

**Fiscal Year 2017: 2<sup>nd</sup> Quarter Status Report**

**01 January – 31 March, 2017**

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24 April 2017

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This quarterly status report is provided to satisfy the reporting requirements outlined in Section 13 of our original Research Cooperative Agreement Schedule. Please see below for an executive summary, bulleted items highlighting major accomplishments, actions, and progress associated with the vegetation and salinity monitoring within the Savannah National Wildlife Refuge in the months of January, February, and March 2017. This work is done under Cooperative Agreement Number W912HZ-14-2-0002 under the terms of the Piedmont South Atlantic Coast (PSAC) Cooperative Ecosystems Studies Unit (CESU). The Cooperative Agreement Title is "Identifying and Evaluating Impacts to Wetlands from the Savannah River Estuary".

Respectfully,

Jamie Duberstein  
Clemson University

### **Executive Summary:**

All regularly scheduled field work was carried out successfully during this quarter. We replaced one belowground sensor (Aquatroll 200) that was deployed at Back 3, and was occasionally fouling. "Bad data" were easy to identify and were minimal; bad data were removed prior to making the summary calculations shown in this report. Data tables provided in this report include: monthly site salinity statistics since 01 October 2016, a record of salinity data losses since 01 October 2016, and three monthly "spot checks" of salinity conditions comparing Aquatroll values to those measured manually using a handheld unit.

## January 2017

### Marsh Vegetation

- There were no updates to report.

### Water Data

- Data from all water sensors were downloaded during the days of 18 – 20 January.
- An updated salinity table was provided (see Table 1).
- A complete list of salinity data losses thus far for FY17 was provided, which included recently discovered data losses at Back 3 (see Table 2).
- A “spot check” of belowground salinity conditions were measured using a YSI Pro30 handheld salinity meter during the January sensor download. Salinity values were compared to those measured via Aquatrolls (Table 3).
  - We saw a difference of 0.7 psu at the Back 3 monitoring area, so we investigated the data file.
  - There appeared to be episodic data errors from the belowground sensor at Back 3. Belowground salinity readings usually change gradually, not typically varying much over the course of a day. However, there are episodic, small (< 1 psu) irregularities in the data set collected by the belowground salinity sensor located at Back 3. The irregularities were not consistent with increasing or decreasing water stage (*i.e.*, tidal changes), suggesting a potential internal sensor problem. Assumed measurement errors appear to be minimal, but sporadically located during several short time periods between 06 November 2016 and 19 January 2017 (see Table 2).
  - Assumed measurement errors were deleted prior to calculating site averages for the months effected. **Note that previous monthly reports and the FY17 1<sup>st</sup> quarter report may have slightly different values** than those presented in Table 1 because the assumed measurement areas were just recently identified (and removed) this month.
  - The presumed malfunctioning sensor was removed from the field and sent to the manufacturer for diagnostic examination. A replacement sensor was deployed on 27 January.

### Forest monitoring

- Monthly measurements of baldcypress tree growth were last taken on 20 January at the swamp monitoring areas.
- Average basal area increase since last measurement:
  - Swamp 1: 0.0 cm<sup>2</sup> (18 December – 20 January)
  - Swamp 2: -0.1 cm<sup>2</sup> (17 December – 20 January)
  - Swamp 3: -0.1 cm<sup>2</sup> (18 December – 20 January)
- It is normal to see no change or even constriction of the tree trunk (*i.e.*, small negative values) during winter months.

## February 2017

### Marsh Vegetation

- There are no updates.

### Water Data

- Data from all water sensors were downloaded during the days of 15 – 16 February.
- An updated salinity table was provided (see Table 1).
- A complete list of salinity data losses thus far for FY17 was provided (see Table 2).
- A “spot check” of belowground salinity conditions were measured using a YSI Pro30 handheld salinity meter during the February sensor download. Salinity values were compared to those measured via Aquatrolls (Table 4).
- Last month we reported the discovery of potential errors with the data coming from the belowground sensor at Back 3. The sensor manufacturer tested the unit and verified there was some fouling occurring. The manufacturer cleaned and calibrated the sensor, tested it against standards, and returned it ready for deployment (once programmed).

