Technical Appendix:

Section 4. Stream Characteristics

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TA-4 Stream Characteristics

Additional Clarksburg Study Maps

Map showing test and control areas, geomorphic survey areas, and stream and precipitation gage locations in the Clarksburg Monitoring Partnership Study Area (Figure TA-4.1). Also included are biological monitoring stations and geomorphic survey locations.

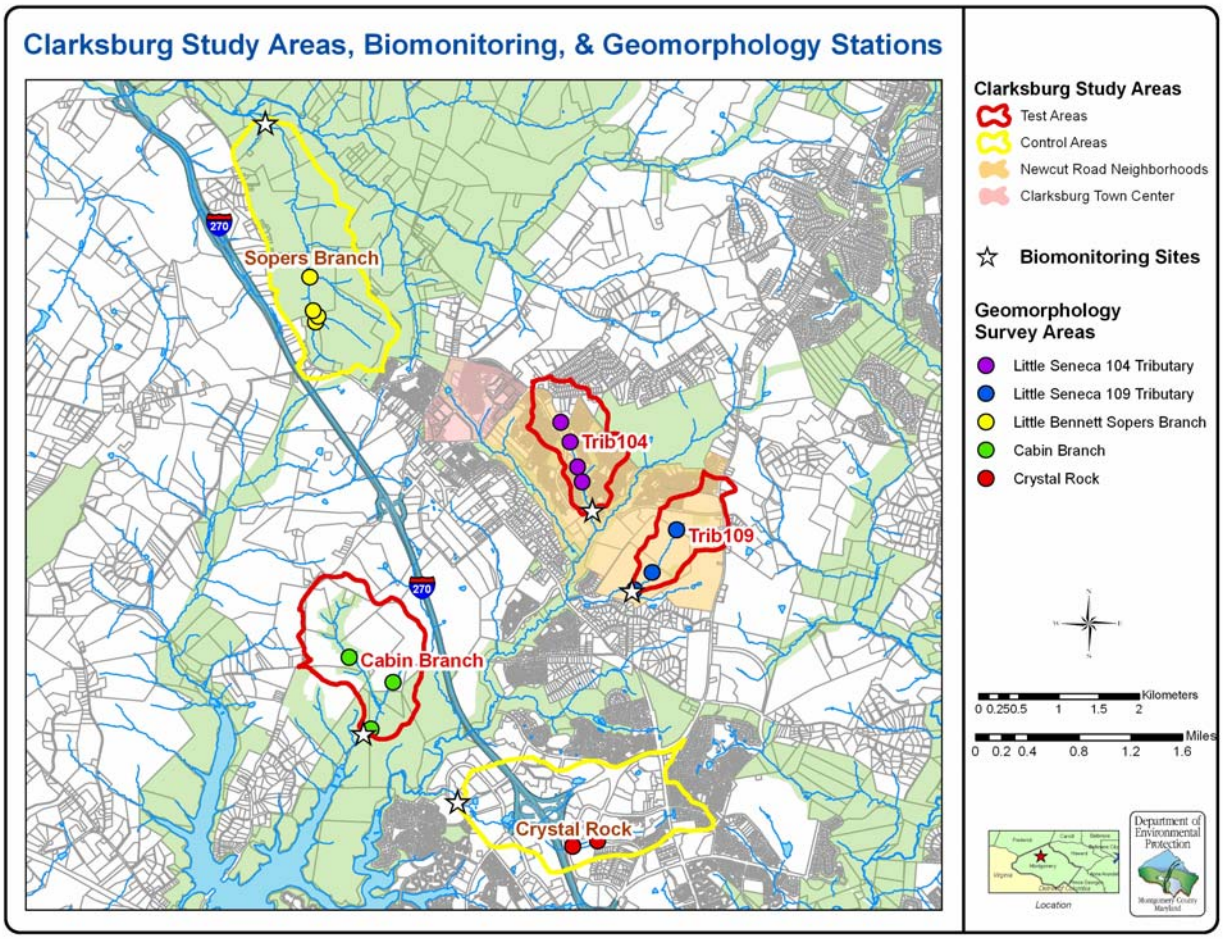

Figure TA-4. 1. Location of the Clarksburg Monitoring Partnership BACI three test areas and two control areas.

Aerial maps of Sopers Branch gage and study locations (Fig TA-4.2) and the Newcut Road Neighborhood (Fig TA-4.3) are also provided.

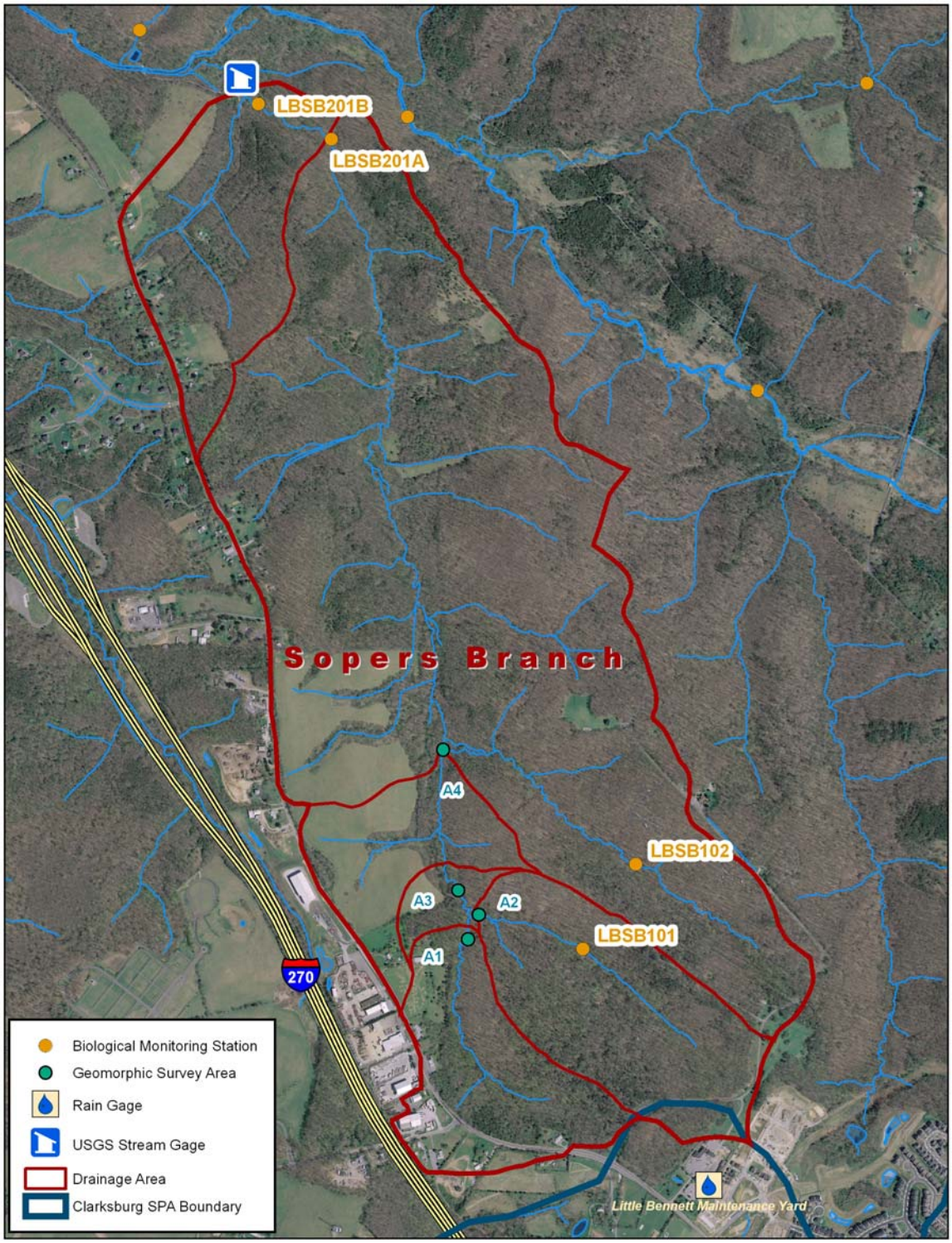

Figure TA-4. 2. Sopers Branch Control Subwatershed, Geomorphic Survey Areas and Stream, and Precipitation Gage Locations.

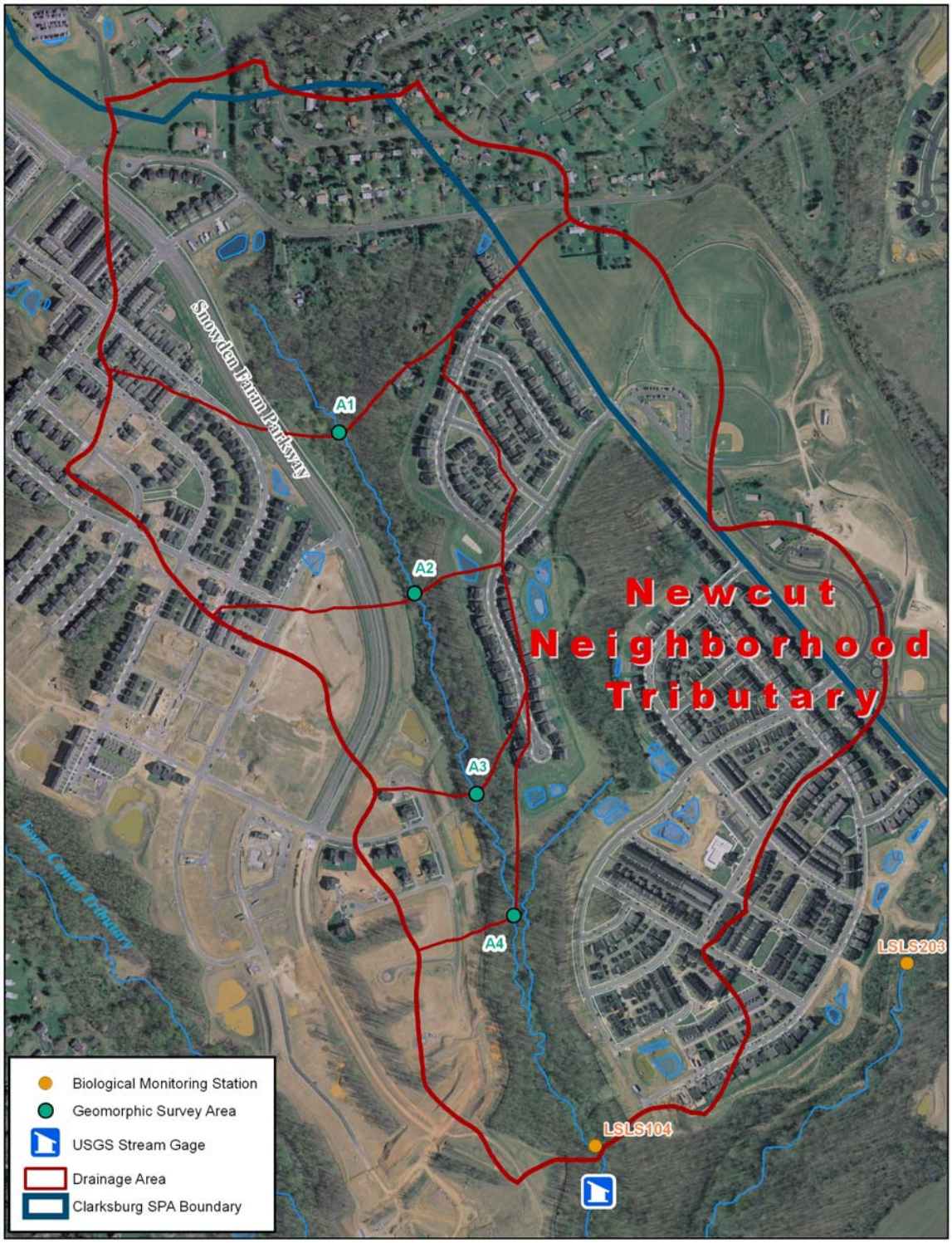

Figure TA-4. 3. Newcuut Raod Neighborhood Test Subwatershed, Geomorphic Survey Areas, and Stream and Precipitation Gage Locations.

TA-4.1 Hydrology

TA-4.1.1 Background

There are no technical appendix materials for this section.

TA-4.1.2 Hydrologic Data Analysis and Interpretation

Precipitation, Infiltration, and Annual Flows

Rain data presented in the summary table and utilized in calculations is available upon request. Please contact DEP at AskDEP@montgomerycountymd.gov, 240-777-7700.

Copies of the 2009 USGS Water Year Reports for Soper's Branch and the Newcut Road Neighborhood stream gages follow (pages TA-4.13 – TA-4.18.)

Stream Flashiness

Daily Mean Discharge and Instantaneous Peak Discharge for storm events from 2004 through 2009 are provided in Table TA-4.1.

Time of Concentration

No Technical Appendix materials.

2009 Water Year Reports for Soper's Branch and Newcut Road Neighborhood stream gages

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Water-Data Report 2009

01643395 SOPER BRANCH AT HYATTSTOWN, MD

Potomac Basin
Middle Potomac-Catoctin Subbasin

LOCATION.--Lat 39°16'31.1", long 77°18'13.2" referenced to North American Datum of 1927, Montgomery County, MD, Hydrologic Unit 02070008, on left bank 0.1 mi upstream of Little Bennett Creek, 0.3 mi upstream of Dark Branch, 0.95 mi south of Frederick County, MD, and within Little Bennett Regional Park.

DRAINAGE AREA.--1.17 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--February 2004 to current year.

GAGE.--Water-stage recorder. Datum of gage is 379.83 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair, except for October through December, and estimated days (ice effect, backwater), which are poor. U.S. Geological Survey gage-height telemeter at station. Several measurements of water temperature were made during the year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 25 ft^3/s and (or) maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec 11	1940	30	1.26
Dec 11	2255	42	1.38
Mar 28	0555	27	1.23
Apr 3	1220	26	1.22
Apr 20	1105	26	1.21
May 4	1500	39	1.35
May 26	0940	*105	*1.79

Minimum discharge, 0.38 ft^3/s, Oct. 27, 28, Sept. 15, 16, 21-26, 28-30.

U.S. Department of the Interior
U.S. Geological Survey

Water-Data Report 2009

01643395 SOPER BRANCH AT HYATTSTOWN, MD—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.48	0.46	1.6	0.59	0.61	0.70	1.5	1.0	1.8	0.77	0.67	0.46
2	0.46	0.46	0.93	0.59	0.73	0.70	1.3	1.0	1.5	0.83	0.83	0.45
3	0.49	0.46	0.74	0.59	0.76	0.68	6.8	3.0	1.8	0.80	0.65	0.42
4	0.48	0.46	0.67	0.59	0.76	0.68	2.8	13	3.3	0.74	0.57	0.42
5	0.46	0.46	0.57	0.59	0.60	0.67	2.0	4.7	9.7	0.70	0.54	0.42
6	0.46	0.43	0.55	0.62	0.54	0.73	1.7	3.2	4.4	0.70	0.50	0.42
7	0.46	0.42	0.55	7.1	0.57	0.76	1.5	5.0	2.6	0.70	0.50	0.43
8	0.47	0.42	0.55	2.6	0.62	0.72	1.3	2.7	2.0	0.70	0.50	0.46
9	0.46	0.42	0.55	1.3	0.65	0.73	1.2	2.0	1.8	0.67	0.49	0.45
10	0.46	0.42	0.66	1.0	0.65	0.76	1.2	1.6	1.8	0.59	0.46	0.42
11	0.46	0.42	7.8	0.99	0.65	0.76	2.8	1.6	1.8	0.59	0.46	0.56
12	0.46	0.42	4.8	0.87	0.67	0.76	1.9	1.5	1.5	0.58	0.46	0.56
13	0.46	0.79	1.1	0.78	0.65	0.76	1.5	1.3	1.3	0.55	0.46	0.49
14	0.47	0.63	0.77	e0.69	0.65	0.76	1.3	1.1	1.2	0.55	0.43	0.45
15	0.45	0.99	0.68	e0.63	0.65	0.76	1.9	1.0	1.1	0.55	0.42	0.41
16	0.43	0.89	0.70	0.56	0.65	0.76	2.2	1.00	1.1	0.55	0.42	0.41
17	0.46	0.67	3.0	e0.55	0.65	1.0	1.6	1.2	1.2	0.55	0.42	0.55
18	e0.46	0.59	1.2	e0.53	0.66	0.96	1.5	0.95	4.5	0.55	0.42	0.49
19	e0.46	0.55	1.5	e0.52	0.70	0.95	1.4	0.88	1.8	0.55	0.44	0.46
20	e0.46	0.55	1.4	e0.51	0.65	0.88	7.2	0.86	1.5	0.54	0.42	0.46
21	e0.46	0.53	0.97	e0.50	0.65	0.82	4.5	0.79	1.3	0.52	3.2	0.45
22	e0.46	0.50	0.75	e0.50	0.65	0.82	2.7	0.76	1.1	0.50	1.7	0.38
23	0.47	0.50	0.61	e0.49	0.67	0.82	2.0	0.72	0.96	1.2	0.82	0.39
24	0.45	0.53	0.64	e0.50	0.70	0.82	1.7	0.65	0.93	1.1	0.58	0.38
25	0.97	0.66	0.67	0.50	0.70	0.82	1.5	0.83	0.86	0.57	0.49	0.41
26	0.52	0.55	0.61	0.52	0.70	0.91	1.3	16	0.92	0.73	0.45	0.50
27	0.39	0.48	0.64	0.55	0.69	1.1	1.1	2.8	0.95	0.64	0.46	0.69
28	0.40	0.46	0.64	0.61	0.70	7.9	1.1	5.2	0.82	0.53	1.1	0.39
29	0.44	0.46	0.59	0.67	---	3.5	1.0	7.0	0.80	0.56	0.65	0.38
30	0.46	0.76	0.59	0.68	---	2.3	0.97	3.8	0.76	0.67	0.54	0.38
31	0.46	---	0.59	0.61	---	1.7	---	2.3	---	0.80	0.49	---
Mean	0.48	0.54	1.21	0.91	0.66	1.19	2.08	2.89	1.90	0.66	0.66	0.45
Max	0.97	0.99	7.8	7.1	0.76	7.9	7.2	16	9.7	1.2	3.2	0.69
Min	0.39	0.42	0.55	0.49	0.54	0.67	0.97	0.65	0.76	0.50	0.42	0.38
Cfsm	0.41	0.47	1.04	0.78	0.57	1.02	1.78	2.47	1.63	0.57	0.57	0.39
In.	0.47	0.52	1.20	0.90	0.59	1.18	1.99	2.84	1.82	0.65	0.65	0.43

