

Appendix F

Bluff Recession Data

Table F-1. Todd Creek Bluff Recession Data
Post-Closure Care and Corrective Action Permit Renewal Application
UCC Woodbine, Camden County, Georgia

Date of Measurement	Storm Event	ECM-0			ECM-1 (Monitoring Well MW-17)				ECM-2 (Monitoring Well MW-20)				ECM-3 (Monitoring Well MW-24)			
		Total Distance from Baseline (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Erosion Measurement (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Erosion Measurement (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Erosion Measurement (feet)	Recession (feet)	Cumulative Recession (feet)
3/19/1996		--	--	--	--	29.58	--	0.00	--	58.25	--	0.00	--	44.33	--	0.00
6/24/1996		--	--	--	--	29.58	0.00	0.00	--	58.25	0.00	0.00	--	42.00	2.33	2.33
9/27/1996		--	--	--	--	29.58	0.00	0.00	--	57.83	0.42	0.42	--	42.00	0.00	2.33
12/11/1996		--	--	--	--	29.50	0.08	0.08	--	57.67	0.17	0.58	--	42.00	0.00	2.33
3/24/1997		--	--	--	--	29.50	0.00	0.08	--	57.67	0.00	0.58	--	42.00	0.00	2.33
6/18/1997		--	--	--	--	29.50	0.00	0.08	--	57.67	0.00	0.58	--	42.00	0.00	2.33
9/26/1997		--	--	--	--	29.75 ¹	-0.25	-0.167	--	57.67	0.00	0.58	--	42.00	0.00	2.33
12/16/1997		--	--	--	--	29.50	0.25	0.08	--	57.67	0.00	0.58	--	42.00	0.00	2.33
3/20/1998		--	--	--	--	29.50	0.00	0.08	--	57.67	0.00	0.58	--	41.25	0.75	3.08
6/22/1998		--	--	--	--	29.50	0.00	0.08	--	57.33	0.33	0.92	--	41.00	0.25	3.33
9/24/1998	Hurricane Earl - Sept 1998	--	--	--	--	29.50	0.00	0.08	--	57.33	0.00	0.92	--	36.08	4.92	8.25
12/17/1998	Hurricane Georges - Sept 1998	--	--	--	--	29.50	0.00	0.08	--	57.33	0.00	0.92	--	36.08	0.00	8.25
3/25/1999		--	--	--	--	29.50	0.00	0.08	--	57.33	0.00	0.92	--	35.58	0.50	8.75
6/30/1999		--	--	--	--	29.50	0.00	0.08	--	57.33	0.00	0.92	--	35.00	0.58	9.33
9/29/1999		--	--	--	--	29.50	0.00	0.08	--	57.33	0.00	0.92	--	35.00	0.00	9.33
12/8/1999		--	--	--	--	29.50	0.00	0.08	--	57.33	0.00	0.92	--	36.33	-1.333	8.00
3/29/2000		--	--	--	--	29.50	0.00	0.08	--	57.33	0.00	0.92	--	36.33	0.00	8.00
6/30/2000		--	--	--	--	29.50	0.00	0.08	--	57.33	0.00	0.92	--	36.33	0.00	8.00