### Forest monitoring

- Monthly measurements of baldcypress tree growth were last taken on 16 February at the swamp monitoring areas.
- Average basal area increase since last measurement:
  - Swamp 1: -0.1 cm<sup>2</sup> (20 January – 16 February)
  - Swamp 2: -0.1 cm<sup>2</sup> (20 January – 16 February)
  - Swamp 3: -0.1 cm<sup>2</sup> (20 January – 16 February)
- It is normal to see no change or even constriction of the tree trunk (*i.e.*, small negative values) during winter months.

## March 2017

### Marsh Vegetation

- There are no updates.

### Water Data

- Data from all water sensors were downloaded during the days of 16 – 17 March.
- An updated salinity table was provided (Table 1).
- There haven't been any data losses since January.
  - See Table 2 for a complete list of salinity data losses thus far for FY17.
- A "spot check" of belowground salinity conditions were measured using a YSI Pro30 handheld salinity meter during the March sensor download. Salinity values were compared to those measured via Aquatrolls (Table 5).

### Forest monitoring

- Monthly measurements of baldcypress tree growth were last taken on 16 February at the swamp monitoring areas.
- Average basal area increase since last measurement:
  - Swamp 1: 0.1 cm<sup>2</sup> (16 February – 17 March)
  - Swamp 2: 0.0 cm<sup>2</sup> (16 February – 17 March)
  - Swamp 3: 0.0 cm<sup>2</sup> (16 February – 17 March)

Table 1. Fiscal Year 2017 average, minimum, and maximum salinity (psu: practical salinity units) measured via sensors at above- and below-ground locations at (12) marsh monitoring areas and (3) tidal forest areas. Summaries are based on hourly measurements starting 01 October 2016 through 16 March 2017 for all monitoring areas unless noted by superscript; details of data losses are provided in Table 2. Measurements taken during dry well conditions were removed from calculations of summary statistics.

Area	Month	<u>Aboveground Salinity (psu)</u>			<u>Belowground Salinity (psu)</u>		
		Avg. (std. err.)	Min	Max	Avg. (std. err.)	Min	Max
Back 1	October 2016	0.03 (0.01)	0.00	0.24	0.22 (0.00)	0.12	0.30
	November 2016	0.07 (0.01)	0.00	0.55	0.32 (0.00)	0.26	0.39
	December 2016	0.04 (0.01)	0.00	0.12	0.23 (0.00)	0.16	0.33
	January 2017	0.05 (0.00)	0.05	0.06	0.13 (0.00)	0.09	0.18
	February 2017	0.05 (0.00)	0.05	0.06	0.09 (0.00)	0.07	0.11
	March 2017	0.08 (0.02)	0.00	0.11	0.10 (0.00)	0.09	0.11
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.05 (0.01)	0.00	0.55	0.19 (0.00)	0.07
Back 2	October 2016	0.16 (0.01)	0.00	1.58	0.31 (0.00)	0.19	0.53
	November 2016	0.35 (0.03)	0.00	2.61	0.63 (0.01)	0.28	1.30
	December 2016	0.06 (0.01)	0.00	0.85	0.28 (0.00)	0.15	0.72
	January 2017	0.04 (0.01)	0.00	0.34	0.15 (0.00)	0.07	0.33
	February 2017	0.11 (0.01)	0.00	0.40	0.14 (0.00)	0.08	0.25
	March 2017	0.09 (0.01)	0.00	0.61	0.19 (0.00)	0.10	0.30
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.16 (0.01)	0.00	2.61	0.29 (0.00)	0.07

Table 1 (cont'd). Fiscal Year 2017 average, minimum, and maximum salinity at above- and below-ground locations in marsh and tidal freshwater forest monitoring areas.

