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Upper Susquehanna Subbasin

A Water Quality and Biological Assessment

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SUSQUEHANNA RIVER BASIN COMMISSION

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The Susquehanna River Basin Commission (SRBC) conducts a water quality and biological assessment of each of the six major subbasins (Figure 1) about every 10 years on a rotating schedule. The SRBC assessment has provided information used to:

- evaluate the chemical, biological, and habitat conditions of streams in the basin
- identify major sources of pollution and lengths of stream impacted
- maintain a database that can be used to document changes in stream quality over time
- review projects affecting water quality in the basin
- identify areas for more intensive study

SRBC surveyed the Upper Susquehanna Subbasin in 1998, and will coordinate with the Upper Susquehanna Coalition and other local interests to target follow-up sampling in priority watersheds in 1999. This follow-up sampling will be used to support local watershed protection and remediation activities.

Headwaters Region

The Upper Susquehanna Subbasin encompasses an area of about 4,950 square miles, which includes the area from the headwaters of the Susquehanna River at Otsego Lake, N.Y., to the confluence of the Susquehanna River and the Chemung River near Athens, Pa. The subbasin is sparsely populated, with only one large city, Binghamton, N. Y., and several small population centers such as Sayre, Pa., and Cortland, Norwich, Oneonta, and Waverly, N.Y.

S. Obleski

Otsego Lake, Cooperstown, N.Y., the source of the main stem Susquehanna River

The subbasin lies almost entirely within U.S. Level III Ecoregion 60, the Northern Appalachian Plateau and Uplands region. An ecoregion is an area of similar geology, physiography, vegetation, climate, soil, land use, wildlife, and hydrology (Wood, 1996). Ecoregion 60 is characterized by low hills covered by hardwood forests and open valleys scattered with agricultural lands. The fertile, but rocky, till soils were deposited by receding glaciers during the Wisconsinan Age.

Figure 1. Susquehanna River Subbasins

Figure 2. Land Use in the Upper Susquehanna Subbasin (See site description in Appendix.)

The Upper Susquehanna Subbasin includes the drainage areas of several large rivers: the Chenango, Otselic, Sangerfield, Tioughnioga, Unadilla, and part of the Susquehanna River. Forests cover about 2,947 square miles (59.6 percent) of the Upper Susquehanna Subbasin. Agriculture, which is the second leading land use, covers about 1,775 square miles (35.9 percent).

The main stem Susquehanna River begins at a narrow outlet of Otsego Lake. In 1995, the Susquehanna River Basin Commission presented this plaque to the Village of Cooperstown to mark the point where the Susquehanna River begins. A companion plaque resides in the City of Havre de Grace, Md., marking the point where the river spills into the Chesapeake Bay.

Methods Used in the Subbasin Survey

SRBC sampled 83 sites between July and September 1998, when streamflows were supported mostly by ground water (Figure 2, Appendix). Samples were collected using a slightly modified version of the U.S. Environmental Protection Agency's (EPA's) Rapid Bioassessment Protocols for Use in Streams and Rivers (RBP III). Data from each site were collected during a single sampling event to give a point-in-time look at stream characteristics on the date sampled.

Field and laboratory water quality analyses were performed on water quality samples collected at each site. Water quality parameters measured in the field included water temperature, conductivity, pH, dissolved oxygen, alkalinity, and acidity. Conductivity was measured with a Cole-Parmer Model 1481 meter. A Cole-Parmer Model 5996 meter was used to measure pH, and a Cole-Parmer Model 5946 dissolved oxygen meter was used to measure dissolved oxygen. Alkalinity was determined by titration of a known volume of sample water to pH 4.5 with 0.2N H_2SO_4. Acidity was determined by titration of a known volume of sample water to pH 8.3 with 0.2N NaOH.

Four 250-ml bottles of water were collected for laboratory analyses. Two bottles of water were acidified to pH 2, or less, with nitric acid for metal analysis. Samples were iced and shipped to the Pa. Department of Environmental Protection, Bureau of Laboratories in Harrisburg, Pa.

Water quality was assessed by examining 25 water quality parameters, including nutrients, major ions, and metals. Each parameter from every site was ranked from 0 to 100 to obtain a percentile score. Water quality indexes were developed from the median and average of all the parameter percentile scores from each site, and then used to designate water quality conditions. Each site was then designated "good," "fair," or "poor," based on analysis of parameters and water quality indexes at all the sites. Water quality parameters are listed in Table 1 on Page 5.

Habitat conditions were evaluated using a modified version of RBP III (Plafkin, 1989). Parameters relating to substrate and instream cover were rated on a scale from 0 to 20, with 20 being optimal; these included bottom substrate, embeddedness, and velocity/depth diversity. Parameters relating to channel morphology were rated on a scale from 0 to 15, and included pool/riffle or run/bend ratio, pool quality, riffle/run quality, and channel alteration. Bank erosion, bank stability, streamside cover, riparian zone, aesthetic rating, and remoteness were rated on a scale from 0 to 10. Land uses, types of bottom substrate, and other important stream characteristics also were noted.

Habitat scores were summed to produce a total habitat score for each site. These scores were then compared to the total score of the reference site to determine the degree to which the site's habitat could support aquatic life. Sites were characterized as "excellent," "supporting," "partially supporting," or "nonsupporting."

Benthic macroinvertebrates (organisms that live on the stream bottom, including aquatic insects, crayfish, clams, snails, and worms) were collected using a modified version of RBP III (Plafkin, 1989). Samples were obtained by disturbing a 1-meter-square area of riffle habitat and collecting dislodged material with a 1-meter-square (500-micron mesh) screen. Each sample was preserved in a solution of isopropyl alcohol and glycerin, and returned to SRBC's lab, where the sample was sorted into a 100-organism subsample. Most organisms in the subsample were identified to genus, except for midges and aquatic worms.

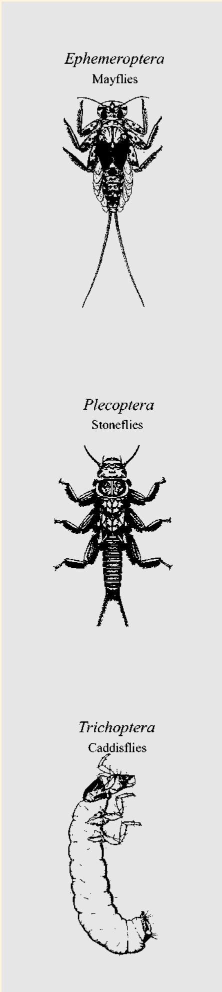
What are RBPs?

Rapid bioassessment protocols (RBPs) are used to compare sample site habitat scores and biological conditions with those associated with a reference site. RBPs are performed for specific reference categories, which are based on areas with similar ecological characteristics and drainage area. A reference site is chosen to represent the best attainable conditions within a reference category.

USEPA has established RBPs for benthic macroinvertebrates, algae, and fish. These protocols provide monitoring strategies that can be implemented with minimal cost and effort. RBP III is the most detailed of the benthic macroinvertebrate protocols, and can be used to show levels of stream impairment.

