

number of sites exceeding levels of concern were similar in both years. These parameters were alkalinity, nitrate, nitrogen, and sodium. In 2001, alkalinity and nitrate had the highest number of sites (25), and sodium and nitrogen were close with 24 and 23 sites, respectively. The parameter to exceed levels of concern the most in 2008 was sodium (23), with alkalinity (20), nitrogen (15), and nitrate (14) being high also. The largest difference in percentage of sites between years was total nitrate, nitrogen, and phosphorus, with total nitrate and nitrogen being higher in 2001 and total phosphorus being higher in 2008.

Many of the sites had the same parameters that exceeded levels of concern in both 2001 and 2008. Also, the sites that had the overall highest or lowest values in certain parameters were the same in both years. Newport Creek had the highest values of typical AMD parameters, such as iron, manganese, and sulfate, and Little Nescopeck Creek had the highest aluminum value, lowest alkalinity, and the same pH value in 2001 and 2008. Leggetts Creek had excessively high values in nutrients and sodium in 2001, with little to no overall improvement in 2008. This site (LEGT 0.1) had the overall highest nutrient and sodium values in both surveys. Many of the Susquehanna River mainstem sites exceeded levels of concern for sodium values in both 2001 and 2008.

CONCLUSIONS

Overall, the majority of the streams in the Middle Susquehanna Subbasin were good with nonimpaired and slightly impaired ratings assigned to 74 percent of the sites sampled. There were also numerous extremely degraded streams, mostly impacted by AMD. Figures 3 and 4, which display the 2008 and historical condition categories, show that the most impaired stream sites were located in the AMD and urban land use areas on Figure 2. The watersheds most impacted by AMD were Newport Creek, Nanticoke Creek, Solomons Creek, Lackawanna River, and Catawissa Creek. Streams that were impacted by urban land use were Leggetts Creek, Lackawanna River, Sugar Creek headwaters, and Mahoning Creek. Agriculture land use was located throughout the subbasin, but was more prevalent in the southern end. Not many or severe impacts from agriculture were noted. Streams that may experience slight agricultural impacts include Wyalusing Creek, Green Creek, Briar Creek (east and west branches), Mahoning Creek, and Sugar Creek headwaters. Another pollution concern in this subbasin is acidic atmospheric deposition. Numerous stream sites had low alkalinity as the only water quality parameter that exceeded levels of concern. Many of these sites drain the same area of North Mountain and Huntingdon Mountain located near the intersections of Sullivan, Columbia, Luzerne, and Wyoming Counties. This area has waters that have been designated by the Department of Environmental Protection as potentially impacted by atmospheric deposition, including East Branch Fishing Creek. The watersheds in this survey that had low

alkalinity and are located in this area include headwaters of Fishing Creek, Mehoopany Creek, Bowman Creek, and Shickshinny Creek. East Branch Briar Creek and Hunlock Creek, which are also in this area, had lower alkalinity; however, it was not lower than 20 mg/l. East Branch Fishing Creek and West Branch Fishing Creek also had elevated aluminum (higher than 200 µg/l) at the time of sampling, which is another indication of acidic atmospheric deposition influence. Schrader Creek also had low alkalinity and was located in an area of atmospheric deposition concerns.

The watersheds in the northern portion of the Middle Susquehanna Subbasin (Endless Mountain Region) appeared to be healthier, in general, than the ones in the lower portion, which was also noted in the 2001 survey. The watersheds with the majority of the best overall conditions were Tunkhannock Creek, Towanda Creek, and Sugar Run Watersheds. Other watersheds showing mostly nonimpaired conditions included Meshoppen, Hunlock, Fishing, and Roaring Creek Watersheds. Lackawanna River headwaters had good water quality; however, it was extremely degraded toward the mouth. Each ecoregion and drainage size category reference site used for the biological analysis included STNK 0.5, WMSH 1.2, TUNK 1.8, WLWR 5.2, HUNT 0.3, SBRC 0.5, and SUSQ 209.1. The sites with the best habitat scores in each reference category included TUNK 20.3, ETNK 10.0, SCHR 0.2, SCHR 11.7, HUNT 0.3, LFSH 0.1, and SUSQ 138. The most degraded watersheds in this survey were Newport Creek, Nanticoke Creek, Lackawanna River, and Solomons Creek. Other watersheds that showed some degraded conditions included Catawissa Creek, Leggetts Creek, Briar Creek, Toby Creek, Little Nescopeck Creek, Mahoning Creek, and Harveys Creek.