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2004 - 2009, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	0.68	1.28	1.34	1.32	1.70	2.23	2.69	2.11	1.15	0.74	0.48	0.56
Max	1.24	3.31	1.67	2.07	3.53	4.34	3.99	3.89	1.90	1.42	0.97	1.20
(WY)	(2006)	(2007)	(2007)	(2007)	(2004)	(2007)	(2005)	(2008)	(2009)	(2004)	(2004)	(2004)
Min	0.31	0.49	0.78	0.46	0.66	0.93	1.19	0.71	0.71	0.38	0.23	0.23
(WY)	(2008)	(2008)	(2008)	(2008)	(2009)	(2006)	(2006)	(2006)	(2008)	(2008)	(2006)	(2005)

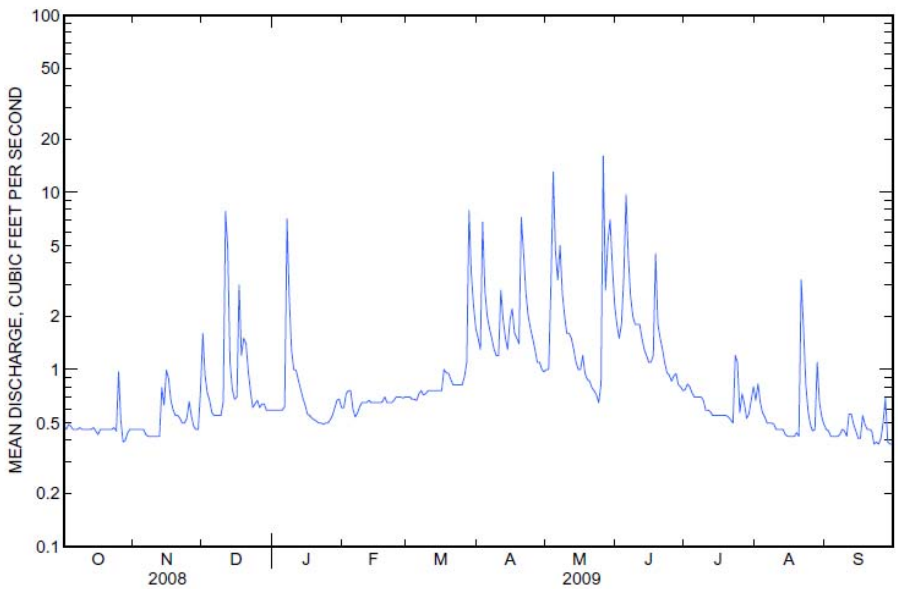
Water-Data Report 2009

01643395 SOPER BRANCH AT HYATTSTOWN, MD—Continued

SUMMARY STATISTICS

	Calendar Year 2008		Water Year 2009		Water Years 2004 - 2009	
Annual mean	1.16		1.14		1.25	
Highest annual mean					1.63	2007
Lowest annual mean					1.04	2006
Highest daily mean	34	May 12	16	May 26	34	May 12, 2008
Lowest daily mean	0.26	Aug 20[a]	0.38	Sep 22[b]	0.10	Oct 4, 2007[c]
Annual seven-day minimum	0.26	Aug 20	0.42	Sep 19	0.12	Oct 2, 2007
Maximum peak flow			105	May 26	[d]260	May 11, 2008
Maximum peak stage			1.79	May 26	3.04	Jan 14, 2005
Instantaneous low flow			0.38	Oct 27[f]	0.08	Oct 3, 2007
Annual runoff (cfsm)	0.995		0.975		1.07	
Annual runoff (inches)	13.55		13.23		14.57	
10 percent exceeds	1.6		2.0		2.3	
50 percent exceeds	0.59		0.67		0.70	
90 percent exceeds	0.32		0.45		0.31	

[a] Aug. 20-27.
[b] Sept. 22, 24, 29, 30.
[c] Oct. 4, 5, 2007.
[d] From rating curve extended above 57.5 ft^3/s.
[f] Oct. 27, 28, Sept. 15, 16, 21-26, 28-30.



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Water-Data Report 2009

01644371 LITTLE SENECA CREEK TRIBUTARY NEAR CLARKSBURG, MD

Potomac Basin
Middle Potomac-Catoctin Subbasin

LOCATION.--Lat 39°13'53", long 77°15'22" referenced to North American Datum of 1927, Montgomery County, MD, Hydrologic Unit 02070008, on left bank 900 ft upstream from confluence with Little Seneca Creek, and 1.4 mi east-southeast of Clarksburg.

DRAINAGE AREA.--0.43 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--May 2004 to current year.

REVISED RECORDS.--WDR US 2006: 2004-05.

GAGE.--Water-stage recorder. Elevation of gage is 510 ft above National Geodetic Vertical Datum of 1929, from topographic maps.

REMARKS.--Records poor, including estimated daily discharges (ice effect, backwater). U.S. Geological Survey gage-height telemeter at station. Several measurements of water temperature were made during the year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 50 ft^3/s and (or) maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jul 23	2155	*148	*5.72
Jul 29	1610	82	4.98
Aug 21	2215	50	4.59

Minimum discharge, 0.24 ft^3/s, Oct. 26, 27, March 3-5, 7-16, 18-26.

U.S. Department of the Interior
U.S. Geological Survey

01644371 LITTLE SENECA CREEK TRIBUTARY NEAR CLARKSBURG, MD—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.35	0.29	1.0	0.57	0.43	0.27	0.64	0.85	0.70	0.50	0.73	0.66
2	0.34	0.29	0.52	0.59	0.41	0.28	0.57	0.57	0.63	0.48	0.77	0.64
3	0.32	0.46	0.50	0.56	0.40	0.26	e2.1	0.95	0.86	0.44	0.66	0.61
4	0.31	0.29	0.50	0.54	0.39	0.26	e1.1	3.3	1.1	0.43	0.64	0.58
5	0.31	0.29	0.46	0.54	0.37	0.28	0.80	1.6	2.9	0.41	0.61	0.54
6	0.30	0.29	0.46	0.58	0.37	0.28	0.74	1.5	1.3	0.40	0.61	0.53
7	0.29	0.28	0.46	2.6	0.38	0.25	0.69	2.7	1.0	0.39	0.57	0.55
8	0.29	0.29	0.44	0.85	0.39	0.24	0.63	1.4	0.87	0.37	0.56	0.53
9	0.30	0.28	0.45	0.65	0.35	0.24	0.60	1.1	0.90	0.37	0.54	0.50
10	0.28	0.28	0.50	0.63	0.33	0.24	0.58	0.97	0.89	0.36	0.54	0.48
11	0.28	0.29	3.6	0.64	0.34	0.24	1.1	1.3	0.88	0.36	0.52	0.59
12	0.28	0.28	1.5	0.70	0.36	0.24	0.71	1.0	0.73	0.34	0.50	0.55
13	0.27	0.47	0.61	e0.69	0.36	0.24	0.66	0.83	0.74	0.33	0.49	0.50
14	e0.28	0.29	0.55	e0.65	0.36	0.24	0.65	0.82	0.69	0.32	0.48	0.48
15	0.29	0.73	0.50	e0.62	0.35	0.24	0.71	0.76	0.64	0.31	0.48	0.45
16	0.29	0.41	0.59	e0.59	0.35	0.24	0.80	0.83	0.61	0.31	0.45	0.44
17	0.29	0.39	1.3	e0.56	0.34	0.28	0.75	0.82	0.62	0.32	0.49	0.49
18	0.29	0.38	0.62	e0.54	0.37	0.25	0.61	0.73	3.6	0.31	0.45	0.45
19	0.29	0.39	0.89	e0.55	0.33	0.25	0.59	0.65	1.1	0.30	0.45	0.43
20	0.29	0.39	0.68	e0.52	0.31	0.24	2.3	0.62	1.0	0.30	0.44	0.41
21	0.31	0.39	0.62	e0.51	0.30	0.24	1.4	0.59	0.83	0.38	3.8	0.41
22	0.32	0.39	0.54	e0.49	0.32	0.24	1.2	0.57	0.70	0.38	2.6	0.41
23	0.29	0.37	0.52	e0.47	0.30	0.24	0.88	0.57	0.66	4.9	0.84	0.37
24	0.31	0.39	0.54	e0.45	0.29	0.24	0.77	0.56	0.65	2.9	0.68	0.37
25	0.78	0.44	0.53	0.42	0.28	0.24	0.69	0.61	0.60	0.81	0.61	0.37
26	0.26	0.39	0.52	0.41	0.26	0.30	0.66	3.7	0.60	0.71	0.57	0.54
27	0.25	0.39	0.51	0.42	0.27	0.28	0.67	0.93	0.57	0.66	0.92	0.61
28	0.32	0.42	0.50	0.47	0.26	1.8	0.62	1.1	0.60	0.61	2.0	0.34
29	0.36	0.42	0.50	0.44	---	e0.94	0.61	1.4	0.58	1.2	0.87	0.31
30	e0.30	0.58	0.50	0.43	---	e0.74	0.81	0.89	0.50	0.66	0.72	0.30
31	0.29	---	0.55	0.42	---	0.66	---	0.76	---	1.00	0.70	---
Total	9.73	11.24	21.96	19.10	9.57	10.98	25.64	34.98	28.05	21.56	25.29	14.44
Mean	0.31	0.37	0.71	0.62	0.34	0.35	0.85	1.13	0.94	0.70	0.82	0.48
Max	0.78	0.73	3.6	2.6	0.43	1.8	2.3	3.7	3.6	4.9	3.8	0.66
Min	0.25	0.28	0.44	0.41	0.26	0.24	0.57	0.56	0.50	0.30	0.44	0.30
Cfsm	0.73	0.87	1.65	1.43	0.79	0.82	1.99	2.62	2.17	1.62	1.90	1.12
In.	0.84	0.97	1.90	1.65	0.83	0.95	2.22	3.03	2.43	1.87	2.19	1.25

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2004 - 2009, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	0.42	0.60	0.64	0.67	0.54	0.72	0.86	0.73	0.58	0.56	0.33	0.37
Max	0.69	1.35	0.76	0.94	0.73	1.44	1.19	1.42	0.98	0.92	0.82	0.67
(WY)	(2006)	(2007)	(2007)	(2007)	(2007)	(2007)	(2007)	(2008)	(2006)	(2006)	(2009)	(2008)
Min	0.21	0.30	0.56	0.53	0.31	0.32	0.31	0.28	0.18	0.22	0.16	0.09
(WY)	(2008)	(2008)	(2005)	(2005)	(2005)	(2006)	(2006)	(2006)	(2005)	(2007)	(2005)	(2005)

Water-Data Report 2009

01644371 LITTLE SENECA CREEK TRIBUTARY NEAR CLARKSBURG, MD—Continued

SUMMARY STATISTICS

	Calendar Year 2008		Water Year 2009		Water Years 2004 - 2009	
Annual total	227.71		232.54			
Annual mean	0.62		0.64		0.59	
Highest annual mean					0.71	2007
Lowest annual mean					0.44	2005
Highest daily mean	11	May 11	4.9	Jul 23	11	Jul 5, 2006[a]
Lowest daily mean	0.20	Aug 4[b]	0.24	Mar 8[c]	0.05	Sep 13, 2005
Annual seven-day minimum	0.21	Aug 20	0.24	Mar 8	0.07	Sep 7, 2005
Maximum peak flow			148	Jul 23	[d]392	Jul 5, 2006
Maximum peak stage			5.72	Jul 23	[f]7.68	Jul 5, 2006
Instantaneous low flow			0.24	Oct 26[g]	0.04	Sep 13, 2005
Annual runoff (cfsm)	1.45		1.48		1.36	
Annual runoff (inches)	19.70		20.12		18.54	
10 percent exceeds	0.84		1.0		0.97	
50 percent exceeds	0.46		0.50		0.40	
90 percent exceeds	0.26		0.28		0.18	

[a] July 5, 2006, May 11, 2008.

[b] Aug. 4, 26.

[c] March 8-16, 20-25.

[d] From rating curve extended above 65 ft^3/s on basis of slope-area measurement of peak flow.

[f] From high-water mark.

[g] Oct. 26, 27, March 3-5, 7-16, 18-26.

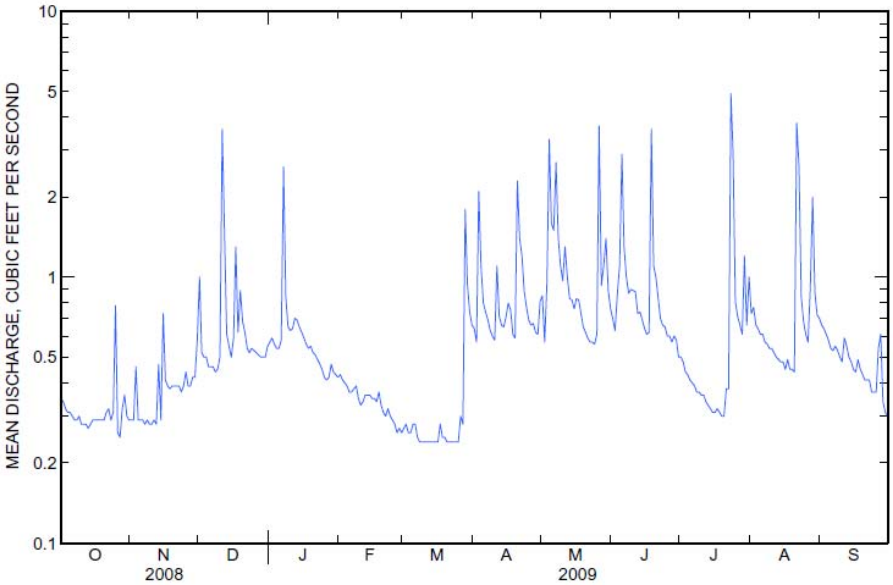

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Table TA-4.1 Daily Mean Discharge and Instantaneous Peak Discharges for Storm Events; 2004 to 2009

Date of Storm	Sopers Daily Mean Discharge (in/hr/per acre)	Sopers Instantaneous Peak Discharge (in/hr/per acre)	Sopers Ratio IPD/DMD	Newcut Daily Mean Discharge (in/hr/per acre)	Newcut Instantaneous Peak Discharge (in/hr/per acre)	Newcut Ratio IPD/DMD
6/11/2004	0.0412	0.1122	2.72	0.061	0.3924	6.43
7/23/2004	0.0872	0.8921	10.23	0.1079	2.8343	26.26
9/28/2004	0.116	0.5582	4.81	0.1573	1.0901	6.93
6/25/2006	0.0588	0.3525	6	0.3028	4.9273	16.27
7/5/2006	0.0175	0.3366	19.24	0.4689	16.2209	34.59
4/14 to 4/15/2007	0.2857	0.5859	2.05	0.2532	0.6541	2.58
6/13/2007	0.0134	0.0195	1.45	0.0205	0.0916	4.47
7/29/2007	0.0052	0.0288	5.52	0.0066	0.007	1.05
8/25/2007	0.0246	0.2803	11.41	0.0354	0.2355	6.66
3/4/2008	0.0099	0.0321	3.25	0.0079	0.0327	4.15
3/7/2008	0.0039	0.0089	2.29	0.0036	0.0051	1.41
4/20/2008	0.0193	0.0628	3.25	0.0191	0.3052	15.99
6/27/2008	0.0008	0.0013	1.7	0.0022	0.0131	5.85
6/28/2008	0.0008	0.002	2.39	0.0013	0.0023	1.76
7/9/2008	0.0007	0.0013	1.88	0.0012	0.0044	3.61
7/13/2008	0.0008	0.0013	1.54	0.0016	0.004	2.44
10/25/2008	0.0014	0.0036	2.63	0.0028	0.0109	3.92
3/27 to 3/28/2009	0.0102	0.0364	3.58	0.0064	0.0251	3.93
4/3/2009	0.0091	0.0353	3.89	0.0081	0.0269	3.31
4/11/2009	0.004	0.0074	1.86	0.004	0.009	2.25
4/15/2009	0.0028	0.0045	1.58	0.0026	0.0036	1.39
4/20/2009	0.0099	0.0342	3.47	0.0085	0.0251	2.95
4/29/2009	0.0014	0.0014	1	0.0023	0.0025	1.09
5/1/2009	0.0014	0.0016	1.15	0.0031	0.0069	2.21

5/6 to 5/07/2009	0.0064	0.0118	1.85	0.0097	0.0216	2.24
5/11/2009	0.0022	0.0026	1.17	0.0042	0.0073	1.75
5/16/2009	0.0017	0.002	1.22	0.0034	0.0061	1.82
5/25 to 5/26/2009	0.0175	0.1408	8.04	0.0118	0.0654	5.56
5/28/2009	0.0086	0.0311	3.63	0.0044	0.009	2.07
5/29/2009	0.0092	0.032	3.48	0.0048	0.0091	2.07
6/3/2009	0.0026	0.008	3.08	0.0033	0.0105	3.17
6/20/2009	0.002	0.0023	1.18	0.0037	0.0065	1.76
7/1/2009	0.0011	0.0011	1.07	0.0018	0.0025	1.34
7/21/2009	0.0007	0.0007	1	0.0017	0.0095	5.67
7/23/2009	0.0024	0.0136	5.77	0.0263	0.5378	20.45
7/29/2009	0.001	0.0016	1.62	0.0026	0.0073	2.76
7/31/2009	0.0012	0.002	1.73	0.0039	0.0121	3.13
8/1/2009	0.0011	0.0015	1.32	0.0028	0.0054	1.91
8/21/2009	0.0056	0.0257	4.61	0.0201	0.1829	9.1
8/22/2009	0.0013	0.0015	1.17	0.0039	0.0069	1.78
8/27/2009	0.0014	0.0054	3.91	0.0082	0.0606	7.41
9/11/2009	0.0008	0.0009	1.17	0.0022	0.0029	1.33
10/24/2009	0.0016	0.0034	2.14	0.0081	0.0606	7.5
11/1/2009	0.0022	0.0033	1.52	0.0043	0.0081	1.86
11/13/2009	0.0022	0.0028	1.23	0.0039	0.0073	1.86
11/23 to 11/24/2009	0.0027	0.0074	2.71	0.0053	0.0132	2.51
12/2/2009	0.0035	0.008	2.28	0.0051	0.012	2.28
12/13/2009	0.0065	0.0146	2.26	0.0086	0.0225	2.62
12/25/2009	0.047	0.1221	2.62	0.045	0.1043	2.32

TA-4.2 Changes in Stream Geomorphology

TA-4.2.1 Study Design and Collection

There are no additional technical appendix materials for this section. Maps are provided in the main document and Figs TA-4.1 through TA-4.3 in this Technical Appendix.

