

Technical Appendix:

Section 4. Stream Characteristics

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Table of Contents

List of Figures 4

List of Tables 5

TA-4.1 Landscape Changes in the Newcut Road area of Clarksburg 7

TA-4.2 Hydrology 7

TA-4.2.1 Background..... 7

TA-4.2.2 Study Design and Data Collection 7

**Maps showing test and control areas, geomorphic survey areas, and stream
 and precipitation gage locations 7**

Maps of stream gage locations 8

TA-4.2.3. Hydrologic Data Analysis and Interpretation 11

**2008 Water Year Reports for Soper’s Branch and Newcut Road
 Neighborhood stream gages 11**

TA-4.3 Changes in Stream Geomorphology..... 18

TA-4.4 Changes in Physical Chemistry 18

TA-4.4.1 Water Temperature 18

TA-4.4.2 Water Chemistry..... 18

TA-4.5 Habitat..... 18

TA-4.6 Summary..... 18

Note to Reader..... 18

List of Figures

Figure TA-4. 1. Location of the Clarksburg Monitoring Partnership BACI three test areas and two control areas. Also included are biological monitoring stations and geomorphic survey locations. 7

Figure TA-4. 2. Sopers Branch Control Subwatershed, Geomorphic Survey Areas, and Stream Gage Location..... 8

Figure TA-4. 3. Newcut Road Neighborhood Test Subwatershed, Geomorphic Survey Areas, and Stream Gage Location. 9

List of Tables

Table TA-4. 1. Daily Mean Discharge and Instantaneous Peak Discharges for Storm
Events > 0.5", 2004 to 2008. 17

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TA-4.1 Landscape Changes in the Newcut Road area of Clarksburg

No appendix materials

TA-4.2 Hydrology

TA-4.2.1 Background

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.

TA-4.2.2 Study Design and Data Collection

Maps showing test and control areas, geomorphic survey areas, and stream and precipitation gage locations

