

Monthly Report: August 2016

**BARUCH
INSTITUTE OF
COASTAL
ECOLOGY AND
FOREST
SCIENCE**

Highway 17 North
PO Box 596
Georgetown, SC
29442-0596

P (843) 546-1013
F (843) 546-6296

To:
William Bailey and Mary E. Richards
Planning Division
Savannah District
US Army Corps of Engineers
100 W. Oglethorpe Ave.
Savannah, GA 31401

02 September 2016

By:
Jamie Duberstein

Bill and Mary:

Please see the bulleted list below for the major actions and accomplishments associated with Cooperative Agreement Number W912HZ-14-2-0002 (Modification Number P00002) for the month of August 2016. Please let me know if you would like me to elaborate on the details of any items I've listed below, or if there are any status updates you'd like on unlisted topics.

Best Regards,

Jamie

Marsh Vegetation

- Data analysis is underway and expected to be complete in time for the September report.

Water Data

- Data from all water sensors were downloaded on 18 and 19 August 2016.
 - An updated salinity table (Table 1) is included with this August monthly report.
- The to-date salinity data losses for 2016 are listed in Table 2.
 - There was nearly a month of lost data for the belowground sensor at Middle 3. It malfunctioned shortly after we downloaded in July, going undetected until 18 August. The sensor was removed and replaced with a properly functioning sensor during the August download field mission (i.e., when it was discovered faulty).
- A “spot check” of belowground salinity conditions were measured using a handheld YSI meter during the August sensor download. This is the first month that we used this particular (new) YSI meter for the spot check.
 - Salinity values were compared to those measured via Aquatrolls, provided in Table 3.

Forest monitoring

- Monthly measurements of baldcypress tree growth were last taken on 19 August at all swamp study areas.
- Average basal area increase since last measurement:
 - Swamp 1: 0.0 cm² (21 July – 19 August)
 - Swamp 2: 0.5 cm² (21 July – 19 August)
 - Swamp 3: -0.2 cm² (21 July – 19 August)

Herpetofauna (MS student) study

- Data are being entered and interpreted.

Table 1. Year 2016 average, maximum, and minimum 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 January through 18 August 2016 for all monitoring areas unless noted by superscript; details of data loss provided in Table 2. Measurements taken during dry well conditions were removed from calculations of summary statistics.

Area	Month	Aboveground Salinity (psu)			Belowground Salinity (psu)		
		Avg. (std. err)	Max	Min	Avg (std. err)	Max	Min
Back 1	January	0.03 (0.00)	0.05	0.00	0.09 (0.00)	0.10	0.08
	February	0.03 (0.00)	0.05	0.00	0.07 (0.00)	0.09	0.07
	March	0.08 (0.00)	0.12	0.00	0.09 (0.00)	0.11	0.06
	April	0.07 (0.00) ^b	0.12 ^b	0.00 ^b	0.10 (0.00) ^b	0.10 ^b	0.08 ^b
	May	0.06 (0.01)	0.15	0.00	0.12 (0.00)	0.13	0.09
	June	0.06 (0.01)	0.18	0.00	0.10 (0.00)	0.13	0.08
	July	0.11 (0.01)	0.15	0.01	0.13 (0.00)	0.14	0.10
	August	0.12 (0.03)	0.23	0.00	0.15 (0.00)	0.18	0.12
	September						
	October						
	November						
	December						
	Annual	0.06 (0.00)	0.23	0.00	0.10 (0.00)	0.18	0.06
Back 2	January	0.03 (0.00) ^a	0.03 ^a	0.03 ^a	0.06 (0.00) ^a	0.09 ^a	0.04 ^a
	February	0.03 (0.00)	0.04	0.00	0.07 (0.00) ^a	0.09 ^a	0.04 ^a
	March	0.05 (0.00)	0.08	0.00	0.08 (0.00)	0.10	0.07
	April	0.05 (0.00)	0.30	0.00	0.10 (0.00)	0.13	0.07
	May	0.08 (0.01)	0.40	0.00	0.14 (0.00)	0.19	0.08
	June	0.11 (0.01)	0.55	0.00	0.15 (0.00)	0.26	0.09
	July	0.12 (0.01)	0.77	0.00	0.20 (0.00)	0.31	0.16
	August	0.12 (0.03)	1.68	0.00	0.32 (0.01)	0.77	0.22
	September						
	October						
	November						
	December						
	Annual	0.08 (0.00)	1.68	0.00	0.14 (0.00)	0.77	0.04

^a Incomplete data record. See Table 2 for details.