A Watershed Protection Approach is a strategy established by the USEPA and adopted by SRBC to effectively protect and restore aquatic ecosystems and protect human health. This strategy is based on the premise that many water quality and ecosystem problems are best solved at the watershed level, rather than at the individual waterbody or discharger level. Major features of a Watershed Protection Approach are: targeting priority problems, promoting a high level of stakeholder involvement, developing integrated solutions that make use of the expertise and authority of multiple agencies, and measuring success through monitoring and other data gathering.
(EPA: HYPERLINK http://www.epa.gov/OWOW/watershed/index2.html)

EPT



Certain aquatic insects, especially mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) (collectively referred to as EPT), are very sensitive to water pollution,

G. Hirschel

SRBC staff carefully collect, sort, and categorize aquatic insects to help determine the health of streams.

and are often used as indicators of good water quality. The EPT index is based on the total number of genera in these orders. A high EPT index value indicates a healthy biological community in the stream.

Macroinvertebrate data were analyzed to provide the following statistical measurements (metrics), which describe the condition of the benthic community at individual sites:

Taxonomic Richness:
the total number of taxa in the sample

Shannon Diversity Index:
a measure of the complexity of the community

Hilsenhoff Biotic Index:
a measure of organic pollution tolerance

EPT Index:
another measure of pollution tolerance *(see sidebar at the left)*

Percent Taxonomic Similarity:
a measure of the similarity between the kinds of organisms in the sample and those found at the reference site

Percent Trophic Similarity:
a measure of the food chain/food web similarity between the organisms in the sample and those at the reference site *(see below)*

Each of the above metrics was expressed as a percentage of the reference score. These scores were then summed to produce a total score for each site. The score for each site was then expressed as a percentage of the reference score to provide a biological condition category ("nonimpaired," "slightly impaired," "moderately impaired," or "severely impaired") for each site.

Trophic Similarity

Trophic similarity matrixes give a score relative to the similarity of the trophic structure (feeding habits) of individuals in the biological community of a site to that of a reference site. The proportional composition of functional feeding groups in a benthic macroinvertebrate community reflects the food resources that are available to these organisms, and provides insight into the way energy, in the form of organic matter, is distributed throughout a given aquatic ecosystem. The reference site OULT 12.0 represents a trophically-balanced community, and CHOC 1.7 represents a trophically-skewed community with an abundance of filterer-collectors and a lack of shredders.

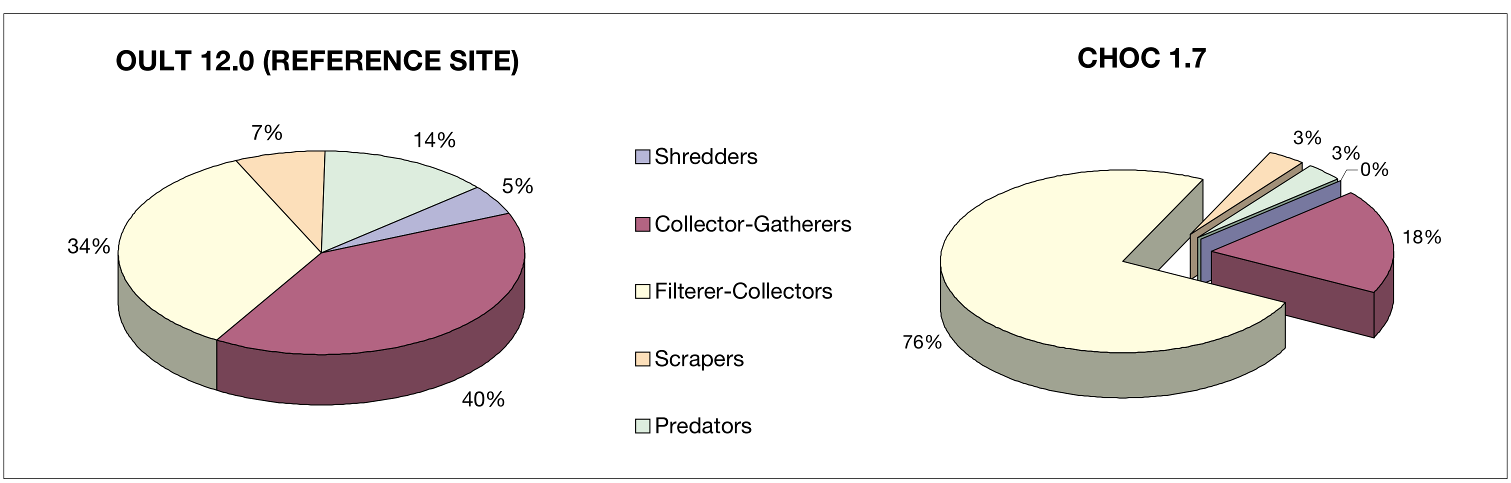


Table 1

Field Parameters	
Temperature, °C	Dissolved Oxygen
Flow, instantaneous cfs	Acidity
pH	Alkalinity
Conductivity	
Laboratory Analysis	
Alkalinity	Calcium, Total
Total Residue	Chloride, Total
Total Suspended Solids	Sulfate, Total
Ammonia-N, Total	Iron, Total
Nitrogen, Total	Manganese, Total
Nitrite-N, Total	Aluminum, Total
Nitrate-N, Total	Lead, Total
Phosphorus, Total	Copper, Total
Orthophosphate, Total	Zinc, Total
Hardness, Total	Nickel, Total
Sodium, Total	Organic Carbon, Total
Potassium, Total	
Magnesium, Total	

Water Quality Parameters Sampled in the Upper Susquehanna Subbasin

Results

Data were analyzed based on three reference categories, and because the Upper Susquehanna Subbasin lies almost entirely in Ecoregion 60, reference categories were designated based on drainage area: small (0-100 square miles); medium (100-500 square miles); and large (>500 square miles). Generalized characteristic results are summarized in Figure 3 (A, B, and C). For reporting purposes, six subwatersheds were designated (pages 6-8): the Chenango, Great Bend, Otsego, Owego, Unadilla, and Tioughnioga Sections.

"The Upper Susquehanna Subbasin includes some of the most pristine water quality, providing for healthy biological habitat. But there are also areas of concern that must be addressed. It's going to take a partnership between interested organizations and government agencies to protect and improve the subbasin's water quality."

