PATUXENT RESERVOIRS WATERSHED PROTECTION GROUP

Supplemental Documentation In Support of the Patuxent Reservoirs Technical Advisory Committee's 2009 Annual Report

Table of Contents

Table of Contents ii
Tables and Figures iii
List of Acronyms and Abbreviations iv
Introduction 1
Interim Watershed Management Report 2
Reservoir and Tributary Water Chemistry Monitoring 2
WSSC Land Acquisition Program 3
Tributary Biological and Habitat Monitoring 4
  Howard County 4
Stream Corridor Management 5
  Reddy Branch Riparian Forest Buffer Plantings 5
Agricultural Progress 7
  Patuxent Reservoirs Watershed Cost Share Program 7
Management of the Deer Population on WSSC-owned property 9
New Initiatives for 2009 9
  Municipal Separate Storm Sewer System (MS4) Permit Implementation Plans 9
References 10

Appendices

Appendix A: Water Quality Assessment of the Patuxent Reservoirs
Appendix B: 2009 Annual Policy Board Meeting Presentation
Appendix C: 2009 Annual Policy Board Meeting Summary
Appendix D: 2009 Policy Board Correspondence
Appendix E: 2009 Technical Advisory Committee Meeting Agendas and Summaries
Appendix F: Public Briefings for Patuxent Reservoirs Interim Watershed Management Report
Appendix G: Annual Report of Deer Management Program of WSSC Owned Lands
Appendix H: Patuxent Reservoirs Watershed Protection Agreement
Appendix I: Patuxent Reservoirs Protection Strategy Agricultural MOU and Amendments
Appendix J: 2009 List of Contacts for Patuxent Reservoirs Watershed Protection Group's Technical Advisory Committee

Tables and Figures

Table 1. Assessment Categories for Biological and Physical Stream Habitat Monitoring 4
Table 2. Historical Biological Monitoring by Howard County in the Patuxent Reservoirs Watershed.. 4
Table 3. HSCD Historical Use of Patuxent Reservoirs Watershed Cost-Share Funds 8
Table 4. BMP Totals Using Patuxent Reservoirs Watershed Cost-Share Funds (2001-2009) 8
Table 5. Remaining Funds in Patuxent Reservoirs Cost-Share Program 8

Figure 1. Location of Properties Acquired in 2009 by WSSC for Water Quality Protection 3
Figure 2. Aerial Photo of Reddy Branch Riparian Forest Buffer Planting Schedule 5
Figure 3. View of Reddy Branch Tree Planting Area 6
Figure 4. Close-up view of Reddy Branch Tree Planting..... 6
Figure 5. Stream protection fencing 7
Figure 6. Livestock watering trough..... 7

List of Acronyms and Abbreviations

BMP	Best Management Practice
CHL-a	Chlorophyll-a
DNR	Maryland Department of Natural Resources
DEP	Montgomery County Department of Environmental Protection
DO	Dissolved Oxygen
ea	Each
EPA	U.S. Environmental Protection Agency
ft	Feet
FY	Fiscal Year
GIS	Geographic Information System
HC	Howard County
HSCD	Howard Soil Conservation District
IBI	Index of Biological (or Benthic) Integrity
LA	Load Allocation
Lbs/yr	Pounds per year
MACS	Maryland Agricultural Cost Share
MC	Montgomery County
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
mg/L	Milligrams per Liter
M-NCPPC	Maryland-National Capital Park and Planning Commission
MS4	Municipal Separate Storm Sewer System
MSCD	Montgomery Soil Conservation District
PGC	Prince George's County
PRW	Patuxent Reservoirs Watershed
RG	Rocky Gorge
RMC	Resource Management Concepts
SCD	Soil Conservation District
SEP	Supplemental Environmental Project
SSO	Sanitary Sewer Overflow
TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TP	Total Phosphorus
µg/L	Micrograms per Liter
USGS	US Geological Survey
WFP	Water Filtration Plant
WLA	Waste Load Allocation
WSSC	Washington Suburban Sanitary Commission

Introduction

In 2003, the Technical Advisory Committee (TAC) determined that the Annual Report should be more concise and focus on annual accomplishments. So beginning in 2004, a compilation of supplemental documentation (Technical Supplement) has been provided to include more detailed information that supports the accomplishments summarized in the annual report.

This year's Technical Supplement contains more detailed information that further explains the efforts undertaken as discussed in the 2009 Annual Report. For WSSC's Land Acquisition Program, a map is included which shows the location of two parcels purchased in 2009. A historical summary of biological and habitat monitoring results is also provided for tributaries within Howard County. For the riparian forest plantings along Reddy Branch, an update is provided of what has been accomplished since the annual report; furthermore, an aerial photo is also included that shows past and future planting areas. An accounting is also provided of the Patuxent Reservoirs Watershed Agricultural Cost-Share Program in addition to a historical summary of how those funds have been used to install riparian BMPs. Finally, a brief update is provided of a public meeting held in late 2009 regarding Montgomery County's MS4 Permit.

