



CHARACTERIZATION AND ASSESSMENT OF THE BEDEN BROOK WATERSHED



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The Stony Brook-Millstone Watershed Association (SBMWA) would like to thank everyone who helped in the development of this Characterization and Assessment of the Beden Brook Watershed. The funding for this project was made possible by Federal funds from the Clean Water Action Initiative that has been administered by the **New Jersey Department of Environmental Protection** (NJDEP) through Section 319(h).

We would like to thank the members of our **Clean Water Action Advisory Committee** for their guidance and for sharing their expertise in watershed management.

- Jim Cosgrove, Senior Associate, OMNI Environmental Corporation
- Jennifer DiLorenzo, former Raritan Bureau Chief, NJDEP
- Donna Drewes, RC&D Coordinator, North Jersey Resource Conservation & Development Council
- Tod Fairbanks, Director - Corporate Development, Bristol-Myers Squibb
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- Marjorie Kaplan, Division of Science, Research & Technology, NJDEP
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- Robert Ortego, Environmental Compliance Manager, Princeton University
- Tara Paxton, former Education & Outreach Coordinator, NJDEP
- Dave Peifer, Executive Director, Upper Raritan Watershed Association
- Paul Pogorzelski, Hopewell Township Engineer, Van Cleef Engineering
- Bill Rawlyk, Senior Land Preservation Specialist, Delaware & Raritan Greenway
- Andy Rowan, Director, GIS Center
- Kent Scully, Engineer, Montgomery Township
- Joe Skupian, Principal Hydraulic Engineer, Somerset County
- Dan Van Abs, Manager, Watershed Protection Programs, NJ Water Supply Authority

- Michael Wright, Senior Associate, OMNI Environmental Corporation

SBMWA's **StreamWatch volunteers** (past and present) for donating their time to collect the chemical, biological, and visual assessment data used in this report.

Summer 2000 Watershed Management interns (Schuyler Holmes, Kristi Rosso, Marissa Vahlsing and Patrick Zahn) for performing the visual assessments in the Beden Brook Watershed.

Jessica Milose, Americorps Watershed Ambassador, for videotaping the streams in the Beden Brook Watershed as part of the visual assessment.

Summer 2001 Watershed Management interns (Cynthia Lin and Meghan Fehlig) for assistance with editing the Beden Brook Watershed assessment and for writing the Glossary.

The agencies, organizations and companies that shared their data on the environmental resources of Beden Brook so that a complete picture of the Beden Brook Watershed's health could be obtained.

- NJDEP (GIS Unit, Ambient Biomonitoring Network, Natural Heritage Program, Division of Fish & Wildlife's Endangered & Nongame Species Program)
- OMNI Environmental Corporation
- Stony Brook Regional Sewerage Authority
- State of New Jersey Office of State Planning

EXECUTIVE SUMMARY

Sprawl, according to Webster's New Collegiate Dictionary, is defined as: to creep or clamber awkwardly; to spread or develop irregularly; to cause to spread out carelessly or awkwardly. *Awkward. Irregular. Careless.* These are not words that we want to associate with the planning and development of the towns where we live, work and play. And yet, in Central New Jersey the consequences of this careless development are clear: development is degrading our natural resources, most particularly putting the region's water quality and quantity at risk.

In order to better identify the causes of declining environmental health, we need an understanding of our watershed and the changes that have occurred within the natural boundaries. The water that flows in a stream arrives there in part by flowing over the land or percolating through the soil. Thus, how we develop the land is reflected in the water quality of the streams.

The Stony Brook-Millstone Watershed Association (SBMWA) decided to initiate a project that combined the data analysis necessary to pinpoint problems with projects that can be implemented to restore and enhance the local environment. Research indicates that the most effective management efforts are generally confined to subwatersheds on the order of 20-50 square miles (Center for Watershed Protection, 1998). Such a localized approach allows personal contact with the community and fosters building relationships and trust. The goals of this project include improved water quality, educated local residents, businesses, and municipalities on nonpoint-source pollution reductions, and measurable reductions in this type of pollution in Beden Brook and its tributaries.