Area	Month	Aboveground Salinity (psu)			Belowground Salinity (psu)		
		Avg. (std. err.)	Min	Max	Avg. (std. err.)	Min	Max
Back 3	October 2016	0.24 (0.03)	0.00	2.63	1.19 (0.02)	0.41	1.96
	November 2016	0.52 (0.06)	0.00	4.05	1.36 (0.02) <sup>a</sup>	0.63 <sup>a</sup>	3.50 <sup>a</sup>
	December 2016	0.10 (0.02)	0.00	2.39	0.81 (0.01) <sup>a</sup>	0.40 <sup>a</sup>	1.50 <sup>a</sup>
	January 2017	0.08 (0.01) <sup>a</sup>	0.00 <sup>a</sup>	0.17 <sup>a</sup>	0.65 (0.00) <sup>a</sup>	0.27 <sup>a</sup>	1.84 <sup>a</sup>
	February 2017	0.13 (0.03)	0.00	0.96	0.60 (0.01)	0.19	0.87
	March 2017	0.16 (0.05)	0.00	0.94	0.66 (0.01)	0.43	0.88
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.29 (0.02) <sup>a</sup>	0.00 <sup>a</sup>	4.05 <sup>a</sup>	0.92 (0.01) <sup>a</sup>	0.19 <sup>a</sup>
Back 3.5	October 2016	0.44 (0.04)	0.00	10.27	2.14 (0.01)	1.75	2.44
	November 2016	0.87 (0.07)	0.00	5.37	2.28 (0.00)	2.09	2.73
	December 2016	0.20 (0.02)	0.00	2.74	2.24 (0.00)	2.05	2.37
	January 2017	0.15 (0.03)	0.00	1.79	2.14 (0.00)	1.97	2.31
	February 2017	0.24 (0.03)	0.00	1.54	2.08 (0.00)	1.95	2.24
	March 2017	0.24 (0.05)	0.00	1.46	2.04 (0.00)	1.97	2.22
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.43 (0.02)	0.00	10.27	2.16 (0.00)	1.75

<sup>a</sup> Incomplete data record. See Table 2 for details.



Table 1 (cont'd). Fiscal Year 2017 average, minimum, and maximum salinity at above- and below-ground locations in marsh and tidal freshwater forest monitoring areas.

Area	Month	Aboveground Salinity (psu)			Belowground Salinity (psu)		
		Avg. (std. err.)	Min	Max	Avg. (std. err.)	Min	Max
Back 4	October 2016	1.01 (0.06)	0.00	8.96	3.68 (0.02)	3.01	4.50
	November 2016	1.38 (0.11)	0.00	8.80	3.76 (0.02)	3.15	4.18
	December 2016	0.66 (0.06)	0.00	5.72	3.87 (0.01)	3.50	4.20
	January 2017	0.34 (0.05)	0.00	3.12	3.06 (0.02)	2.23	3.68
	February 2017	0.26 (0.04)	0.00	4.56	2.16 (0.01)	1.54	3.07
	March 2017	0.22 (0.04)	0.00	3.96	2.06 (0.01)	1.73	2.42
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.75 (0.03)	0.00	8.96	3.21 (0.01)	1.54
Front 1	October 2016	0.18 (0.02)	0.00	1.23	0.25 (0.00)	0.09	0.60
	November 2016	0.42 (0.03)	0.00	1.86	0.56 (0.01)	0.30	0.94
	December 2016	0.10 (0.01)	0.00	0.66	0.42 (0.00)	0.28	0.63
	January 2017	0.07 (0.00)	0.02	0.14	0.30 (0.00)	0.20	0.36
	February 2017	0.10 (0.01)	0.00	0.22	0.23 (0.00)	0.16	0.29
	March 2017	0.21 (0.02)	0.01	0.30	0.21 (0.00)	0.15	0.34
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.23 (0.01)	0.00	1.86	0.34 (0.00)	0.09

Table 1 (cont'd). Fiscal Year 2017 average, minimum, and maximum salinity at above- and below-ground locations in marsh and tidal freshwater forest monitoring areas.