In addition, there are several items not covered in the annual report, briefly discussed here, and included in the appendices of this supplement. These include: Appendix A, which contains a report that evaluates the water quality data collected from the Patuxent Reservoirs; Appendix F, which contains a summary of both public information meetings held to elicit public input for the Interim Watershed Management Report completed by Versar Inc.; and Appendix G, which contains a ten-year summary of WSSC's Deer Management Program.

Interim Watershed Management Report

During the development of the *Patuxent Reservoirs Interim Watershed Management Report*, the TAC decided that public involvement should be solicited; consequently, two public meetings were held at two different locations within the PRW. Unfortunately, very few people attended either meeting. Refer to Appendix F for more information about these meetings.

Reservoir and Tributary Water Chemistry Monitoring

WSSC's Environmental Group conducted an evaluation of historic water quality data for the Patuxent Reservoirs. This evaluation focused on eleven indicators to assess the condition of the Patuxent Reservoirs including: chlorophyll-a, dissolved oxygen, total and orthophosphate phosphorous, nitrogen (Total Kjeldahl, nitrate-nitrite and ammonia), total organic carbon, water transparency (using Secchi depth), chloride, and total algal counts. The eleven indicators were chosen for inclusion in this report because of their relevance to address required nutrient reductions associated with the Total Maximum Daily Loads (TMDLs) and their usefulness to operators at the Patuxent Water Filtration Plant (WFP).

This evaluation of the reservoir historic monitoring data extends the evaluation done for the period of 1993-2000 by Resource Management Concepts (RMC) under contract to Tetra Tech, Inc. For the current report, reservoir monitoring data for the period 2001-2008 have been added to the original data set, and the entire period from 1993-2008 is being evaluated. Refer to Appendix A for the full report.

WSSC Land Acquisition Program

In late 2005 the WSSC entered into a Consent Decree with regulatory authorities over sanitary sewer overflows (SSOs), one component of which is the acquisition of conservation easements and land in the Patuxent reservoirs watershed to enhance water quality. This program is a $3.29 million Supplemental Environmental Project (SEP) intended to provide environmental benefits in lieu of paying penalties for past Clean Water Act violations due to SSOs.

In 2009 WSSC purchased two properties to partially satisfy the requirements of the SEP. WSSC acquired the Furman property (21.36 acres) in Burtonsville, Montgomery County. This property is located at the headwaters of a tributary to Rocky Gorge Reservoir. Its acquisition prevents development of the property into four residential lots and maintains largely forested land cover. WSSC also acquired the Trivelli property (13.83 acres) in Highland, Howard County. It is located adjacent to the Patuxent River downstream from Brighton Dam and upstream from Rocky Gorge Reservoir. It adjoins and extends existing 300+ foot wide WSSC buffer land holdings along the Patuxent River, and prevents development of the property as a residential lot (Figure 1).

