data were collected at 15 minute time steps. Green shading indicates period of high precipitation for a heavy rain event in 2005 (left, March 31st to April 1st) and hurricane Isaac in 2012 (right, August 28th to 30th). Red shading for the first event indicates the date of documented phosphorus spill. E1A: event 1 acute, E2A: event 2 acute.

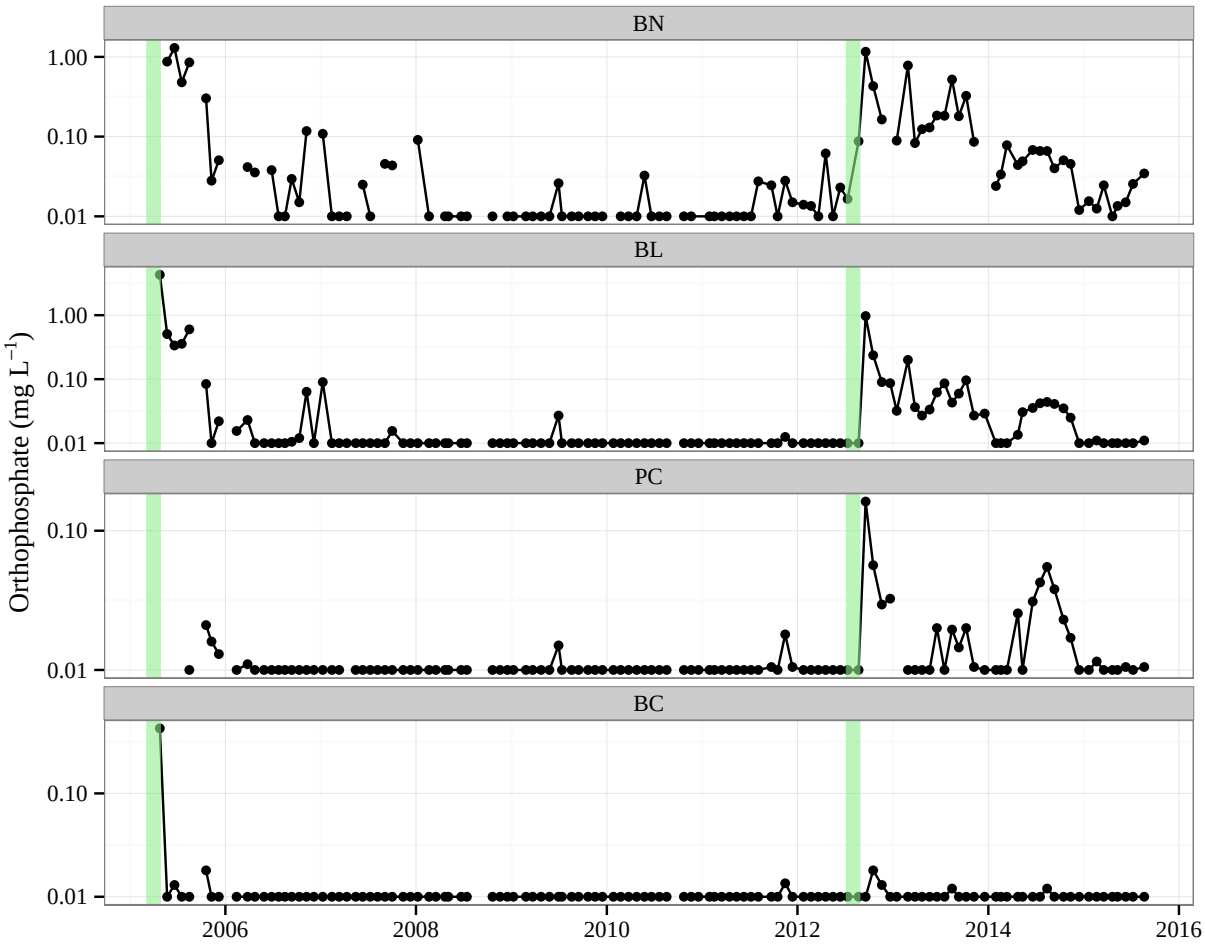

Figure 4: Monthly phosphate time series at Bangs North (BN), Bangs Lake (BL), Point aux Chenes (PC), and Bayou Cumbest (BC) sites at Grand Bay. Vertical green bars indicate a heavy rain event in April 2005 and hurricane Isaac in August 2012.