John Hicks
New York commissioner to the
Susquehanna River Basin Commission

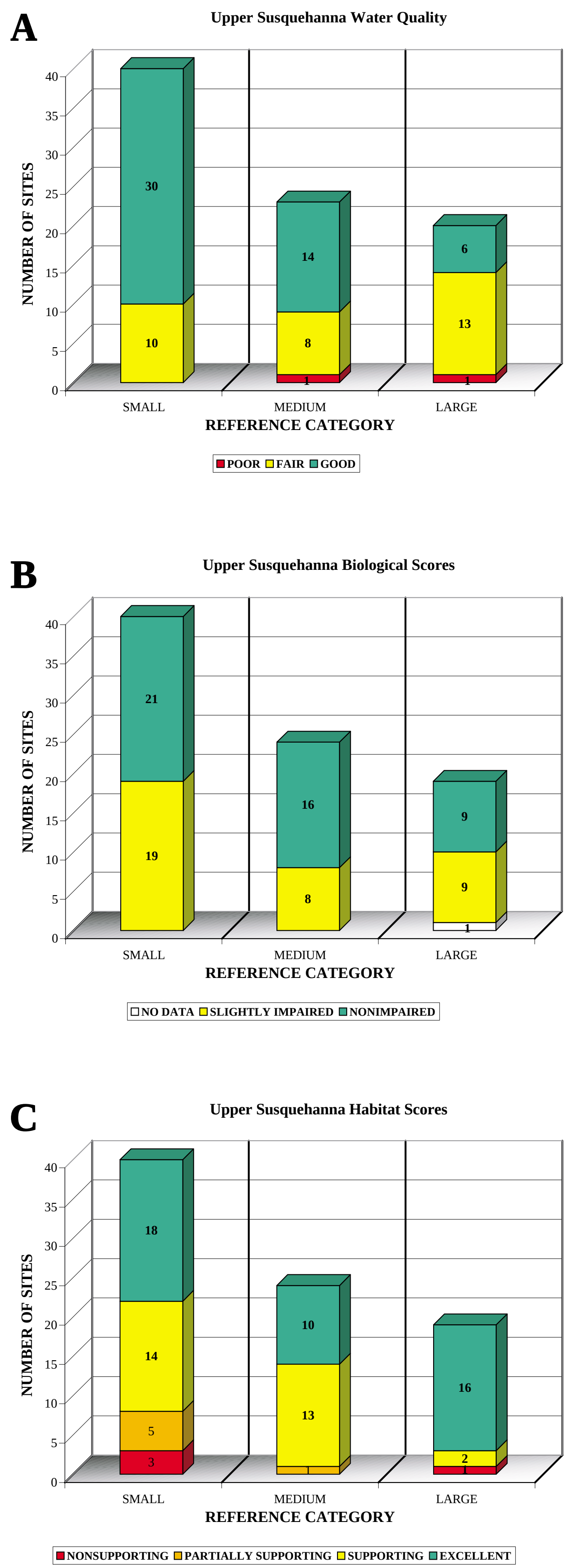


Figure 3. Summary of Water Quality, Biological, and Habitat Characteristics

Courtesy Alliance for the Chesapeake Bay

Chenango Section

Ten sites were sampled in this section. (See results in Figures 4–9.) Six sites were located on the Chenango River, and four sites were on tributaries to the Chenango River (Sangerfield River, Canasawacta Creek, and Geneganslet Creek). Four sites had a water quality score that was considered good, and six were rated as fair. Habitat scores were excellent or supporting at all sites, except CNWT 1.6 (23), which was classified as nonsupporting. Habitat at CNWT 1.6 lacked pool/riffle diversity, as well as varied depth and velocity. Biological scores were high throughout the Chenango section. CHEN 69.3 (18) and CHEN 13.5 (13) were the only sites with impairment. Slight impairment at CHEN 69.3 was due to a lack of EPT taxa and a low taxonomic similarity score, and CHEN 13.5 had a low EPT score and a low taxonomic richness score.

The 7th annual Susquehanna Sojourn in 1997 featured a 114-mile stretch of the Chenango River and the Susquehanna River, beginning at Sherburne, N.Y. The sojourn program is a popular interactive outdoor classroom that allows canoeists to experience the recreational opportunities of the Susquehanna and its tributaries, while learning the history and ecology of the region.

Great Bend Section

S. Obleski

At Great Bend, Pennsylvania, the Susquehanna River literally makes a 90 degree bend and flows back into New York, making it a downstream state at that point.

Ten sites were sampled in this section. Five sites were on the Susquehanna River, and five sites were on tributaries (Kelsey, Snake, Salt Lick, and Starrucca Creeks) (Figures 4–9). Water quality analyses revealed that seven sites had good scores and three had fair scores. Habitat scores varied with five excellent, two supporting, two partially supporting, and one nonsupporting. Habitat scores at STLK 0.5, SNAK 0.2, and KELS 0.6 were low due to the lack of stable streambanks and forested buffer zones. Biological scores in this region reflected the varied water quality and habitat scores, with five nonimpaired and five slightly impaired sites. Biological impairment was primarily due to low EPT index, taxonomic richness, and diversity index scores.

The 1998 Susquehanna River Basin Water Quality Assessment 305(b) Report Results for the Upper Susquehanna Subbasin

- About 97 percent of the assessed stream miles meet designated uses
- Of the streams assessed, no reach received a nonsupport designated use and only four miles of streams did not meet attained uses
- Steep tributary gradients and glacial deposits make this area highly susceptible to erosion
- Increased siltation of the streambed and eutrophic conditions have reduced habitat used for fish propagation
- The parameter that most frequently exceeded water quality standards was total iron, but these elevated iron concentrations appear to be natural (Rowles and Sitlinger, 1998)

(Edwards, 1998)