Area	Month	Aboveground Salinity (psu)			Belowground Salinity (psu)		
		Avg. (std. err.)	Min	Max	Avg. (std. err.)	Min	Max
Front 2	October 2016	0.52 (0.07)	0.00	12.29	1.43 (0.02)	0.48	6.07
	November 2016	0.83 (0.08)	0.00	6.53	1.84 (0.01)	1.15	2.26
	December 2016	0.21 (0.03)	0.00	5.73	1.58 (0.01)	1.30	2.20
	January 2017	0.12 (0.02)	0.00	1.87	1.04 (0.01)	0.34	1.77
	February 2017	0.26 (0.04)	0.00	2.65	0.79 (0.01)	0.43	2.62
	March 2017	0.34 (0.06)	0.00	2.71	1.02 (0.01)	0.71	1.21
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.46 (0.03)	0.00	12.29	1.31 (0.01)	0.34
Middle 1	October 2016	0.29 (0.02) <sup>a</sup>	0.08 <sup>a</sup>	3.35 <sup>a</sup>	0.55 (0.02)	0.24	9.62
	November 2016	1.11 (0.09)	0.00	3.46	0.88 (0.02)	0.37	1.68
	December 2016	0.37 (0.02)	0.00	0.79	0.83 (0.00)	0.70	0.95
	January 2017	0.17 (0.02)	0.02	0.39	0.64 (0.00)	0.36	0.74
	February 2017	0.07 (0.01)	0.00	0.28	0.47 (0.00)	0.27	0.56
	March 2017	0.11 (0.02)	0.00	0.39	0.41 (0.00)	0.39	0.44
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.48 (0.04) <sup>a</sup>	0.00 <sup>a</sup>	3.46 <sup>a</sup>	0.65 (0.01)	0.24

<sup>a</sup> Incomplete data record. See Table 2 for details.

Table 1 (cont'd). Fiscal Year 2017 average, minimum, and maximum salinity at above- and below-ground locations in marsh and tidal freshwater forest monitoring areas.

Area	Month	Aboveground Salinity (psu)			Belowground Salinity (psu)		
		Avg. (std. err.)	Min	Max	Avg. (std. err.)	Min	Max
Middle 2	October 2016	0.84 (0.36)	0.00	11.67	0.75 (0.04)	0.19	11.17
	November 2016	0.34 (0.12)	0.00	6.20	1.44 (0.03)	0.48	5.50
	December 2016	0.16 (0.03)	0.00	0.94	1.04 (0.02)	0.42	2.00
	January 2017	0.11 (0.01)	0.00	0.57	0.70 (0.01)	0.32	0.98
	February 2017	0.05 (0.03)	0.00	0.12	0.63 (0.01)	0.32	0.99
	March 2017	0.10 (0.04)	0.00	0.37	0.59 (0.01)	0.26	0.72
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.29 (0.07)	0.00	11.67	0.88 (0.01)	0.19
Middle 3	October 2016	0.26 (0.26)	0.00	5.92	1.02 (0.04)	0.32	9.64
	November 2016	N/A <sup>b</sup>	N/A <sup>b</sup>	N/A <sup>b</sup>	2.01 (0.04)	0.80	5.28
	December 2016	0.24 (0.05)	0.00	1.29	1.35 (0.02)	0.54	2.64
	January 2017	0.21 (0.05)	0.00	0.89	0.96 (0.01)	0.47	1.37
	February 2017	N/A <sup>b</sup>	N/A <sup>b</sup>	N/A <sup>b</sup>	0.81 (0.01)	0.59	1.16
	March 2017	N/A <sup>b</sup>	N/A <sup>b</sup>	N/A <sup>b</sup>	0.72 (0.00)	0.56	0.94
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.24 (0.06)	0.00	5.92	1.19 (0.01)	0.32

<sup>b</sup> There wasn't aboveground flooding for this reporting period.

Table 1 (cont'd). Fiscal Year 2017 average, minimum, and maximum salinity at above- and below-ground locations in marsh and tidal freshwater forest monitoring areas.