9/18/2000		--	--	--	--	29.50	0.00	0.08	--	57.33	0.00	0.92	--	36.17	0.17	8.17
12/19/2000	Hurricane Gordon - Sept 2000	--	--	--	--	29.33	0.17	0.25	--	57.33	0.00	0.92	--	36.08	0.08	8.25
3/28/2001		--	--	--	--	29.17	0.17	0.42	--	57.33	0.00	0.92	--	36.00	0.08	8.33
6/25/2001		--	--	--	--	29.00	0.17	0.58	--	57.33	0.00	0.92	--	36.00	0.00	8.33
9/27/2001		--	--	--	--	29.00	0.00	0.58	--	57.33	0.00	0.92	--	36.00	0.00	8.33
12/18/2001		--	--	--	--	29.00	0.00	0.58	--	57.33	0.00	0.92	--	36.00	0.00	8.33
3/14/2002		--	--	--	--	29.00	0.00	0.58	--	57.33	0.00	0.92	--	34.83	1.17	9.50
6/24/2002		--	--	--	--	29.00	0.00	0.58	--	57.33	0.00	0.92	--	34.83	0.00	9.50
9/30/2002		--	--	--	--	29.00	0.00	0.58	--	57.33	0.00	0.92	--	34.58	0.25	9.75
12/19/2002	Hurricane Kyle - October 2002	--	--	--	--	29.00	0.00	0.58	--	57.00	0.33	1.25	--	34.58	0.00	9.75
3/24/2003		--	--	--	--	29.00	0.00	0.58	--	57.00	0.00	1.25	--	34.33	0.25	10.00
6/24/2003		--	--	--	--	29.00	0.00	0.58	--	57.00	0.00	1.25	--	31.75	2.58	12.58
9/30/2003		--	--	--	--	29.00	0.00	0.58	--	57.00	0.00	1.25	--	31.67	0.08	12.67
12/16/2003		--	--	--	--	29.00	0.00	0.58	--	57.00	0.00	1.25	--	31.67	0.00	12.67
6/25/2004		--	--	--	--	29.00	0.00	0.58	--	57.00	0.00	1.25	--	31.67	0.00	12.67
9/29/2004	Hurricane Charley - August 2004	--	--	--	--	29.00	0.00	0.58	--	57.00	0.00	1.25	--	30.50	1.17	13.83
12/13/2004		--	--	--	--	28.75	0.25	0.83	--	57.00	0.00	1.25	--	29.17	1.33	15.17
3/31/2005		--	--	--	--	28.75	0.00	0.83	--	57.00	0.00	1.25	--	29.17	0.00	15.17
6/30/2005		--	--	--	--	28.75	0.00	0.83	--	57.00	0.00	1.25	--	29.17	0.00	15.17
9/30/2005		--	--	--	--	28.58	0.17	1.00	--	56.58	0.42	1.67	--	29.17	0.00	15.17
12/16/2005		--	--	--	--	28.58	0.00	1.00	--	56.50	0.08	1.75	--	29.00	0.17	15.33
4/4/2006		--	--	--	--	28.75	-0.167	0.83	--	56.58	-0.083	1.67	--	28.42	0.58	15.92
7/29/2006		--	--	--	--	28.75	0.00	0.83	--	56.58	0.00	1.67	--	28.42	0.00	15.92
9/29/2006	Hurricane Ernesto - Sept 2006	--	--	--	--	28.75	0.00	0.83	--	56.58	0.00	1.67	--	28.42	0.00	15.92
12/28/2006		--	--	--	--	28.75	0.00	0.83	--	56.58	0.00	1.67	--	28.42	0.00	15.92
3/29/2007		--	--	--	--	28.75	0.00	0.83	--	56.58	0.00	1.67	--	28.42	0.00	15.92