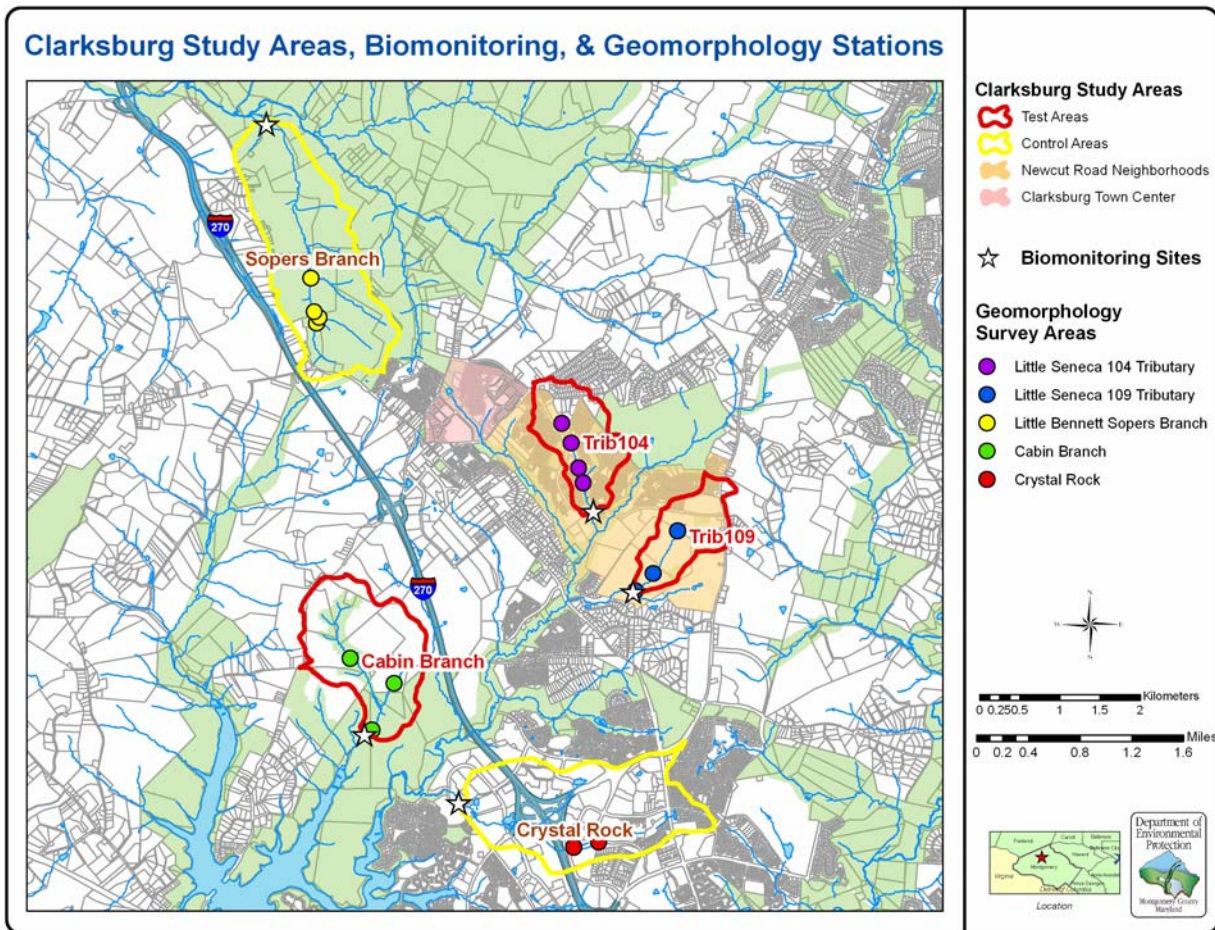


Figure TA-4. 1. Location of the Clarksburg Monitoring Partnership BACI three test areas and two control areas. Also included are biological monitoring stations and geomorphic survey locations.