Area	Month	Aboveground Salinity (psu)			Belowground Salinity (psu)		
		Avg. (std. err.)	Min	Max	Avg. (std. err.)	Min	Max
Middle 4	October 2016	0.55 (0.09)	0.00	16.89	3.23 (0.07) <sup>a</sup>	1.02 <sup>a</sup>	11.16 <sup>a</sup>
	November 2016	0.81 (0.09)	0.00	7.41	3.74 (0.02)	2.60	4.90
	December 2016	0.14 (0.03)	0.00	6.34	3.38 (0.03)	2.17	5.90
	January 2017	0.20 (0.04)	0.00	0.83	2.36 (0.02)	1.16	3.33
	February 2017	0.18 (0.05)	0.00	2.98	2.09 (0.01)	0.68	2.88
	March 2017	0.16 (0.05)	0.00	1.97	2.09 (0.02)	0.97	2.48
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.47 (0.04)	0.00	16.89	2.87 (0.02) <sup>a</sup>	0.68 <sup>a</sup>
Middle 5	October 2016	0.63 (0.05)	0.00	10.82	1.51 (0.01)	0.92	2.42
	November 2016	0.84 (0.06)	0.00	5.57	1.54 (0.01)	1.17	1.78
	December 2016	0.26 (0.02)	0.00	3.63	1.69 (0.00)	1.58	1.75
	January 2017	0.15 (0.02)	0.00	1.85	1.56 (0.01)	1.19	1.73
	February 2017	0.19 (0.02)	0.00	1.97	1.36 (0.01)	1.03	1.64
	March 2017	0.23 (0.03)	0.00	1.91	0.88 (0.01)	0.60	1.28
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.47 (0.02)	0.00	10.82	1.47 (0.00)	0.60

<sup>a</sup> Incomplete data record. See Table 2 for details.

Table 1 (cont'd). Fiscal Year 2017 average, minimum, and maximum salinity at above- and below-ground locations in marsh and tidal freshwater forest monitoring areas.

Area	Month	Aboveground Salinity (psu)			Belowground Salinity (psu)		
		Avg. (std. err.)	Min	Max	Avg. (std. err.)	Min	Max
Swamp 1	October 2016	0.07 (0.00)	0.00	0.43	0.07 (0.00)	0.06	0.08
	November 2016	0.07 (0.00)	0.00	0.08	0.07 (0.00)	0.06	0.09
	December 2016	0.05 (0.00)	0.00	0.07	0.07 (0.00)	0.05	0.09
	January 2017	0.04 (0.00)	0.00	0.05	0.06 (0.00)	0.05	0.07
	February 2017	0.04 (0.00)	0.02	0.05	0.05 (0.00)	0.04	0.07
	March 2017	0.05 (0.00)	0.04	0.05	0.05 (0.00)	0.04	0.06
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.06 (0.00)	0.00	0.43	0.06 (0.00)	0.04
Swamp 2	October 2016	0.46 (0.09)	0.00	10.95	0.25 (0.00)	0.14	0.37
	November 2016	0.43 (0.04)	0.00	1.80	0.33 (0.00)	0.31	0.37
	December 2016	0.22 (0.01)	0.01	0.36	0.27 (0.00)	0.21	0.32
	January 2017	0.10 (0.01)	0.00	0.18	0.20 (0.00)	0.18	0.23
	February 2017	0.09 (0.01)	0.00	0.14	0.15 (0.00)	0.11	0.19
	March 2017	0.10 (0.01)	0.03	0.13	0.12 (0.00)	0.11	0.14
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.35 (0.04)	0.00	10.95	0.23 (0.00)	0.11

Table 1 (cont'd). Fiscal Year 2017 average, minimum, and maximum salinity at above- and below-ground locations in marsh and tidal freshwater forest monitoring areas.

Area	Month	Aboveground Salinity (psu)			Belowground Salinity (psu)		
		Avg. (std. err.)	Min	Max	Avg. (std. err.)	Min	Max
Swamp 3	October 2016	0.25 (0.04)	0.00	5.72	0.32 (0.00)	0.20	0.57
	November 2016	0.38 (0.04)	0.00	3.04	0.39 (0.01)	0.19	0.66
	December 2016	0.11 (0.01)	0.00	0.68	0.32 (0.00)	0.21	0.41
	January 2017	0.09 (0.01)	0.00	0.26	0.18 (0.00)	0.01	0.22
	February 2017	0.08 (0.00)	0.00	0.13	0.11 (0.00)	0.09	0.14
	March 2017	0.10 (0.01)	0.00	0.18	0.09 (0.00)	0.08	0.11
	April 2017						
	May 2017						
	June 2017						
	July 2017						
	August 2017						
	September 2017						
		<b>FY17</b>	0.21 (0.02)	0.00	5.72	0.25 (0.00)	0.01

Table 2. Summary of FY17 salinity data losses from Aquatroll sensors deployed at SHEP monitoring areas between the dates of 01 October - 16 March 2017. Data loss periods and number of days may include periods within FY16. Minor data losses were incurred when data were downloaded near pre-programmed sensor measurements. Water level data losses may be beyond dates listed below.