The results of this report were similar to those found in the 2001 Middle Susquehanna Subbasin Survey (LeFevre, 2002). Similar biological condition categories were obtained in both years and similar parameters exceeded levels of concern on the same streams. The watersheds that were identified as being the most severely degraded in 2001 (Lackawanna River, Solomons Creek, Nanticoke Creek, Newport Creek, Nescopeck Creek, and Catawissa Creek) were still degraded in 2008 (except data for Nescopeck Creek was limited to Little Nescopeck Creek in 2008). Similar watersheds that were identified as healthy in 2001 were still healthy in 2008, such as Towanda, Meshoppen, Tunkhannock, Fishing, Roaring, Mehoopany, and Bowman Creeks.

SRBC staff is conducting the Middle Susquehanna Subbasin Survey Year-2 assessment of the Lackawanna Creek Watershed, focusing on CSO systems and untreated sewage impacts. CSO systems are antiquated sewer and stormwater runoff collection infrastructure that release untreated sewage to streams when capacity is exceeded. The Lackawanna River Watershed study will include water sampling in the mainstem and tributary waters during low flow and high flow (storm events), and macroinvertebrate community assessments.

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Appendix

Site #	Station Name	Location Description	County	Latitude	Longitude	Ecoregion	Drainage Size
1	ABRA002.9	Abrahams Creek along 8th Avenue near West Wyoming	Luzerne	41.32583	-75.85167	62	SMALL
2	* BLAK000.1	Black Creek above SR 3016 bridge upstream of Nescopeck Creek confluence	Luzerne	41.0075	-76.16722	67	SMALL
3	* BLAK015.0	Black Creek upstream of SR 93 bridge outside Hazleton	Luzerne	40.97361	-76.01028	62	SMALL
4	BOWM002.5	Bowman Creek downstream of SR 3003 bridge above Tunkhannock	Wyoming	41.50722	-75.985	62	MEDIUM
5	BOWM013.1	Bowman Creek upstream of Market Street Bridge in Noxen	Wyoming	41.42444	-76.05806	62	SMALL
6	BRIRO0.4	Briar Creek downstream of Rt. 11 bridge	Columbia	41.04556	-76.285	67	SMALL
7	CATW000.5	Catawissa Creek next to park area near old railroad bridge piers	Columbia	40.9475	-76.46139	67	MEDIUM
8	CATW014.6	Catawissa Creek upstream of T367 bridge	Columbia	40.93417	-76.30528	67	MEDIUM
9	CATW033.2	Catawissa Creek upstream of T818 bridge	Schuylkill	40.88	-76.10611	62	SMALL
10	EBRRO04.9	East Branch Briar Creek along SR 1014 above lake	Columbia	41.07444	-76.29611	67	SMALL
11	EFSH003.4	East Fishing Creek above bridge near Jamison City at gamelands	Columbia	41.31222	-76.34972	62	SMALL
12	EHRV000.1	East Fork Harveys Creek upstream of Rt. 29 bridge	Luzerne	41.25194	-75.99861	62	SMALL
13	ELWR000.1	East Branch Lackawanna River upstream of SR 171 bridge and Stillwater Lake	Susquehanna	41.70611	-75.4825	62	SMALL