Maps of stream gage locations

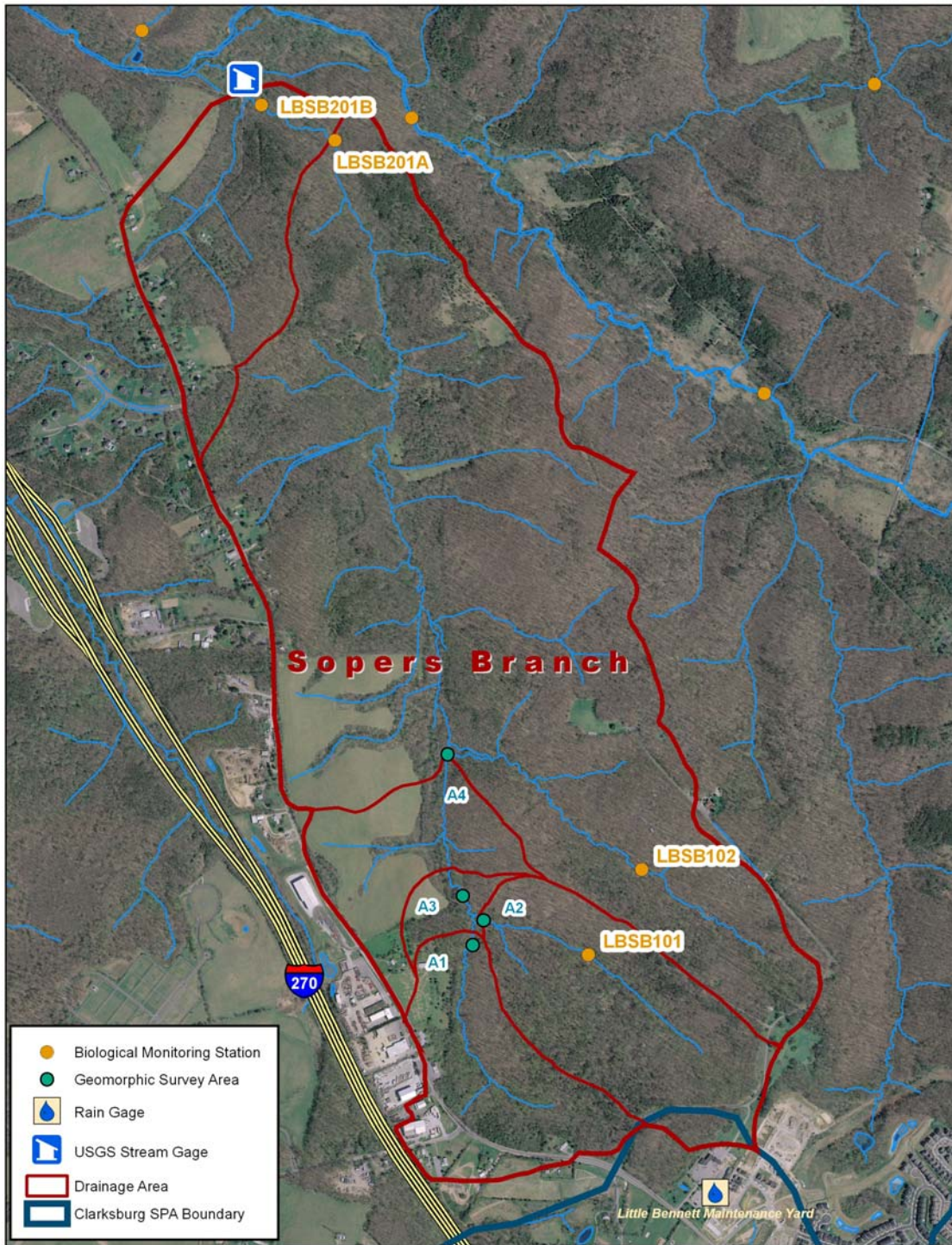


Figure TA-4. 2. Sopers Branch Control Subwatershed, Geomorphic Survey Areas, and Stream Gage Location.