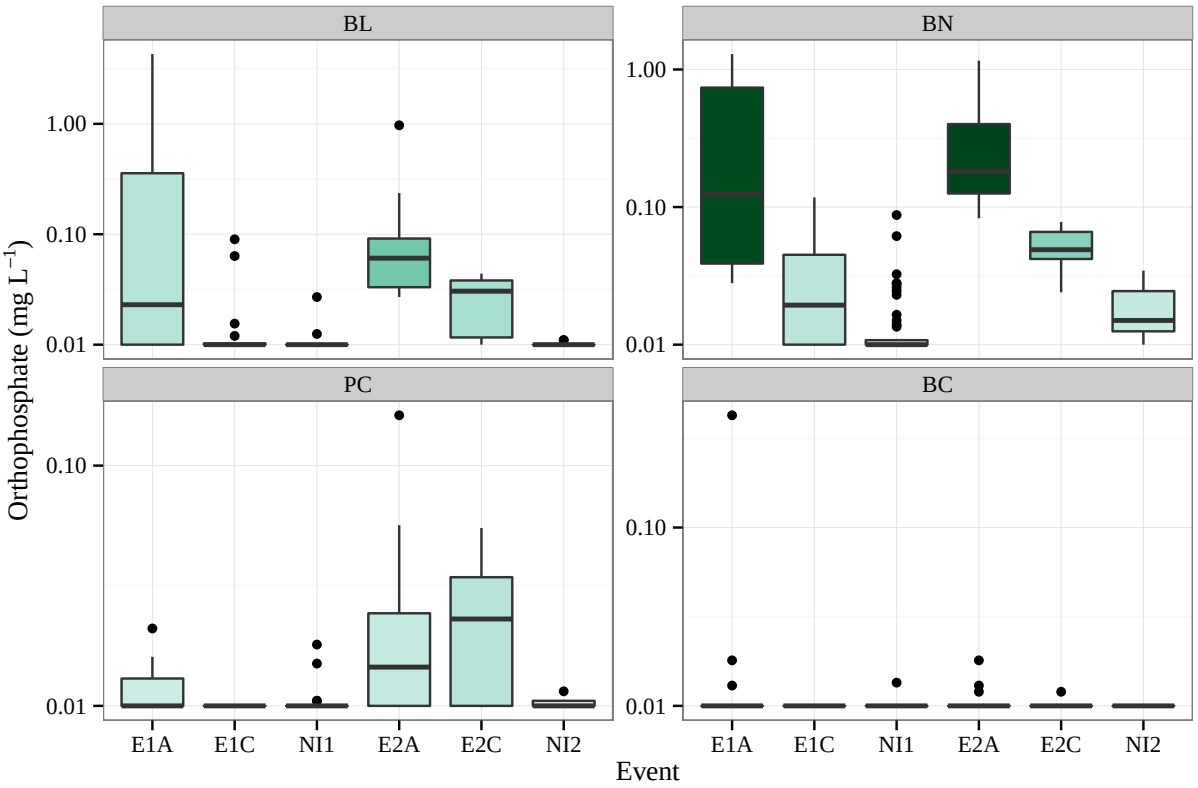

Figure 5: Boxplot summaries by event of monthly orthophosphate data at Bangs Lake (BL), Bangs North (BN), and Point aux Chenes (PC), and Bayou Cumbest (BC) sites in Grand Bay. Boxes represent the interquartile range (IQR, 25$^{\text{th}}$ to 75$^{\text{th}}$ percentile) with the median as the middle horizonal line. Outliers are present beyond whiskers (1.5·IQR). Boxes are shaded by medians between sites. See table 2 for a numerical summary. E1A: event 1 acute, E1C: event 1 chronic, NI1: non-impact 1, E2A: event 2 acute, E2C: event 2 chronic, and NI2: non-impact 2.