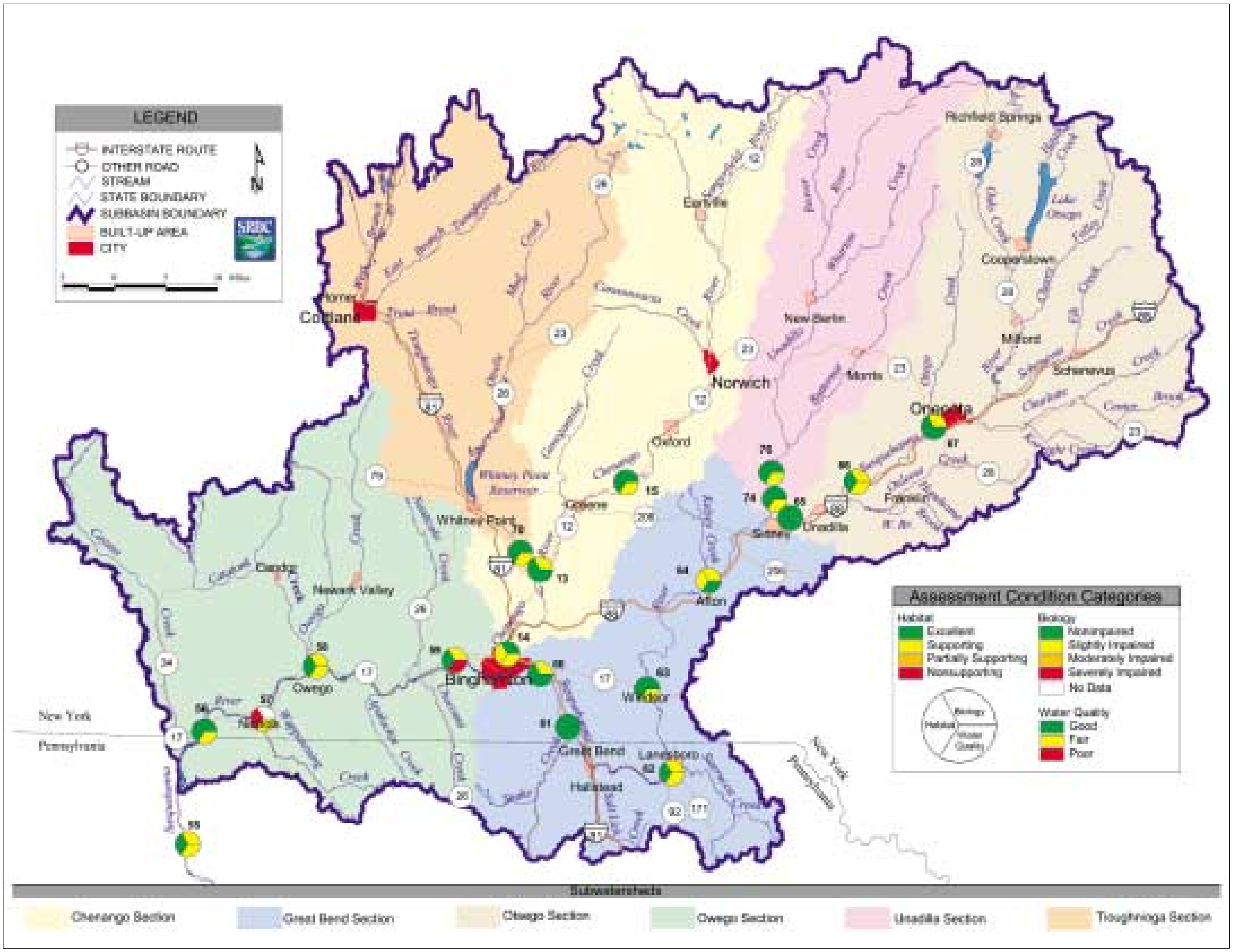


Figure 4. Water Quality, Biological, and Habitat Categories at Large Reference Category Sample Sites in the Upper Susquehanna Subbasin

Otsego Section

Twenty-three sites were sampled in this section, including five sites on the Susquehanna River and eighteen sites on tributaries (Center Brook, West Branch Handsome Brook, and Elk, Kortright, Ouleout, Otego, Oaks, Ocquionis, and Hayden Creeks) (Figures 4–9). Water quality at sixteen sites was assessed as good, and seven sites had a fair rating. Habitat scores in this region were some of the highest in the survey. Eighteen sites were rated as excellent, four were supporting, and one was listed as partially supporting. Sedimentation and lack of stable bottom substrate were the main cause of habitat impairment at OCQU 1.1. Biological scores were almost evenly split, with eleven sites being nonimpaired, and twelve sites being slightly impaired. A low EPT index score was the most common cause of slight impairment status.

Owego Section

Nineteen sites were sampled in this section, including five sites on the Susquehanna River and fourteen sites on tributaries (Cayuta, Catatonk, Owego, Nanticoke, Choconut, Apalachin, and Wappasening Creeks) (Figures 4–9). Eleven sites had good water quality scores, seven were listed as fair, and one site had a poor score. Habitat scores showed nine excellent, seven supporting, one partially supporting, and two nonsupporting sites. Both APAL 3.2 and SUSQ 299.5 lacked pool/riffle and velocity/depth diversity, resulting in degraded habitat scores. Eight sites had nonimpaired biological communities, while ten sites had slightly impaired communities. Low index scores varied greatly among the ten slightly impaired sites, but most had a low EPT index score. A macroinvertebrate sample was not collected at SUSQ 299.5, due to a lack of suitable habitat for sampling.

Unadilla Section

Nine sites were sampled in this section, including four sites on the Unadilla River and five sites on tributaries (Beaver, Butternut, and Wharton Creeks) (Figures 4–9). Five sites had good water quality scores, and four had fair ratings. Habitat assessment revealed five sites with an excellent habitat score, three with a supporting score, and one site with a partially supporting score. A low habitat rating at BEAV 0.7 was due to a lack of pool/riffle and velocity/depth diversity and the lack of a forested buffer zone. Biological scores throughout this section were generally high. Eight sites had nonimpaired biological communities and one site, UNAD 42.7, had a slightly impaired rating due to low taxonomic richness and a low EPT index.

Tioughnioga Section

Twelve sites were sampled in this section, including two sites on the East Branch Tioughnioga River, two sites on the West Branch Tioughnioga River, three sites on the Tioughnioga River, and five sites on tributaries (Trout Brook, Mud Creek, and Otselic River) (Figures 4–9). Water quality scoring produced five sites with a good rating, six sites with a fair rating, and one site with a poor rating. Four sites had an excellent habitat rating, seven sites were supporting, and one site was partially supporting. Habitat at TRBK 0.1 lacked diversity with respect to pool/riffle and velocity/depth features. Biological scoring characterized five sites as unimpaired and seven sites as slightly impaired. Impairment status at most sites was related to a low EPT index score.

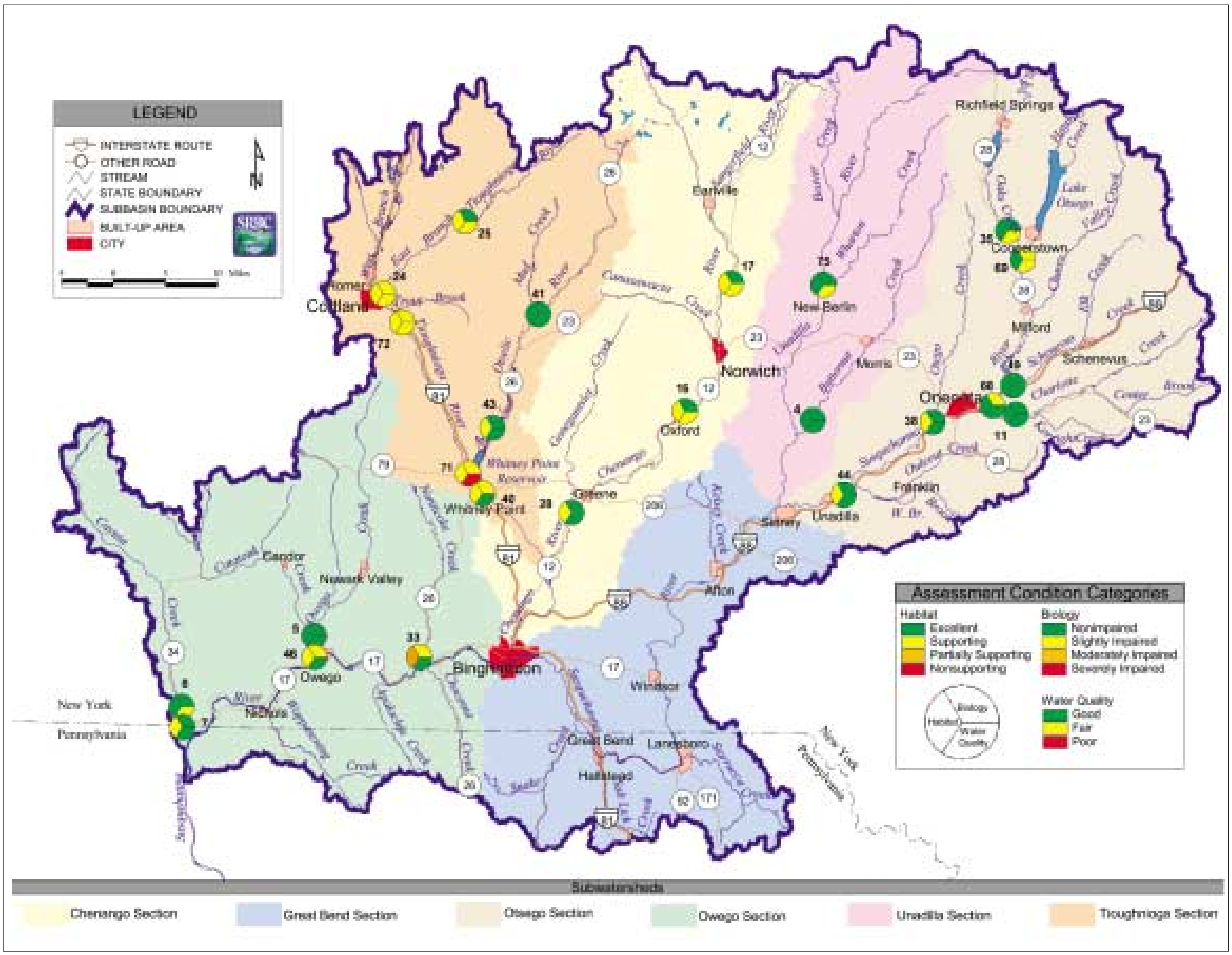


Figure 5. Water Quality, Biological, and Habitat Categories at Medium Reference Category Sample Sites in the Upper Susquehanna Subbasin