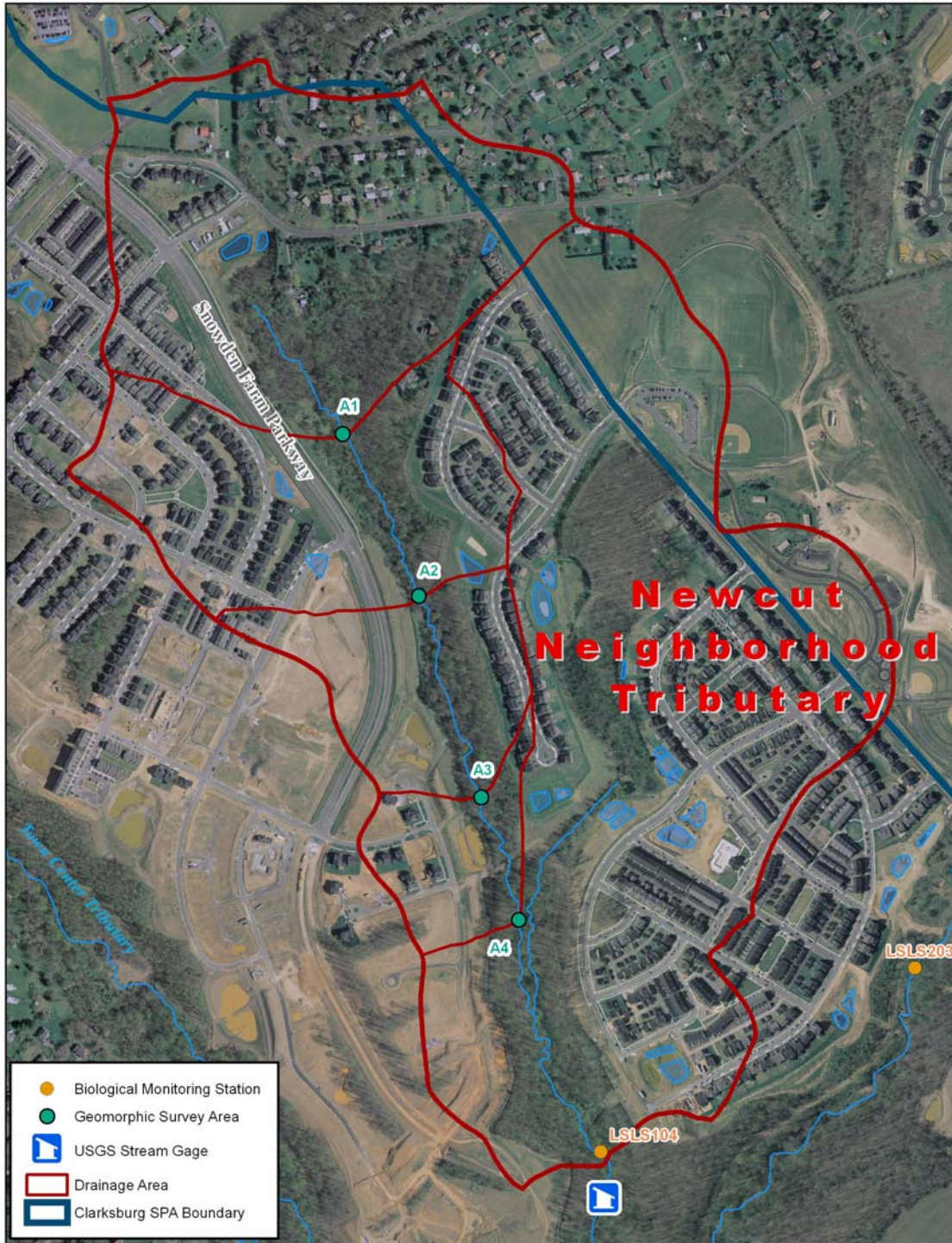


Figure TA-4. 3. Newcut Road Neighborhood Test Subwatershed, Geomorphic Survey Areas, and Stream Gage Location.

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TA-4.2.3. Hydrologic Data Analysis and Interpretation

**2008 Water Year Reports for Soper’s Branch and Newcut Road
Neighborhood stream gages**



Water-Data Report 2008

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 mi².

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 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 ft³/s and (or) maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Dec 16	0450	26	1.54
Feb 1	1300	30	1.70
Apr 20	1540	47	2.23
Apr 20	2230	30	1.70
May 11	2340	*260	*2.39
Sep 6	1400	62	1.53

Minimum discharge, 0.08 ft³/s, Oct. 3.

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

Water-Data Report 2008

01643395 SOPER BRANCH AT HYATTSTOWN, MD—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.18	e0.38	e0.42	0.66	12	0.76	0.70	1.5	1.1	0.46	0.29	0.29
2	0.13	0.37	0.56	0.55	3.5	0.76	0.70	1.5	0.93	0.45	0.32	0.29
3	0.11	e0.35	0.91	0.53	1.5	0.74	0.78	1.5	0.90	0.42	0.29	0.29
4	0.10	e0.34	0.61	0.45	1.2	0.71	2.4	1.6	1.3	0.42	0.28	0.29
5	0.10	e0.33	0.57	0.45	1.0	7.8	1.3	1.6	1.1	0.42	0.27	0.29
6	0.13	0.32	0.48	0.45	0.92	2.0	1.2	1.6	0.93	0.42	0.27	8.4
7	0.13	e0.32	0.45	0.45	1.0	1.8	1.2	1.6	0.85	0.51	0.47	0.80
8	0.13	e0.33	0.53	0.45	0.85	4.1	1.1	1.7	0.78	0.42	0.37	0.51
9	e0.15	e0.35	0.61	0.45	0.77	2.4	1.0	3.4	0.70	0.47	0.31	0.44
10	e0.20	e0.39	0.61	0.42	0.69	1.7	0.97	4.6	0.72	0.44	0.30	0.44
11	e0.15	e0.40	0.61	0.45	0.61	1.5	1.0	29	0.72	0.38	0.29	0.42
12	e0.13	e0.56	e0.58	0.44	0.61	1.3	1.7	34	0.62	0.37	0.28	0.45
13	e0.12	0.48	e0.53	0.39	4.9	1.2	1.3	6.1	0.59	0.43	0.41	0.49
14	e0.13	0.45	e0.50	0.39	2.8	1.1	1.1	3.3	0.75	0.56	0.37	0.46
15	e0.14	1.9	0.47	0.39	1.5	1.1	1.0	2.4	0.70	0.40	0.31	0.45
16	e0.15	0.95	7.4	0.39	1.2	1.0	0.97	2.9	0.72	0.38	0.30	0.43
17	0.15	e0.70	1.4	0.41	1.1	0.91	0.92	2.1	0.76	0.35	0.29	0.44
18	e0.15	e0.55	0.73	0.48	1.0	0.83	0.83	1.8	0.63	0.34	0.28	0.45
19	0.17	e0.49	0.55	0.53	0.91	1.0	0.81	1.6	0.59	0.32	0.27	0.49
20	0.24	e0.45	0.49	0.51	0.83	2.0	18	2.6	0.59	0.31	0.26	0.50
21	e0.21	0.44	0.42	0.39	0.73	1.2	11	2.0	0.57	0.31	0.26	0.50
22	e0.17	0.42	0.39	0.39	0.70	1.1	3.3	1.6	0.53	0.31	0.26	0.50
23	0.20	0.39	0.41	0.39	0.70	1.0	1.9	1.4	0.50	0.36	0.26	0.51
24	0.54	0.39	0.39	0.39	0.70	0.97	1.4	1.3	0.50	0.36	0.26	0.50
25	0.74	0.39	0.39	0.39	0.70	0.89	1.2	1.2	0.48	0.32	0.26	0.58
26	0.99	0.43	0.39	0.39	0.81	0.83	1.1	1.1	0.45	0.30	0.26	0.89
27	2.0	0.53	0.39	0.39	1.1	0.83	1.2	1.1	0.51	0.35	0.26	1.5
28	0.71	e0.48	0.39	0.39	0.87	0.81	2.4	0.97	0.60	0.37	0.33	0.62
29	e0.50	e0.43	0.58	0.42	0.78	0.76	2.1	0.95	0.55	0.32	0.80	0.53
30	e0.40	e0.42	0.53	0.73	---	0.74	1.6	0.92	0.49	0.29	0.39	0.50
31	e0.39	---	0.89	0.66	---	0.70	---	1.5	---	0.29	0.30	---
Mean	0.31	0.49	0.78	0.46	1.59	1.44	2.21	3.89	0.71	0.38	0.32	0.78
Max	2.0	1.9	7.4	0.73	12	7.8	18	34	1.3	0.56	0.80	8.4
Min	0.10	0.32	0.39	0.39	0.61	0.70	0.70	0.92	0.45	0.29	0.26	0.29
Cism	0.27	0.42	0.67	0.39	1.36	1.23	1.89	3.32	0.60	0.33	0.27	0.66
In.	0.31	0.47	0.77	0.45	1.46	1.42	2.10	3.83	0.67	0.38	0.31	0.74