14	ETNK001.0	East Branch Tunkhannock Creek near Rt. 407 bridge	Susquehanna	41.64694	-75.70417	60	SMALL
15	ETNK010.0	East Branch Tunkhannock Creek upstream of SR 2014 bridge	Susquehanna	41.67056	-75.57722	60	SMALL
16	FISH002.2	Fishing Creek at Bloom Street/Creek Road bridge in Bloomsburg	Columbia	41.00194	-76.46389	67	MEDIUM
17	FISH019.5	Fishing Creek upstream of Rt. 487 bridge	Columbia	41.15278	-76.36889	67	MEDIUM
18	GARD000.4	Gardner Creek above SR 3005 bridge	Lackawanna	41.39306	-75.8175	62	SMALL
19	GRENO01.1	Green Creek 1/2 mile upstream of bridge on SR 4020	Columbia	41.09444	-76.41194	67	SMALL
20	HARV000.1	Harveys Creek downstream of Rt. 11 bridge, upstream of railroad bridge	Luzerne	41.22083	-76.01528	62	SMALL
21	HARV008.9	Harveys Creek adjacent to Rt. 118 below LR 802	Luzerne	41.30667	-76.0575	62	SMALL
22	**HICK000.5	Hicks Creek immediately upstream of Rt. 92 bridge in West Pittston	Luzerne	41.34111	-75.805	62	SMALL
23	HUNL001.7	Hunlock Creek upstream of Hunlock Fire Station	Luzerne	41.21028	-76.08889	62	SMALL
24	HUNT000.3	Huntingdon Creek adjacent to SR1021 on fishing accessible land.	Columbia	41.10694	-76.35639	67	MEDIUM
25	LAWRO00.8	Lackawanna River at SR 2033 bridge near Duryea	Luzerne	41.34667	-75.78028	62	MEDIUM
26	LAWRO04.2	Lackawanna River upstream of 3rd Street/Moosic Road bridge	Susquehanna	41.35611	-75.72778	62	MEDIUM
27	LAWRO17.9	Lackawanna River at Rt. 347 bridge along River Road in Olyphant Borough	Lackawanna	41.47444	-75.6	62	MEDIUM
28	LAWRO35.2	Lackawanna River upstream of SR 247 bridge near Forest City	Wayne	41.64861	-75.46194	62	SMALL
29	LEGT000.1	Leggetts Creek 0.5 miles downstream of South Abington/Clarks Summit Joint STP & WTP along Rt. 11/6	Lackawanna	41.44472	-75.64444	62	SMALL
30	LFSH000.1	Little Fishing Creek near mouth	Columbia	41.01889	-76.47639	67	SMALL
31	LFSH015.9	Little Fishing Creek at Arden Hill Road covered bridge (fishing permitted section)	Columbia	41.19556	-76.47278	62	SMALL
32	**LNSK000.1	Little Nescopeck Creek near confluence with Nescopeck Creek	Luzerne	41.00944	-76.07444	62	SMALL
33	**LNSK005.7	Little Nescopeck Creek upstream T335 bridge near Kis-Lyn	Luzerne	41.0109	-75.9891	62	SMALL
34	LSHK000.1	Little Shickshinny Creek near mouth at turnaround at end of Glen Road	Luzerne	41.15417	-76.155	62	SMALL
35	*LWVP000.5	Little Wapwallopen Creek upstream of Route 239 bridge	Luzerne	41.095	-76.61806	67	SMALL
36	*LWVP004.5	Little Wapwallopen Creek upstream of T392 bridge	Luzerne	41.10611	-76.07306	67	SMALL
37	MAHO001.4	Mahoning Creek at Rt. 11 bridge, adjacent to Rt. 54 in Danville	Montour	40.965	-76.61806	67	SMALL
38	MAHO005.9	Mahoning Creek upstream of Rt. 642 bridge near Green Ave.	Montour	41.01056	-76.61139	67	SMALL
39	MART006.5	Martins Creek at Rt. 167 bridge near Hope Bottom	Susquehanna	41.7055	-75.7674	60	SMALL