This characterization and assessment report for the Beden Brook Watershed provides an overview of the trends seen within this area between 1986 and 1995/97 (see attached Figures). This report is intended to relay the past and present status of the Beden Brook Watershed and its environmental resources. Highlights of these findings include:

- ◆ Agricultural areas are being lost to suburban development throughout the watershed. Between 1986 and 1995/97, 1,702 acres of land were converted to urban land.
- ◆ In order to perform analysis of water quality trends, monitoring data must be available. There is a lack of basic water quality information for many of the streams, with the exception of Beden Brook
- ◆ The Sourland Mountains are a unique resource within this watershed. The area remains primarily forest and wetlands and is the headwaters for many streams.
- ◆ Analysis of the 100-foot area around the streams in Beden Brook Watershed reveals that the land use in 1995/97 was primarily wetlands and forests (78%). Vegetated stream corridors provide habitat, remove sediment and pollutants and slow stormwater.
- ◆ Water quality is degraded along Beden Brook, as evidenced by increasing nutrients, moderate impairment to the macroinvertebrate community, and the lowest rated visual assessment for the stream segment from Province Line Road to the Great Road. The surrounding land uses for that stretch of Beden Brook are directly impacting the water quality as well as quantity.
- ◆ The majority of Cruser Brook Subwatershed is not densely developed. However, there is one NJDEP biological monitoring site, which was rated as non-impaired in 1993 and moderately impaired in 1998. When analyzing the data for this

subwatershed, it was noted that the highest impervious cover is near this sampling site and much of this concentration of development has occurred since 1986 as agricultural land has been converted to urban.

- ◆ Pike Run had the greatest conversion of agricultural lands to developed lands, mostly single-family homes, often located near stream. Biological monitoring data indicate water quality has declined.

These trends expose areas that need improvement and protection within Beden Brook Watershed. The evaluation was used to set priority areas and make recommendations to municipalities, citizens, businesses, golf courses and SBMWA staff.

RECOMMENDATIONS

- 1) *Due to the loss of farmland, preservation efforts need to be encouraged. The proximity of many farms to streams also means that River-Friendly Farm Programs need to continue to educate farmers on wise crop management and riparian buffer implementation.*
- 2) *More data needs to be collected in Back Brook, Rock Brook, Cruser Brook, and Pike Run in order to properly characterize and assess the water quality in these areas. This is especially important, as these streams are located primarily in Montgomery Township, which is undergoing increasing development.*
- 3) *The State should support preservation efforts by local non-profits, municipalities and counties for the Sourland Mountains. Local municipalities and land trust organizations should integrate NJDEP Division of Fish and Wildlife's Landscape Project information into open space preservation initiatives.*
- 4) *Municipalities and individual residents must preserve stream corridors to ensure that they are primarily forest and wetland. Stream Corridor Protection Ordinances and deed restrictions should be considered in order for the corridors to continue to function properly and protect water quality.*
- 5) *Municipalities should integrate information about natural features such as soils and geology into their planning efforts in order to proactively plan to ensure adequate groundwater recharge, water quality and open space preservation.*
- 6) *To reduce nonpoint source pollution, River-Friendly Programs should be targeted at citizens, businesses and golf courses in the fastest-developing areas, such as Hillsborough and Montgomery.*
- 7) *SBMWA supports the clustered, mixed-use development that has occurred in Hopewell Borough. We recommend that the municipal leaders review their stormwater management practices and look for opportunities to upgrade existing structures when renovations are considered.*
- 8) *We also recommend that an assessment of Hopewell Borough's ordinances be performed in order to determine protection opportunities for stream corridors and for improving water quality.*
- 9) *We recommend targeting the residents of Hopewell Borough for future River-Friendly Resident education programs.*

- 10) *Currently, NJDEP monitors and tests the soils and groundwater in the vicinity of a known contaminated site. The agency also outlines necessary remediation strategy, when necessary. Due to the reliance on community supply wells and private wells for drinking water, local municipalities and their health departments should pay close attention to the status of these sites and the monitoring results.*
- 11) *It is a priority that the Cherry Valley Country Club and the Bedens Brook Club and associated residential developments become actively involved in our River-Friendly Golf Course and Residential Certification Program.*
- 12) *For the Rock Brook Subwatershed, we recommend increasing the monitoring sites, protecting the riparian areas from development, monitoring ground water quality (as this is a gaining stream) and preserving the area surrounding Rock Brook's headwaters, the only area to receive an "excellent" rating for visual assessment in the Beden Brook Subwatershed. Many of our general recommendations for the entire watershed can also be applied to this area.*
- 13) *The Cruser Brook Subwatershed should be studied further to determine the source(s) of potential pollution in order to improve the water quality.*
- 14) *Municipalities should ensure that stream corridors, critical habitat and other key features are preserved and that development is directed to the appropriate areas within Cruser Brook Subwatershed.*