Area	Position	Data loss period		# Days	Reason
		Beginning	End		
Middle 1	Aboveground	09/28/2016 03:00	10/20/2016 12:00	22.38	Circuit board failure
Middle 4	Belowground	10/09/2016 07:00	10/20/2016 15:00	11.33	Circuit board failure
Back 3	Belowground	11/06/2016 02:00	11/06/2016 18:00	0.67	Sensor fouling
Back 3	Belowground	12/07/2016 08:00	12/09/2016 07:00	1.96	Sensor fouling
Back 3	Belowground	12/15/2016 20:00	12/17/2016 14:00	1.75	Sensor fouling
Back 3	Belowground	12/29/2016 10:00	12/29/2016 21:00	0.46	Sensor fouling
Back 3	Belowground	01/17/2017 04:00	01/27/2017 13:00	10.38	Sensor fouling
Back 3	Aboveground	01/19/2017 11:00	01/27/2017 13:00	8.08	Incorrect download interval*

\*these data will be recovered

Table 3. Comparison of belowground salinity measurements taken January 2017 via autonomous sensors (In-Situ Aquatrolls) versus a "spot check" measured via handheld YSI salinity meter (units: parts per thousand = ppt). Reports typically provide summaries of hourly Aquatroll measurements of salinity as practical salinity units (psu) though measurements of total dissolved solids as parts per thousand (ppt) are also collected. Here we report both Aquatroll measurements to facilitate comparisons with handheld YSI measurements. Accuracy of the handheld YSI meter is 0.1 (ppt), while accuracy of the Aquatrolls is 0.001 (psu, ppt); Aquatroll values were rounded to the nearest 0.1 to facilitate comparisons.

Site	Aquatroll Total		YSI "spot check" (ppt)	YSI Measurement Time	Aquatroll Measurement Time
	Aquatroll Salinity (psu)	Dissolved Solids (ppt)			
Back 1	0.1	0.2	0.1	01/18/2017 15:48	01/18/2017 15:00
Back 2	0.1	0.2	0.2	01/19/2017 10:45	01/19/2017 10:00
Back 3	0.0	0.0	0.7	01/19/2017 10:16	01/19/2017 10:00
Back 3.5	2.2	2.7	2.2	01/19/2017 09:49	01/19/2017 09:00
Back 4	3.4	4.0	3.4	01/19/2017 16:16	01/19/2017 16:00
Front 1	0.3	0.4	0.4	01/19/2017 11:37	01/19/2017 11:00
Front 2	0.9	1.1	1.0	01/20/2017 11:38	01/20/2017 11:00
Middle 1	0.6	0.8	0.6	01/19/2017 13:48	01/19/2017 13:00
Middle 2	0.8	1.0	0.8	01/19/2017 12:49	01/19/2017 12:00
Middle 3	0.7	0.9	1.1	01/19/2017 12:21	01/19/2017 12:00
Middle 4	2.2	2.7	2.2	01/19/2017 08:07	01/19/2017 08:00
Middle 5	1.5	1.9	1.6	01/19/2017 09:04	01/19/2017 09:00
Swamp 1	0.1	0.1	0.1	01/20/2017 08:45	01/20/2017 08:00
Swamp 2	0.2	0.3	0.2	01/20/2017 10:18	01/20/2017 10:00
Swamp 3	0.2	0.3	0.2	01/20/2017 13:46	01/20/2017 13:00



Table 4. Comparison of belowground salinity measurements taken February 2017 via autonomous sensors (In-Situ Aquatrolls) versus a "spot check" measured via handheld YSI salinity meter (units: parts per thousand = ppt). Reports typically provide summaries of hourly Aquatroll measurements of salinity as practical salinity units (psu) though measurements of total dissolved solids as parts per thousand (ppt) are also collected. Here we report both Aquatroll measurements to facilitate comparisons with handheld YSI measurements. Accuracy of the handheld YSI meter is 0.1 (ppt), while accuracy of the Aquatrolls is 0.001 (psu, ppt); Aquatroll values were rounded to the nearest 0.1 to facilitate comparisons.