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2004 - 2008, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	0.73	1.46	1.37	1.42	1.91	2.44	2.81	1.95	1.00	0.76	0.45	0.58
Max	1.24	3.31	1.67	2.07	3.53	4.34	3.99	3.89	1.84	1.42	0.97	1.20
(WY)	(2006)	(2007)	(2007)	(2007)	(2004)	(2007)	(2005)	(2008)	(2004)	(2004)	(2004)	(2004)
Min	0.31	0.49	0.78	0.46	0.91	0.93	1.19	0.71	0.71	0.38	0.23	0.23
(WY)	(2008)	(2008)	(2008)	(2008)	(2005)	(2006)	(2006)	(2006)	(2008)	(2008)	(2006)	(2005)

Water-Data Report 2008

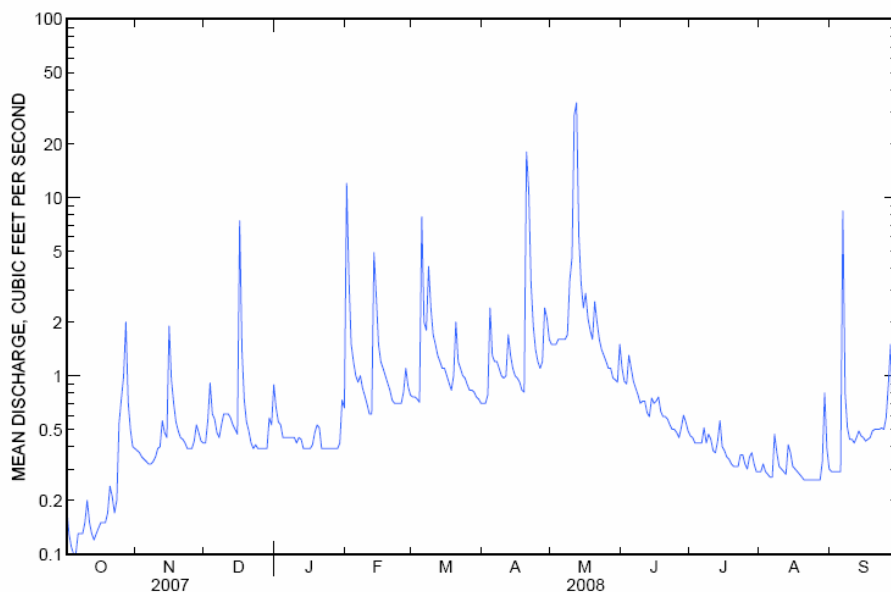
01643395 SOPER BRANCH AT HYATTSTOWN, MD—Continued