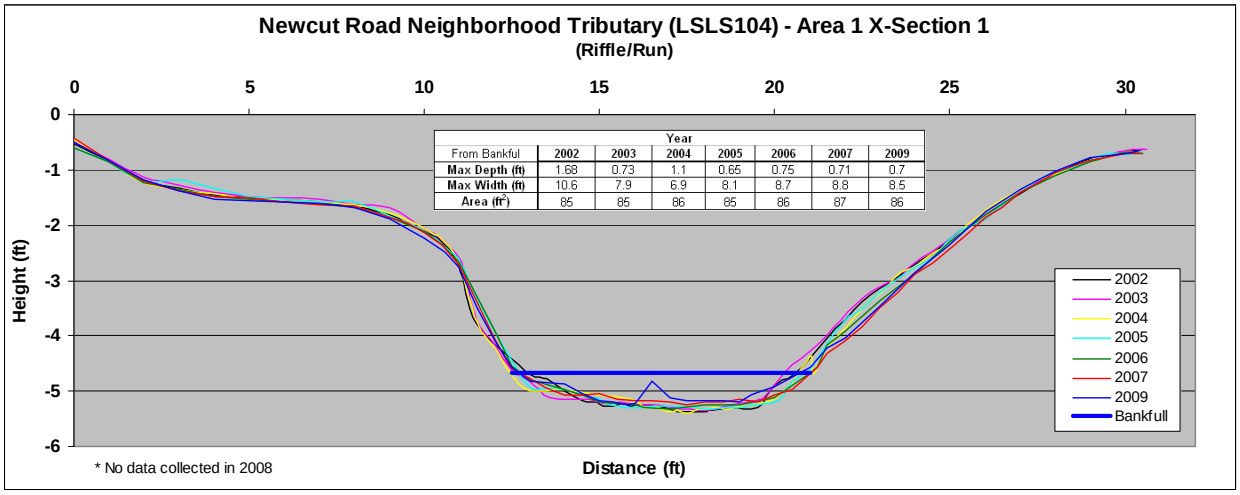
TA-4.2.2 Data Analysis and Interpretation

Newcut Road Neighborhood Tributary (LSLS104) Cross Sections

There are four geomorphic study areas associated with LSLS104. Two cross sections were measured at LSLS104 Areas 1 and 2 (Figs TA-4.4 and TA-4.5). Four cross sections were measured at LSLS104 Area 3 (Fig. TA-4.6); three cross sections were documented at Area 4 (Fig. TA-4.7).

Figure TA-4. 4. Newcut Road Neighborhood Tributary (LSLS104) Cross Sections: Area 1

Cross Section 1



From Bankful	Year 2002	2003	2004	2005	2006	2007	2009
Max Depth (ft)	1.68	0.73	1.1	0.65	0.75	0.71	0.7
Max Width (ft)	10.6	7.9	6.9	8.1	8.7	8.8	8.5
Area (ft^2)	85	85	86	85	86	87	86

Cross Section 2

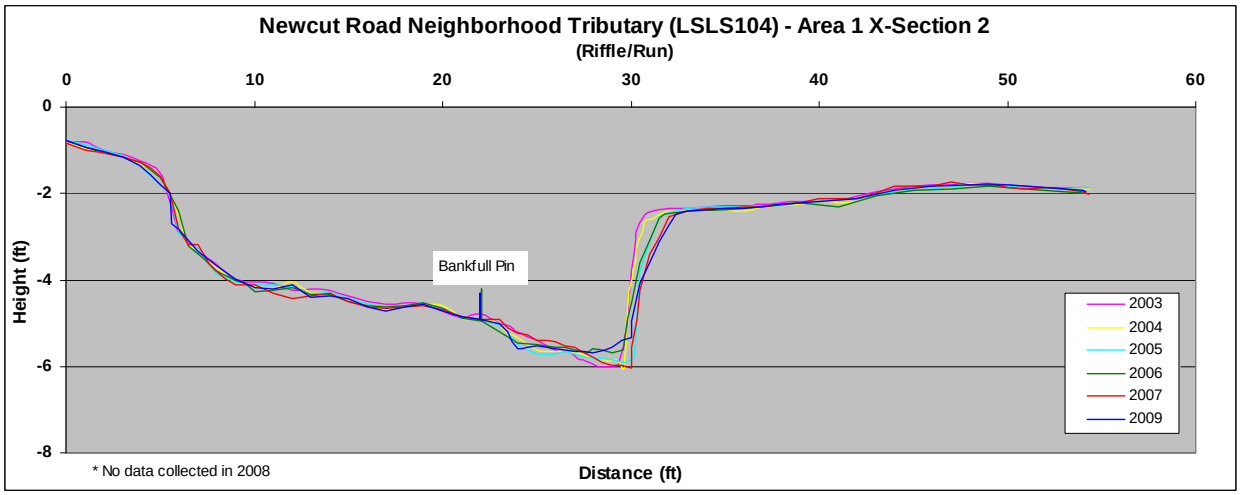
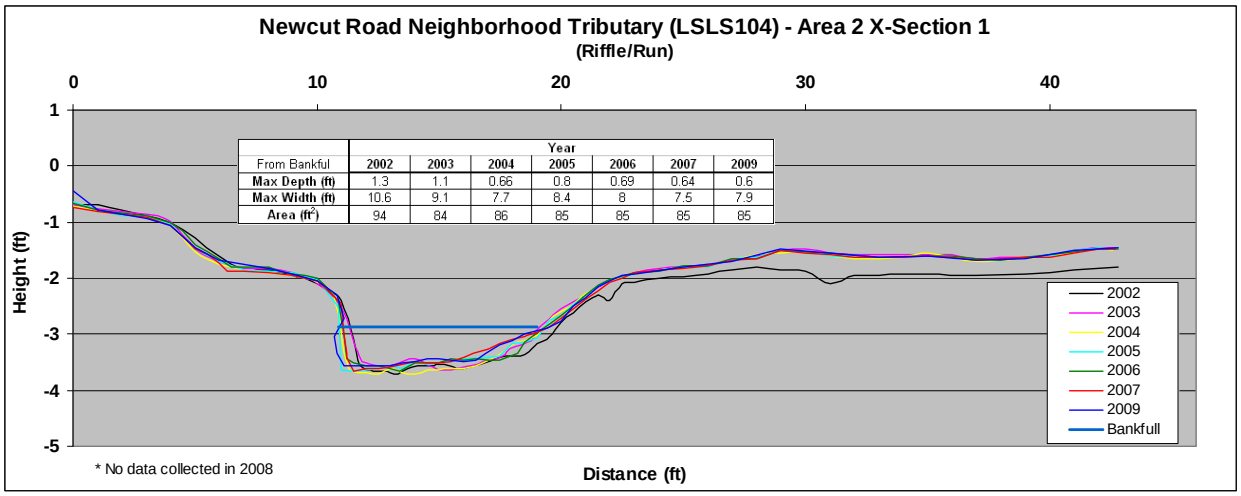


Figure TA-4. 5. Newcut Road Neighborhood Tributary (LSLS104) Cross Sections: Area 2

Cross Section 1



From Bankful	Year						
	2002	2003	2004	2005	2006	2007	2009
Max Depth (ft)	1.3	1.1	0.66	0.8	0.69	0.64	0.6
Max Width (ft)	10.6	9.1	7.7	8.4	8	7.5	7.9
Area (ft^2)	94	84	86	85	85	85	85

Cross Section 2

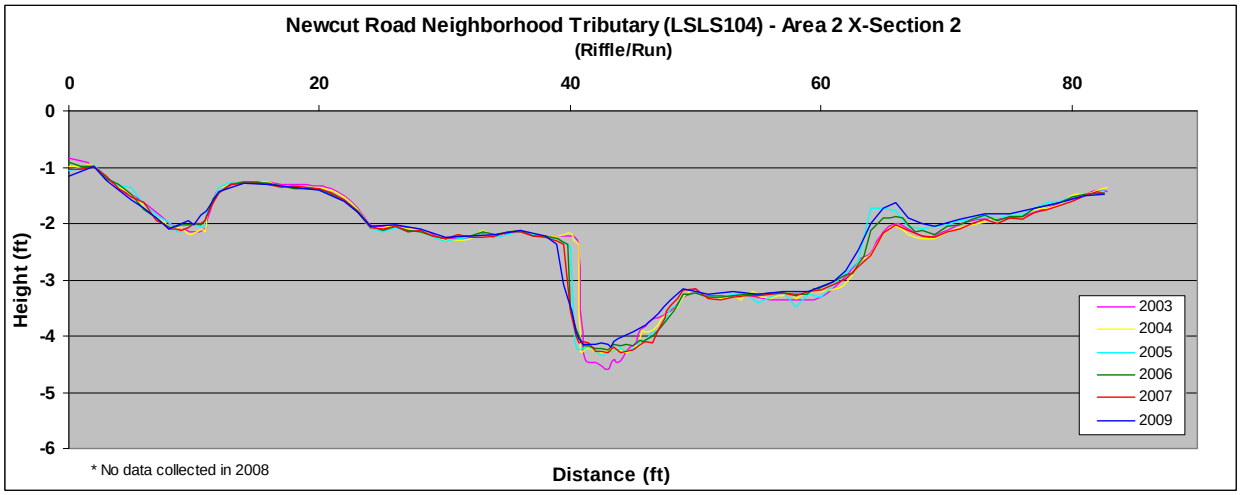
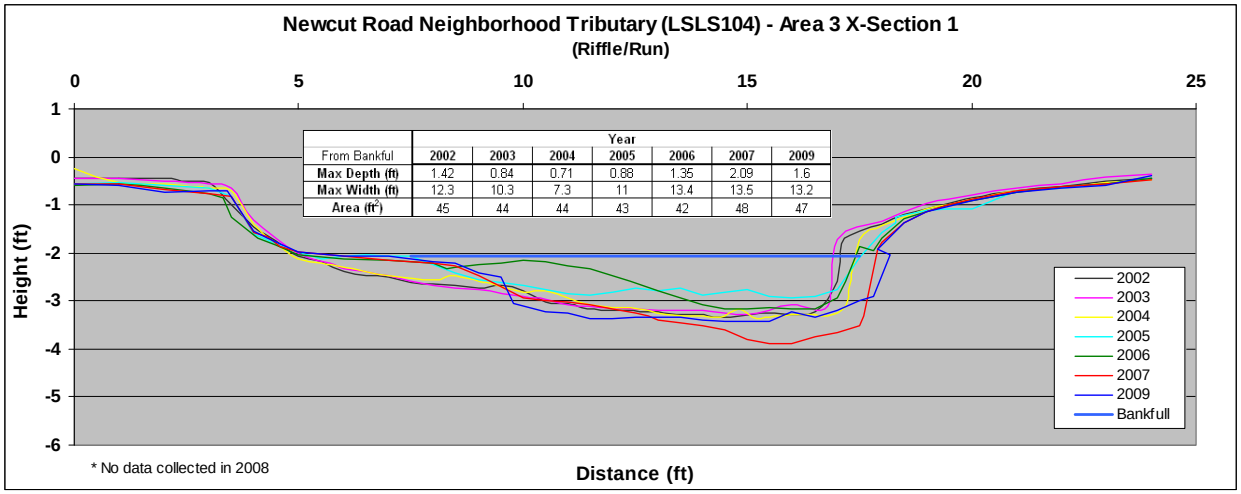


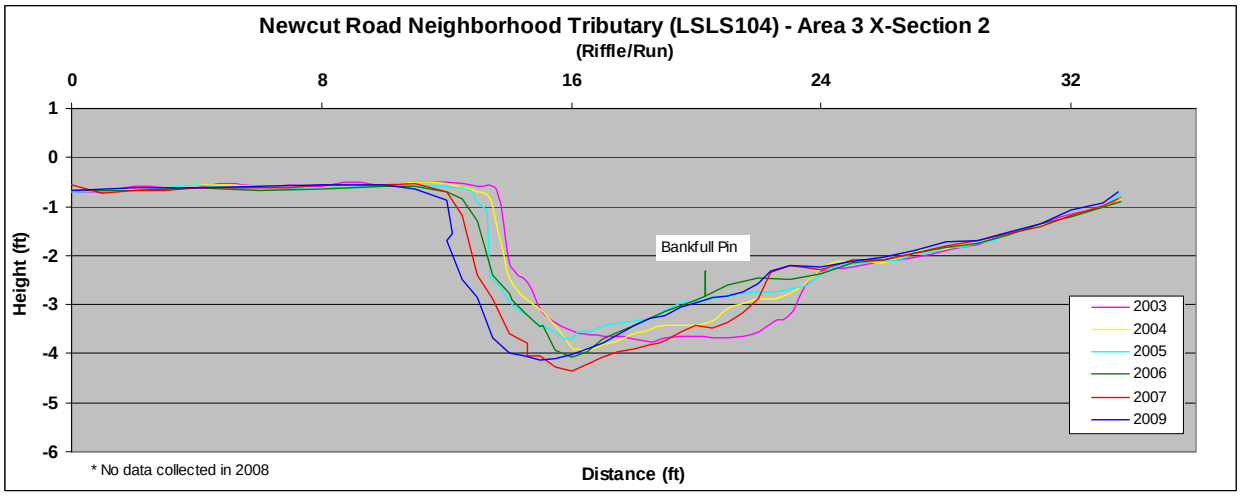
Figure TA-4. 6. Newcut Road Neighborhood Tributary (LSLS104) Cross Sections: Area 3

Cross Section 1

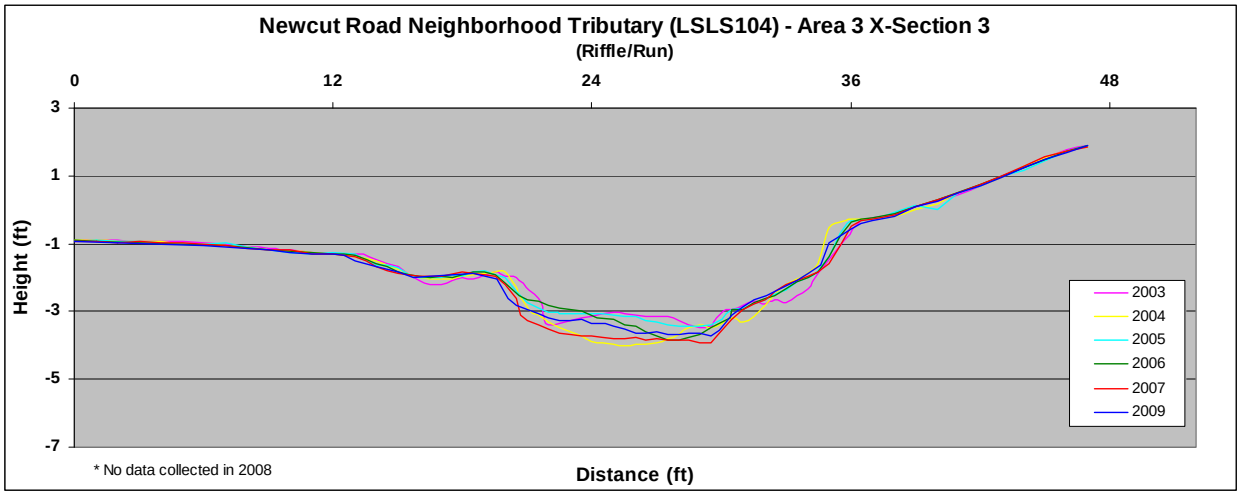


From Bankful	Year						
	2002	2003	2004	2005	2006	2007	2009
Max Depth (ft)	1.42	0.84	0.71	0.88	1.35	2.09	1.6
Max Width (ft)	12.3	10.3	7.3	11	13.4	13.5	13.2
Area (ft^2)	45	44	44	43	42	48	47