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UCC Woodbine, Camden County, Georgia

Date of Measurement	Storm Event	ECM-0			ECM-1 (Monitoring Well MW-17)				ECM-2 (Monitoring Well MW-20)				ECM-3 (Monitoring Well MW-24)			
		Total Distance from Baseline (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Erosion Measurement (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Erosion Measurement (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Erosion Measurement (feet)	Recession (feet)	Cumulative Recession (feet)
6/22/2007		--	--	--	--	28.75	0.00	0.83	--	56.58	0.00	1.67	--	28.42	0.00	15.92
9/28/2007		--	--	--	--	28.75	0.00	0.83	--	56.58	0.00	1.67	--	26.00	2.42	18.33
12/18/2007		--	--	--	--	28.67	0.08	0.92	--	56.08	0.50	2.17	--	25.83	0.17	18.50
3/28/2008		--	--	--	--	28.67	0.00	0.92	--	56.08	0.00	2.17	--	25.83	0.00	18.50
6/20/2008		--	--	--	--	28.67	0.00	0.92	--	56.00	0.08	2.25	--	25.83	0.00	18.50
9/19/2008		--	--	--	--	28.67	0.00	0.92	--	55.67	0.33	2.58	--	25.83	0.00	18.50
12/30/2008		--	--	--	--	28.75	-0.083	0.83	--	55.83	-0.167	2.42	--	26.00	-0.167	18.33
3/27/2009		--	--	--	--	28.75	0.00	0.83	--	55.50	0.33	2.75	--	26.17	-0.167	18.17
6/26/2009		--	--	--	--	28.75	0.00	0.83	--	55.50	0.00	2.75	--	26.17	0.00	18.17
9/17/2009		--	--	--	--	28.75	0.00	0.83	--	55.50	0.00	2.75	--	21.83	4.33	22.50
12/23/2009		--	--	--	--	28.75	0.00	0.83	--	55.50	0.00	2.75	--	21.75	0.08	22.58
3/26/2010		--	--	--	--	28.75	0.00	0.83	--	55.50	0.00	2.75	--	21.50	0.25	22.83
6/25/2010		--	--	--	--	28.75	0.00	0.83	--	55.50	0.00	2.75	--	21.75	-0.25	22.58
9/24/2010		--	--	--	--	28.67	0.08	0.92	--	55.67	-0.167	2.58	--	21.75	0.00	22.58
12/21/2010		--	--	--	--	28.67	0.00	0.92	--	55.67	0.00	2.58	--	20.25	1.50	24.08
3/30/2011		--	--	--	--	28.67	0.00	0.92	--	55.67	0.00	2.58	--	20.25	0.00	24.08
6/27/2011		--	--	--	--	28.67	0.00	0.92	--	55.67	0.00	2.58	--	20.25	0.00	24.08
9/30/2011		--	--	--	--	28.33	0.33	1.25	--	55.58	0.08	2.67	--	20.17	0.08	24.17
12/30/2011		--	--	--	--	28.33	0.00	1.25	--	55.58	0.00	2.67	--	20.16 ²	0.00	24.17
3/23/2012		--	--	--	--	28.33	0.00	1.25	--	55.67	-0.083	2.58	--	20.17	0.00	24.17
6/11/2012		--	--	--	--	28.33	0.00	1.25	--	55.58	0.08	2.67	--	21.67	-1.5	22.67
9/28/2012		--	--	--	--	28.08	0.25	1.50	--	55.58	0.00	2.67	--	21.25	0.42	23.08
12/17/2012		--	--	--	--	28.08	0.00	1.50	--	55.58	0.00	2.67	--	14.58	6.67	29.75
3/28/2013		--	--	--	--	28.08	0.00	1.50	--	55.58	0.00	2.67	--	13.00	1.58	31.33
6/28/2013		--	--	--	--	27.67	0.42	1.92	--	55.58	0.00	2.67	--	13.00	0.00	31.33
9/16/2013		--	--	--	--	27.67	0.00	1.92	--	55.58	0.00	2.67	--	13.00	0.00	31.33
12/30/2013		--	--	--	--	27.67	0.00	1.92	--	55.58	0.00	2.67	--	13.00	0.00	31.33
3/24/2014		--	--	--	--	27.67	0.00	1.92	--	55.58	0.00	2.67	--	13.00	0.00	31.33
6/18/2014		--	--	--	--	27.67	0.00	1.92	--	55.33	0.25	2.92	--	12.83	0.17	31.50
9/23/2014		--	--	--	--	27.67	0.00	1.92	--	55.50	-0.167	2.75	--	12.67	0.17	31.67
12/29/2014		--	--	--	--	27.67	0.00	1.92	--	55.50	0.00	2.75	--	12.67	0.00	31.67
3/24/2015		--	--	--	--	27.67	0.00	1.92	--	55.50	0.00	2.75	--	12.67	0.00	31.67
6/29/2015		--	--	--	--	27.67	0.00	1.92	--	55.50	0.00	2.75	--	12.67	0.00	31.67
9/24/2015		--	--	--	--	27.67	0.00	1.92	--	55.50	0.00	2.75	--	12.67	0.00	31.67
12/8/2015		--	--	--	--	27.67	0.00	1.92	--	55.50	0.00	2.75	--	12.67	0.00	31.67
3/21/2016		--	--	--	--	27.67	0.00	1.92	--	55.50	0.00	2.75	--	12.67	0.00	31.67
6/21/2016		--	--	--	--	27.67	0.00	1.92	--	55.50	0.00	2.75	--	12.42	0.25	31.92
9/28/2016	Hurricane Hermine - Sept 2016	--	--	--	--	27.67	0.00	1.92	--	55.50	0.00	2.75	--	12.42	0.00	31.92
12/7/2016	Hurricane Matthew - Oct 2016	--	--	--	--	27.50	0.17	2.08	--	55.50	0.00	2.75	--	10.17	2.25	34.17
4/11/2017		--	--	--	--	27.50	0.00	2.08	--	55.50	0.00	2.75	--	10.17	0.00	34.17
Implemented Revised Todd Creek Streambank Stabilization Plan																
6/22/2017		127.43	0.00	0.00	101.30	NA	0.00	2.08	157.41	NA	0.00	2.75	192.83	NA	0.00	34.17
9/19/2017	Hurricane Irma - Sept 2017	124.76	2.67	2.67	101.17	NA	0.13	2.21	156.83	NA	0.58	3.33	189.50	NA	3.33	37.50