Table 2: Within site comparisons of monthly orthophosphate data for each time frame at Grand Bay. Values are within-group summaries of sample size, median, and ranges for orthophosphate by station and time frame. Result letters indicate time frames within each station that were not significantly different based on multiple comparisons with Mann-Whitney rank sum tests. P-values were adjusted using the sequential Bonferroni method to reduce the probability of Type I errors. Sites are BC: Bayou Cumbest, BL: Bangs Lake, BN: Bangs North, and PC: Point aux Chenes. Time frames are E1A: event 1 acute, E1C: event 1 chronic, NI1: non-impact 1, E2A: event 2 acute, E2C: event 2 chronic, and NI2: non-impact 2.

Site	Result	n	Median	Min	Max
BL					
E1A	ab	13	0.02	0.01	4.29
E1C	c	19	0.01	0.01	0.09
NI1	d	52	0.01	0.01	0.03
E2A	a	16	0.06	0.03	0.97
E2C	bc	11	0.03	0.01	0.04
NI2	bcd	9	0.01	0.01	0.01
BN					
E1A	ab	10	0.18	0.03	1.29
E1C	cd	14	0.02	0.01	0.12
NI1	e	48	0.01	0.01	0.09
E2A	a	14	0.18	0.08	1.16
E2C	bc	11	0.05	0.02	0.08
NI2	d	9	0.02	0.01	0.03
PC					
E1A	a	9	0.01	0.01	0.02
E1C	b	18	0.01	0.01	0.01
NI1	b	52	0.01	0.01	0.02
E2A	a	15	0.01	0.01	0.16
E2C	a	11	0.02	0.01	0.06
NI2	ab	9	0.01	0.01	0.01
BC					
E1A	a	13	0.01	0.01	0.43
E1C	a	19	0.01	0.01	0.01
NI1	a	52	0.01	0.01	0.01
E2A	a	16	0.01	0.01	0.02
E2C	a	11	0.01	0.01	0.01
NI2	a	9	0.01	0.01	0.01

Table 3: Within time frame comparisons of monthly orthophosphate data at Grand Bay. Values are within-group summaries of sample size, median, and ranges for orthophosphate by time frame and station. Result letters indicate stations within each time frame that were not significantly different based on multiple comparisons with Mann-Whitney rank sum tests. P-values were adjusted using the sequential Bonferroni method to reduce the probability of Type I errors. Sites are BC: Bayou Cumbest, BL: Bangs Lake, BN: Bangs North, and PC: Point aux Chenes. Time frames are E1A: event 1 acute, E1C: event 1 chronic, NI1: non-impact 1, E2A: event 2 acute, E2C: event 2 chronic, and NI2: non-impact 2.

Site	Result	n	Median	Min	Max
E1A					
BL	bc	13	0.02	0.01	4.29
BN	b	10	0.18	0.03	1.29
PC	ac	9	0.01	0.01	0.02
BC	a	13	0.01	0.01	0.43
E1C					
BL	ab	19	0.01	0.01	0.09
BN	b	14	0.02	0.01	0.12
PC	a	18	0.01	0.01	0.01
BC	a	19	0.01	0.01	0.01
NI1					
BL	a	52	0.01	0.01	0.03
BN	b	48	0.01	0.01	0.09
PC	a	52	0.01	0.01	0.02
BC	a	52	0.01	0.01	0.01
E2A					
BL	b	16	0.06	0.03	0.97
BN	c	14	0.18	0.08	1.16
PC	d	15	0.01	0.01	0.16
BC	a	16	0.01	0.01	0.02
E2C					
BL	b	11	0.03	0.01	0.04
BN	c	11	0.05	0.02	0.08
PC	b	11	0.02	0.01	0.06
BC	a	11	0.01	0.01	0.01
NI2					
BL	a	9	0.01	0.01	0.01
BN	b	9	0.02	0.01	0.03
PC	a	9	0.01	0.01	0.01
BC	a	9	0.01	0.01	0.01