Cross Section 2



Cross Section 3



Cross Section 4

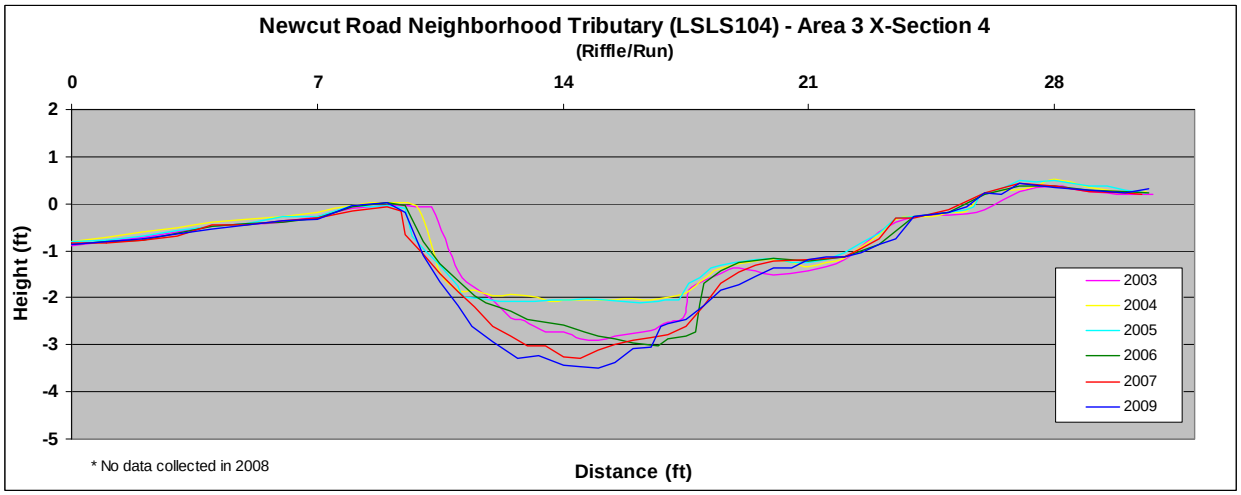
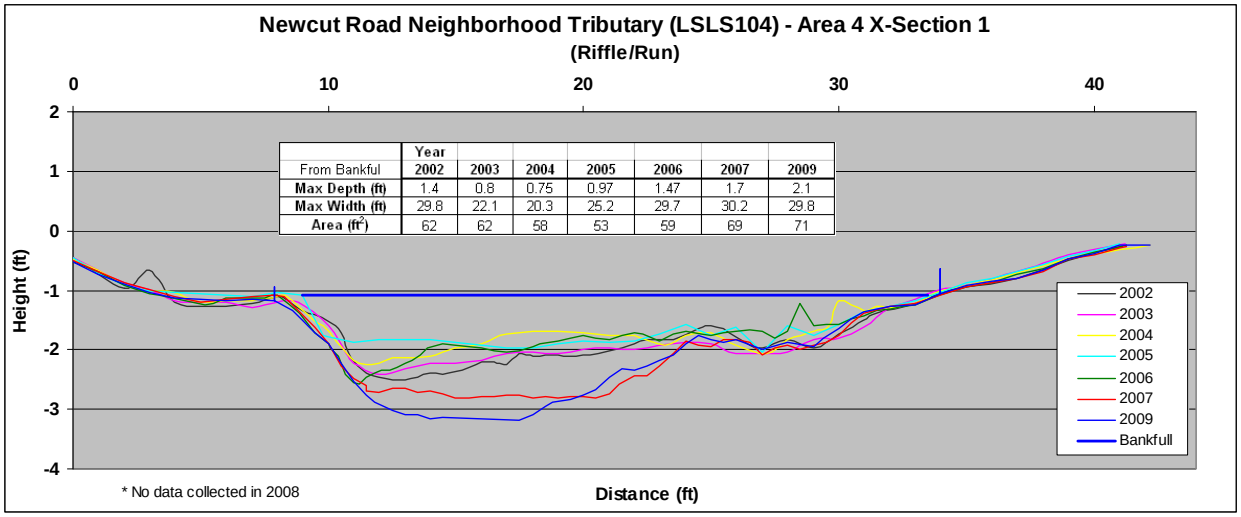


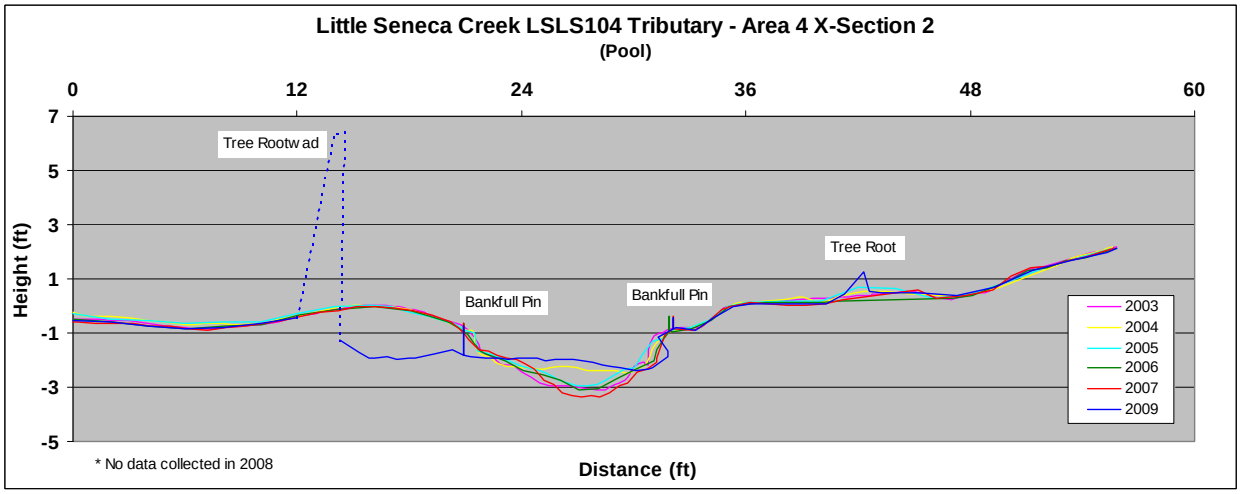
Figure TA-4.7. Newcut Road Neighborhood Tributary (LSLS104) Cross Sections: Area 4

Cross Section 1

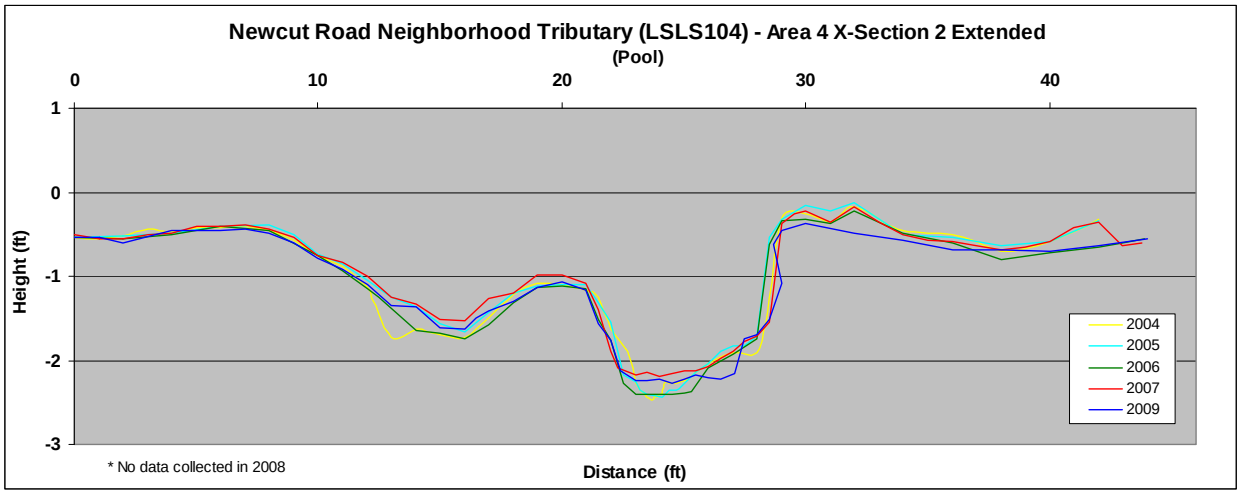


	Year						
From Bankful	2002	2003	2004	2005	2006	2007	2009
Max Depth (ft)	1.4	0.8	0.75	0.97	1.47	1.7	2.1
Max Width (ft)	29.8	22.1	20.3	25.2	29.7	30.2	29.8
Area (ft^2)	62	62	58	53	59	69	71

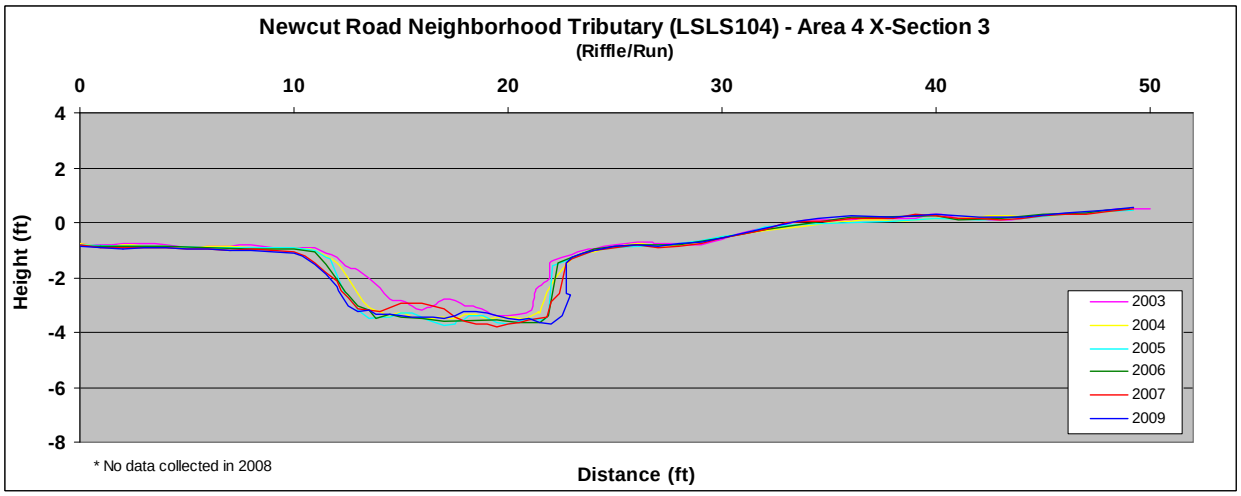
Cross Section 2



Cross Section 2 Extended



Cross Section 3

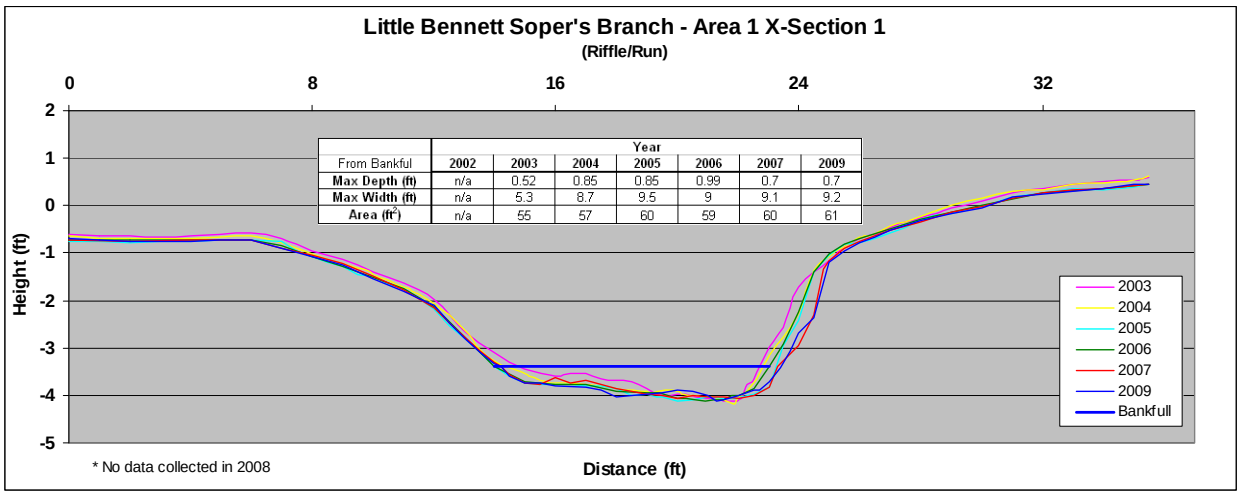


Sopers Branch Tributary of Little Bennett Creek Cross Sections

There are four geomorphic study areas associated with the Sopers Branch Tributary of Little Bennett Creek. Two cross sections were measured at Sopers Branch Areas 1 and 2 (Figs TA-4.8 and TA-4.9). Three cross sections were measured at Sopers Branch Area 3 (Fig. TA-4.10); three cross sections were documented at Area 4 (Fig. TA-4.11).

Figure TA-4.8. Soper's Branch Tributary Cross Sections: Area 1

Cross Section 1



From Bankful	Year 2002	2003	2004	2005	2006	2007	2009
Max Depth (ft)	n/a	0.52	0.85	0.85	0.99	0.7	0.7
Max Width (ft)	n/a	5.3	8.7	9.5	9	9.1	9.2
Area (ft^2)	n/a	55	57	60	59	60	61

Cross Section 2

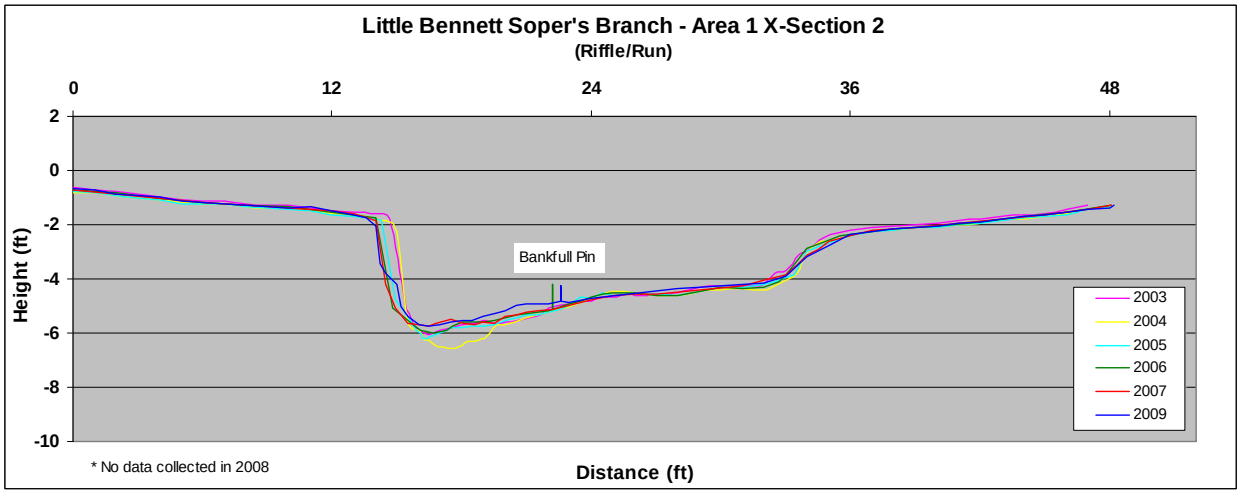
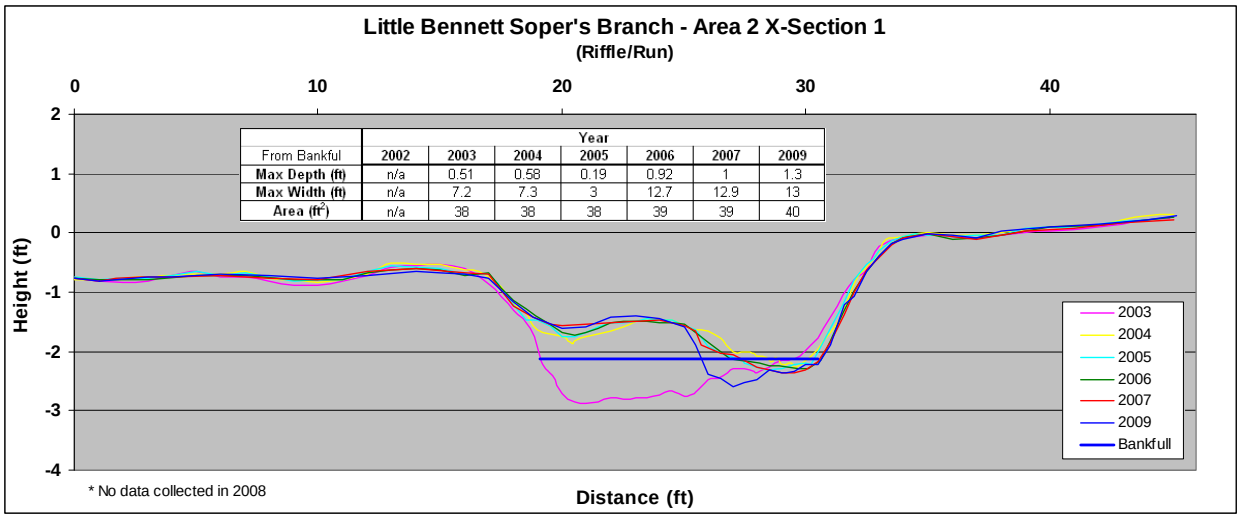