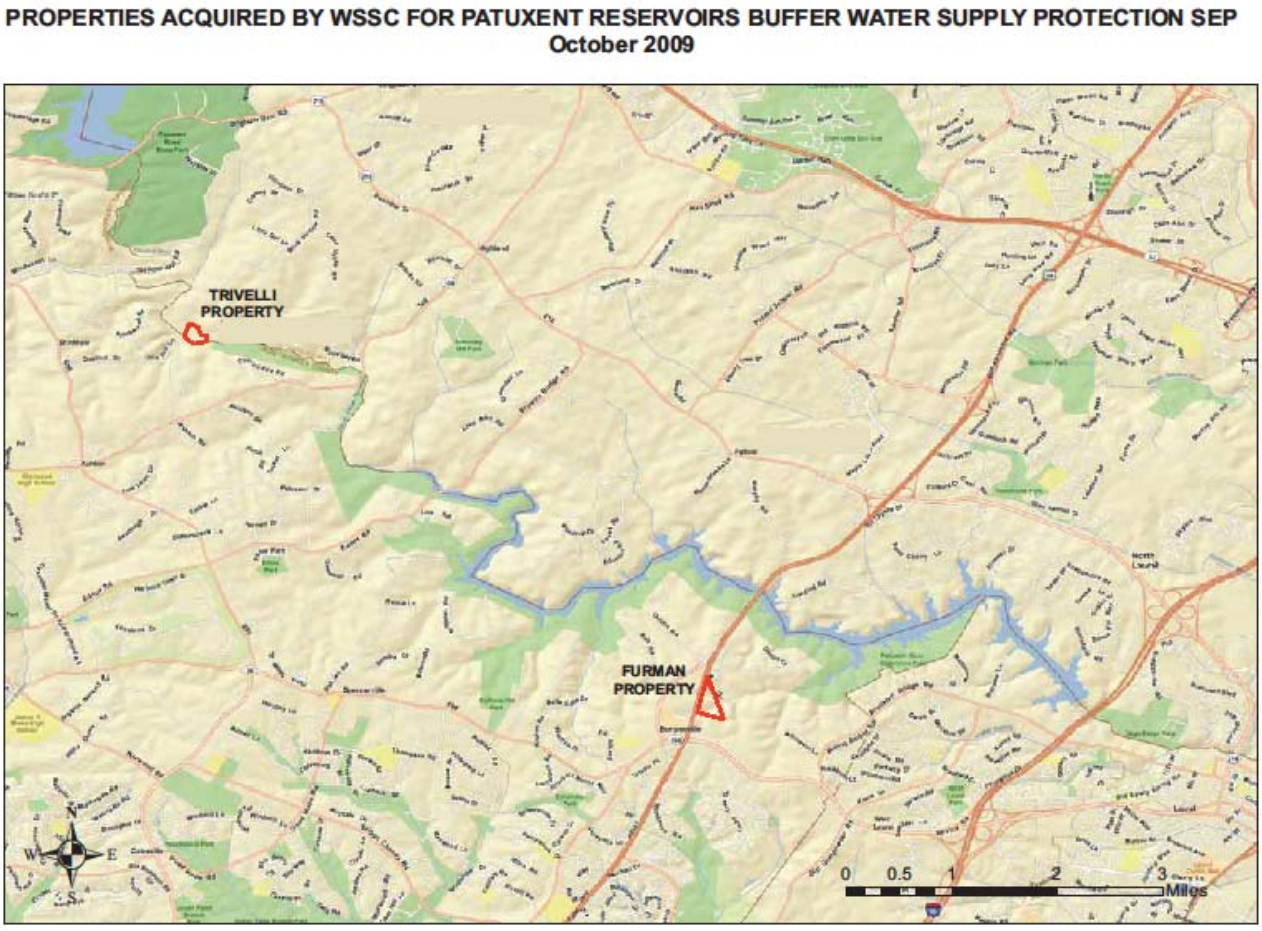

Figure 1. Location of Properties Acquired in 2009 by WSSC for Water Quality Protection

Tributary Biological and Habitat Monitoring

Biological and habitat monitoring of the tributaries are used to track progress in protecting the stream system and aquatic biota, as land cover changes occur and stream restoration and streamside best management practices are implemented. These monitoring efforts can also locate problem areas and provide indicators for possible problem sources to help guide future restoration efforts.

Howard County

Howard County is on a five-year monitoring cycle so that each of the County's 15 watersheds is sampled once every five years. Each monitoring site is evaluated for its physical health and its ability to support an acceptable level of biological health. The physical habitat condition is assessed as comparable to a reference stream, supporting, partially supporting, or non-supporting based on the stream segment's ability to support biological health. The biological condition is assessed as good, fair, poor or very poor based on the number and type of aquatic insects found in the stream (Table 1).

Table 1. Assessment Categories for Biological and Physical Stream Habitat Monitoring

Benthos	Stream Area Habitat
Good	Comparable
Fair	Supporting
Poor	Partially Supporting
Very Poor	Non-Supporting

Beginning in 2001, Howard County has assessed streams within the Patuxent Reservoirs Watershed (Table 2). Considering results from the benthic macroinvertebrate community and the stream's physical habitat, Howard County's portion of the Triadelphia Reservoir (Cattail Creek, Upper/Lower Brighton watersheds) is in better condition than Howard County's portion of Rocky Gorge Reservoir. For 2010 Cattail Creek and Upper and Lower Brighton Dam watersheds will be monitored for the third time. Refer to Figure 3 in the 2009 Annual Report that displays the locations of the monitoring stations sampled in 2009.

Table 2. Historical Biological Monitoring by Howard County in the Patuxent Reservoirs Watershed

Name of Watershed	Year of Survey	Physical Condition	Biological Condition
Cattail Creek Upper Brighton Lower Brighton	2001	Non-Supporting Partially Supporting Non-Supporting	Fair (3.5) Fair (3.87) Fair (3.43)
Rocky Gorge	2003	Non-Supporting	Poor (2.83)
Cattail Creek, Upper Brighton Lower Brighton	2005	Non-Supporting Partially Supporting Partially Supporting	Fair (3.37) Fair (3.93) Fair (3.77)
Rocky Gorge	2009	Partially Supporting	Poor (2.94)