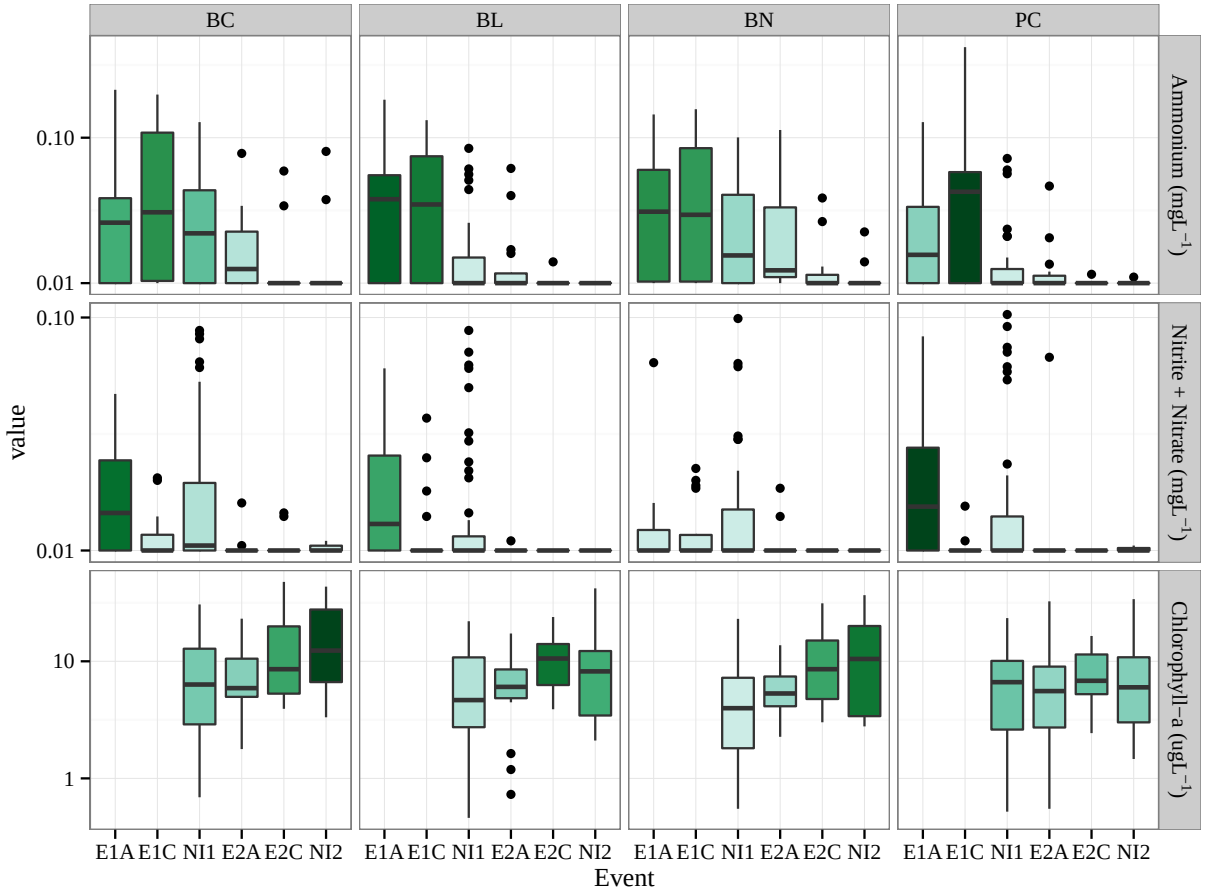

Figure S1: Boxplot summaries by event of nutrient data at Bayou Cumbest (BC), Bangs Lake (BL), Bangs North (BN), and Point aux Chenes (PC) sites at Grand Bay. Boxes represent the interquartile range (IQR, 25^{th} to 75^{th} percentile) with the median as the middle horizontal line. Boxes are colored by relative median nutrients between sites. Outliers are present beyond whiskers (1.5·IQR). See tables S1, S3 and S5 for numerical summaries. Insufficient chlorophyll data were removed for E1A and E1C. E1A: event 1 acute, E1C: event 1 chronic, NI1: non-impact 1, E2A: event 2 acute, E2C: event 2 chronic, and NI2: non-impact 2.

Table S1: Within site comparisons of monthly ammonium data for each time frame at Grand Bay. Values are within-group summaries of sample size, median, and ranges for ammonium by station and time frame. Result letters indicate time frames within each station that were not significantly different based on multiple comparisons with Mann-Whitney rank sum tests. P-values were adjusted using the sequential Bonferroni method to reduce the probability of Type I errors. Sites are BC: Bayou Cumbest, BL: Bangs Lake, BN: Bangs North, and PC: Point aux Chenes. Time frames are E1A: event 1 acute, E1C: event 1 chronic, NI1: non-impact 1, E2A: event 2 acute, E2C: event 2 chronic, and NI2: non-impact 2.