^b Data loss less than 48 hours as a result of updating field sensor.

Table 1 (cont'd). Year 2016 average, maximum, and minimum 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)	Max	Min	Avg (std. err)	Max	Min
Back 3	January	0.04 (0.00)	0.07	0.00	1.49 (0.01) ^a	1.88 ^a	1.12 ^a
	February	0.03 (0.00)	0.06	0.00	1.15 (0.01) ^a	1.39 ^a	0.62 ^a
	March	0.06 (0.01)	0.15	0.00	0.68 (0.01)	1.46	0.12
	April	0.07 (0.01) ^b	0.48 ^b	0.00 ^b	0.42 (0.01)	1.03	0.01
	May	0.33 (0.04)	1.28	0.00	0.36 (0.01)	1.20	0.01
	June	0.25 (0.03)	1.61	0.00	0.43 (0.01)	1.12	0.00
	July	0.28 (0.04)	1.78	0.00	0.80 (0.01)	1.43	0.30
	August	0.27 (0.07)	3.31	0.00	1.12 (0.02)	1.84	0.33
	September						
	October						
	November						
	December						
	Annual	0.17 (0.01)	3.31	0.00	0.72 (0.01)	1.88	0.00
Back 3.5	January	0.03 (0.00)	0.18	0.00	2.14 (0.01)	2.61	1.23
	February	0.04 (0.00)	0.11	0.00	2.07 (0.00)	2.31	1.83
	March	0.06 (0.01)	0.38	0.00	1.78 (0.02)	2.20	0.43
	April	0.08 (0.01)	0.61	0.00	1.92 (0.00) ^b	2.11 ^b	1.78 ^b
	May	0.28 (0.03)	2.08	0.00	1.81 (0.01)	2.14	1.45
	June	0.27 (0.03)	2.04	0.00	1.73 (0.01)	2.06	0.88
	July	0.26 (0.03)	2.05	0.00	1.61 (0.01)	1.96	1.20
	August	0.41 (0.08)	3.22	0.00	1.90 (0.01)	2.85	1.57
	September						
	October						
	November						
	December						
	Annual	0.18 (0.01)	3.22	0.00	1.87 (0.00)	2.85	0.43

^a Incomplete data record. See Table 2 for details.

^b Data loss less than 48 hours as a result of updating field sensor.

Table 1 (cont'd). Year 2016 average, maximum, and minimum 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)	Max	Min	Avg (std. err)	Max	Min
Back 4	January	0.05 (0.00)	0.57	0.00	2.27 (0.01)	2.65	1.73
	February	0.08 (0.01)	0.62	0.00	2.69 (0.00)	2.83	2.42
	March	0.21 (0.02)	2.39	0.00	2.75 (0.01)	2.86	0.02
	April	0.33 (0.03) ^b	3.59 ^b	0.00 ^b	2.48 (0.01) ^b	2.83 ^b	1.96 ^b
	May	0.76 (0.07)	5.37	0.00	2.42 (0.00)	2.63	1.92
	June	0.72 (0.06)	7.18	0.00	2.10 (0.01)	3.36	1.52
	July	0.65 (0.07)	6.30	0.00	2.71 (0.00)	2.91	2.58
	August	0.67 (0.13)	8.08	0.00	3.11 (0.03)	5.07	2.70
	September						
	October						
	November						
	December						
	Annual	0.43 (0.02)	8.08	0.00	2.54 (0.01)	5.07	0.02
Front 1	January	0.03 (0.00)	0.08	0.00	0.08 (0.00)	0.10	0.05
	February	0.03 (0.00)	0.06	0.00	0.08 (0.00)	0.09	0.07
	March	0.04 (0.00)	0.06	0.00	0.08 (0.00)	0.09	0.07
	April	0.03 (0.00) ^b	0.13 ^b	0.00 ^b	0.06 (0.00) ^b	0.08 ^b	0.05 ^b
	May	0.05 (0.01)	0.47	0.00	0.11 (0.00)	0.15	0.06
	June	0.07 (0.01)	0.43	0.00	0.12 (0.00)	0.33	0.04
	July	0.12 (0.02)	0.74	0.00	0.19 (0.00)	0.49	0.12
	August	0.21 (0.05)	0.68	0.00	0.39 (0.00)	0.64	0.27
	September						
	October						
	November						
	December						
	Annual	0.05 (0.00)	0.74	0.00	0.13 (0.00)	0.64	0.04