These recommendations offer the municipalities, businesses, golf courses, residents and farmers an opportunity to react to the current situation and also to use the data within this report to work proactively. Collectively, there must be some vision for this region and a plan to move toward that vision to ensure that our communities do not become awkward, irregular or careless.

TABLE OF CONTENTS OF FULL REPORT

	Page
Acknowledgements	i
Table of Contents	iii
List of Tables	iv
List of Graphs	iv
List of Appendices	v
Introduction	1
Landscape	3
➤ Topography	3
➤ Geology	5
➤ Soils	7
➤ Endangered/Threatened Species	8
➤ Critical Habitats	9
➤ Contaminated Sites	9
▪ Superfund Sites	9
▪ Other Contaminated Sites	10
➤ Point Source Dischargers	11
▪ Dischargers to Surface Water	11
▪ Dischargers to Groundwater	11
Population	12
Land Use	16
➤ Forest	17
➤ Agriculture	18
➤ Urban	18
➤ Wetlands	19
➤ Impervious Cover	21
➤ Riparian Corridors	22
Water Quality	23
➤ Visual Assessments	25
➤ Biological Assessments	25
➤ Chemical Assessments	27
Conclusions/Recommendations	28
List of Acronyms	33
Glossary	34
References	37
Appendices	41
➤ Appendix A – Figures	41
➤ Appendix B – Water Quality Data	64
➤ Appendix C - Known Contaminated Sites and Point Source Dischargers	74

Figure 14
Land Use Changed to "Urban"
between 1986 and 1995/97 in
Beden Brook Watershed