Appendix *continued*

Site #	Station Name	Location Description	County	Latitude	Longitude	Ecoregion	Drainage Size
40	MEH0001.5	Mehoopany Creek at SR 87 bridge near mouth	Wyoming	41.56	-76.06778	62	MEDIUM
41	MEH0006.4	Mehoopany Creek upstream of confluence with West Branch Mehoopany Creek at SR 87 bridge	Wyoming	41.53361	-76.12306	62	SMALL
42	MEH0011.2	Mehoopany Creek at SR 3001 bridge upstream of Kasson Brook	Wyoming	41.47333	-76.14444	62	SMALL
43	MESH000.2	Meshoppen Creek near mouth upstream of Bedrock Gorge Recreation Area	Wyoming	41.61389	-76.04667	60	MEDIUM
44	MESH004.6	Meshoppen Creek upstream of SR 4019 bridge	Wyoming	41.61111	-75.98139	60	SMALL
45	MESH020.6	Meshoppen Creek upstream of SR 2024 bridge	Susquehanna	41.75	-75.85028	60	SMALL
46	*MILLO01.7	Mill Creek upstream of first bridge on Stream Hollow Drive	Bradford	41.7879	-76.6428	62	SMALL
47	MILLO06.7	Mill Creek about 1/4 mile downstream from powerline crossing along SR 2039	Luzerne	41.25806	-75.77806	62	SMALL
48	NANT000.4	Nanticoke Creek upstream of San Souci Expressway near Nanticoke, upstream of Wyoming Valley Sanitary Authority building	Luzerne	41.20861	-75.98556	62	SMALL
49	NBWC002.8	North Branch Wyalusing Creek upstream of Gaylord Creek, at Rt. 858 bridge	Susquehanna	41.82194	-76.10028	60	SMALL
50	*NESK001.1	Nescopeck Creek upstream of Rt. 339 bridge, downstream of SR 4092 bridge	Luzerne	41.04361	-76.22222	67	MEDIUM
51	*NESK014.7	Nescopeck Creek upstream of bridge on TR 338	Luzerne	41.00778	-76.10139	62	MEDIUM
52	*NESK019.1	Nescopeck Creek upstream of Little Nescopeck Creek above TR 342	Luzerne	41.01722	-76.05083	62	SMALL
53	NMHO000.1	North Branch Mehoopany Creek 1/4 mile downstream of SR 3001 bridge	Wyoming	41.53444	-76.12417	62	SMALL
54	NWPT000.5	Newport Creek upstream of railroad bridge near Weis Market in Nanticoke	Luzerne	41.20778	-76.00639	62	SMALL
55	RORBO03.0	Roaring Brook upstream of Ash Street Bridge in Scranton	Lackawanna	41.40833	-75.63528	62	SMALL
56	RORBO14.2	Roaring Brook upstream of SR 2005 bridge, upstream of Bear Brook	Lackawanna	41.33972	-75.51444	62	SMALL
57	RORCO01.7	Roaring Creek along T 313 upstream of dwellings	Montour	40.92028	-76.52722	67	MEDIUM
58	RORCO10.9	Roaring Creek upstream of Rt. 42 bridge at Queen City	Columbia	40.915	-76.42861	67	SMALL
59	SBRC000.5	South Branch Roaring Creek at Krick Road bridge off Rt. 487	Columbia	40.915	-76.51167	67	SMALL
60	SCHRO00.2	Schrader Creek at bridge in Powell	Bradford	41.70472	-76.505	62	MEDIUM
61	SCHRO11.7	Schrader Creek at old railroad grade at Laquin	Bradford	41.63083	-76.6425	62	SMALL
62	SGRC000.7	Sugar Creek upstream of old railroad bridge at dead end off Rt. 6	Bradford	41.79083	-76.46167	60	MEDIUM
63	SGRC015.9	Sugar Creek downstream of SR 3019 bridge at West Burlington	Bradford	41.75972	-76.67389	60	MEDIUM