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Date of Measurement	Storm Event	ECM-0			ECM-1 (Monitoring Well MW-17)				ECM-2 (Monitoring Well MW-20)				ECM-3 (Monitoring Well MW-24)			
		Total Distance from Baseline (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Erosion Measurement (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Erosion Measurement (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Erosion Measurement (feet)	Recession (feet)	Cumulative Recession (feet)
12/12/2017		124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	189.50	NA	0.00	37.50
3/20/2018		124.76	0.00	2.67	101.25	NA	-0.08	2.13	156.83	NA	0.00	3.33	188.83	NA	0.67	38.17
6/18/2018		124.76	0.00	2.67	101.25	NA	0.00	2.13	156.83	NA	0.00	3.33	188.83	NA	0.00	38.17
9/17/2018		124.76	0.00	2.67	101.17	NA	0.08	2.21	156.83	NA	0.00	3.33	188.83	NA	0.00	38.17
10/31/2018	Hurricane Michael - Oct 2016	124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	188.83	NA	0.00	38.17
12/18/2018		124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	188.83	NA	0.00	38.17
3/26/2019		124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	188.83	NA	0.00	38.17
6/24/2019		124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	186.63	NA	2.20	40.37
9/9/2019	Hurricane Dorian - Sept. 4, 2019	124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	184.75	NA	1.88	42.25
9/23/2019		124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	184.75	NA	0.00	42.25
10/23/2019	Tropical Storm Nester - Oct. 19, 2019	124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	184.75	NA	0.00	42.25
12/16/2019		124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	184.76	NA	-0.01	42.24
3/18/2020		124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	184.76	NA	0.00	42.24
6/9/2020		124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	184.76	NA	0.00	42.24
8/6/2020	Tropical Storm Isaias	124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	184.76	NA	0.00	42.24
9/22/2020		124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	184.76	NA	0.00	42.24
11/30/2020		124.76	0.00	2.67	101.17	NA	0.00	2.21	156.83	NA	0.00	3.33	184.76	NA	0.00	42.24
1Q 2021	Not completed during construction	NM	NM	--	*	NA	--	--	NM	NA	NM	--	NM	NA	NM	--
2Q 2021	Not completed during construction	NM	NM	--	*	NA	--	--	NM	NA	NM	--	NM	NA	NM	--
3Q 2021	Not completed during construction	NM	NM	--	*	NA	--	--	NM	NA	NM	--	NM	NA	NM	--
11/4/2021		124.76	0.00	2.67	*	NA	--	--	156.83	NA	0.00	3.33	184.76	NA	0.00	42.24
3/15/2022		124.76	0.00	2.67	*	NA	--	--	156.83	NA	0.00	3.33	184.76	NA	0.00	42.24
6/23/2022		124.76	0.00	2.67	*	NA	--	--	156.83	NA	0.00	3.33	184.76	NA	0.00	42.24
9/14/2022		124.76	0.00	2.67	*	NA	--	--	156.83	NA	0.00	3.33	184.76	NA	0.00	42.24
10/4/2022	Tropical Storm Ian - 9/29-9/30/22	124.76	0.00	2.67	*	NA	--	--	156.83	NA	0.00	3.33	183.43	NA	1.33	43.57
11/17/2022	Tropical Storm Nicole	124.76	0.00	2.67	*	NA	--	--	156.83	NA	0.00	3.33	174.00	NA	9.43	53.00
3/14/2023		123.69	1.07	3.74	*	NA	--	--	156.83	NA	0.00	3.33	174.00	NA	0.00	53.00
6/14/2023		123.69	0.00	3.74	*	NA	--	--	155.72	NA	1.11	4.44	171.90	NA	2.10	55.10
9/20/2023		123.69	0.00	3.74	*	NA	--	--	155.72	NA	0.00	4.44	171.90	NA	0.00	55.10
12/14/2023		124.30	-0.61	3.13	*	NA	--	--	155.60	NA	0.12	4.56	171.40	NA	0.50	55.60
Recession since Q2 2017				3.13				0.13				1.81				21.43
Recession Rate (feet/year)				0.48				0.09				0.16				2.00

Recession shown represents the difference between that period's measured distance to the bluff edge compared to the previous period's measured distance.

Negative differences result from field measurement error adjustments or minor measurement location variations.

Erosion rates calculated from all available data for each monitoring transect.

* Measurements ended for ECM-1 and ECM-4 when bank construction work started in March 2021 at ECM-1 and ECM-4.