Stream Corridor Management

Reddy Branch Riparian Forest Buffer Plantings

The Reddy Branch project is continuing to move forward with a series of riparian plantings equaling nearly 4 acres buffering about 1,700 linear feet of this stream. Good weather and plenty of rain as well as rich moist soil have helped to encourage significant growth over the past year and a half. Maintenance has included mowing around the trees and some treatment for invasives such as thistles and mile-a-minute. The greatest challenge has been controlling deer damage, particularly buck rub. Many trees have been damaged or lost when deer protection measures failed. Fortunately, these losses were covered under warranty and protective measures have been adjusted for better results. The Izaak Walton League provided manpower and materials to plant a one-half acre area in the fall. They will continue to be part of this project for the foreseeable future. Activities may include invasive control and additional planting projects. The Montgomery County Parks are currently studying an area of stream migration for potential limited stream restoration. The remainder of the planned riparian planting is dependent on a land swap with an adjacent property owner (Figure 2). If successful, this will facilitate access needed to plant and maintain the rest of the area. Figures 3 and 4 show photos of progress to date.

Figure 2. Aerial Photo of Reddy Branch Riparian Forest Buffer Planting Schedule

Figure 3. View of Reddy Branch Tree Planting Area

Figure 4. Close-up view of Reddy Branch Tree Planting

Agricultural Progress

Annual accomplishments of the Howard and Montgomery Soil Conservation Districts were summarized in Table 1 of the 2009 Annual Report. Three charts were also included in the Annual Report that summarized historical efforts from both soil conservation districts since 1999 (e.g., number of conservation plans written, number of farm acres covered by conservation plans, and the number of BMPs installed).

Patuxent Reservoirs Watershed Cost Share Program

The Patuxent Reservoirs Protection Strategy Memorandum of Understanding (Appendix I) established as its second initiative the Patuxent Reservoirs Watershed Cost-Share Program. The focus of this effort is to implement stream-side best management practices.

For FY 2009, the Howard County Soil Conservation District (HSCD) used funds from this cost-share program to assist land owners who installed five best management practices including two livestock exclusion stream fences and three livestock watering troughs (Table 2 and Figures 5 and 6).

Since 2001, HSCD has assisted the agricultural community using cost-share program funds to install 18 BMPs (Tables 3 and 4).

Figure 5. Stream protection fencing

Figure 6. Livestock watering trough

Table 3. HSCD Historical Use of Patuxent Reservoirs Watershed Cost-Share Funds

Fiscal Year	Best Management Practice Type	Quantity (units)	Cost-Share Funds Spent
2001	Riparian buffer planting	1 acre	$460.00
2002	Livestock watering trough Stream Fencing (2) Stream Crossing Riparian buffer planting	2 (each) 280 (feet) 1 (each) 0.75 (acre)	$3896.40
2003	Stream Fencing (2) Stream Crossing Livestock watering trough	1,387 (feet) 1 (each) 1 (each)	$5,883.59
2005	Grassed Waterway (2)	0.7 (acre)	$3,129.23
2007	Stream Crossing Stream Fencing	1 (each) 500 (feet)	$6,284.00
2009	Stream Fencing (2) Livestock watering trough	304 (feet) 3 (each)	$6,909.76
	Total		$26,562.98

Table 4. BMP Totals Using Patuxent Reservoirs Watershed Cost-Share Funds (2001-2009)

Best Management Practice Type	Number Installed (units)
Stream Fencing	7 (2,471 feet or 0.47 miles)
Stream Crossing	3 (each)
Riparian buffer planting	2 (1.75 acres)
Livestock watering trough	7 (each)

The remaining funds in this cost-share program are $54,224 (Table 5). For the Montgomery SCD (MSCD), the amount of funds remaining has changed only slightly since 2004 ($54,311). In 2008, MSCD enrolled the first land owner in the program and helped to install a livestock watering trough (Figure 6). Consideration should be given to determine and remove impediments to its continued use by the MSCD.

Table 5. Remaining Funds in Patuxent Reservoirs Cost-Share Program

Soil Conservation District	Patuxent Reservoirs Cost Share Program
Howard	$2,379
Montgomery	$51,845
Total	$54,224

Management of the Deer Population on WSSC-owned property

This year marks the tenth year of WSSC's Deer Damage Mitigation Program. The deer management program was initiated because of the harmful effects that the deer population has had on the WSSC-owned property as well as adjacent landowners. The Howard County Department of Recreation and Parks determined from infra-red studies that the deer population was well above the recommended density of 15 animals per square mile. According to the report, those harmful effects include over-grazing of the forest understory layer diminishing natural seedling regeneration and loss of income due to deer browse of agricultural land and private gardens. This program was also deemed as an essential component of management actions needed to support the long-term sustainability of WSSC-owned forest lands (MD DNR, 2007).

During the 2009-2010 hunting season, 340 deer were taken in nine designated areas within WSSC-owned land, which was the greatest number since the program's inception. Refer to Appendix G for more information about this on-going program.