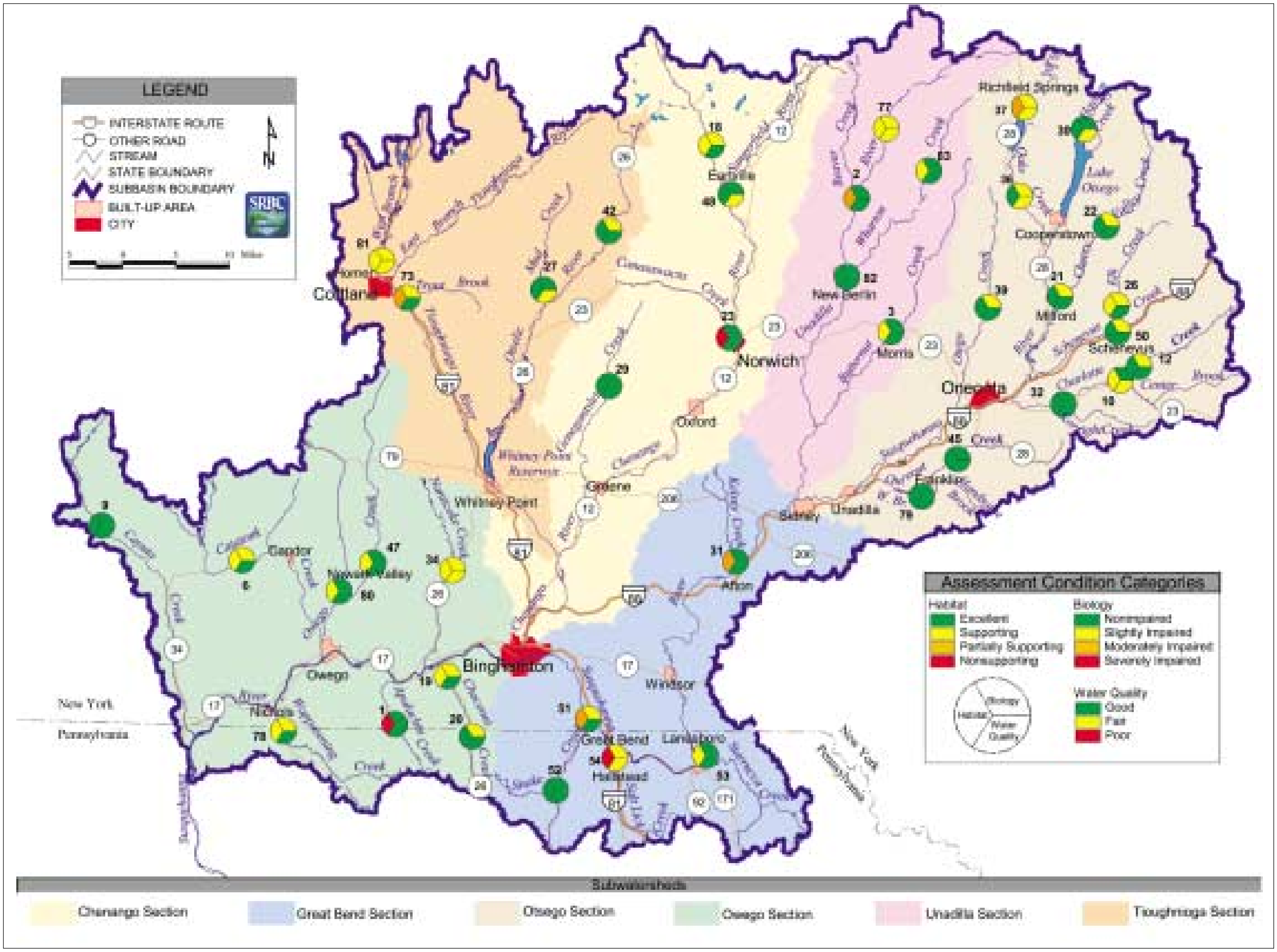


Figure 6. Water Quality, Biological, and Habitat Categories at Small Reference Category Sample Sites in the Upper Susquehanna Subbasin

Figures 7, 8, and 9 are ordinations of biological and habitat condition scores at sample sites in each reference category. Each site assessment is compared to the best attainable habitat and biological condition within that reference site, and is plotted as a percentage of the reference site score. Sites are listed as a number, which corresponds to the site description in the Appendix.

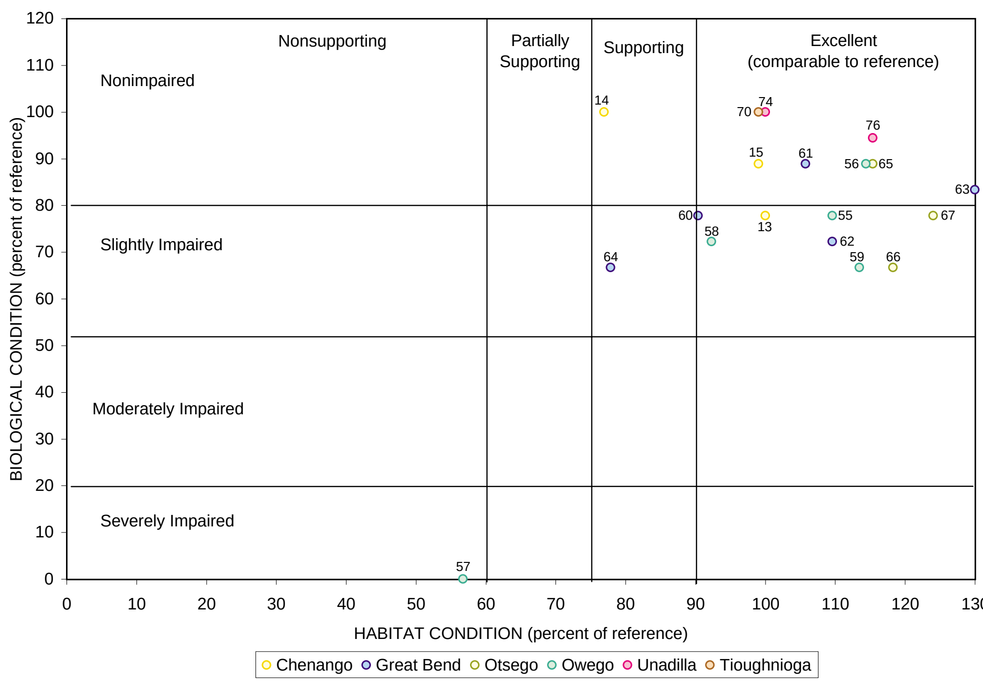


Figure 7. Biological and Habitat Condition Scores at Large Reference Category Sample Sites in the Upper Susquehanna Subbasin