feet/year = feet per year

NM = not measured

NA = not applicable

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Date of Measurement	Storm Event	ECM-4			DC-1			DC-2		
		Total Distance from Baseline (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Recession (feet)	Cumulative Recession (feet)
3/19/1996		--	--	--	--	--	--	--	--	--
6/24/1996		--	--	--	--	--	--	--	--	--
9/27/1996		--	--	--	--	--	--	--	--	--
12/11/1996		--	--	--	--	--	--	--	--	--
3/24/1997		--	--	--	--	--	--	--	--	--
6/18/1997		--	--	--	--	--	--	--	--	--
9/26/1997		--	--	--	--	--	--	--	--	--
12/16/1997		--	--	--	--	--	--	--	--	--
3/20/1998		--	--	--	--	--	--	--	--	--
6/22/1998		--	--	--	--	--	--	--	--	--
9/24/1998	Hurricane Earl - Sept 1998	--	--	--	--	--	--	--	--	--
12/17/1998	Hurricane Georges - Sept 1998	--	--	--	--	--	--	--	--	--
3/25/1999		--	--	--	--	--	--	--	--	--
6/30/1999		--	--	--	--	--	--	--	--	--
9/29/1999		--	--	--	--	--	--	--	--	--
12/8/1999		--	--	--	--	--	--	--	--	--
3/29/2000		--	--	--	--	--	--	--	--	--
6/30/2000		--	--	--	--	--	--	--	--	--
9/18/2000		--	--	--	--	--	--	--	--	--
12/19/2000	Hurricane Gordon - Sept 2000	--	--	--	--	--	--	--	--	--
3/28/2001		--	--	--	--	--	--	--	--	--
6/25/2001		--	--	--	--	--	--	--	--	--
9/27/2001		--	--	--	--	--	--	--	--	--
12/18/2001		--	--	--	--	--	--	--	--	--
3/14/2002		--	--	--	--	--	--	--	--	--
6/24/2002		--	--	--	--	--	--	--	--	--
9/30/2002		--	--	--	--	--	--	--	--	--
12/19/2002	Hurricane Kyle - October 2002	--	--	--	--	--	--	--	--	--
3/24/2003		--	--	--	--	--	--	--	--	--
6/24/2003		--	--	--	--	--	--	--	--	--
9/30/2003		--	--	--	--	--	--	--	--	--
12/16/2003		--	--	--	--	--	--	--	--	--
6/25/2004		--	--	--	--	--	--	--	--	--
9/29/2004	Hurricane Charley - August 2004	--	--	--	--	--	--	--	--	--
12/13/2004		--	--	--	--	--	--	--	--	--
3/31/2005		--	--	--	--	--	--	--	--	--
6/30/2005		--	--	--	--	--	--	--	--	--
9/30/2005		--	--	--	--	--	--	--	--	--
12/16/2005		--	--	--	--	--	--	--	--	--
4/4/2006		--	--	--	--	--	--	--	--	--
7/29/2006		--	--	--	--	--	--	--	--	--
9/29/2006	Hurricane Ernesto - Sept 2006	--	--	--	--	--	--	--	--	--
12/28/2006		--	--	--	--	--	--	--	--	--
3/29/2007		--	--	--	--	--	--	--	--	--

Table F-1. Todd Creek Bluff Recession Data
 Post-Closure Care and Corrective Action Permit Renewal Application
 UCC Woodbine, Camden County, Georgia

Date of Measurement	Storm Event	ECM-4			DC-1			DC-2		
		Total Distance from Baseline (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Recession (feet)	Cumulative Recession (feet)
6/22/2007		--	--	--	--	--	--	--	--	--
9/28/2007		--	--	--	--	--	--	--	--	--
12/18/2007		--	--	--	--	--	--	--	--	--
3/28/2008		--	--	--	--	--	--	--	--	--
6/20/2008		--	--	--	--	--	--	--	--	--
9/19/2008		--	--	--	--	--	--	--	--	--
12/30/2008		--	--	--	--	--	--	--	--	--
3/27/2009		--	--	--	--	--	--	--	--	--
6/26/2009		--	--	--	--	--	--	--	--	--
9/17/2009		--	--	--	--	--	--	--	--	--
12/23/2009		--	--	--	--	--	--	--	--	--
3/26/2010		--	--	--	--	--	--	--	--	--
6/25/2010		--	--	--	--	--	--	--	--	--
9/24/2010		--	--	--	--	--	--	--	--	--
12/21/2010		--	--	--	--	--	--	--	--	--
3/30/2011		--	--	--	--	--	--	--	--	--
6/27/2011		--	--	--	--	--	--	--	--	--
9/30/2011		--	--	--	--	--	--	--	--	--
12/30/2011		--	--	--	--	--	--	--	--	--
3/23/2012		--	--	--	--	--	--	--	--	--
6/11/2012		--	--	--	--	--	--	--	--	--
9/28/2012		--	--	--	--	--	--	--	--	--
12/17/2012		--	--	--	--	--	--	--	--	--
3/28/2013		--	--	--	--	--	--	--	--	--
6/28/2013		--	--	--	--	--	--	--	--	--
9/16/2013		--	0.00	0.00	--	--	--	--	--	--
12/30/2013		--	0.00	0.00	--	--	--	--	--	--
3/24/2014		--	0.00	0.00	--	--	--	--	--	--
6/18/2014		--	1.00	1.00	--	--	--	--	--	--
9/23/2014		--	0.00	1.00	--	--	--	--	--	--
12/29/2014		--	2.16	3.16	--	--	--	--	--	--
3/24/2015		--	0.50	3.66	--	--	--	--	--	--
6/29/2015		--	0.17	3.83	--	--	--	--	--	--
9/24/2015		--	0.33	4.16	--	--	--	--	--	--
12/8/2015		--	0.00	4.16	--	--	--	--	--	--
3/21/2016		--	0.00	4.16	--	--	--	--	--	--
6/21/2016		--	0.00	4.16	--	--	--	--	--	--
9/28/2016	Hurricane Hermine - Sept 2016	--	0.00	4.16	--	--	--	--	--	--
12/7/2016	Hurricane Matthew - Oct 2016	--	7.50	11.66	--	--	--	--	--	--
4/11/2017		--	0.00	11.66	--	--	--	--	--	--
Implemented Revised Todd Creek Streambank Stabilization F										
6/22/2017		116.55	0.00	11.66	180.20	0.00	0.00	126.12	0.00	0.00
9/19/2017	Hurricane Irma - Sept 2017	108.42	8.13	19.79	175.20	5.00	5.00	117.41	8.71	8.71