New Initiatives for 2009

Municipal Separate Storm Sewer System (MS4) Permit Implementation Plans

Montgomery County Department of Environmental Protection (DEP) hosted a public meeting on 18 November 2009 to discuss the Watershed Restoration Implementation Strategy being developed to meet the third round MS4 permit requirements. The strategy must address specific runoff management and pollutant reduction goals. The portion of the PRW within Montgomery County is one of eight watersheds in which the County will develop an implementation plan.

Access the following website for more information:
http://www.montgomerycountymd.gov/deptmpl.asp?url=/content/dep/StormwaterPermit/publicmeetings.asp

References

Maryland Department of Natural Resources, Forest Service. September 2007. *Forest Conservation Plan for Washington Suburban Sanitary Commission Reservoir Properties*.

Appendix A

Water Quality Assessment of the Patuxent Reservoirs

Washington Suburban Sanitary Commission

Water Quality Assessment of the Patuxent Reservoirs (1993-2008)

Prepared by:
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Table of Contents

Table of Contents ii
List of Tables iii
List of Figures iii
List of Abbreviations, Acronyms, and Units v
Introduction 1
Objectives of Reservoir Monitoring Program 3
Prior Data Analysis 3
Field Sampling and Laboratory Methods 4
Field sampling methods 4
Laboratory methods 4
Historical Data Set 5
Evaluation of Results 7
Chlorophyll-a 8
Total Phosphorous and Orthophosphate-Phosphorus 15
Nitrogen 23
Total Organic Carbon 32
Water Clarity 38
Chloride 42
Total Algal Counts 44
Reservoir Productivity - Trophic State Assessment 45
Recommendations 50
Acknowledgements 51
References 52

List of Tables

Table 1. History of Water Quality Monitoring of the Patuxent Reservoirs 1
Table 2. List of parameters analyzed for the Patuxent Reservoirs monitoring program 5
Table 3. Historical Sampling Frequency for Rocky Gorge Reservoir 6
Table 4. Historical Sampling Frequency for Triadelphia Reservoir 6
Table 5. Percent of Results for each Trophic State Category 46

List of Figures

Figure 1. Rocky Gorge Monitoring Station Locations 2
Figure 2. Triadelphia Reservoir Monitoring Station Locations 2
Figure 3. Example of Box Plot 7
Figure 4. Total Chlorophyll-a Results for Rocky Gorge Reservoir 9
Figure 5. Total Chlorophyll-a Results for Triadelphia Reservoir 9
Figure 6. Box Plots of Chlorophyll-a by Reservoir Station Location 10
Figure 7. Annual Box Plots of Total Chlorophyll-a for Rocky Gorge Reservoir 11
Figure 8. Annual Box Plots of Chlorophyll-a for Triadelphia Reservoir 12
Figure 9. Monthly Box Plots of Chlorophyll-a for Rocky Gorge Reservoir 13
Figure 10. Monthly Box Plots of Chlorophyll-a for Triadelphia Reservoir 13
Figure 11. Seasonal Box Plots of Chlorophyll-a for Rocky Gorge Reservoir 14
Figure 12. Seasonal Box Plots of Chlorophyll-a for Triadelphia Reservoir 14
Figure 13. Annual Average TP and Soluble OP for Rocky Gorge Reservoir - surface 16
Figure 14. Annual Average TP and Soluble OP for Rocky Gorge Reservoir - bottom 16
Figure 15. Annual Average TP and Soluble OP for Triadelphia Reservoir - surface 17
Figure 16. Annual Average TP and Soluble OP for Triadelphia Reservoir - bottom 17
Figure 17. Monthly TP Concentrations by station for Rocky Gorge Reservoir - surface 19
Figure 18. Monthly TP Concentrations by station for Triadelphia Reservoir – surface 19
Figure 19. Monthly Box Plots of TP Concentrations for Rocky Gorge Reservoir - surface 21
Figure 20. Monthly Box Plots of TP Concentrations for Rocky Gorge Reservoir - bottom 21
Figure 21. Monthly Box Plots of TP Concentrations for Triadelphia Reservoir – surface 22
Figure 22. Monthly Box Plots of TP Concentrations for Triadelphia Reservoir - bottom 22
Figure 23. Nitrate+Nitrite Nitrogen Concentrations for Rocky Gorge Reservoir - surface 24
Figure 24. Nitrate+Nitrite Nitrogen Concentrations for Rocky Gorge Reservoir – bottom 24
Figure 25. Nitrate+Nitrite Nitrogen Concentrations for Triadelphia Reservoir - surface 25
Figure 26. Nitrate+Nitrite Nitrogen Concentrations for Triadelphia Reservoir - bottom 25
Figure 27. Annual Avg. Total N, TKN, and Organic N for Rocky Gorge Reservoir – surface 27
Figure 28. Annual Avg. Total N, TKN, and Organic N for Rocky Gorge Reservoir - bottom 27
Figure 29. Annual Avg. Total N, TKN, and Organic N for Triadelphia Reservoir – surface 28
Figure 30. Annual Avg. Total N, TKN, and Organic N for Triadelphia Reservoir - bottom 28
Figure 31. Monthly Nitrate+Nitrite Concentrations for Rocky Gorge Reservoir – bottom 30
Figure 32. Monthly Ammonia Concentrations for Rocky Gorge Reservoir – bottom 30
Figure 33. Monthly Nitrate+Nitrite Concentrations for Triadelphia Reservoir – bottom 31
Figure 34. Monthly Ammonia Concentrations for Triadelphia Reservoir – bottom 31
Figure 35. Total Organic Carbon Concentrations for Rocky Gorge Reservoir 33
Figure 36. Total Organic Carbon Concentrations for Triadelphia Reservoir 33