SUMMARY STATISTICS

	Calendar Year 2007	Water Year 2008	Water Years 2004 - 2008
Annual mean	1.26	1.11	1.28
Highest annual mean			1.63 2007
Lowest annual mean			1.04 2006
Highest daily mean	22 Apr 15	34 May 12	34 May 12, 2008
Lowest daily mean	0.10 Oct 4 ^a	0.10 Oct 4 ^a	0.10 Oct 4, 2007 ^a
Annual seven-day minimum	0.12 Oct 2	0.12 Oct 2	0.12 Oct 2, 2007
Maximum peak flow		^b 260 May 11	^b 260 May 11, 2008
Maximum peak stage		2.39 May 11	3.04 Jan 14, 2005
Instantaneous low flow		0.08 Oct 3	0.08 Oct 3, 2007
Annual runoff (cfsm)	1.08	0.948	1.10
Annual runoff (inches)	14.65	12.91	14.90
10 percent exceeds	2.8	1.6	2.4
50 percent exceeds	0.66	0.53	0.72
90 percent exceeds	0.21	0.28	0.29

^a Oct. 4, 5.

^b From rating curve extended above 57.5 ft²/s.





Water-Data Report 2008

01644371 LITTLE SENECA CREEK TRIBUTARY NEAR CLARKSBURG, MD

Potomac Basin
Middle Potomac-Catoctin Subbasin

LOCATION.--Lat 39°13'53", long 77°1E'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 mi².

SURFACE-WATER RECORDS

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

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

REMARKS.--No estimated daily discharges. Records poor. U.S. Geological Survey gage-height telemeter at station. Several measurements of water temperature were made during the year.

REVISIONS.--WDR US 2006: 2004-05.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 50 ft³/s and (or) maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr 20	1430	84	5.01
May 11	2115	64	4.73
Sep 6	1255	*91	*5.10

Minimum discharge, 0.05 ft³/s, Oct. 7-9.