^a Incomplete data record. See Table 2 for details.

^b Data loss less than 48 hours as a result of updating field sensor.

Table 1 (cont'd). Year 2016 average, maximum, and minimum 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)	Max	Min	Avg (std. err)	Max	Min
Front 2	January	0.03 (0.00)	0.05	0.01	0.14 (0.00)	0.33	0.05
	February	0.03 (0.00)	0.05	0.00	0.13 (0.00)	0.32	0.05
	March	0.06 (0.00)	0.31	0.00	0.20 (0.00)	0.47	0.08
	April	0.08 (0.01)	3.75	0.00	0.25 (0.00)	0.44	0.17
	May	0.14 (0.02)	3.43	0.00	0.42 (0.01)	0.68	0.15
	June	0.29 (0.03)	4.45	0.00	0.46 (0.01)	1.52	0.13
	July	0.36 (0.05)	4.83	0.00	1.22 (0.03)	4.20	0.32
	August	0.61 (0.11)	6.10	0.00	1.98 (0.07)	5.97	0.48
	September						
	October						
	November						
	December						
	Annual	0.21 (0.01)	6.10	0.00	0.53 (0.01)	5.97	0.05
Middle 1	January	0.04 (0.00) ^a	0.05 ^a	0.00 ^a	0.20 (0.00)	0.33	0.11
	February	0.04 (0.00)	0.09	0.00	0.23 (0.00)	0.33	0.16
	March	0.05 (0.00)	0.11	0.00	0.20 (0.00)	0.27	0.14
	April	0.07 (0.00)	0.25	0.00	0.21 (0.00) ^b	0.25 ^b	0.10 ^b
	May	0.14 (0.02)	1.18	0.00	0.27 (0.00)	0.42	0.19
	June	0.17 (0.05)	2.53	0.00	0.27 (0.00)	1.28	0.13
	July	0.13 (0.03)	0.45	0.00	0.31 (0.00)	1.19	0.15
	August	0.02 (0.01)	0.28	0.00	0.52 (0.00)	1.30	0.38
	September						
	October						
	November						
	December						
	Annual	0.10 (0.01)	2.53	0.00	0.26 (0.00)	1.30	0.10

^a Incomplete data record. See Table 2 for details.

^b Data loss less than 48 hours as a result of updating field sensor.

Table 1 (cont'd). Year 2016 average, maximum, and minimum 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)	Max	Min	Avg (std. err)	Max	Min
Middle 2	January	0.03 (0.00) ^a	0.04 ^a	0.02 ^a	0.07 (0.00)	0.12	0.05
	February	0.03 (0.00)	0.05	0.00	0.09 (0.00)	0.16	0.06
	March	0.06 (0.00)	0.14	0.00	0.09 (0.00)	0.14	0.04
	April	0.08 (0.01)	0.45	0.00	0.11 (0.00) ^b	0.21 ^b	0.07 ^b
	May	0.12 (0.02)	1.17	0.00	0.21 (0.00)	0.32	0.08
	June	0.17 (0.08)	3.36	0.00	0.29 (0.01)	2.17	0.06
	July	0.19 (0.12)	0.68	0.00	0.49 (0.01)	1.39	0.23
	August	0.00 (0.00)	0.00	0.00	0.95 (0.01)	1.63	0.57
	September						
	October						
	November						
	December						
	Annual	0.09 (0.01)	3.36	0.00	0.25 (0.00)	2.17	0.04
Middle 3	January	0.04 (0.00) ^a	0.05 ^a	0.03 ^a	0.29 (0.01)	0.60	0.10
	February	0.03 (0.00)	0.05	0.02	0.24 (0.00)	0.50	0.03
	March	0.09 (0.02)	0.27	0.00	0.40 (0.01)	0.74	0.13
	April	0.07 (0.02)	0.53	0.00	0.30 (0.01) ^b	0.58 ^b	0.09 ^b
	May	0.26 (0.06)	2.04	0.00	0.66 (0.01)	1.40	0.00
	June	0.16 (0.09)	5.90	0.00	0.57 (0.03)	5.83	0.06
	July	0.00 (0.00)	0.00	0.00	0.70 (0.00)	0.86	0.38
	August	0.00 (0.00)	0.00	0.00	N/A ^a	N/A ^a	N/A ^a
	September						
	October						
	November						
	December						
	Annual	0.13 (0.03)	5.90	0.00	0.45 (0.01)	5.83	0.00