Figure 37. Comparison of TOC results among all monitoring station locations 34
Figure 38. Monthly Box Plots of TOC for Rocky Gorge Reservoir 35
Figure 39. Monthly Box Plots of TOC for Triadelphia Reservoir 35
Figure 40. Annual Box Plots of TOC for Rocky Gorge Reservoir 36
Figure 41. Annual Box Plots of TOC for Triadelphia Reservoir 37
Figure 42. TOC Concentrations during Peak Quarter for Rocky Gorge Reservoir – near intake 37
Figure 43. Comparison of Secchi depth among monitoring station locations 38
Figure 44. Monthly comparison of Secchi depths for Rocky Gorge Reservoir 39
Figure 45. Monthly comparison of Secchi depths for Triadelphia Reservoir 40
Figure 46. Annual comparison of Secchi depths for Rocky Gorge Reservoir 41
Figure 47. Annual comparison of Secchi depths for Triadelphia Reservoir 41
Figure 48. Histogram of Chloride Concentrations at the Patuxent Water Filtration Plant 42
Figure 49. Chloride Concentrations at the Patuxent Water Filtration Plant 43
Figure 50. Total Algal Counts at Patuxent Water Filtration Plant (1993-2008) 44
Figure 51. Carlson's TSI Values and Corresponding Water Quality Conditions 45
Figure 52. Carlson's TSI for Total Phosphorus for Rocky Gorge Reservoir 47
Figure 53. Carlson's TSI for Chl-a for Rocky Gorge Reservoir 47
Figure 54. Carlson's TSI for Secchi Depth for Rocky Gorge Reservoir 47
Figure 55. Carlson's TSI for Total Phosphorus for Triadelphia Reservoir 48
Figure 56. Carlson's TSI for Chl-a for Triadelphia Reservoir 48
Figure 57. Carlson's TSI for Secchi Depth for Triadelphia Reservoir 48
Figure 58. Carlson's TSI Showing All Metrics for Rocky Gorge Reservoir 49
Figure 59. Carlson's TSI Showing All Metrics for Triadelphia Reservoir 49

List of Abbreviations, Acronyms, and Units

Abbreviation Acronym Unit	Definition
Chl-a	Chlorophyll-a
IQR	Interquartile Range
L	Liter
MDE	Maryland Department of the Environment
mg/L	Milligram per Liter, equivalent to part per million (ppm), or one minute in 2 years or one cent in $10,000
µg/L	Microgram per Liter, equivalent to part per billion (ppb), or one minute in 2,000 years, or one cent in $10 million
M-NCPPC	Maryland-National Capital Park and Planning Commission
OP	Orthophosphate-phosphorus
R^2	Coefficient of determination (ratio of explained variation to total variation)
RG	Rocky Gorge
TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TP	Total Phosphorus
TR	Triadelphia
WFP	Water Filtration Plant
WSSC	Washington Suburban Sanitary Commission

Introduction

The Washington Suburban Sanitary Commission (WSSC) owns and operates two reservoirs along the upper reaches of the Patuxent River. Water is withdrawn from the Rocky Gorge (a.k.a. T. Howard Duckett) Reservoir to supply potable water to approximately 650,000 customers in the supply area of Montgomery and Prince George's Counties. A small portion of southern Howard County is also served by this drinking water source. Triadelphia Reservoir is located about 13 miles up-river of Rocky Gorge and its volume is used to augment Rocky Gorge during low flow and high demand periods. In addition to the primary purpose of providing potable water, the reservoirs also provide limited recreational opportunities.

Monitoring Program History

Water quality data have been collected from the Rocky Gorge and Triadelphia Reservoirs (the Patuxent Reservoirs) sporadically since the late 1970's (Table 1). In 1993, WSSC initiated its own monitoring program. WSSC field crews originally collected water quality samples and received lab results for two stations at each reservoir, but in 1998 a third monitoring location was added to the sampling protocol as a result of a recommendation from a management planning study of the Patuxent Reservoirs Watershed (Tetra Tech, Inc., 1997). Both additional monitoring stations (RG3 and TR3) are located further up-stream of the original two locations (Figures 1 and 2). The purpose of adding a third location was to determine if spatial variability in water quality exists among locations.