Table F-1. Todd Creek Bluff Recession Data
 Post-Closure Care and Corrective Action Permit Renewal Application
 UCC Woodbine, Camden County, Georgia

Date of Measurement	Storm Event	ECM-4			DC-1			DC-2		
		Total Distance from Baseline (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Recession (feet)	Cumulative Recession (feet)	Total Distance from Baseline (feet)	Recession (feet)	Cumulative Recession (feet)
12/12/2017		108.42	0.00	19.79	175.20	0.00	5.00	117.41	0.00	8.71
3/20/2018		107.08	1.34	21.13	175.20	0.00	5.00	117.41	0.00	8.71
6/18/2018		107.08	0.00	21.13	175.20	0.00	5.00	117.41	0.00	8.71
9/17/2018		107.08	0.00	21.13	175.20	0.00	5.00	117.41	0.00	8.71
10/31/2018	Hurricane Michael - Oct 2016	107.08	0.00	21.13	175.20	0.00	5.00	117.41	0.00	8.71
12/18/2018		107.08	0.00	21.13	174.95	0.25	5.25	117.41	0.00	8.71
3/26/2019		107.08	0.00	21.13	174.95	0.00	5.25	117.41	0.00	8.71
6/24/2019		106.50	0.58	21.71	174.95	0.00	5.25	117.41	0.00	8.71
9/9/2019	Hurricane Dorian - Sept. 4, 2019	106.00	0.50	22.21	174.95	0.00	5.25	115.00	2.41	11.12
9/23/2019		106.00	0.00	22.21	174.95	0.00	5.25	115.00	0.00	11.12
10/23/2019	Tropical Storm Nester - Oct. 19, 2019	106.00	0.00	22.21	174.95	0.00	5.25	115.00	0.00	11.12
12/16/2019		106.00	0.00	22.21	174.95	0.00	5.25	115.00	0.00	11.12
3/18/2020		106.00	0.00	22.21	174.95	0.00	5.25	115.00	0.00	11.12
6/9/2020		106.00	0.00	22.21	174.95	0.00	5.25	115.00	0.00	11.12
8/6/2020	Tropical Storm Isaias	106.00	0.00	22.21	174.95	0.00	5.25	115.00	0.00	11.12
9/22/2020		105.42	0.58	22.79	174.95	0.00	5.25	115.00	0.00	11.12
11/30/2020		105.42	0.00	22.79	174.95	0.00	5.25	115.00	0.00	11.12
1Q 2021	Not completed during construction	*	--	--	NM	NM	--	NM	NM	--
2Q 2021	Not completed during construction	*	--	--	NM	NM	--	NM	NM	--
3Q 2021	Not completed during construction	*	--	--	NM	NM	--	NM	NM	--
11/4/2021		*	--	--	172.20	2.75	8.00	115.00	0.00	11.12
3/15/2022		*	--	--	172.20	0.00	8.00	115.00	0.00	11.12
6/23/2022		*	--	--	172.20	0.00	8.00	115.00	0.00	11.12
9/14/2022		*	--	--	172.20	0.00	8.00	115.00	0.00	11.12
10/4/2022	Tropical Storm Ian - 9/29-9/30/22	*	--	--	172.20	0.00	8.00	115.00	0.00	11.12
11/17/2022	Tropical Storm Nicole	*	--	--	167.00	5.20	13.20	110.95	4.05	15.17
3/14/2023		*	--	--	167.00	0.00	13.20	110.95	0.00	15.17
6/14/2023		*	--	--	167.00	0.00	13.20	110.95	0.00	15.17
9/20/2023		*	--	--	167.00	0.00	13.20	109.00	1.95	17.12
12/14/2023		*	--	--	164.10	2.90	16.10	109.00	0.00	17.12
Recession since Q2 2017				11.13			16.10			17.12
Recession Rate (feet/year)				3.16			2.48			2.64

Recession shown represents the difference between that period's measured distance to the bluff edge compared to the previous period's measured distance.

Negative differences result from field measurement error adjustments or minor measurement location variations.

Erosion rates calculated from all available data for each monitoring transect.