Figure TA-4.9. Soper's Branch Tributary Cross Sections: Area 2

Cross Section 1



From Bankful	Year 2002	2003	2004	2005	2006	2007	2009
Max Depth (ft)	n/a	0.51	0.58	0.19	0.92	1	1.3
Max Width (ft)	n/a	7.2	7.3	3	12.7	12.9	13
Area (ft^2)	n/a	38	38	38	39	39	40

Cross Section 2

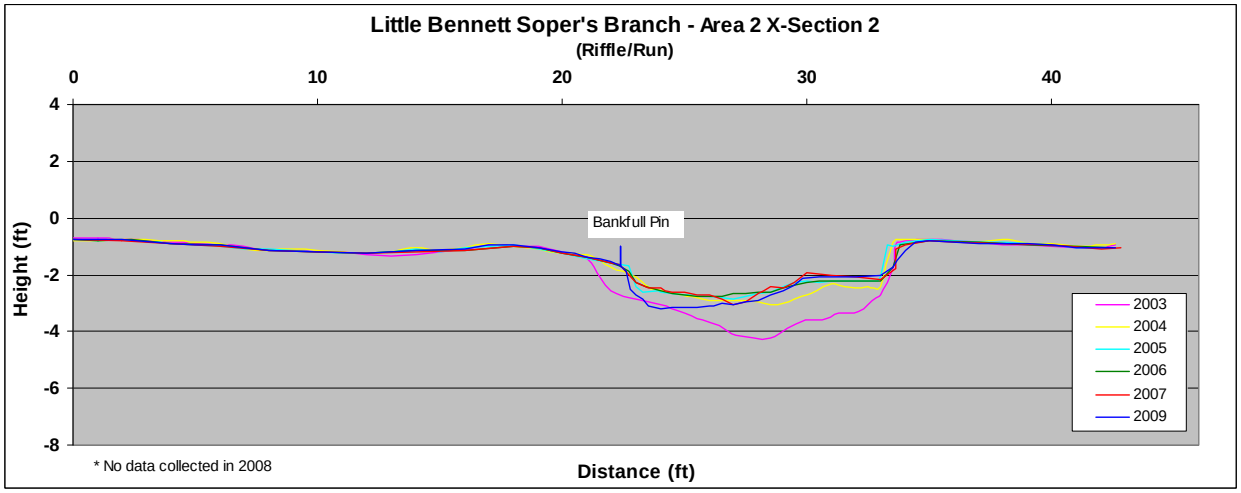
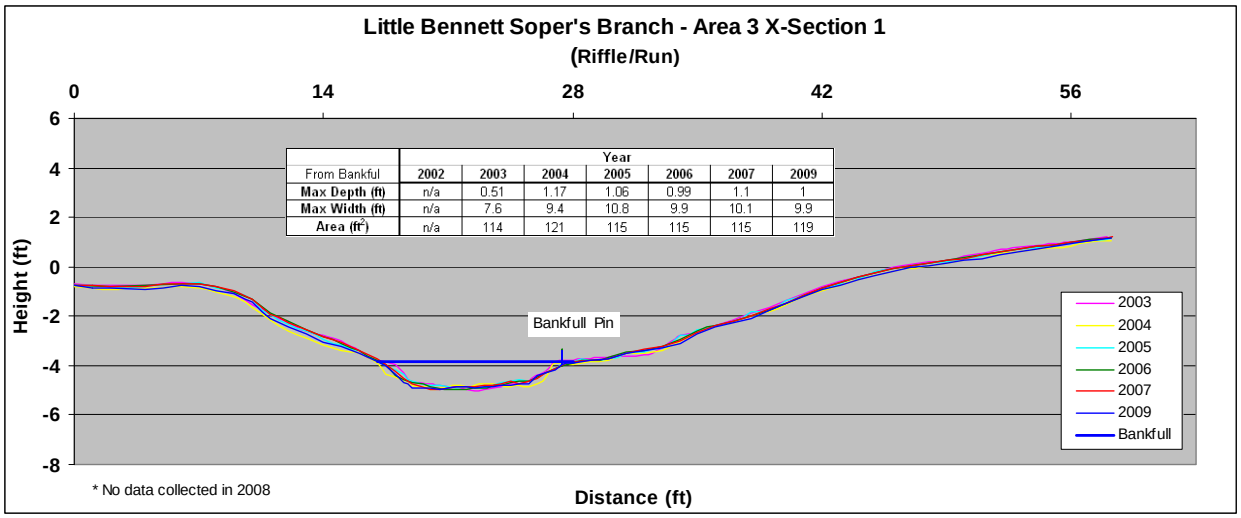


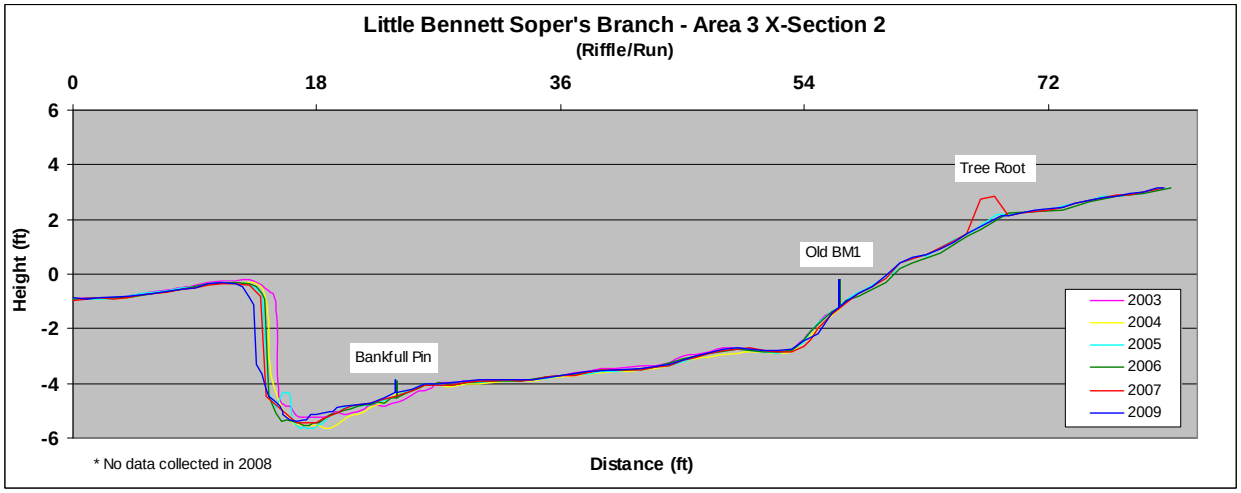
Figure TA-4.10. Soper's Branch Tributary Cross Sections: Area 3

Cross Section 1



From Bankful	Year 2002	2003	2004	2005	2006	2007	2009
Max Depth (ft)	n/a	0.51	1.17	1.06	0.99	1.1	1
Max Width (ft)	n/a	7.6	9.4	10.8	9.9	10.1	9.9
Area (ft^2)	n/a	114	121	115	115	115	119

Cross Section 2



Cross Section 3

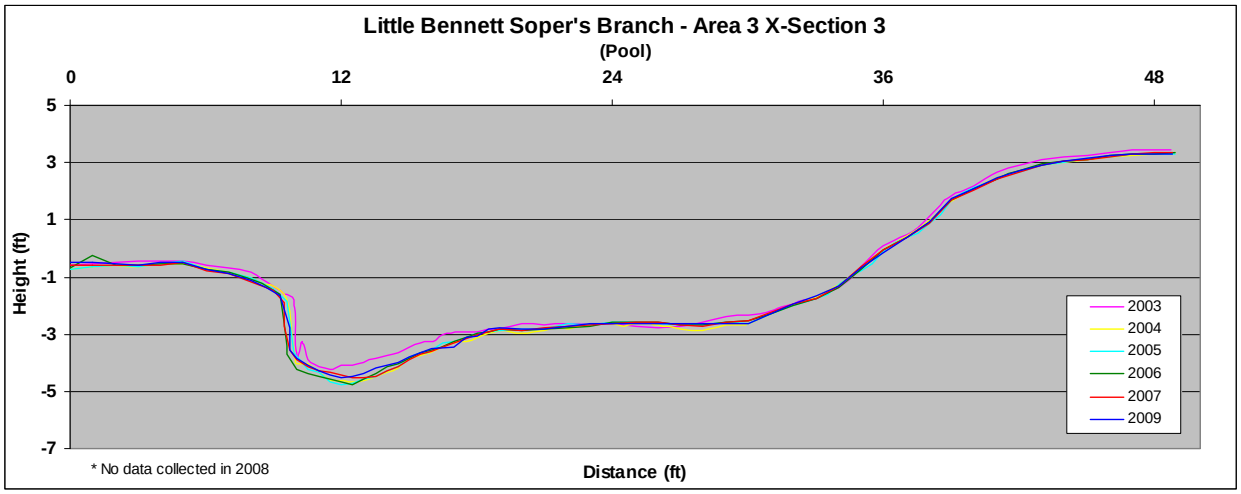
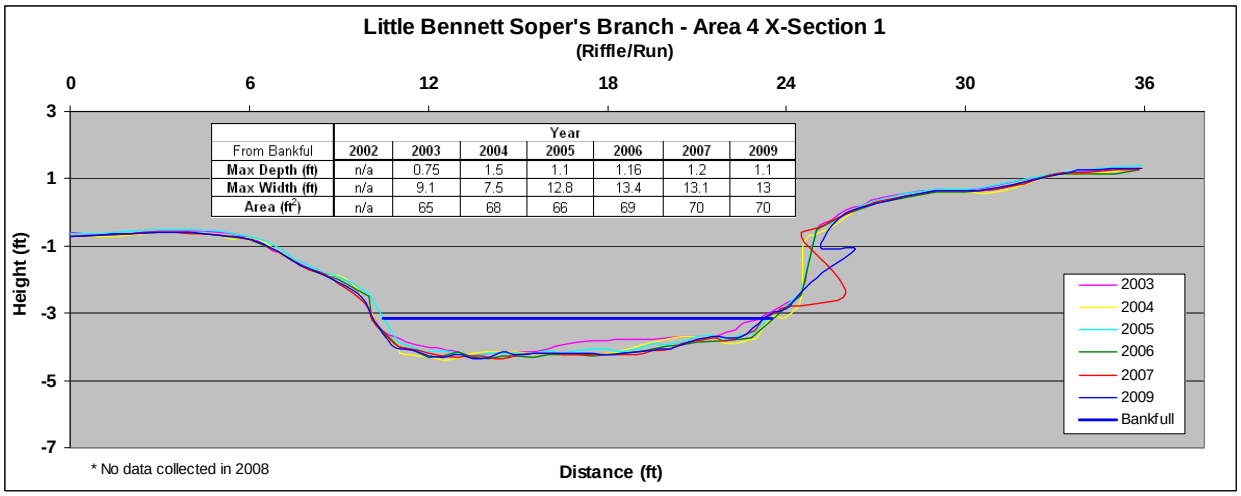


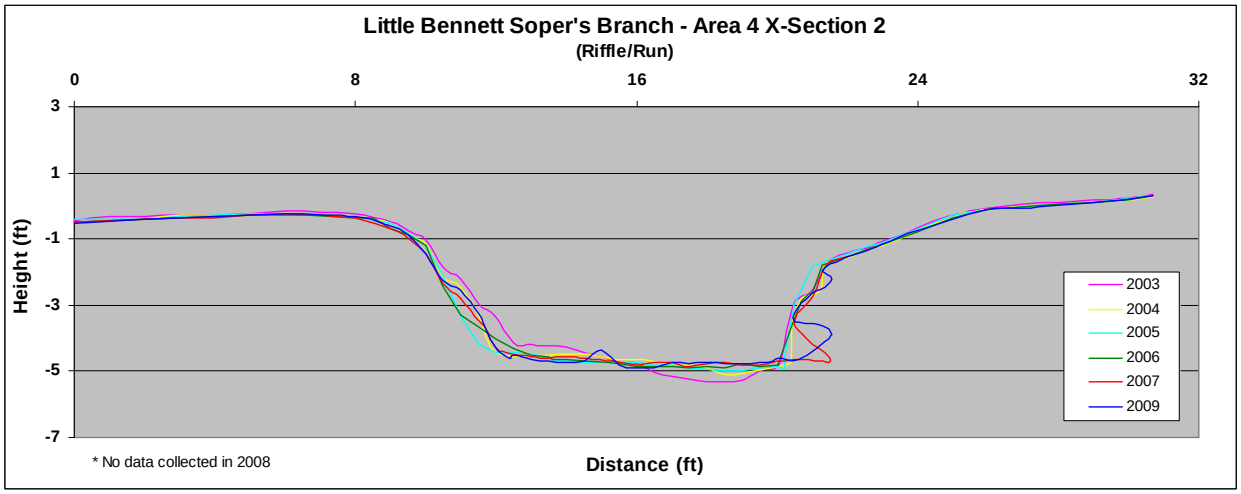
Figure TA-4.11. Soper's Branch Tributary Cross Sections: Area 4

Cross Section 1



	Year						
From Bankful	2002	2003	2004	2005	2006	2007	2009
Max Depth (ft)	n/a	0.75	1.5	1.1	1.16	1.2	1.1
Max Width (ft)	n/a	9.1	7.5	12.8	13.4	13.1	13
Area (ft^2)	n/a	65	68	66	69	70	70

Cross Section 2



Germantown, Crystal Rock Drive (LSCR201) Tributary Cross Sections

Geomorphic surveys are also conducted in the Crystal Rock Tributary of Little Seneca Creek (LSCR201) in Germantown, MD. There are two geomorphic study areas associated with the Crystal Rock Tributary. One cross section is plotted for Crystal Rock Area 1 (Fig TA-4.12); two cross sections were measured at Crystal Rock Area (Fig TA-4.13).

Figure TA-4.12. Crystal Rock Tributary (LSCR201) Cross Sections: Area 1

Cross Section 1

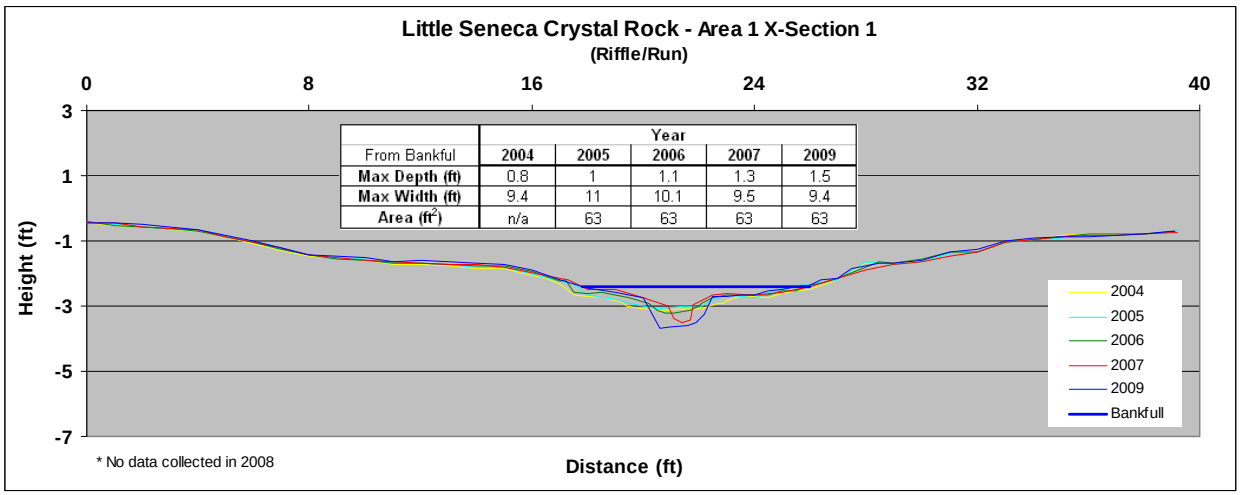
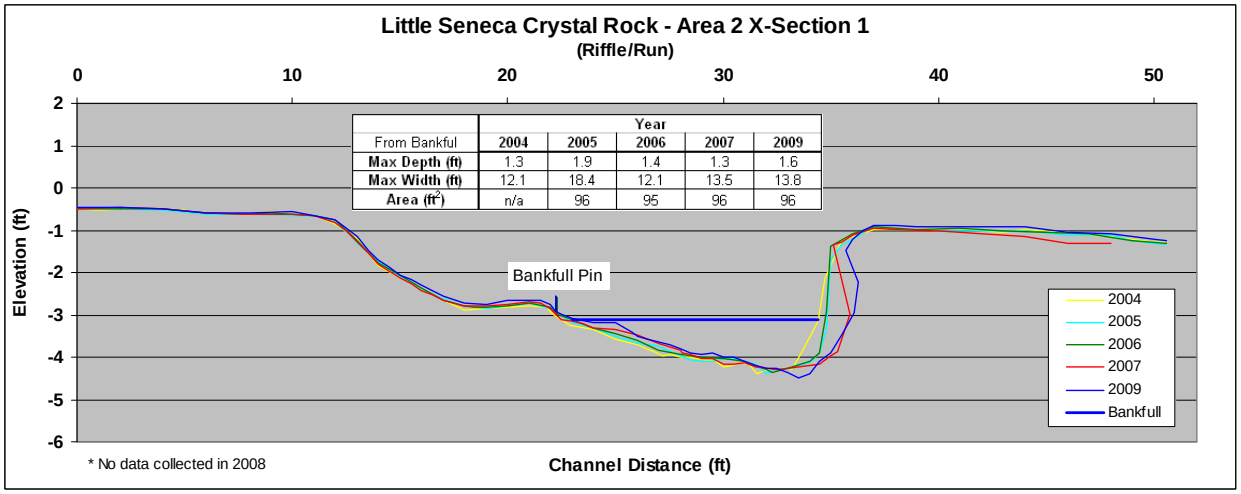
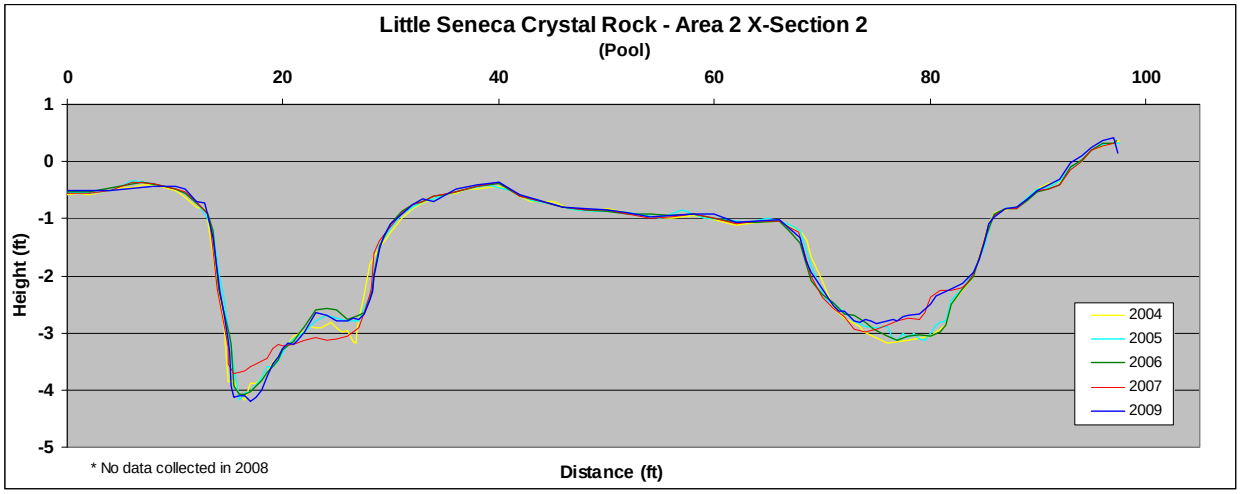