^a Incomplete data record. See Table 2 for details.

^b Data loss less than 48 hours as a result of updating field sensor.

Table 1 (cont'd). Year 2016 average, maximum, and minimum 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)	Max	Min	Avg (std. err)	Max	Min
Middle 4	January	0.02 (0.00) ^a	0.06 ^a	0.00 ^a	1.02 (0.01)	1.52	0.20
	February	0.02 (0.00)	0.08	0.00	1.24 (0.01)	2.11	0.84
	March	0.06 (0.01)	0.45	0.00	1.40 (0.01)	2.48	0.48
	April	0.06 (0.01)	1.20	0.00	1.16 (0.01)	3.16	0.34
	May	0.21 (0.03)	2.74	0.00	1.43 (0.02)	3.02	0.41
	June	0.28 (0.05)	7.28	0.00	1.86 (0.02)	3.58	0.64
	July	0.27 (0.05)	3.65	0.00	2.57 (0.03)	6.18	1.25
	August	0.49 (0.13)	5.81	0.00	3.55 (0.06)	6.39	1.45
	September						
	October						
	November						
	December						
	Annual	0.19 (0.02)	7.28	0.00	1.68 (0.01)	6.39	0.20
Middle 5	January	0.02 (0.00) ^a	0.10 ^a	0.00 ^a	0.29 (0.00) ^a	0.40 ^a	0.19 ^a
	February	0.05 (0.00) ^b	0.13 ^b	0.00 ^b	0.43 (0.01) ^a	0.76 ^a	0.26 ^a
	March	0.16 (0.01)	0.66	0.00	0.51 (0.01)	0.90	0.29
	April	0.14 (0.01)	1.89	0.00	0.43 (0.00)	0.87	0.31
	May	0.20 (0.02)	2.62	0.00	0.64 (0.01)	0.93	0.38
	June	0.33 (0.03)	5.09	0.00	0.70 (0.01)	2.02	0.18
	July	0.26 (0.03)	4.33	0.00	1.17 (0.02)	4.35	0.52
	August	0.28 (0.04)	5.87	0.00	2.17 (0.05)	5.26	0.96
	September						
	October						
	November						
	December						
	Annual	0.22 (0.01)	5.87	0.00	0.76 (0.01)	5.26	0.18

^a Incomplete data record. See Table 2 for details.

^b Data loss less than 48 hours as a result of updating field sensor.