64	SGRC022.1	Sugar Creek upstream of Rt. 6 bridge below Troy	Bradford	41.78944	-76.76972	60	SMALL
65	SGRRO00.4	Sugar Run upstream of SR 2002 bridge	Bradford	41.64083	-76.23222	60	SMALL
66	SHIK000.1	Shickshinny Creek near mouth downstream of channelized section	Luzerne	41.15167	-76.14778	62	SMALL
67	SHIK004.6	Shickshinny Creek downstream of SR 4007 bridge	Luzerne	41.20111	-76.18694	62	SMALL
68	SOLO000.9	Solomons Creek 1/8 mile downstream of Breaker Road Bridge	Luzerne	41.22667	-75.93667	62	SMALL
69	SPRBO01.9	Spring Brook 1/8 mile upstream of Rt. 502 and downstream of Rt. 9 bridges	Luzerne	41.35056	-75.71333	62	SMALL
70	STNK000.5	South Branch Tunkhannock Creek along Spur Road off Rt. 6 near Bardwell	Wyoming	41.56083	-75.86639	60	MEDIUM
71	STNK016.3	South Branch Tunkhannock Creek downstream of SR 4003 and Rt. 81 bridges near Jordan Hollow	Lackawanna	41.57556	-76.65556	60	SMALL
72	STWN000.1	South Branch Towanda Creek near mouth	Bradford	41.70806	-76.47028	60	SMALL
73	STWN009.5	South Branch Towanda Creek upstream of Beech Creek Road bridge at Monroe Township Building	Bradford	41.59	-76.43222	60	SMALL
74	*SUSQ126.3	Susquehanna River at Rt. 147 bridge between Northumberland and Packers Islands	Northumberland	40.88028	-76.78667	River	LARGE
75	*SUSQ126.4	Susquehanna River at Rt. 147 bridge between Packers Island and Sunbury	Northumberland	40.88722	-76.78944	River	LARGE
76	*SUSQ136.8	Susquehanna River about 1/2 mile downstream of Rt. 54 bridge, upstream of Merck discharge	Northumberland	40.96222	-76.6325	River	LARGE
77	SUSQ138.0	Susquehanna River at Fish and Boat access near Danville	Northumberland	40.94222	-76.60111	River	LARGE
78	SUSQ146.4	Susquehanna River at Fish and Boat access in Bloomsburg	Columbia	40.95389	-76.46583	River	LARGE
79	SUSQ155.9	Susquehanna River downstream of boat ramp at park access in Millinville	Columbia	41.02722	-76.33306	River	LARGE
80	*SUSQ162.2	Susquehanna River upstream of Rt. 93 bridge near Berwick	Luzerne	41.0544	-76.22167	River	LARGE
81	SUSQ172.8	Susquehanna River upstream of Shickshinny Creek about one mile downstream of Retreat bridge	Luzerne	41.15333	-76.14611	River	LARGE
82	*SUSQ181.4	Susquehanna River upstream of Harveys Creek near West Nanticoke	Luzerne	41.21944	-76.01528	River	LARGE
83	SUSQ187.5	Susquehanna River upstream of Pierce Street bridge in Kingston	Luzerne	41.24194	-75.92	River	LARGE
84	*SUSQ201.8	Susquehanna River downstream of powerline crossing, near Stanton Station	Luzerne	41.38028	-75.79861	River	LARGE
85	SUSQ209.1	Susquehanna River at Fish and Boat access in West Falls	Wyoming	41.46028	-75.85333	River	LARGE
86	SUSQ220.6	Susquehanna River at Fish and Boat access in Tunkhannock	Wyoming	41.53528	-75.95972	River	LARGE