Site	Result	n	Median	Min	Max
BL					
E1A	ab	12	0.04	0.01	0.18
E1C	a	18	0.03	0.01	0.13
NI1	ab	49	0.01	0.01	0.08
E2A	ab	16	0.01	0.01	0.06
E2C	b	11	0.01	0.01	0.01
NI2	b	9	0.01	0.01	0.01
BN					
E1A	a	11	0.03	0.01	0.14
E1C	a	15	0.03	0.01	0.16
NI1	a	45	0.02	0.01	0.10
E2A	a	14	0.01	0.01	0.11
E2C	a	11	0.01	0.01	0.04
NI2	a	9	0.01	0.01	0.02
PC					
E1A	ab	8	0.02	0.01	0.13
E1C	a	17	0.04	0.01	0.42
NI1	b	49	0.01	0.01	0.07
E2A	ab	16	0.01	0.01	0.05
E2C	b	11	0.01	0.01	0.01
NI2	b	9	0.01	0.01	0.01
BC					
E1A	a	12	0.03	0.01	0.21
E1C	a	18	0.03	0.01	0.20
NI1	a	49	0.02	0.01	0.13
E2A	a	16	0.01	0.01	0.08
E2C	a	11	0.01	0.01	0.06
NI2	a	9	0.01	0.01	0.08

Table S2: Within time frame comparisons of monthly ammonium data at Grand Bay. Values are within-group summaries of sample size, median, and ranges for ammonium by time frame and station. Result letters indicate stations within each time frame that were not significantly different based on multiple comparisons with Mann-Whitney rank sum tests. P-values were adjusted using the sequential Bonferroni method to reduce the probability of Type I errors. Sites are BC: Bayou Cumbest, BL: Bangs Lake, BN: Bangs North, and PC: Point aux Chenes. Time frames are E1A: event 1 acute, E1C: event 1 chronic, NI1: non-impact 1, E2A: event 2 acute, E2C: event 2 chronic, and NI2: non-impact 2.