Figure TA-4.13. Crystal Rock Tributary (LSCR201) Cross Sections: Area 2

Cross Section 1



Cross Section 2

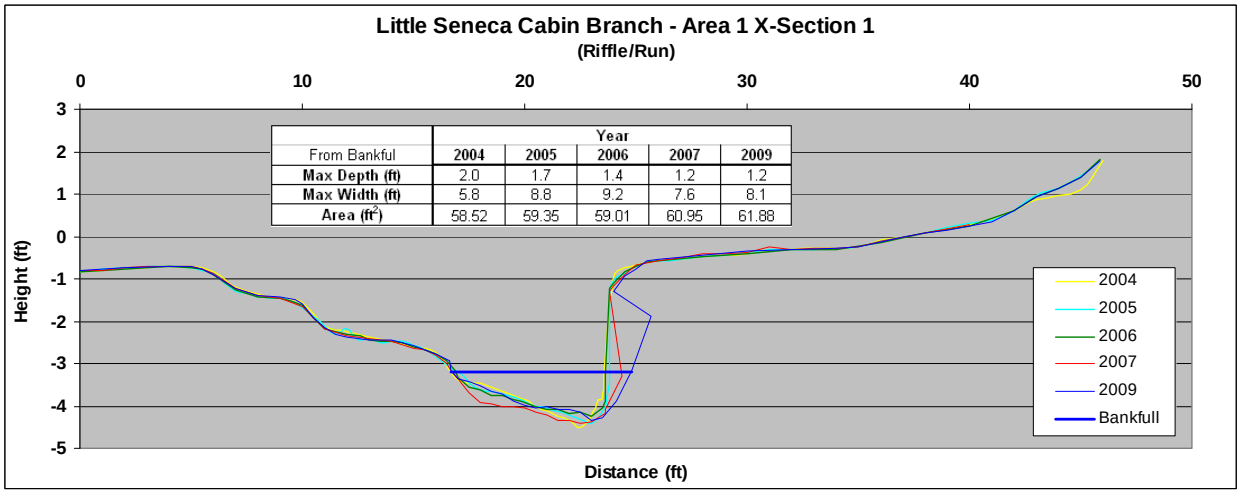


Cabin Branch Tributary of Little Seneca Cross Sections

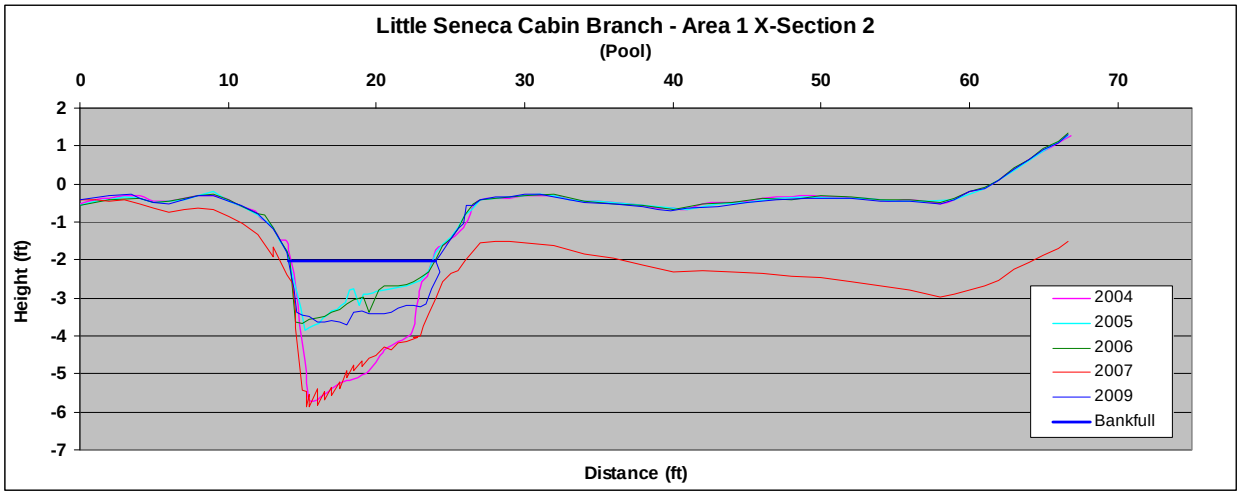
Geomorphic surveys were conducted at three study areas in the Cabin Brach Tributary of Little Seneca Creek. Three cross sections were measured for Cabin Branch Area 1 (Fig TA-4.14). Two cross sections were measured at Cabin Branch Areas 2 and 3 (Figs TA-4.15 and TA-4.16).

Figure TA-4.14. Cabin Branch Tributary of Little Seneca Creek Cross Sections: Area 1

Cross Section 1



Cross Section 2



Cross Section 3

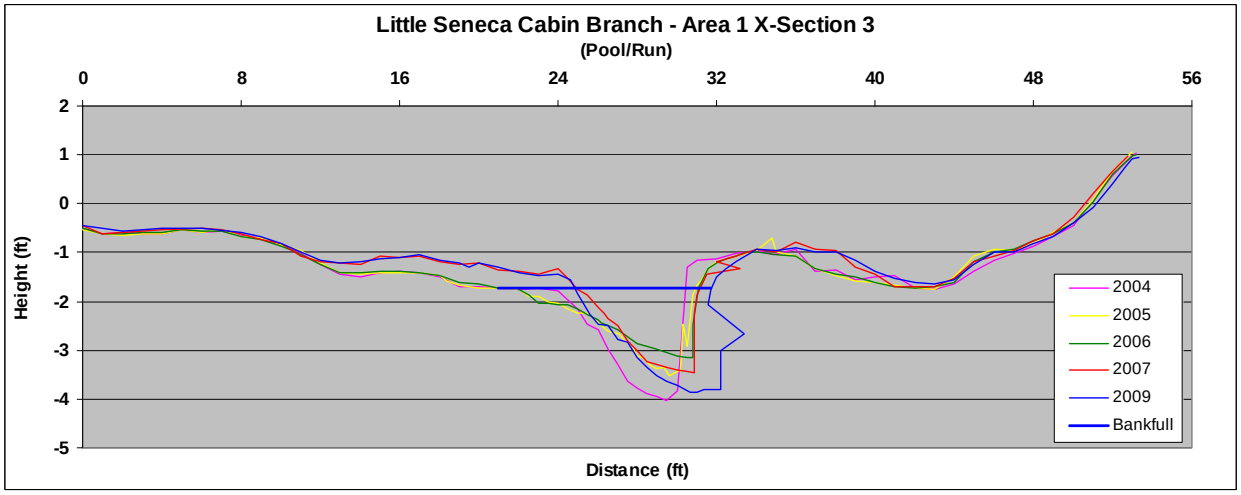
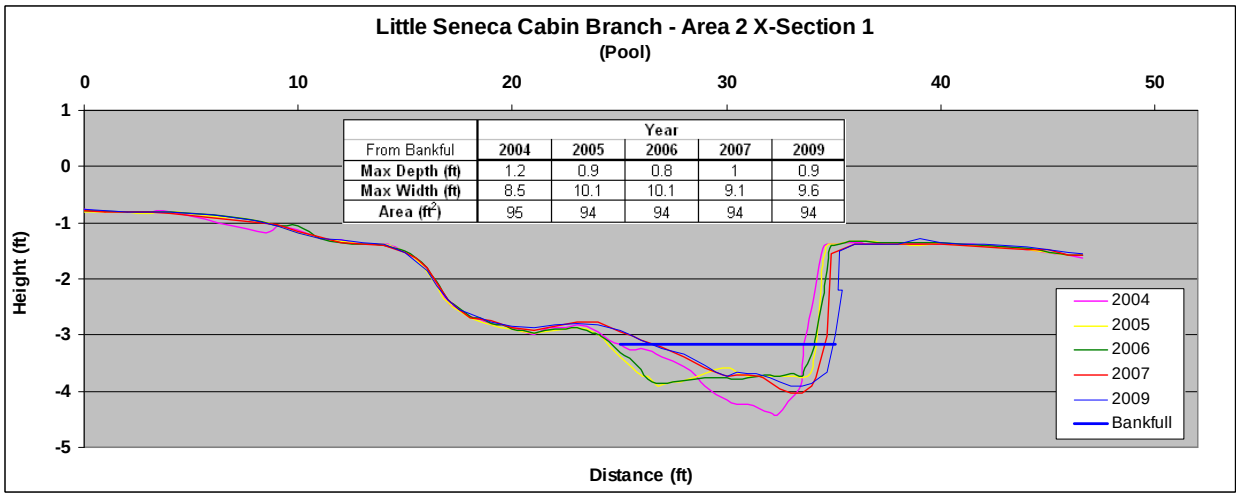


Figure TA-4.15. Cabin Branch Tributary of Little Seneca Creek Cross Sections: Area 2

Cross Section 1



From Bankful	Year 2004	2005	2006	2007	2009
Max Depth (ft)	1.2	0.9	0.8	1	0.9
Max Width (ft)	8.5	10.1	10.1	9.1	9.6
Area (ft^2)	95	94	94	94	94

Cross Section 2

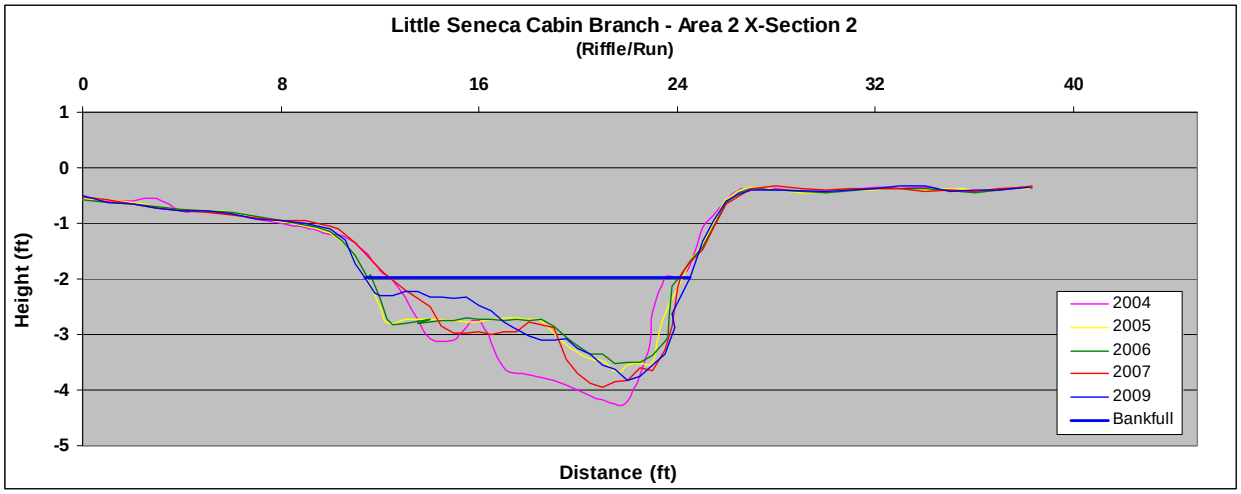
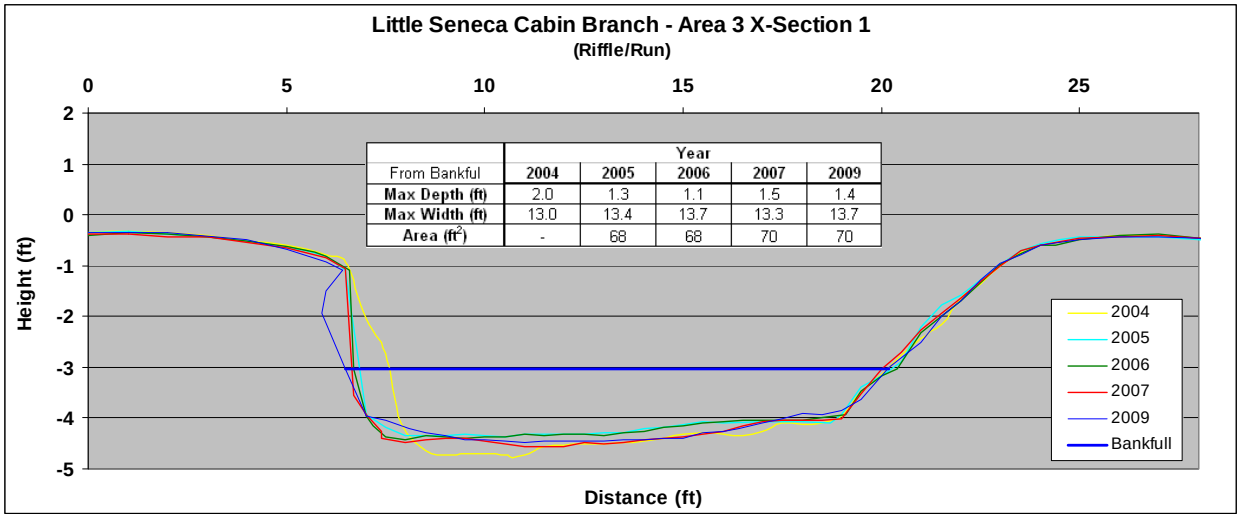


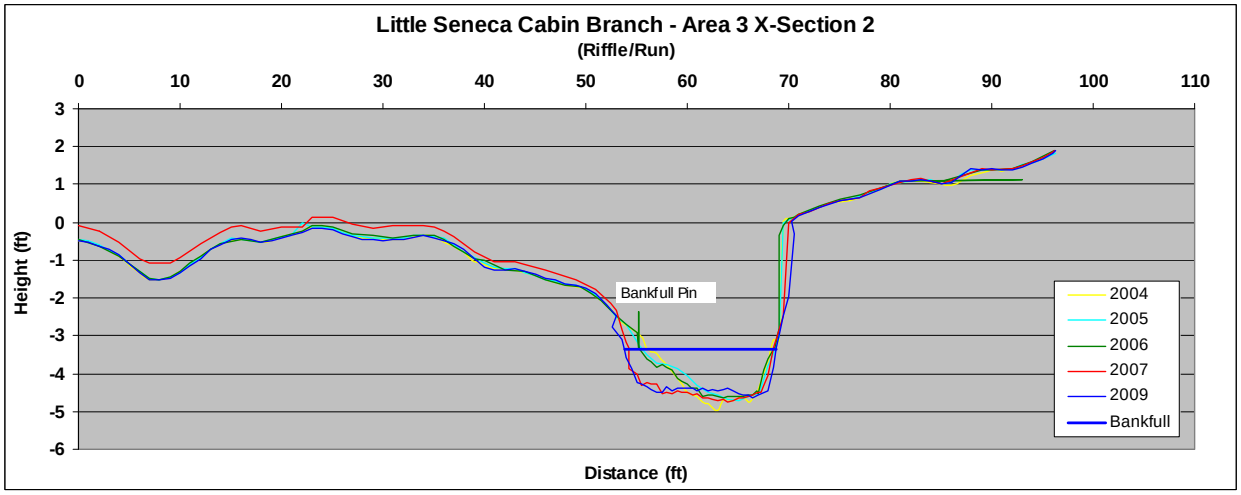
Figure TA-4.16. Cabin Branch Tributary of Little Seneca Creek Cross Sections: Area 3