Site	Aquatroll Total		YSI "spot check" (ppt)	YSI Measurement Time	Aquatroll Measurement Time
	Aquatroll Salinity (psu)	Dissolved Solids (ppt)			
Back 1	0.1	0.1	0.1	02/15/2017 11:52	02/15/2017 11:00
Back 2	0.1	0.1	0.1	02/15/2017 12:18	02/15/2017 12:00
Back 3	0.7	0.9	0.7	02/15/2017 12:42	02/15/2017 12:00
Back 3.5	2.1	2.5	2.1	02/15/2017 13:04	02/15/2017 13:00
Back 4	2.0	2.5	1.7	02/15/2017 13:33	02/15/2017 13:00
Front 1	0.2	0.3	0.2	02/16/2017 11:53	02/16/2017 11:00
Front 2	0.6	0.8	0.8	02/16/2017 12:32	02/16/2017 12:00
Middle 1	0.5	0.6	0.5	02/15/2017 11:22	02/15/2017 11:00
Middle 2	0.7	0.9	0.7	02/15/2017 10:56	02/15/2017 10:00
Middle 3	0.7	0.8	0.7	02/15/2017 10:31	02/15/2017 10:00
Middle 4	2.0	2.5	2.0	02/16/2017 13:21	02/16/2017 13:00
Middle 5	1.4	1.8	1.4	02/16/2017 13:45	02/16/2017 13:00
Swamp 1	0.0	0.1	0.1	02/16/2017 09:04	02/16/2017 09:00
Swamp 2	0.2	0.2	0.2	02/16/2017 10:04	02/16/2017 10:00
Swamp 3	0.1	0.1	0.1	02/16/2017 10:51	02/16/2017 10:00

Table 5. Comparison of belowground salinity measurements taken March 2017 via autonomous sensors (In-Situ Aquatrolls) versus a "spot check" measured via handheld YSI salinity meter (units: parts per thousand = ppt). Reports typically provide summaries of hourly Aquatroll measurements of salinity as practical salinity units (psu) though measurements of total dissolved solids as parts per thousand (ppt) are also collected. Here we report both Aquatroll measurements to facilitate comparisons with handheld YSI measurements. Accuracy of the handheld YSI meter is 0.1 (ppt), while accuracy of the Aquatrolls is 0.001 (psu, ppt); Aquatroll values were rounded to the nearest 0.1 to facilitate comparisons.

Site	Aquatroll Total		YSI "spot check" (ppt)	YSI Measurement Time	Aquatroll Measurement Time
	Aquatroll Salinity (psu)	Dissolved Solids (ppt)			
Back 1	0.1	0.1	0.1	03/16/2017 14:38	03/16/2017 14:00
Back 2	0.2	0.3	0.2	03/16/2017 15:09	03/16/2017 15:00
Back 3	0.7	0.9	0.7	03/16/2017 16:52	03/16/2017 16:00
Back 3.5	2.0	2.5	2.0	03/16/2017 15:47	03/16/2017 15:00
Back 4	2.1	2.6	2.2	03/16/2017 16:08	03/16/2017 16:00
Front 1	0.2	0.3	0.3	03/16/2017 11:33	03/16/2017 11:00
Front 2	1.2	1.5	1.2	03/17/2017 14:36	03/17/2017 14:00
Middle 1	0.4	0.5	0.4	03/16/2017 13:05	03/16/2017 13:00
Middle 2	0.7	0.9	0.7	03/16/2017 12:34	03/16/2017 12:00
Middle 3	0.8	1.1	0.9	03/16/2017 12:04	03/16/2017 12:00
Middle 4	2.2	2.7	2.4	03/16/2017 10:19	03/16/2017 10:00
Middle 5	1.2	1.5	1.3	03/16/2017 09:49	03/16/2017 09:00
Swamp 1	0.0	0.1	0.1	03/17/2017 10:04	03/17/2017 10:00
Swamp 2	0.1	0.2	0.1	03/17/2017 10:50	03/17/2017 10:00
Swamp 3	0.1	0.1	0.1	03/17/2017 12:56	03/17/2017 12:00