Site	Result	n	Median	Min	Max
E1A					
BL	a	12	0.04	0.01	0.18
BN	a	11	0.03	0.01	0.14
PC	a	8	0.02	0.01	0.13
BC	a	12	0.03	0.01	0.21
E1C					
BL	a	18	0.03	0.01	0.13
BN	a	15	0.03	0.01	0.16
PC	a	17	0.04	0.01	0.42
BC	a	18	0.03	0.01	0.20
NI1					
BL	b	49	0.01	0.01	0.08
BN	a	45	0.02	0.01	0.10
PC	b	49	0.01	0.01	0.07
BC	a	49	0.02	0.01	0.13
E2A					
BL	a	16	0.01	0.01	0.06
BN	a	14	0.01	0.01	0.11
PC	a	16	0.01	0.01	0.05
BC	a	16	0.01	0.01	0.08
E2C					
BL	a	11	0.01	0.01	0.01
BN	a	11	0.01	0.01	0.04
PC	a	11	0.01	0.01	0.01
BC	a	11	0.01	0.01	0.06
NI2					
BL	a	9	0.01	0.01	0.01
BN	a	9	0.01	0.01	0.02
PC	a	9	0.01	0.01	0.01
BC	a	9	0.01	0.01	0.08

Table S3: Within site comparisons of monthly nitrogen (nitrate, nitrite) data for each time frame at Grand Bay. Values are within-group summaries of sample size, median, and ranges for nitrogen by station and time frame. Result letters indicate time frames within each station that were not significantly different based on multiple comparisons with Mann-Whitney rank sum tests. P-values were adjusted using the sequential Bonferroni method to reduce the probability of Type I errors. Sites are BC: Bayou Cumbest, BL: Bangs Lake, BN: Bangs North, and PC: Point aux Chenes. Time frames are E1A: event 1 acute, E1C: event 1 chronic, NI1: non-impact 1, E2A: event 2 acute, E2C: event 2 chronic, and NI2: non-impact 2.

Site	Result	n	Median	Min	Max
BL					
E1A	a	14	0.01	0.01	0.06
E1C	ab	19	0.01	0.01	0.04
NI1	ab	53	0.01	0.01	0.09
E2A	b	15	0.01	0.01	0.01
E2C	ab	11	0.01	0.01	0.01
NI2	ab	3	0.01	0.01	0.01
BN					
E1A	a	11	0.01	0.01	0.06
E1C	a	16	0.01	0.01	0.02
NI1	a	49	0.01	0.01	0.10
E2A	a	13	0.01	0.01	0.02
E2C	a	11	0.01	0.01	0.01
NI2	a	3	0.01	0.01	0.01
PC					
E1A	a	10	0.02	0.01	0.08
E1C	a	18	0.01	0.01	0.02
NI1	a	53	0.01	0.01	0.10
E2A	a	15	0.01	0.01	0.07
E2C	a	11	0.01	0.01	0.01
NI2	a	3	0.01	0.01	0.01
BC					
E1A	a	14	0.01	0.01	0.05
E1C	ab	19	0.01	0.01	0.02
NI1	ab	53	0.01	0.01	0.09
E2A	b	16	0.01	0.01	0.02
E2C	ab	11	0.01	0.01	0.01
NI2	ab	3	0.01	0.01	0.01

Table S4: Within time frame comparisons of monthly nitrogen (nitrate, nitrite) data at Grand Bay. Values are within-group summaries of sample size, median, and ranges for nitrogen by time frame and station. Result letters indicate stations within each time frame that were not significantly different based on multiple comparisons with Mann-Whitney rank sum tests. P-values were adjusted using the sequential Bonferroni method to reduce the probability of Type I errors. Sites are BC: Bayou Cumbest, BL: Bangs Lake, BN: Bangs North, and PC: Point aux Chenes. Time frames are E1A: event 1 acute, E1C: event 1 chronic, NI1: non-impact 1, E2A: event 2 acute, E2C: event 2 chronic, and NI2: non-impact 2.