Table 1 (cont'd). Year 2016 average, maximum, and minimum 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)	Max	Min	Avg (std. err)	Max	Min
Swamp 1	January	0.03 (0.00)	0.06	0.00	0.09 (0.00)	0.11	0.08
	February	0.03 (0.00)	0.05	0.00	0.06 (0.00)	0.10	0.03
	March	0.04 (0.00)	0.05	0.00	0.06 (0.00)	0.07	0.05
	April	0.04 (0.00) ^b	0.05 ^b	0.00 ^b	0.06 (0.00) ^b	0.07 ^b	0.04 ^b
	May	0.04 (0.00)	0.05	0.00	0.06 (0.00)	0.08	0.03
	June	0.03 (0.00)	0.05	0.00	0.06 (0.00)	0.08	0.04
	July	0.05 (0.00)	0.09	0.00	0.07 (0.00)	0.13	0.01
	August	0.04 (0.01)	0.06	0.00	0.06 (0.00)	0.10	0.00
	September						
	October						
	November						
	December						
		Annual	0.04 (0.00)	0.09	0.00	0.06 (0.00)	0.13
Swamp 2	January	0.04 (0.00)	0.09	0.00	0.18 (0.00)	0.22	0.15
	February	0.06 (0.00)	0.11	0.00	0.15 (0.00)	0.18	0.12
	March	0.07 (0.00)	0.12	0.00	0.13 (0.00)	0.16	0.10
	April	0.08 (0.00) ^b	0.11 ^b	0.01 ^b	0.10 (0.00) ^b	0.14 ^b	0.08 ^b
	May	0.10 (0.01)	0.21	0.00	0.11 (0.00)	0.14	0.07
	June	0.08 (0.01)	0.47	0.00	0.11 (0.00)	0.14	0.07
	July	0.08 (0.00)	0.15	0.00	0.12 (0.00)	0.15	0.06
	August	0.12 (0.01)	0.20	0.00	0.16 (0.00)	0.32	0.10
	September						
	October						
	November						
	December						
		Annual	0.07 (0.00)	0.47	0.00	0.13 (0.00)	0.32

^a Incomplete data record. See Table 2 for details.

^b Data loss less than 48 hours as a result of updating field sensor.

Table 1 (cont'd). Year 2016 average, maximum, and minimum 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)	Max	Min	Avg (std. err)	Max	Min
Swamp 3	January	0.02 (0.00)	0.08	0.00	0.10 (0.00)	0.14	0.09
	February	0.04 (0.00)	0.09	0.00	0.09 (0.00)	0.12	0.08
	March	0.03 (0.00)	0.08	0.00	0.95 (0.00)	0.12	0.07
	April	0.03 (0.00) ^b	0.08 ^b	0.00 ^b	0.08 (0.00) ^b	0.12 ^b	0.06 ^b
	May	0.05 (0.00)	0.44	0.00	0.12 (0.00)	0.17	0.04
	June	0.11 (0.02)	2.26	0.00	0.13 (0.00)	0.25	0.07
	July	0.10 (0.01)	1.09	0.00	0.15 (0.00)	0.40	0.07
	August	0.18 (0.03)	0.85	0.00	0.32 (0.01)	0.59	0.17
	September						
	October						
	November						
	December						
	Annual	0.06 (0.00)	2.26	0.00	0.13 (0.00)	0.59	0.04

^a Incomplete data record. See Table 2 for details.

^b Data loss less than 48 hours as a result of updating field sensor.

Table 2. Summary of 2016 year-to-date (01 January – 18 August) salinity data losses from Aquatroll sensors deployed at SHEP monitoring areas. Water level data losses may be beyond dates listed below. Sensors noted 'never failed' were replaced with new sensors with updated circuit boards, and minor data loss was incurred. 'Single hour' losses sometimes occur when data are downloaded in close temporal proximity to scheduled sensor measurements.