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

Water-Data Report 2008

01644371 LITTLE SENECA CREEK TRIBUTARY NEAR CLARKSBURG, MD—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.09	0.33	0.26	0.67	3.8	0.41	0.59	0.84	0.54	0.33	0.24	0.26
2	0.09	0.28	0.34	0.63	0.85	0.41	0.52	0.82	0.48	0.32	0.26	0.25
3	0.08	0.28	0.50	0.62	0.70	0.41	0.67	0.80	0.55	0.29	0.22	0.25
4	0.07	0.28	0.32	0.64	0.62	0.45	0.77	0.76	1.2	0.31	0.20	0.24
5	0.07	0.29	0.36	0.65	0.57	2.2	0.62	0.72	0.72	0.31	0.21	0.26
6	0.06	0.31	0.32	0.68	0.52	0.81	0.72	0.70	0.58	0.31	0.22	10
7	0.06	0.32	0.34	0.63	0.49	0.88	0.66	0.65	0.59	0.31	0.55	0.44
8	0.06	0.32	0.44	0.62	0.45	0.98	0.62	0.65	0.54	0.28	0.36	0.27
9	0.06	0.33	0.39	0.62	0.42	0.87	0.62	0.97	0.46	0.33	0.23	0.40
10	0.08	0.31	0.41	0.63	0.41	0.82	0.62	1.1	0.60	0.28	0.22	0.37
11	0.08	0.28	0.39	0.67	0.40	0.78	0.73	11	0.50	0.26	0.27	0.35
12	0.09	0.38	0.37	0.62	0.42	0.74	0.77	6.6	0.44	0.25	0.21	0.35
13	0.08	0.34	0.36	0.62	1.3	0.72	0.65	2.4	0.42	0.31	0.27	0.35
14	0.07	0.32	0.36	0.61	0.75	0.70	0.63	2.0	0.45	0.40	0.28	0.34
15	0.07	0.69	0.34	0.53	0.68	0.68	0.61	1.1	0.42	0.28	0.26	0.35
16	0.08	0.29	2.9	0.52	0.63	0.69	0.60	1.5	0.51	0.27	0.26	0.34
17	0.07	0.28	0.79	0.55	0.62	0.63	0.58	0.98	0.43	0.26	0.22	0.34
18	0.08	0.28	0.71	0.61	0.60	0.64	0.58	0.91	0.40	0.25	0.22	0.33
19	0.11	0.26	0.67	0.58	0.54	0.78	0.58	0.82	0.38	0.25	0.22	0.32
20	0.11	0.23	0.65	0.53	0.52	0.72	7.4	1.4	0.36	0.26	0.21	0.31
21	0.10	0.24	0.62	0.49	0.49	0.65	3.0	0.91	0.35	0.27	0.21	0.31
22	0.10	0.28	0.60	0.49	0.52	0.65	1.3	0.81	0.34	0.25	0.21	0.32
23	0.10	0.33	0.62	0.49	0.51	0.62	1.1	0.75	0.34	0.27	0.21	0.31
24	0.29	0.28	0.59	0.46	0.41	0.59	0.96	0.69	0.33	0.25	0.21	0.31
25	0.48	0.25	0.57	0.43	0.37	0.58	0.87	0.64	0.31	0.25	0.21	0.31
26	0.91	0.28	0.56	0.44	0.49	0.58	0.82	0.60	0.31	0.26	0.20	0.34
27	1.5	0.28	0.53	0.44	0.45	0.58	0.83	0.58	0.58	0.36	0.21	1.1
28	0.43	0.27	0.55	0.44	0.40	0.57	1.2	0.54	0.38	0.24	0.26	0.37
29	0.36	0.24	0.65	0.48	0.39	0.52	0.92	0.53	0.34	0.23	0.49	0.35
30	0.34	0.25	0.62	0.52	---	0.52	0.85	0.49	0.34	0.25	0.29	0.35
31	0.32	---	0.78	0.46	---	0.55	---	0.69	---	0.26	0.26	---
Total	6.49	9.10	17.91	17.37	19.32	21.73	31.39	43.95	14.19	8.75	7.89	20.19
Mean	0.21	0.30	0.58	0.56	0.67	0.70	1.05	1.42	0.47	0.28	0.25	0.67
Max	1.5	0.69	2.9	0.68	3.8	2.2	7.4	11	1.2	0.40	0.55	10
Min	0.06	0.23	0.26	0.43	0.37	0.41	0.52	0.49	0.31	0.23	0.20	0.24
Cfsm	0.49	0.71	1.34	1.30	1.55	1.63	2.43	3.30	1.10	0.66	0.59	1.57
In.	0.56	0.79	1.55	1.50	1.67	1.88	2.72	3.80	1.23	0.76	0.68	1.75

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2004 - 2008, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	0.45	0.66	0.63	0.68	0.58	0.81	0.87	0.63	0.51	0.53	0.23	0.34
Max	0.69	1.35	0.76	0.94	0.73	1.44	1.19	1.42	0.98	0.92	0.30	0.67
(WY)	(2006)	(2007)	(2007)	(2007)	(2007)	(2007)	(2007)	(2008)	(2006)	(2006)	(2007)	(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 2008

01644371 LITTLE SENECA CREEK TRIBUTARY NEAR CLARKSBURG, MD—Continued

SUMMARY STATISTICS

	Calendar Year 2007	Water Year 2008	Water Years 2004 - 2008	
Annual total	207.10	218.28		
Annual mean	0.57	0.60	0.57	
Highest annual mean			0.71	2007
Lowest annual mean			0.44	2005
Highest daily mean	6.1 Apr 15	11 May 11	11	Jul 5, 2006 ^a
Lowest daily mean	0.06 Oct 6 ^b	0.06 Oct 6 ^b	0.05	Sep 13, 2005
Annual seven-day minimum	0.07 Oct 3	0.07 Oct 3	0.07	Sep 7, 2005
Maximum peak flow		91 Sep 6	392	Jul 5, 2006
Maximum peak stage		5.10 Sep 6	7.68	Jul 5, 2006
Instantaneous low flow		0.05 Oct 7 ^f	0.04	Sep 13, 2005
Annual runoff (cfsm)	1.32	1.39	1.34	
Annual runoff (inches)	17.92	18.88	18.15	
10 percent exceeds	1.1	0.82	0.97	
50 percent exceeds	0.35	0.43	0.37	
90 percent exceeds	0.11	0.22	0.16	

^a July 5, 2006, May 11, 2008.