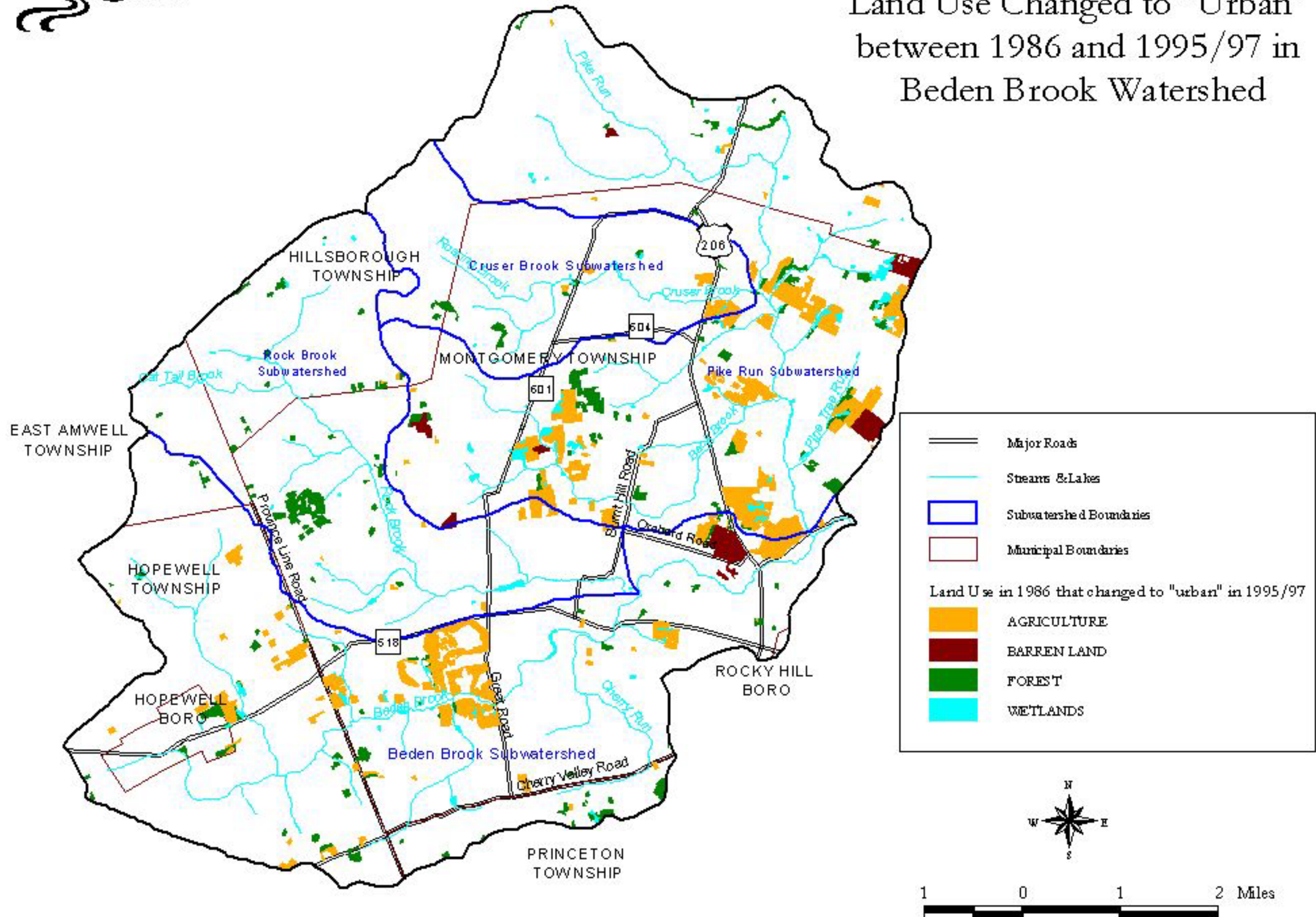
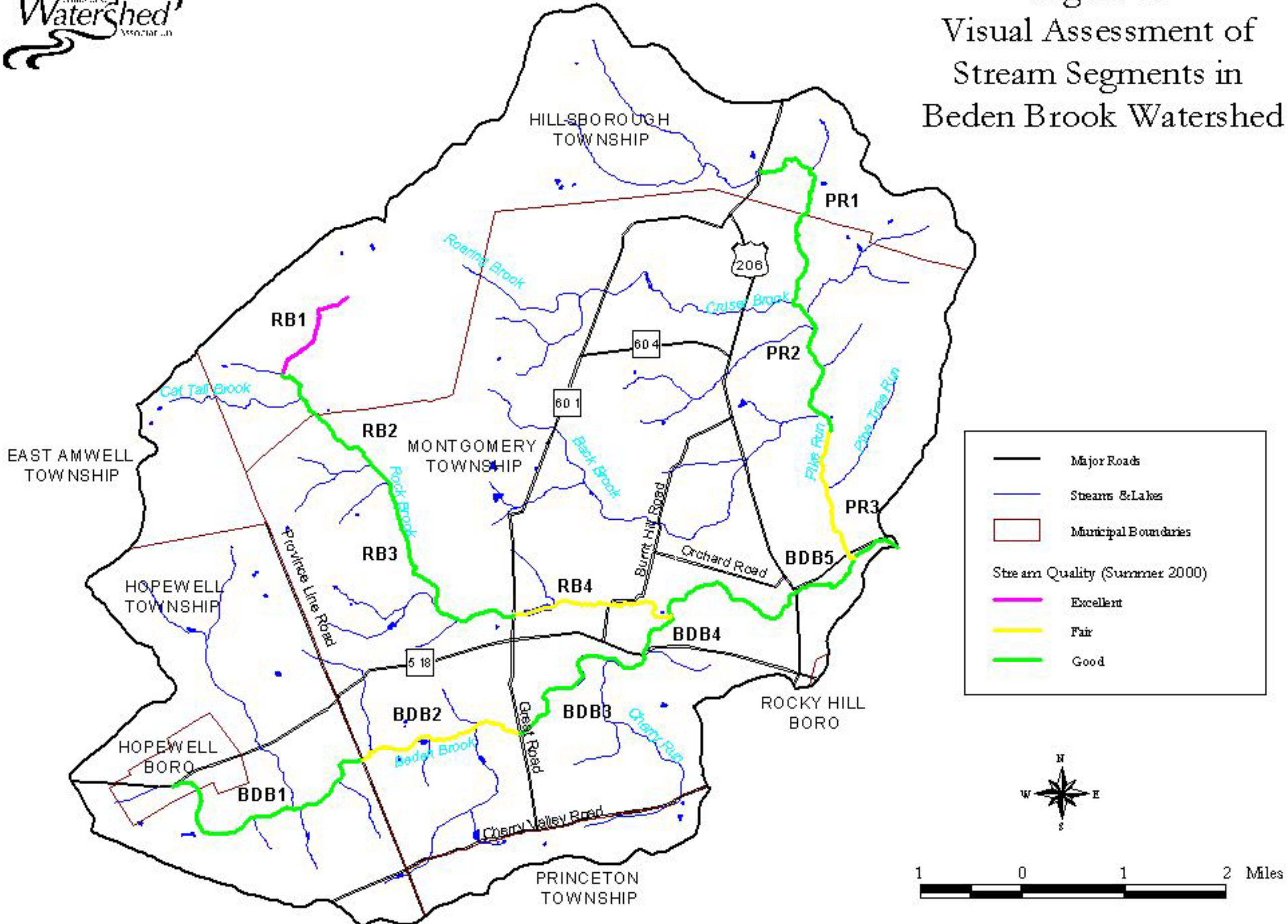