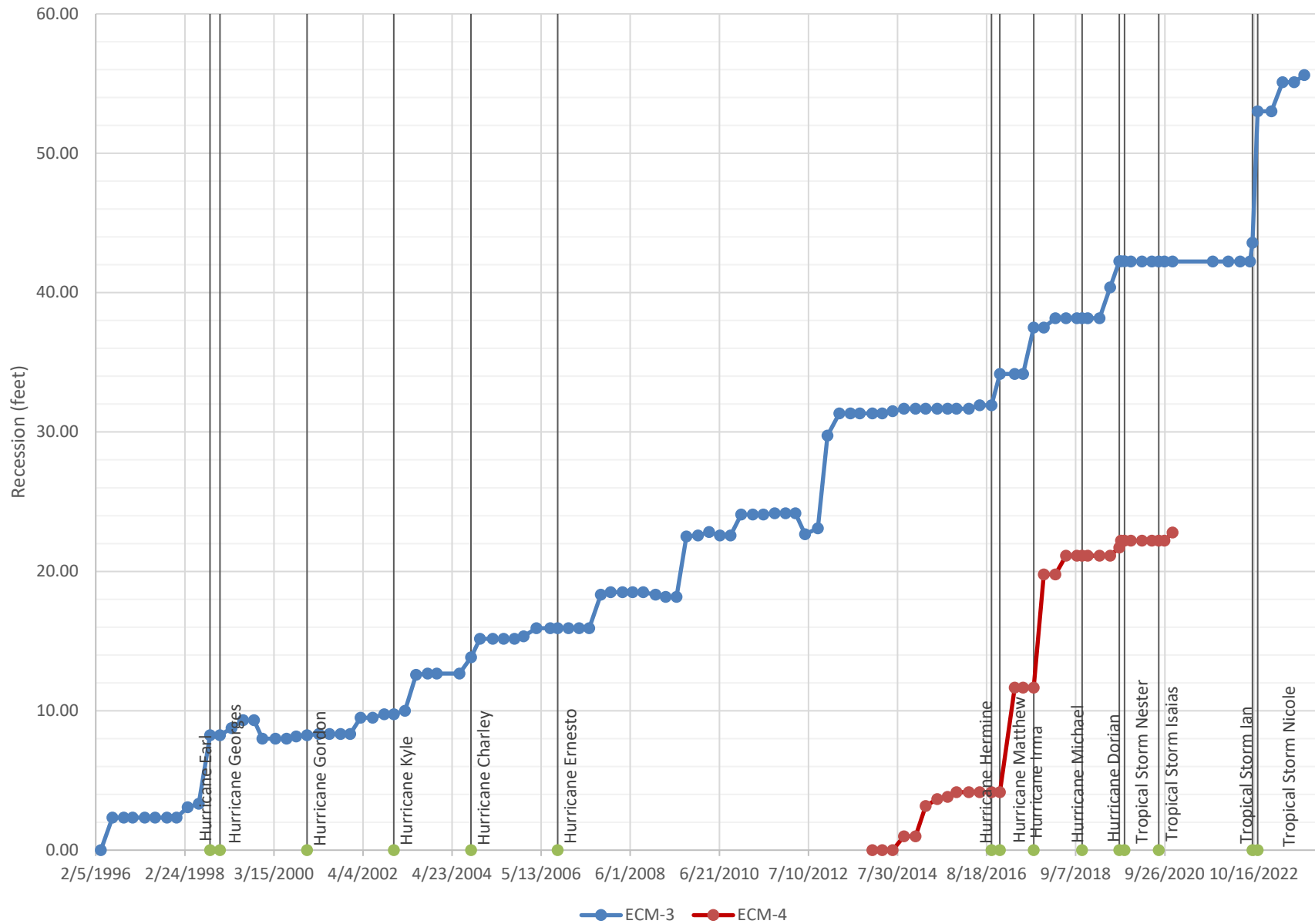
* Measurements ended for ECM-1 and ECM-4 when bank construction work started in March 2021 at ECM-1 and ECM-4.