Table 1. History of Water Quality Monitoring of the Patuxent Reservoirs

Agency/Firm Collecting Data	Period of Record	Rocky Gorge Reservoir	Triadelphia Reservoir
State of Maryland	April-November 1978	Monthly near dam	None
JTC Environmental Consultants, Inc. for WSSC	August 1982-July 1983	Monthly at 4 locations	Monthly at 4 locations
Greenhorne & O'Mara for M-NCPPC's Patuxent Watershed Management Program	April-November 1987	Bi-weekly at 3 locations	Bi-weekly at 1 location
EA Engineering, Science and Technology, Inc. for WSSC	May-October 1990	Monthly at 3 locations	Monthly at 3 locations
WSSC's Environmental Group	1993-Present	Monthly at 2 locations	Monthly at 2 locations
WSSC's Environmental Group	1998-Present	Added 1 location further up-reservoir	Added 1 location further up-reservoir

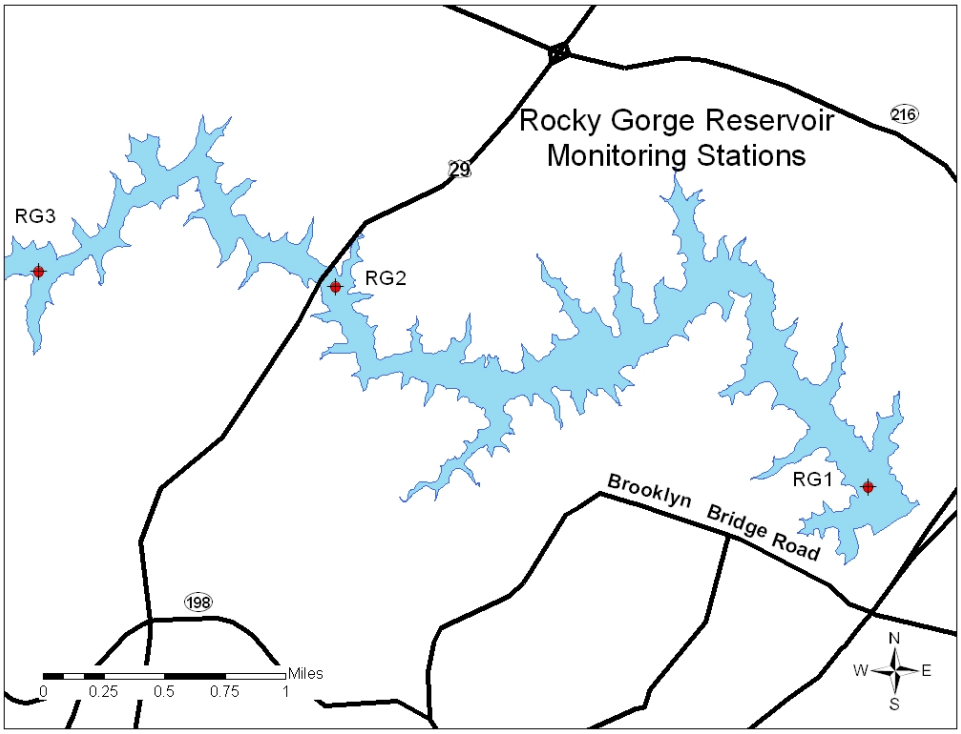

Figure 1. Rocky Gorge Monitoring Station Locations

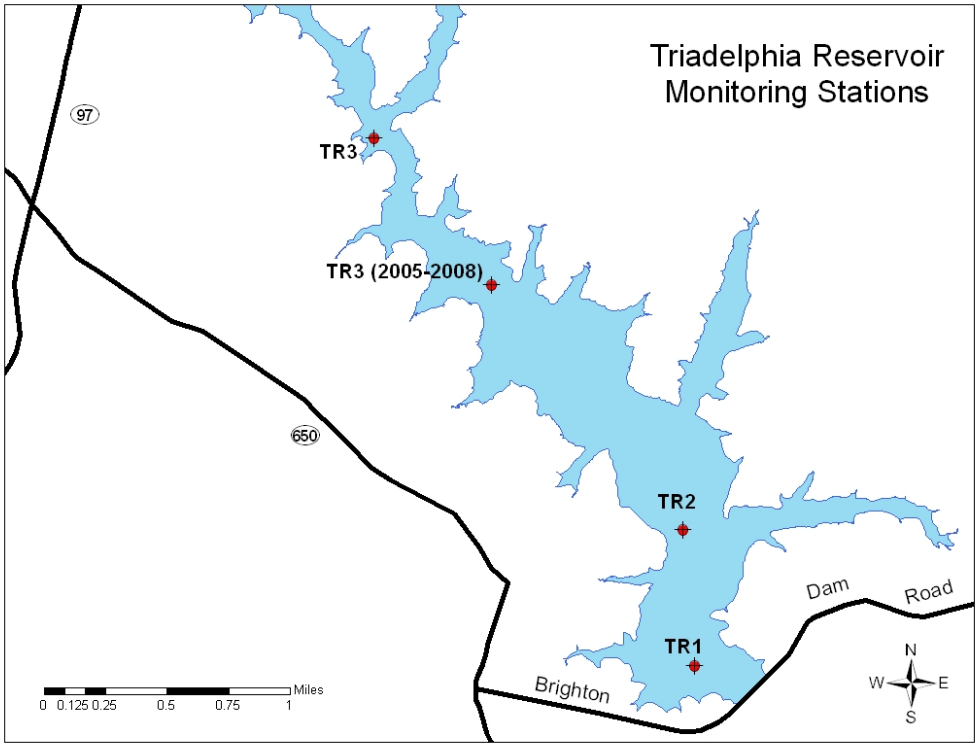

Figure 2. Triadelphia Reservoir Monitoring Station Locations

Objectives of Reservoir Monitoring Program

The objectives of the Patuxent Reservoirs Monitoring Program include the following:

- Describe the water quality in the Patuxent Reservoirs to determine the trophic status and long-term trends (e.g., annual, seasonal, by location),
- Provide information to WSSC's Patuxent Water Filtration Plant operators to optimize treatment and reduce treatment costs,
- Provide data for the calibration of computer models to be used as diagnostic or predictive tools,
- Monitor progress of implementation of best management practices as recommended by the Patuxent Reservoirs Watershed Protection Group's Technical Advisory Committee,
- Monitor progress of TMDL implementation, and
- Help refine watershed management efforts.

Prior Data Analysis

This evaluation of the reservoir monitoring data extends the evaluation done for the period of 1993-2000 by Resource Management Concepts (RMC) under contract to Tetra Tech, Inc. For the current report, reservoir monitoring data for the period 2001-2008 have been added to the original data set and the entire period from 1993-2008 is being evaluated.

The purposes of the RMC analysis (2003) were to: 1) perform a detailed trend analysis of the Patuxent Reservoirs; 2) compare water quality parameters and sedimentation data with the Baltimore City Reservoir system; 3) determine the productivity and impairment of the Patuxent Reservoirs based on trophic state and relative areal oxygen deficits; and 4) compare sediment loads using normalized watershed characteristics.

Conclusions of RMC Analysis

1. The Patuxent Reservoirs showed decreasing trends in pH at stations RG3 and TR3.