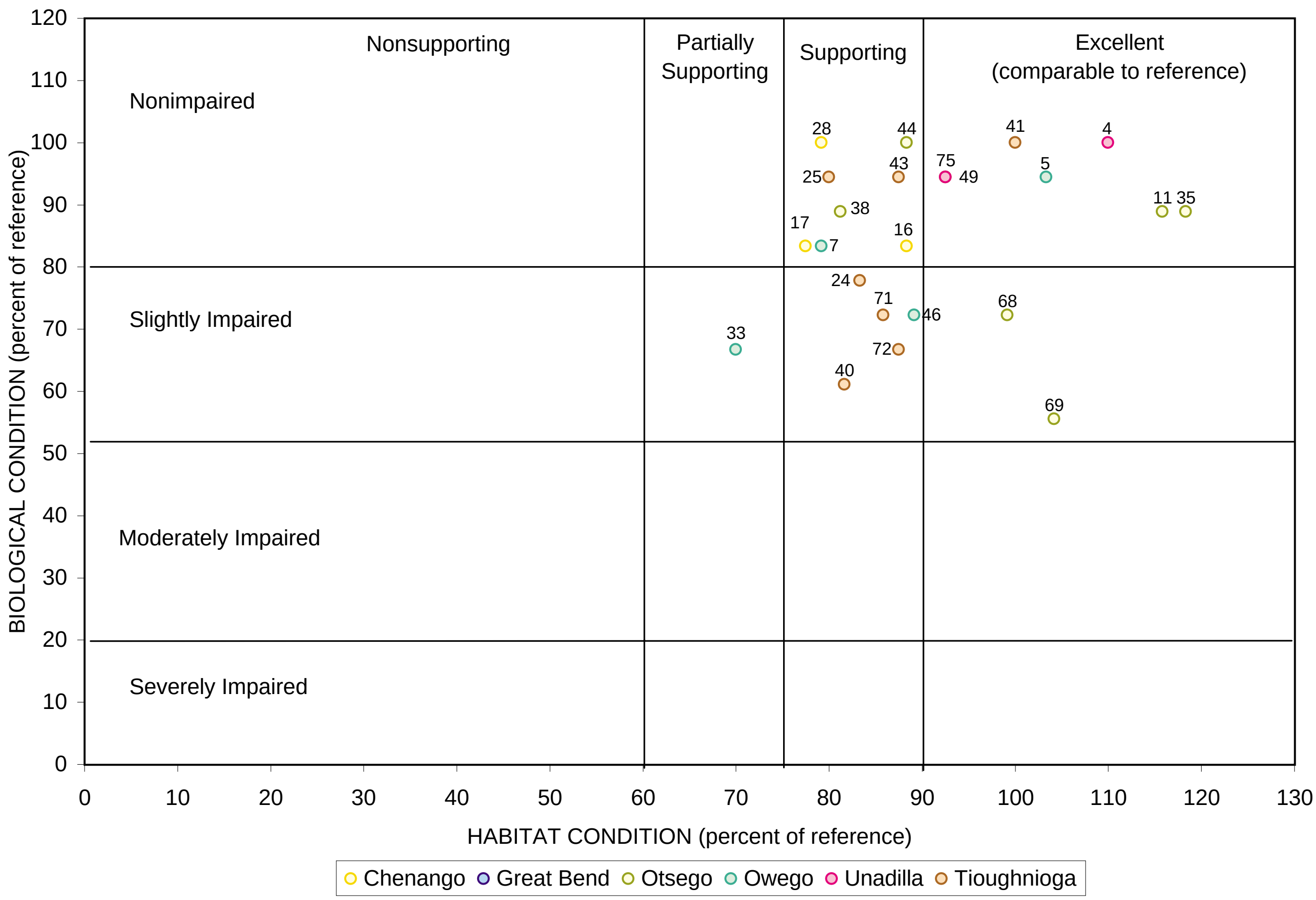


Figure 8. Biological and Habitat Condition Scores at Medium Reference Category Sample Sites in the Upper Susquehanna Subbasin