87	SUSQ231.8	Susquehanna River downstream of Rt. 87 bridge at boat access in North Mehoopany	Wyoming	41.57556	-76.05861	River	LARGE
88	SUSQ253.7	Susquehanna River at boat access near Terrytown	Bradford	41.66778	-76.27833	River	LARGE
89	*SUSQ272.7	Susquehanna River upstream of Rt. 6 bridge at Towanda	Bradford	41.76306	-76.4375	River	LARGE
90	*SUSQ280.6	Susquehanna River upstream of Ulster	Bradford	41.84917	-76.49694	River	LARGE
91	TOBY000.2	Toby Creek upstream of Rt. 11 bridge at Edwardsville	Luzerne	41.25389	-75.91111	62	SMALL
92	TOBY005.1	Toby Creek upstream of Carveton Road	Luzerne	41.3025	-75.93	62	SMALL
93	TOMHO03.2	Tomhicken Creek upstream of T706 bridge (Croll Road)	Schuylkill	40.92694	-76.17667	62	SMALL
94	TUNK001.8	Tunkhannock Creek at Rt. 6 bridge near golf course	Wyoming	41.54194	-75.92306	62	LARGE
95	TUNK011.9	Tunkhannock Creek about 2 mile downstream of SR 1029 bridge	Wyoming	41.60444	-75.82472	60	MEDIUM
96	TUNK020.3	Tunkhannock Creek upstream of Rt. 374 bridge	Susquehanna	41.64806	-75.71806	60	MEDIUM
97	TUSCO00.5	Tuscarora Creek upstream of Rt. 6 bridge near Laceyville	Wyoming	41.6421	-76.1463	60	SMALL
98	TWNO000.7	Towanda Creek upstream of bridge at airport near Towanda	Bradford	41.74111	-76.43278	60	MEDIUM
99	TWNO016.9	Towanda Creek at closed bridge at Woodruff Corners	Bradford	41.68028	-76.67611	60	SMALL
100	TWNO027.3	Towanda Creek upstream of Rt. 154 bridge at Canton	Bradford	41.64972	-76.85361	60	SMALL
101	WBRNO00.7	West Branch Little Fishing Creek above bridge near Rt. 442 covered bridge	Columbia	41.1525	-76.53667	62	SMALL
102	WBRRO03.2	West Branch Briar Creek at Fowlersville Bridge	Columbia	41.055	-76.3275	67	SMALL
103	WFSHO03.2	West Branch Fishing Creek at SR 4049 bridge upstream of Central	Columbia	41.30444	-76.39861	62	SMALL
104	WLWRO05.2	West Branch Lackawanna River upstream of SR 2046 bridge near Burnwood	Susquehanna	41.785	-75.49944	62	SMALL
105	WMSHO01.2	West Branch Meshoppen Creek at T502 bridge, downstream of two tributaries	Wyoming	41.63167	-76.00139	60	SMALL
106	*WWLP000.2	Wapwallopen Creek downstream of Rt. 239 bridge near mouth	Luzerne	41.07111	-76.13306	67	SMALL
107	*WWLP006.5	Wapwallopen Creek upstream of T392 bridge	Luzerne	41.06944	-76.05389	62	SMALL
108	*WWLP017.0	Wapwallopen Creek below SR 2042 bridge	Luzerne	41.14278	-75.91667	62	SMALL
109	WYAL000.4	Wyalusing Creek upstream of Rt. 6 bridge	Bradford	41.665	-76.26167	60	MEDIUM
110	*WYAL014.6	Wyalusing Creek downstream of SR 1075 bridge	Bradford	41.77389	-76.26139	60	MEDIUM
111	WYSX000.4	Wysox Creek upstream Rt. 6 bridge east of Wysox	Bradford	41.77917	-76.38611	60	MEDIUM
112	WYSX006.5	Wysox Creek at Water Street Bridge in Rome	Bradford	41.85611	-76.34083	60	SMALL

*Sites that were not sampled in 2008

Sites sampled in 2001 are in bold text

**HICK 0.5, LNSK 0.1, and LNSK 5.7 were sampled in 2009