^b Oct. 6-9.

^c From rating curve extended above 65 ft³/s on basis of slope-area measurement of peak flow.

^d From high-water mark.

^f Oct. 7-9.

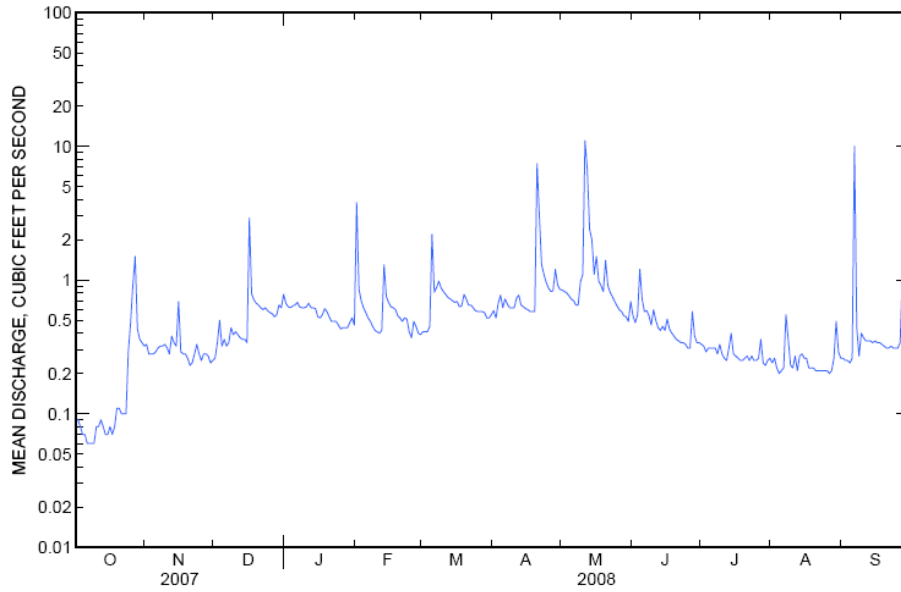


Table TA-4. 1. Daily Mean Discharge and Instantaneous Peak Discharges for Storm Events > 0.5", 2004 to 2008.

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	0.0610	0.3924	6.43
7/23/2004	0.0872	0.8921	10.23	0.1079	2.8343	26.26
9/28/2004	0.1160	0.5582	4.81	0.1573	1.0901	6.93
6/25/2006	0.0588	0.3525	6.00	0.3028	4.9273	16.27
7/5/2006	0.0175	0.3366	19.24	0.4689	16.2209	34.59
4/14 to 4/15/07	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	0.0070	1.05
8/25/2007	0.0246	0.2803	11.41	0.0354	0.2355	6.66
03/04/08	0.0099	0.0321	3.25	0.0079	0.0327	4.15
03/07/08	0.0039	0.0089	2.29	0.0036	0.0051	1.41
04/20/08	0.0193	0.0628	3.25	0.0191	0.3052	15.99
06/27/08	0.0008	0.0013	1.70	0.0022	0.0131	5.85
06/28/08	0.0008	0.0020	2.39	0.0013	0.0023	1.76
07/09/08	0.0007	0.0013	1.88	0.0012	0.0044	3.61
07/13/08	0.0008	0.0013	1.54	0.0016	0.0040	2.44
10/25/08	0.0014	0.0036	2.63	0.0028	0.0109	3.92

TA-4.3 Changes in Stream Geomorphology

No appendix materials

TA-4.4 Changes in Physical Chemistry

No appendix materials

TA-4.4.1 Water Temperature

No appendix materials

TA-4.4.2 Water Chemistry

No appendix materials

TA-4.5 Habitat

No appendix materials

TA-4.6 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.