Cross Section 1



From Bankful	Year 2004	2005	2006	2007	2009
Max Depth (ft)	2.0	1.3	1.1	1.5	1.4
Max Width (ft)	13.0	13.4	13.7	13.3	13.7
Area (ft^2)	-	68	68	70	70

Cross Section 2

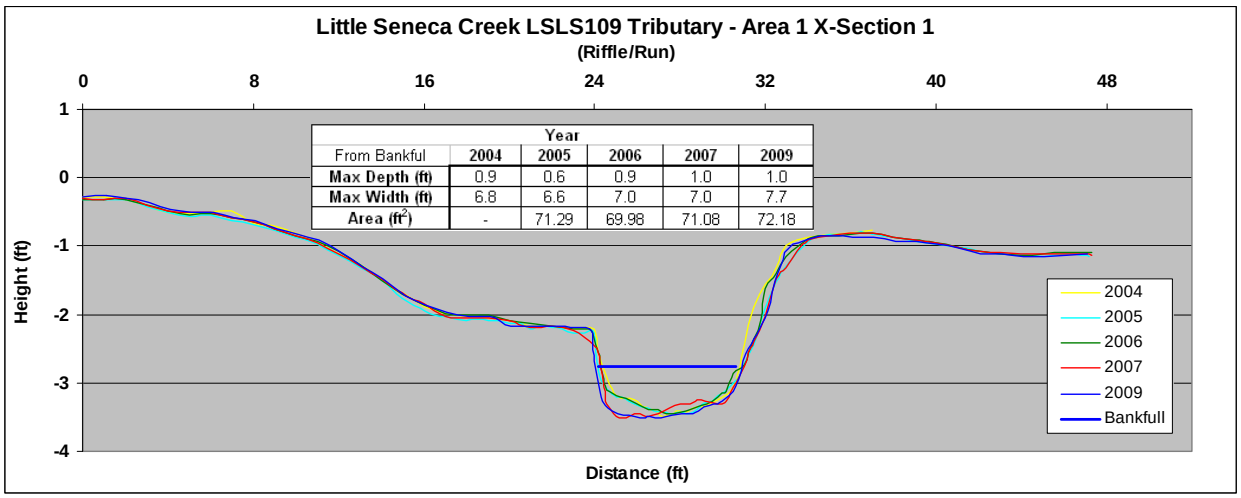


Newcut Road Neighborhood Tributary (LSLS109) Cross Sections

Geomorphic surveys were conducted at three study areas in the Newcut Road Neighborhood Tributary (LSLS109) of Little Seneca Creek. Two cross sections were measured for each of the three LSLS109 areas (Figs TA-4.17, TA-4.18, and TA-4.19, respectively).

Figure TA-4.17. Newcut Road Neighborhood Tributary (LSLS109) Cross Sections: Area 1

Cross Section 1



From Bankful	Year 2004	2005	2006	2007	2009
Max Depth (ft)	0.9	0.6	0.9	1.0	1.0
Max Width (ft)	6.8	6.6	7.0	7.0	7.7
Area (ft^2)	-	71.29	69.98	71.08	72.18

Cross Section 2

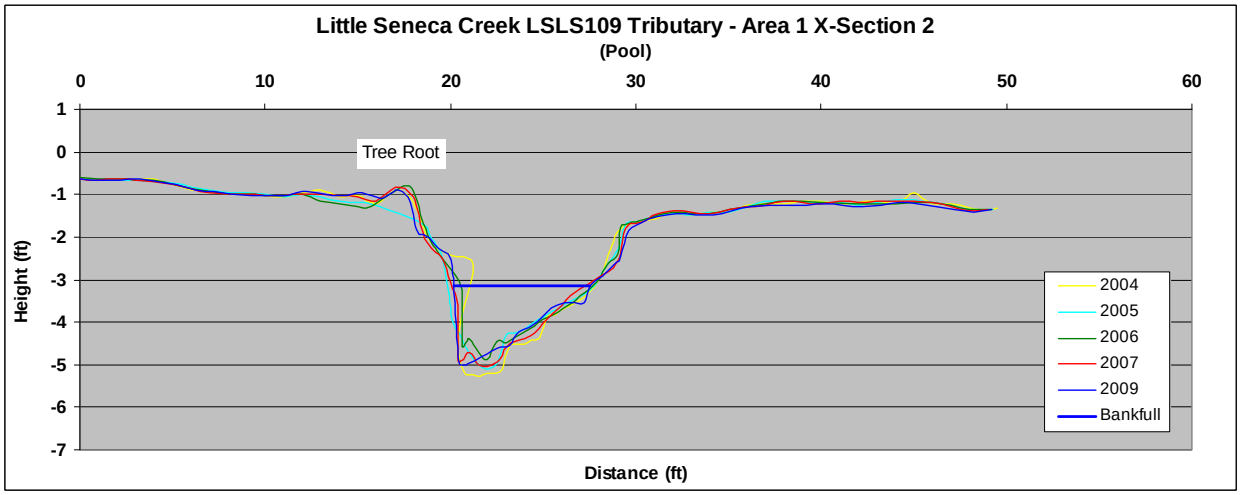
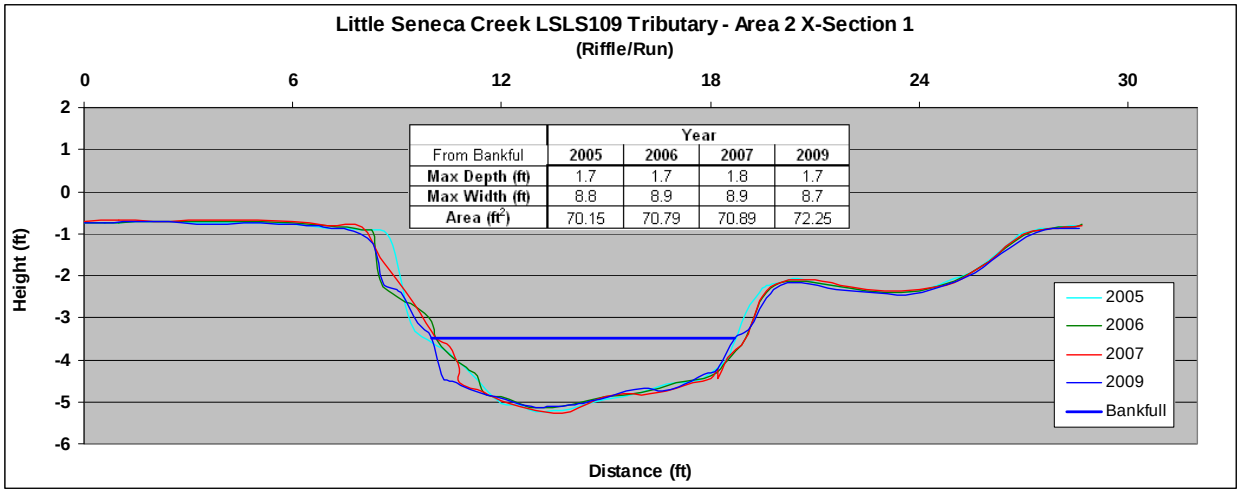


Figure TA-4.18. Newcut Road Neighborhood Tributary (LSLS109) Cross Sections: Area 2

Cross Section 1



From Bankful	Year 2005	2006	2007	2009
Max Depth (ft)	1.7	1.7	1.8	1.7
Max Width (ft)	8.8	8.9	8.9	8.7
Area (ft^2)	70.15	70.79	70.89	72.25

Cross Section 2

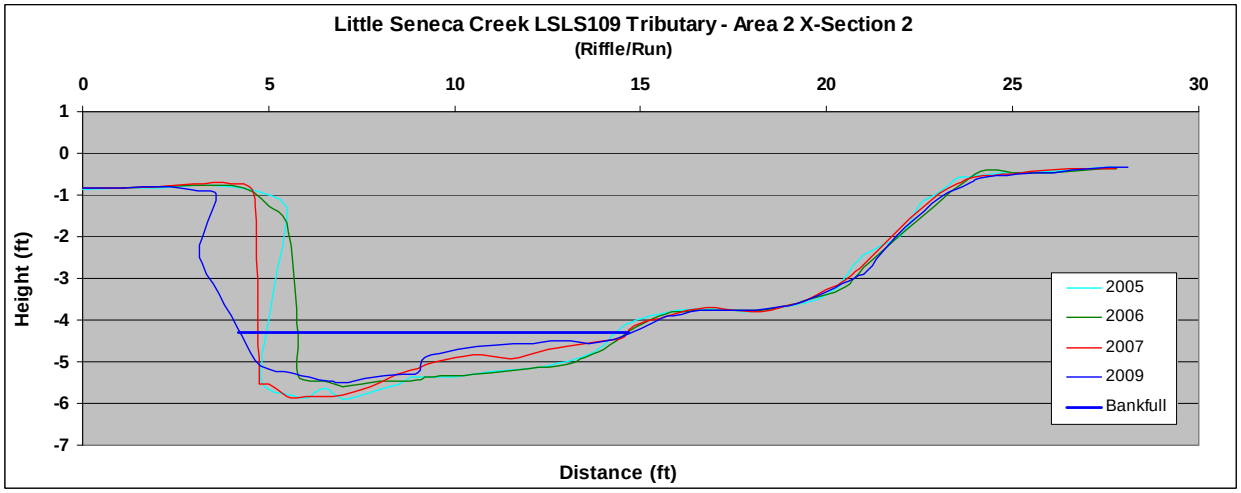
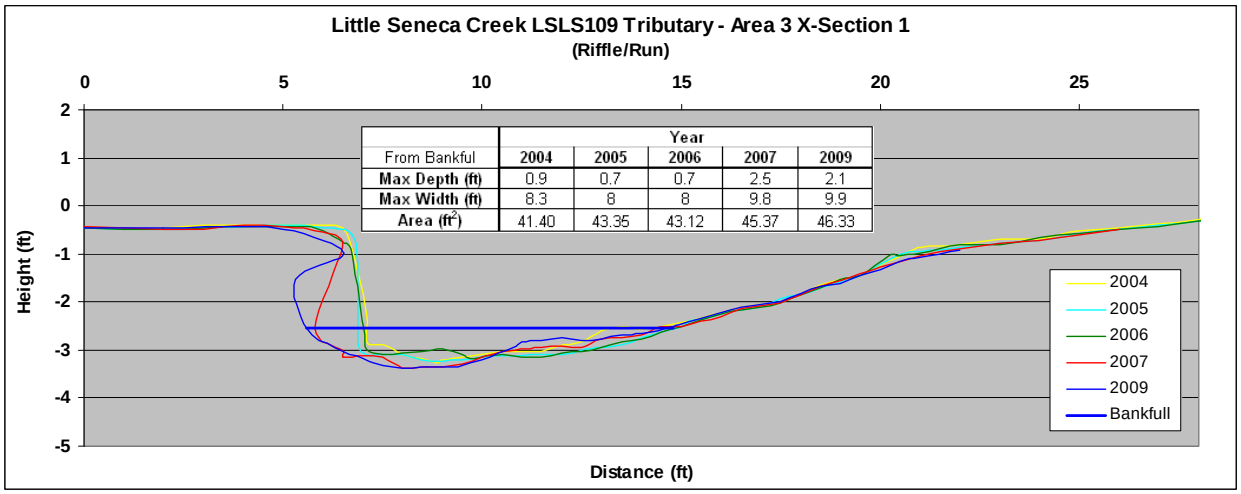


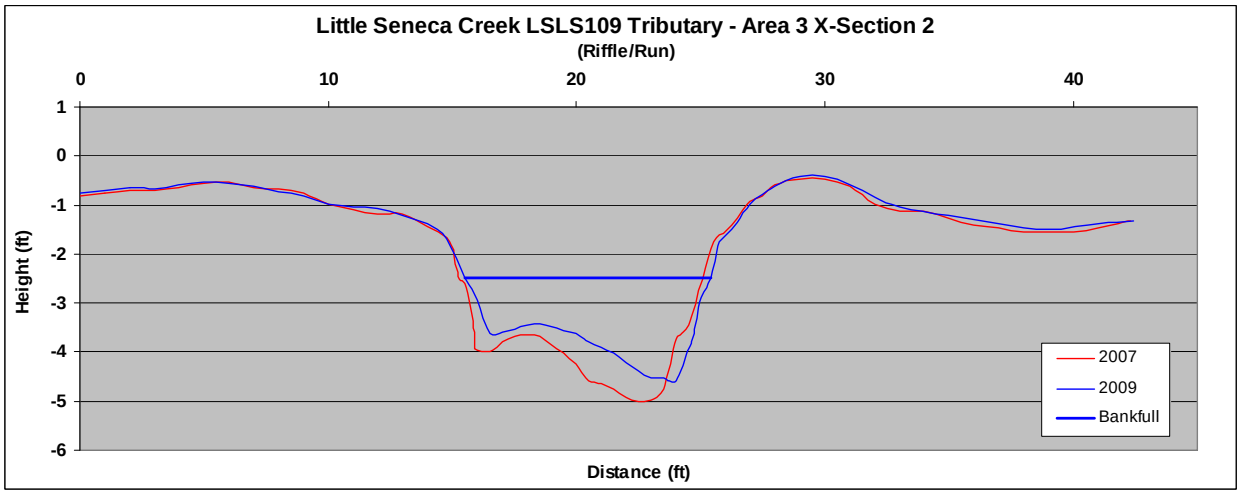
Figure TA-4.19. Newcut Road Neighborhood Tributary (LSLS109) Cross Sections: Area 3

Cross Section 1



From Bankful	Year 2004	2005	2006	2007	2009
Max Depth (ft)	0.9	0.7	0.7	2.5	2.1
Max Width (ft)	8.3	8	8	9.8	9.9
Area (ft^2)	41.40	43.35	43.12	45.37	46.33

Cross Section 2



TA-4.3 Habitat (and Physical Chemistry)

Habitat

There are no technical appendix material concerning the Rapid Habitat Assessment Evaluation.

Stream Temperature

MCDEP also monitors stream temperature in SPAs at biological monitoring stations. This monitoring is separate from the monitoring required for SPA developments. Continuous data loggers are deployed from 1 June through 30 September and record in 24 minute intervals.

Clarksburg SPA

A map of temperature monitoring locations (Fig. TA-4.20) and table of data availability (Table TA-4.2) for the Clarksburg SPA are provided.

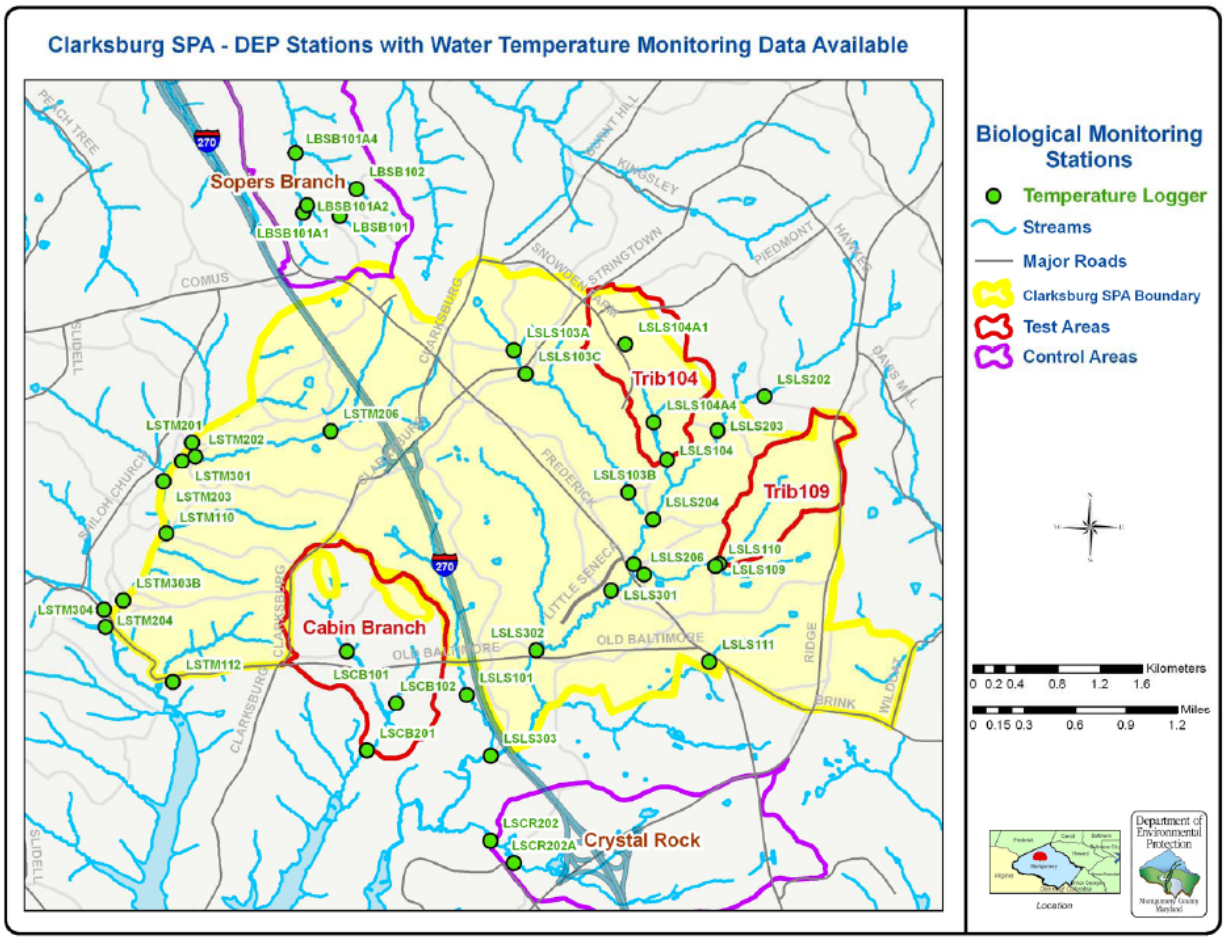


Figure TA-4.20. DEP stations in the Clarksburg SPA with temperature monitoring data.