feet/year = feet per year

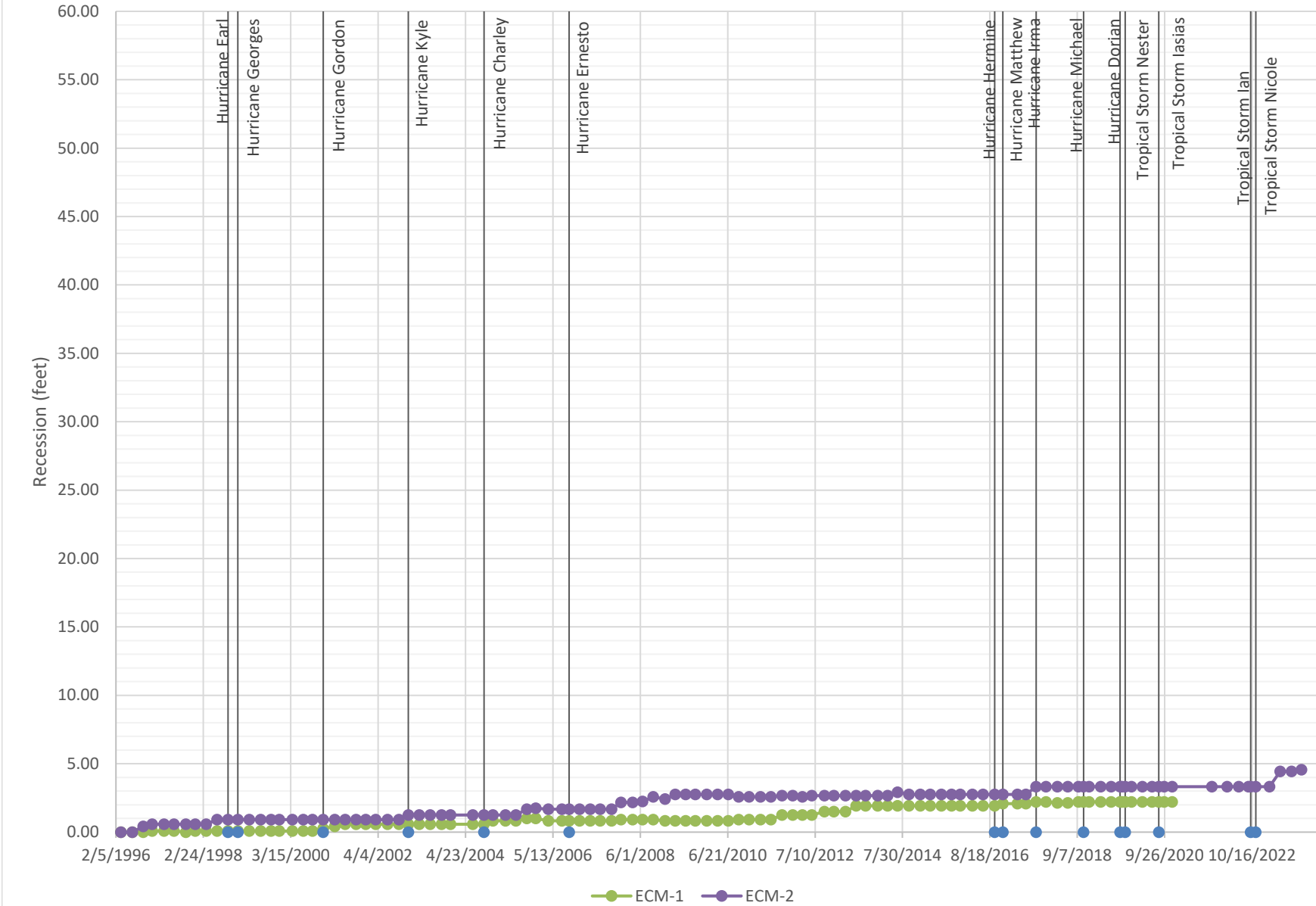
NM = not measured

NA = not applicable

Todd Creek Recession West Side - 1996 through 2023



Todd Creek Recession East Side - 1996 through 2023



Long-Term Bank Recession

Table F-2 below includes recession rates based on data collected through 2023 for each transect compared to long-term recession rates calculated in 2008 (CH2M HILL 2008). The long-term recession rates in 2008 were developed based on the existing and historical shoreline surveys conducted in 1900 and 1939. Table F-2 shows current recession rates at ECM-3, ECM-2, and ECM-1 are consistent with historical long-term recession along Todd Creek.

Table F-2. Transect Recession Rates (West to East)

Todd Creek Streambank Stabilization, Union Carbide Corporation, Woodbine, Georgia

Transect	Recession Rate (feet/year) ^a	Long-term Recession Rate Lower Estimate (2008) ^b	Long-term Recession Rate Upper Estimate (2008) ^b
DC-2	2.64	-	-
ECM-4	3.16	-	-
ECM-3	2.00	1.12	1.76
ECM-2	0.16	-0.69	-1.09
ECM-1	0.09	0.18	0.28
ECM-0	0.48	-	-
DC-1	2.48	-	-

Notes:

^a Recession rates calculated from all available data for each monitoring transect.

^b Refer to Table 1 for lower and upper estimates determined in 2008.

Table 1. Estimated Long-term Shoreline Rescession Rates Based on NOS80k Dataset

Coastal Data Evaluation – Todd Creek Streambank Stabilization Project

Location	Distance to Historic Shoreline (feet)	Distance to Existing Shoreline (feet)	Calculated Long-term Recession Rates (feet/year)	
			Lower Estimate ^a	Upper Estimate ^b
MW-17	113	94	0.18	0.28
MW-20	100	175	-0.69 ^c	-1.09 ^c
MW-24	197	75	1.12	1.76

^a Lower estimate assumes that NOS80k shoreline data for Todd Creek were based on surveys conducted in 1900.

^b Lower estimate assumes that NOS80k shoreline data for Todd Creek were based on surveys conducted in 1939.

^c Negative recession numbers indicate calculated accretion.

Source: CH2M HILL 2008

Reference

CH2M HILL. 2008. *Coastal and Stream Data Evaluation – Todd Creek Streambank Stabilization Project*. Prepared for Union Carbide Corporation. March 18.