Site	Result	n	Median	Min	Max
E1A					
BL	a	14	0.01	0.01	0.06
BN	a	11	0.01	0.01	0.06
PC	a	10	0.02	0.01	0.08
BC	a	14	0.01	0.01	0.05
E1C					
BL	a	19	0.01	0.01	0.04
BN	a	16	0.01	0.01	0.02
PC	a	18	0.01	0.01	0.02
BC	a	19	0.01	0.01	0.02
NI1					
BL	a	53	0.01	0.01	0.09
BN	a	49	0.01	0.01	0.10
PC	a	53	0.01	0.01	0.10
BC	a	53	0.01	0.01	0.09
E2A					
BL	a	15	0.01	0.01	0.01
BN	a	13	0.01	0.01	0.02
PC	a	15	0.01	0.01	0.07
BC	a	16	0.01	0.01	0.02
E2C					
BL	a	11	0.01	0.01	0.01
BN	a	11	0.01	0.01	0.01
PC	a	11	0.01	0.01	0.01
BC	a	11	0.01	0.01	0.01
NI2					
BL	a	3	0.01	0.01	0.01
BN	a	3	0.01	0.01	0.01
PC	a	3	0.01	0.01	0.01
BC	a	3	0.01	0.01	0.01

Table S5: Within site comparisons of monthly chlorophyll data for each time frame at Grand Bay. Values are within-group summaries of sample size, median, and ranges for chlorophyll by station and time frame. Result letters indicate time frames within each station that were not significantly different based on multiple comparisons with Mann-Whitney rank sum tests. P-values were adjusted using the sequential Bonferroni method to reduce the probability of Type I errors. Sites are BC: Bayou Cumbest, BL: Bangs Lake, BN: Bangs North, and PC: Point aux Chenes. Time frames are NI1: non-impact 1, E2A: event 2 acute, E2C: event 2 chronic, and NI2: non-impact 2.

Site	Result	n	Median	Min	Max
BL					
NI1	a	54	4.66	0.46	21.99
E2A	a	16	6.05	0.73	17.28
E2C	a	11	10.56	3.90	23.89
NI2	a	9	8.21	2.10	41.98
BN					
NI1	a	50	3.98	0.55	23.05
E2A	a	14	5.37	2.26	13.71
E2C	a	11	8.56	3.02	31.29
NI2	a	9	10.47	2.78	36.71
PC					
NI1	a	54	6.63	0.52	23.39
E2A	a	16	5.57	0.55	32.52
E2C	a	11	6.81	2.44	16.46
NI2	a	9	6.00	1.47	33.95
BC					
NI1	a	54	6.34	0.69	30.59
E2A	a	16	5.91	1.78	23.12
E2C	a	11	8.57	3.93	47.67
NI2	a	9	12.35	3.33	43.42

Table S6: Within time frame comparisons of monthly chlorophyll data at Grand Bay. Values are within-group summaries of sample size, median, and ranges for chlorophyll by time frame and station. Result letters indicate stations within each time frame that were not significantly different based on multiple comparisons with Mann-Whitney rank sum tests. P-values were adjusted using the sequential Bonferroni method to reduce the probability of Type I errors. Sites are BC: Bayou Cumbest, BL: Bangs Lake, BN: Bangs North, and PC: Point aux Chenes. Time frames are NI1: non-impact 1, E2A: event 2 acute, E2C: event 2 chronic, and NI2: non-impact 2.

Site	Result	n	Median	Min	Max
NI1					
BL	a	54	4.66	0.46	21.99
BN	a	50	3.98	0.55	23.05
PC	a	54	6.63	0.52	23.39
BC	a	54	6.34	0.69	30.59
E2A					
BL	a	16	6.05	0.73	17.28
BN	a	14	5.37	2.26	13.71
PC	a	16	5.57	0.55	32.52
BC	a	16	5.91	1.78	23.12
E2C					
BL	a	11	10.56	3.90	23.89
BN	a	11	8.56	3.02	31.29
PC	a	11	6.81	2.44	16.46
BC	a	11	8.57	3.93	47.67
NI2					
BL	a	9	8.21	2.10	41.98
BN	a	9	10.47	2.78	36.71
PC	a	9	6.00	1.47	33.95
BC	a	9	12.35	3.33	43.42