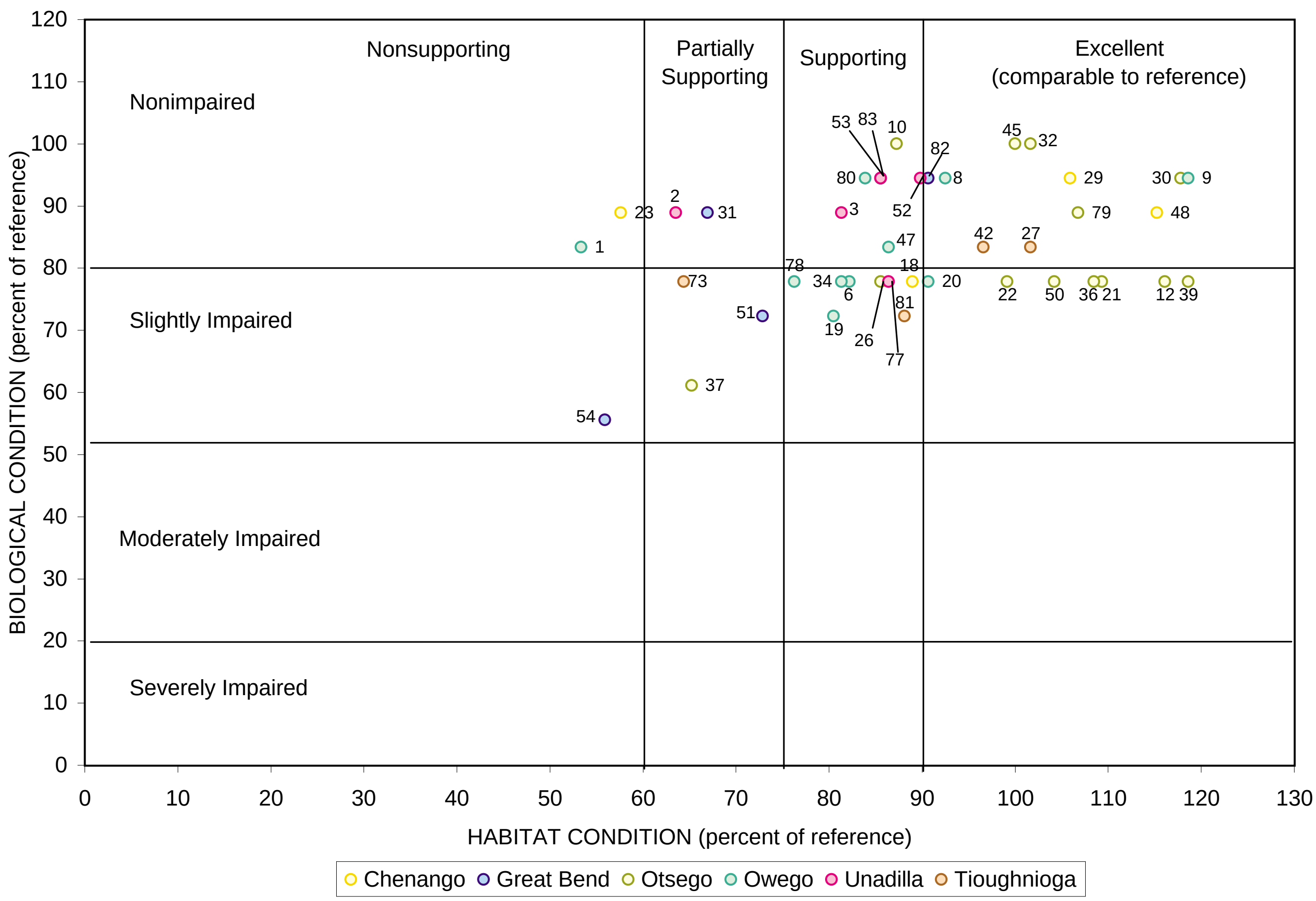


Figure 9. Biological and Habitat Condition Scores at Small Reference Category Sample Sites in the Upper Susquehanna Subbasin

Conclusions and Management Implications

Healthy biological communities and excellent habitat are present in many watersheds throughout the Upper Susquehanna Subbasin. The Otsego section is the area with the highest potential for watershed protection efforts. Sites on Kortright Creek, Charlotte Creek, Shenevus Creek, and West Branch Handsome Brook have biological, habitat, and water quality scores that are all characterized as nonimpaired. Other sites assessed as nonimpaired included sites on the Susquehanna River, Otselic River, Butternut Creek, Catatonk Creek, Ouleout Creek, Snake Creek, and Wharton Creek. The protection of these nonimpaired watersheds is a priority of environmental agencies, including SRBC.

Areas for concern include those where patterns of impairment were evident. Many sites in the Tioughnioga section were assessed as impaired, and appeared to be candidates for additional sampling to support remediation efforts. Nanticoke and Salt Lick Creeks also appear to have remediation potential.

SRBC is planning a second phase of this survey, and will solicit recommendations from local interest groups to identify areas where more intensive sampling would support remediation or protection efforts. Data will be analyzed by SRBC and provided to groups and agencies that are working in the watershed. This data can be used by watershed organizations to enhance grant applications to support watershed protection and restoration projects.