Figure 20
 Visual Assessment of
 Stream Segments in
 Beden Brook Watershed



— Major Roads
 — Streams & Lakes
 — Municipal Boundaries
 Stream Quality (Summer 2000)
 — Excellent
 — Fair
 — Good

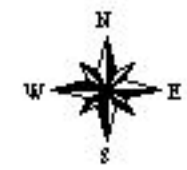


Table B-3: Biological assessment data for Beden Brook Watershed 1993, 1994, 1998 and 1999 (NJDEP Data).

Site	Date	Number in Sample	FBI	Total Taxa Richness	EPT Richness	% EPT	% Dominance	Scoring for Stream Impairment Biological Assessment
AN0398	4/5/1994	100	5.6	10	6	26%	69%	Moderately Impaired
AN0398	4/27/1999	100	5.1	16	6	23%	47%	Moderately Impaired
AN0399	4/5/1994	100	5.5	10	5	25%	69%	Moderately Impaired
AN0399	4/27/1999	105	4.8	12	4	26%	62%	Moderately Impaired
AN0400	4/5/1994	100	5.9	11	3	12%	35%	Moderately Impaired
AN0400	4/27/1999							Not Sampled
AN0401	4/5/1994	100	5.8	11	2	10%	65%	Moderately Impaired
AN0401	4/27/1999	102	5.4	14	4	7%	48%	Moderately Impaired
AN0402	11/10/1993	100	4.3	11	3	9%	51%	Moderately Impaired
AN0402	11/12/1998	100	5.9	24	3	4%	18%	Moderately Impaired
AN0403	11/10/1993	100	4.8	17	4	49%	31%	Non-Impaired
AN0403	11/12/1998	100	6.7	23	5	14%	23%	Moderately Impaired
AN0404	6/14/1994	100	4.6	10	3	40%	31%	Moderately Impaired
AN0404	6/10/1999	100	5.9	19	5	15%	21%	Moderately Impaired
AN0405	4/5/1994	34	6.8	11	2	6%	26%	Moderately Impaired
AN0405	4/27/1999	109	6.7	4	1	1%	71%	Severely Impaired

FBI = Family Biotic Index: Index of the average pollution-tolerance ("sensitivity") of individuals in the sample.

Total Taxa Richness: Number of different families in the sample

EPT Richness: Number of families in *Ephemeroptera*, *Plecoptera*, and *Tricoptera* Orders

% EPT: Percent of sample in the *Ephemeroptera*, *Plecoptera*, and *Tricoptera* Orders

% Dominance: Percent of sample composed of individuals from one family.

Samples should include at least 100 organisms for statistical evaluation. Samples with fewer than 100 were included in this table for in but would not be included in a rigorous evaluation of stream health.