Table TA-4.2 Clarksburg SPA Stream Temperature Data by Station and Year

Shown are available control and reference stations outside of the SPA that have been used for comparisons.

Cabin Branch tributary of Little Seneca

Station	Years	Total
LSCB101	2004, 2006, 2009	3
LSCB102	2006, 2007, 2008, 2009	4
LSCB201	1998, 2003, 2004, 2006, 2007, 2008, 2009	7

Little Seneca

First Order Streams		
LSLS101	2003, 2009	2
LSLS103A	1995, 1996	2
LSLS103B	2003, 2006, 2007, 2009	4
LSLS103C	1997, 1998, 2000, 2001, 2003, 2004, 2006, 2007, 2008, 2009	10
LSLS104	1998, 2003, 2005, 2006, 2007, 2008, 2009	7
LSLS109	1998, 2000, 2004, 2005, 2007, 2009	6
LSLS110	1998, 2000 2001, 2009	4
LSLS111	2000, 2001, 2009	3
Second Order Streams		
LSLS202	2004, 2006, 2007	3
LSLS203	1995, 1996, 2006, 2007, 2008, 2009	6
LSLS204	1997, 1998, 2006, 2007, 2008, 2009	6
LSLS205	1997, 1998, 2008, 2009	4
LSLS206	1998, 2003, 2009	3
Third Order Streams		
LSLS301	1995, 1998, 1999, 2000, 2004, 2007, 2009	7
LSLS302	2000, 2008	2
LSLS303	1995, 1996, 2000, 2004, 2006	5

Sopers Branch tributary of Little Bennett Creek (control)

Station	Years	Total
LBSB102A1	2004, 2005, 2006, 2008, 2009	5
LBSB001A2	2005, 2006, 2007, 2008, 2009	5
LBSB102A4	2005, 2006, 2007, 2008, 2009	5

Crystal Rock tributary of Little Seneca (reference)

Station	Years	Total
LSCR202	2005, 2006, 2007, 2008, 2009	5
LSCR202A	1998, 2001	2

Ten Mile Creek tributary to Little Seneca

Stream temperature data that is available for the Ten Mile Creek tributary to Little Seneca. The east part of Ten Mile Creek is located within the Special Protection Area (SPA).

Station	Years	Total
First Order Streams		
LSTM110	1997, 2003	2
LSTM112	2002	1
Second Order Streams		
LSTM201	1998	1
LSTM202	1997, 1998, 2007	3
LSTM203	1996, 2007, 2008, 2009	4
LSTM206	1997, 1998, 2002, 2006, 2008, 2009	6
Third Order Streams		
LSTM303B	1995, 1996, 1998, 2003 2006, 2007, 2008, 2009	8
LSTM304	1995, 1996, 1997	3

Upper Paint Branch SPA

A map of temperature monitoring locations (Fig. TA-4.21) and table of data availability (Table TA-4.3) for the Upper Paint Branch SPA are provided.

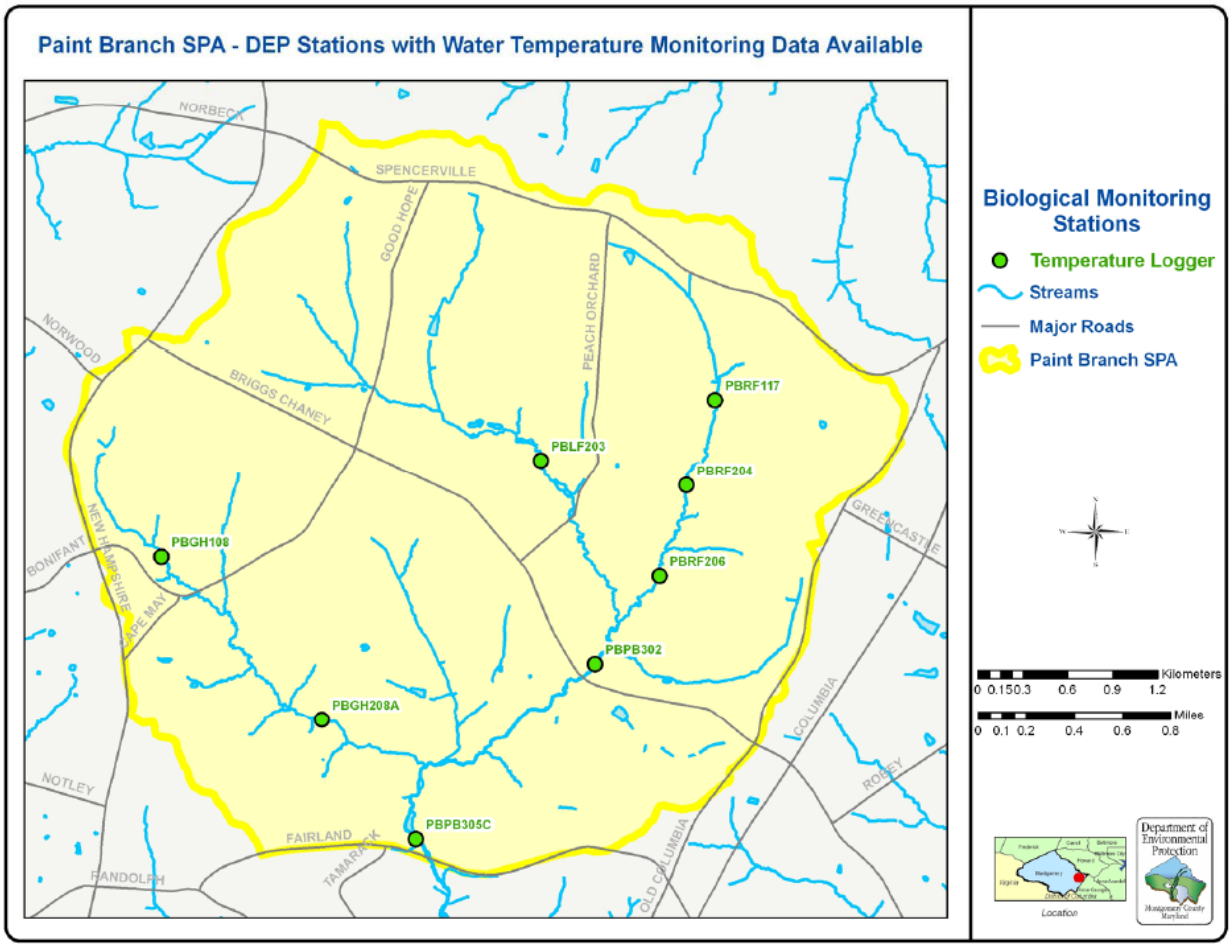


Figure TA-4.21. DEP stations in the Upper Paint Branch SPA with temperature monitoring data.

Table TA-4.3 Upper Paint Branch SPA Stream Temperature Data by Station and Year

PB**GH** is in the Good Hope tributary, PB**RF** is in the Right Fork, PB**LF** is in the Left Fork, and PB**PB** is in the main stem of the Upper Paint Branch.

Station	Years	Total
First Order Streams		
PBGH108	1998, 2000, 2003	3
PBGS111	2009	1
PBRF117	1998, 2003, 2005, 2008, 2009	5
Second Order Streams		
PBGH208A	2003, 2004, 2008	3
PBGS206	2008	1
PBLF202	2009	1
PBLF203	1998	1
PBRF204	1998, 2000, 2003, 2007, 2008, 2009	6
PBRF206	2006, 2007	2
Third Order Streams		
PBPB302	2006, 2007	2
PBPB305C	1998, 2000, 2003, 2004, 2006, 2007, 2008, 2009	8

Piney Branch SPA

A map of temperature monitoring locations (Fig. TA-4.22) and table of data availability (Table TA-4.4) for the Piney Branch SPA are provided.

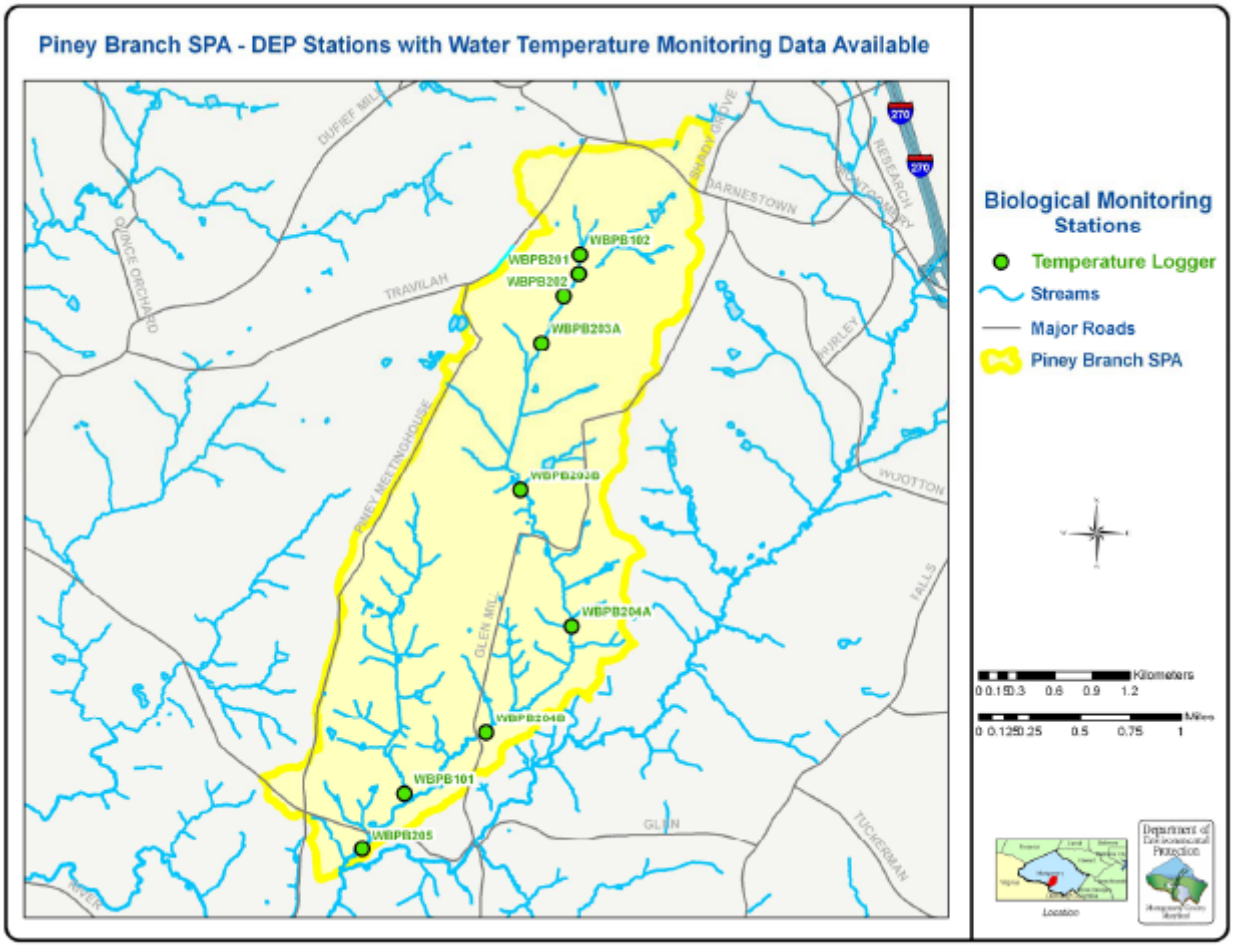


Figure TA-4.22. DEP stations in the Piney Branch SPA with temperature monitoring data.

Table TA-4.4 Piney Branch SPA Stream Temperature Data by Station and Year

Station	Years	Total
First Order Streams		
WBPB101	1995, 1997, 1998, 1999 2001, 2006, 2007, 2009	8
WBPB102	1997	1
Second Order Streams		
WBPB201	1996, 1997, 2006, 2007, 2008, 2009	6
WBPB202	2001	1
WBPB203A	1999, 2001, 2007	3
WBPB203B	1998, 1999, 2001	3
WBPB204A	1995, 1996, 1998, 1999, 2006, 2007, 2008	7
WBPB204B	1997, 1999	2
WBPB205	1995, 1996, 1998, 1999, 2006, 2009	6

Upper Rock Creek SPA

A map of temperature monitoring locations (Fig. TA-4.23) and table of data availability (Table TA-4.5) for the Upper Rock Creek SPA are provided.

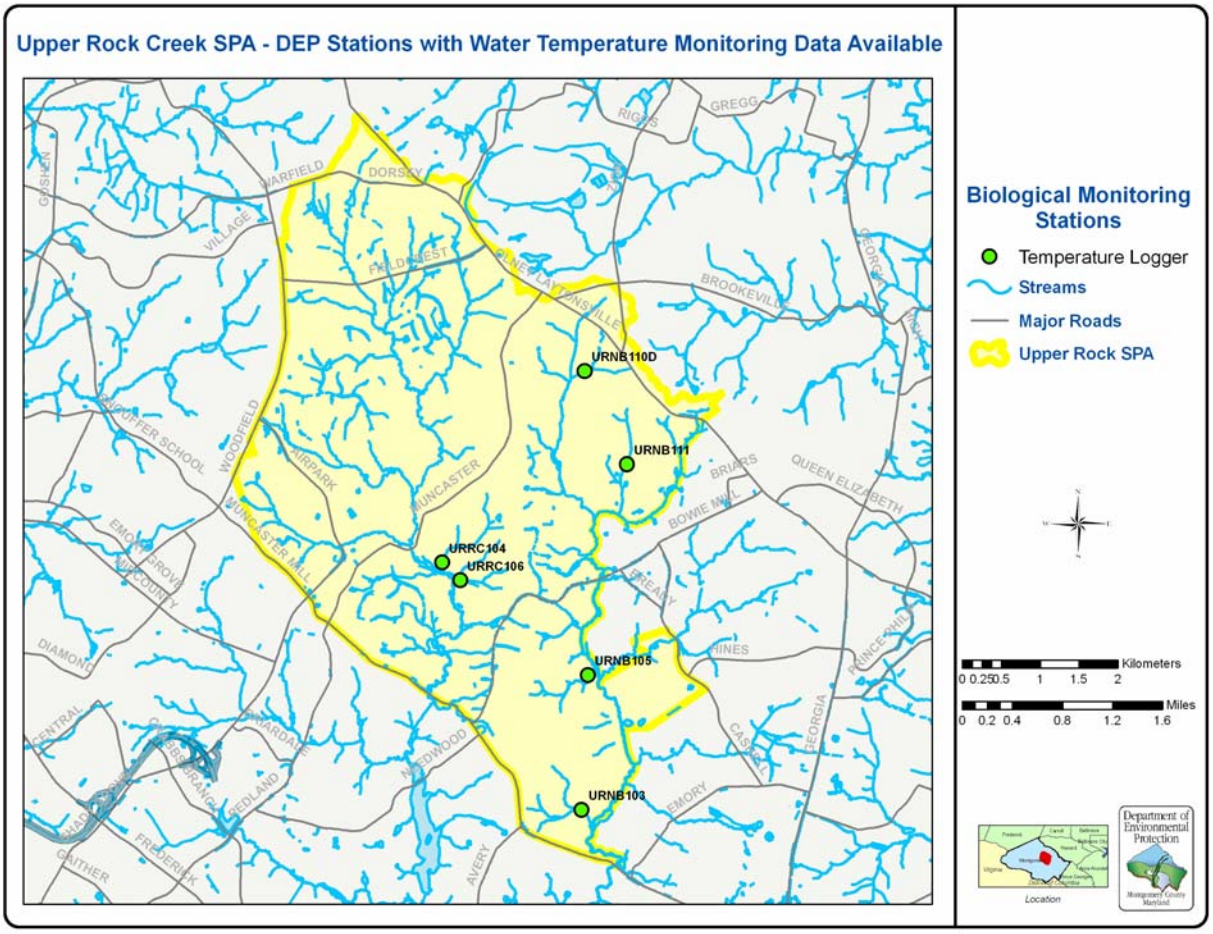


Figure TA-4.23. DEP stations in the Upper Rock Creek SPA with temperature monitoring data.

Table TA-4.5 Upper Rock Creek SPA Stream Temperature Data by Station and Year

Station	Years	Total
URNB103	2009	1
URNB105	2009	1
URNB110D	2004, 2006, 2008, 2009	4
URNB111	2006, 2008, 2009	3
URRC104	2009	1
URRC106	2009	1

Water Chemistry

TA-4.4 Summary

No appendix materials

Note to Reader

For more information on Section 4 or Technical Appendix materials, please contact DEP at AskDEP@montgomerycountymd.gov, 240-777-7700.