Site	Position	Data loss period		Discovered	Replaced
		Beginning	End		
Middle 4	Aboveground	11/30/2015 10:00	01/23/2016 00:00	01/13/2016	01/22/2016
Middle 3	Aboveground	12/19/2015 04:41	01/23/2016 00:00	01/13/2016	01/22/2016
Middle 2	Aboveground	12/19/2015 05:24	01/23/2016 00:00	01/13/2016	01/22/2016
Back 2	Aboveground	01/05/2016 00:20	01/23/2016 00:00	01/13/2016	01/22/2016
Middle 1	Aboveground	01/05/2016 02:53	01/23/2016 00:00	01/13/2016	01/22/2016
Middle 5	Aboveground	01/05/2016 00:47	01/23/2016 00:00	01/13/2016	01/22/2016
Back 3	Belowground	01/19/2016 06:36	02/13/2016 13:00	02/13/2016	02/13/2016
Middle 5	Belowground	01/19/2016 23:42	02/13/2016 18:00	02/13/2016	02/13/2016
Back 2	Belowground	01/23/2016 18:06	02/13/2016 12:00	02/13/2016	02/13/2016
Middle 5	Aboveground	02/13/2016 17:00	single hour	N/A	N/A
Middle 4	Belowground	03/14/2016 12:00	03/14/2016 15:00	N/A	N/A
Back 1	Aboveground	04/19/2016 16:49	04/21/2016 00:00	never failed	04/21/2016
Back 1	Belowground	04/19/2016 15:45	04/21/2016 00:00	never failed	04/21/2016
Back 3	Aboveground	04/19/2016 12:38	04/21/2016 00:00	never failed	04/21/2016
Back 3.5	Belowground	04/19/2016 13:00	04/21/2016 00:00	never failed	04/21/2016
Back 4	Aboveground	04/19/2016 13:59	04/21/2016 00:00	never failed	04/21/2016
Back 4	Belowground	04/19/2016 13:00	04/21/2016 00:00	never failed	04/21/2016
Front 1	Aboveground	04/19/2016 10:12	04/21/2016 00:00	never failed	04/21/2016
Front 1	Belowground	04/19/2016 09:55	04/21/2016 00:00	never failed	04/21/2016
Middle 1	Belowground	04/19/2016 10:45	04/21/2016 00:00	never failed	04/21/2016
Middle 2	Belowground	04/19/2016 10:17	04/21/2016 00:00	never failed	04/21/2016
Middle 3	Belowground	04/20/2016 09:00	single hour	N/A	N/A
Swamp 1	Aboveground	04/20/2016 16:00	04/21/2016 00:00	never failed	04/21/2016
Swamp 1	Belowground	04/20/2016 15:00	04/21/2016 00:00	never failed	04/21/2016
Swamp 2	Aboveground	04/20/2016 17:00	04/21/2016 00:00	never failed	04/21/2016
Swamp 2	Belowground	04/20/2016 17:00	04/21/2016 00:00	never failed	04/21/2016
Swamp 3	Aboveground	04/20/2016 19:00	04/21/2016 00:00	never failed	04/21/2016
Swamp 3	Belowground	04/20/2016 17:00	04/20/2016 19:00	never failed	04/21/2016
Middle 5	Belowground	06/23/2016 13:00	06/23/2016 23:00	July 2016	06/23/2016
Middle 3	Belowground	07/26/2016 00:00	08/18/2016 09:00	08/18/2016	08/18/2016

Table 3. Comparison of belowground salinity measurements taken August 2016 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 Soilds (ppt)			
Back 1	0.2	0.2	0.2	08/18/2016 11:31	08/18/2016 11:00
Back 2	0.6	0.8	0.5	08/18/2016 12:04	08/18/2016 12:00
Back 3	1.7	2.1	1.7	08/18/2016 12:26	08/18/2016 12:00
Back 3.5	2.6	3.1	2.6	08/18/2016 12:50	08/18/2016 12:00
Back 4	4.1	4.8	4.1	08/18/2016 13:17	08/18/2016 13:00
Front 1	0.6	0.8	0.5	08/18/2016 10:26	08/18/2016 10:00
Front 2	2.7	3.3	2.5	08/19/2016 11:39	08/19/2016 11:00
Middle 1	0.6	0.8	0.6	08/18/2016 11:04	08/18/2016 11:00
Middle 2	1.5	1.8	1.5	08/18/2016 09:08	08/18/2016 09:00
Middle 3	N/A	N/A	2.4	08/18/2016 08:30	N/A
Middle 4	5.9	6.7	5.3	08/18/2016 10:04	08/18/2016 09:00
Middle 5	3.4	4.0	2.7	08/18/2016 09:40	08/18/2016 09:00
Swamp 1	0.1	0.1	0.1	08/19/2016 10:27	08/19/2016 10:00
Swamp 2	0.2	0.3	0.2	08/19/2016 10:03	08/19/2016 10:00
Swamp 3	0.6	0.8	0.6	08/19/2016 08:45	08/19/2016 08:00