Appendix

Sample Site #	Site Name (original)	Site Name (corrected)	Site Location Description	Reference Category
1	APAL 3.2	APAL 5.3	Apalachin Creek at Harnick Rd. bridge near South Apalachin, Pa.	small
2	BEAV 0.1	BEAV 0.7	Beaver Creek downstream of rte 8 bridge near South Edmeston, N.Y.	small
3	BUTT 16.9	BUTT 13.8	Butternut Creek upstream of rte 23 bridge at Morris, N.Y.	small
4	BUTT 2.8	BUTT 2.8	Butternut Creek downstream of rte 3 bridge at Copes Corner, N.Y.	medium
5	CATK 0.1	CATK 0.1	Catatonk Creek at USGS gage on Catatonk Rd. near Catatonk, N.Y.	medium
6	CATK 13.9	CATK 14.4	Catatonk Creek along West Candor Rd. near West Candor, N.Y.	small
7	CAY 0.2	CAY 1.6	Cayuta Creek at Milltown, N.Y.	medium
8	CAY 2.0	CAY 3.7	Cayuta Creek downstream of rte 34 bridge near Waverly, N.Y.	medium
9	CAY 25.6	CAY 24.5	Cayuta Creek upstream of rte 224 bridge at fishing access near Cayuta, N.Y.	small
10	CEBR 0.1	CEBR 0.1	Center Brook upstream of rte 9 bridge at Butts Corner, N.Y.	small
11	CHAR 3.6	CHAR 3.6	Charlotte Creek upstream of bridge at West Davenport, N.Y.	medium
12	CHAR 6.0	CHAR 13.2	Charlotte Creek upstream of rte 9 bridge at Butts Corner, N.Y.	small
13	CHEN 13.5	CHEN 13.5	Chenango River adjacent to intersection of rtes 12 and 79 at Chenango Forks, N.Y.	large
14	CHEN 3.6	CHEN 2.4	Chenango River adjacent to Otsiningo Park near Binghamton, N.Y.	large
15	CHEN 34.6	CHEN 28.6	Chenango River downstream of bridge at Brisben, N.Y.	large
16	CHEN 42.0	CHEN 38.6	Chenango River downstream of rte 35 bridge at Oxford, N.Y.	medium
17	CHEN 60.4	CHEN 55.4	Chenango River upstream of abandoned bridge off of Steam Sawmill Rd. near North Norwich. N.Y.	medium
18	CHEN 71.1	CHEN 69.3	Chenango River downstream of Middleport Rd. bridge at Randallsville, N.Y.	small
19	CHOC 0 .1	CHOC 1.7	Choconut Creek downstream of market at Vestal, N.Y.	small
20	CHOC 9.1	CHOC 8.4	Choconut Creek at T693 bridge, Pa.	small
21	CHRV 0.3	CHRV 0.3	Cherry Valley Creek downstream of rte 35 bridge near Milford, N.Y.	small
22	CHRV 12.8	CHRV 10.2	Cherry Valley Creek upstream of rte 35 bridge at Middlefield, N.Y.	small
23	CNWT 1.6	CNWT 1.6	Canasawacta Creek downstream of rte 10 bridge at Norwich, N.Y.	small
24	EBTF 1.6	EBTF 1.6	East Branch Tioughnioga River upstream of rte 81 bridge at park at Cortland, N.Y.	medium
25	EBTF 18	EBTF 15.1	East Branch Tioughnioga River upstream of South Hill bridge at Crains Mills, N.Y.	medium
26	ELK 0.1	ELK 0.1	Elk Creek downstream of rte 7 bridge near Schenevus, N.Y.	small
27	EMUD 1.2	EMUD 1.2	Mud Creek upstream of abandoned bridge near Hydeville, N.Y.	small
28	GENE 0.8	GENE 1.6	Geneganslet Creek adjacent to road near Greene, N.Y.	medium
29	GENE 10.6	GENE 15.3	Geneganslet Creek upstream of Creek Rd. bridge near Greene, N.Y.	small
30	HAYD 0.1	HAYD 0.7	Hayden Creek upstream of rte 53 bridge near Smithfield Corner, N.Y.	small
31	KELS 0.6	KELS 0.6	Kelsey Creek upstream of rte 7 bridge at Afton, N.Y.	small
32	KORT 0.7	KORT 0.7	Kortright Creek downstream of abandoned bridge below rte 23 at Davenport Center, N.Y.	small
33	NANT 0.9	NANT 1.4	Nanticoke Creek at Glendale Park near West Corneus, N.Y.	medium
34	NANT 10.0	NANT 10.7	Nanticoke Creek upstream of East Main Rd. bridge near Maine, N.Y.	small
35	OAKS 0.8	OAKS 2.0	Oaks Creek upstream of abandoned bridge near Toddsville, N.Y.	medium
36	OAKS 9.5	OAKS 6.4	Oaks Creek upstream of abandoned bridge near Cattown, N.Y.	small
37	OCQU 0.1	OCQU 1.1	Ocquinous Creek upstream of first bridge above lake at Richfield Springs, N.Y.	small
38	OTGO 0.1	OTGO 0.1	Otego Creek downstream of bridge on Pony Farm Rd. near Oneonta, N.Y.	medium
39	OTGO 15.9	OTGO 13.1	Otego Creek upstream of rte 11b bridge at Mount Vision, N.Y.	small
40	OTSL 0.01	OTSL 0.1	Otselic River at mouth at Whitney Point, N.Y.	medium
41	OTSL 32.3	OTSL 23.1	Otselic River downstream of rte 12 bridge at Pitcher, N.Y.	medium
42	OTSL 43.0	OTSL 32.7	Otselic River upstream of rte 26 bridge at fishing access near South Otselic, N.Y.	small
43	OTSL 8.1	OTSL 8.7	Otselic River downstream of rte 169 bridge near Landers Corners, N.Y.	medium
44	OULT 0.5	OULT 0.5	Ouleout Creek downstream of Covered Bridge Rd. bridge near Unadilla, N.Y.	medium
45	OULT 10.0	OULT 12.0	Ouleout Creek downstream of Chamberlain Hill Rd. bridge near Leonta, N.Y.	small
46	OWGO 0.1	OWGO 0.1	Owego Creek upstream of rte 17c bridge at Owego, N.Y.	medium
47	OWGO 13.3	OWGO 12.4	Owego Creek downstream of rte 44 bridge at Newark Valley, N.Y.	small
48	SANG 1.5	SANG 1.5	Sangerfield River upstream of Cove Rd. bridge near Earlville, N.Y.	small
49	SHEN 1.7	SHEN 1.7	Schenevus Creek downstream of rte 28 bridge near Colliersville, N.Y.	medium
50	SHEN 11. 5	SHEN 11. 5	Schenevus Creek upstream of rte 41 bridge at Schenevus, N.Y.	small
51	SNAK 0.2	SNAK 0.2	Snake Creek downstream of Erie-Lackawanna RR bridge at Corbettsville, Pa.	small
52	SNAK 10.0	SNAK 9.0	Snake Creek upstream of bridge at Franklin Forks, Pa.	small
53	STAR 0.1	STAR 0.9	Starrucca Creek upstream of SR 1009 bridge near Lanesboro, Pa.	small
54	STLK 0.5	STLK 0.5	Salt Lick Creek upstream of SR 1010 bridge at Hallstead, Pa.	small
55	SUSQ 279	SUSQ 279	Susquehanna River at SR 1022 bridge at Ulster, Pa.	large
56	SUSQ 292	SUSQ 291	Susquehanna River at rte 17 bridge at Litchfield, Pa.	large
57	SUSQ 299.5	SUSQ 299.5	Susquehanna River at boat access near Nichols, N.Y.	large
58	SUSQ 307	SUSQ 307	Susquehanna River at rte 96 bridge at Owego, N.Y.	large
59	SUSQ 326	SUSQ 325	Susquehanna River upstream of turnaround near Endwell, N.Y.	large
60	SUSQ 333	SUSQ 334.5	Susquehanna River downstream of bridge at Five Mile Point, N.Y.	large
61	SUSQ 341.5	SUSQ 341.5	Susquehanna River upstream of Conklin Island, N.Y.	large
62	SUSQ 359	SUSQ 356	Susquehanna River upstream of Starrucca Creek near Lanesboro, Pa.	large
63	SUSQ 365	SUSQ 365	Susquehanna River upstream of rte 17c bridge at Windsor, N.Y.	large
64	SUSQ 387	SUSQ 384	Susquehanna River downstream of rte 41 bridge at Afton, N.Y.	large
65	SUSQ 398	SUSQ 395.5	Susquehanna River upstream of bridge at Sidney, N.Y.	large
66	SUSQ 403	SUSQ 406	Susquehanna River downstream of abandoned bridge at Wells Bridge, N.Y.	large
67	SUSQ 417	SUSQ 417	Susquehanna River upstream of rte 23 bridge near Oneonta, N.Y.	large
68	SUSQ 423.5	SUSQ 422.5	Susquehanna River upstream of bridge at fishing access near Oneonta, N.Y.	medium
69	SUSQ 447	SUSQ 442	Susquehanna River downstream of rte 11c bridge near Hyde Park, N.Y.	medium
70	TIOF 0.1	TIOF 0.1	Tioughnioga River upstream of rte 12 bridge at Chenango Forks, N.Y.	large
71	TIOF 8.1	TIOF 9.5	Tioughnioga River downstream of rte 11 bridge at Whitney Point, N.Y.	medium
72	TIOF 31.8	TIOF 28.7	Tioughnioga River upstream of bridge at Blodgett Mills, N.Y.	medium
73	TRBK 0.1	TRBK 0.1	Trout Brook downstream of rte 11 bridge near Cortland, N.Y.	small
74	UNAD 0.3	UNAD 0.3	Unadilla River upstream of rte 7 bridge at Sidney, N.Y.	large
75	UNAD 29.7	UNAD 26.7	Unadilla River downstream of rte 80 bridge at New Berlin, N.Y.	medium
76	UNAD 5.4	UNAD 5.4	Unadilla River upstream of rte 1 bridge at Rockdale, N.Y.	large
77	UNAD 56.2	UNAD 42.7	Unadilla River upstream of abandoned Kaneatles Tpk. bridge near Leonardsville, N.Y.	small
78	WAPP 0.1	WAPP 2.5	Wappasening Creek downstream of rte 187 bridge near Pa./N.Y. state line	small
79	WBHB 0.1	WBHB 0.1	West Branch Handsome Brook upstream of rte 357 bridge near Franklin, N.Y.	small
80	WBOC 1.5	WBOC 5.4	West Branch Owego Creek upstream of West Creek Rd. bridge near Weltonville, N.Y.	small
81	WBTF 2.6	WBTF 3.3	West Branch Tioughnioga River upstream of bridge at Homer, N.Y.	small
82	WHAR 0.6	WHAR 0.6	Wharton Creek downstream of rte 18 bridge near New Berlin, N.Y.	small
83	WHAR 25.6	WHAR 16.8	Wharton Creek upstream of rte 19 bridge at Beverly Inn Corners, N.Y.	small

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G. Obleski

The Unadilla River at Unadilla, N.Y.

Susquehanna River Basin Commission

In 1972, the Susquehanna River Basin Commission was created as an independent agency by a federal-interstate compact among the states of Maryland, New York, and Commonwealth of Pennsylvania, and the federal government. In creating the Commission, the Congress and state legislatures formally recognized the water resources of the Susquehanna River Basin as a regional asset vested with local, state, and national interests for which all the parties share responsibility. As the single federal-interstate water resources agency with basinwide authority, the Commission's goal is to coordinate the planning, conservation, management, utilization, development and control of the basin's water resources among the public and private sectors.

For More Information

For additional copies of this subbasin survey, contact the Susquehanna River Basin Commission, 1721 N. Front Street, Harrisburg, PA 17102-2391, (717) 238-0423, FAX (717) 238-2436, E-mail: srbc@srbc.net. For raw data from this survey or more information concerning the Commission, visit our web site: www.srbc.net.