2. Both Patuxent Reservoirs were classified as mesotrophic using Carlson's Trophic State Index (Carlson, 1977).

Recommendations from RMC Analysis to Improve the Patuxent Reservoirs Monitoring Program

1. Provide a detailed description of the field sampling and lab techniques.
2. Provide an annual summary report noting significant events (e.g., storm events, algal blooms).
3. Investigate reservoir sediment cores for trend analysis to compliment existing trend analyses.
4. For quality assurance, routinely verify lab results throughout the year.

Field Sampling and Laboratory Methods

Field sampling methods

Historically, the sampling season begins in March and ends in November, which encompasses the growing season in Maryland's piedmont region. A field crew of two WSSC personnel collects water samples for analysis on a monthly basis. Samples are usually collected on two successive days depending on weather conditions. Early morning sampling is preferred because diurnal sunlight and temperature effects can change the dissolved oxygen conditions due to algal respiration.

The field crew uses a gas-powered boat to access all monitoring station locations. Monitoring stations are not marked with permanent buoys, but landmarks or a hand-held GPS receiver are used to return to approximately the same locations.

The field crew uses a Minisonde MS5 probe and a Surveyor 4a data recorder manufactured by Hach to sample in-situ properties of reservoir water at one meter increments from water surface to reservoir bottom. The properties of water recorded by the multi-probe include the following: temperature, dissolved oxygen, percent oxygen saturation, pH, specific conductance, total dissolved solids and redox potential. In addition, water transparency measured with a Secchi disk are recorded.

Samples are collected for laboratory analyses by pumping water from specified depths through weighted silicone tubing directly into the sample bottles. Selected samples are field filtered through a 0.45 μm filter. Samples are collected from one meter below the surface and one meter above the bottom. After sample collection, all bottles are immediately placed in a cooler filled with ice.

Laboratory methods

Samples are delivered to WSSC's Consolidated Laboratory (the lab) on the same day that they are collected.

The list of parameters analyzed has changed only slightly from what was recommended in the Tetra Tech (1997) report. In addition, samples for several parameters are combined into a single composite sample from surface and bottom waters (Table 2).

Table 2. List of parameters analyzed for the Patuxent Reservoirs monitoring program

Parameter	Sampling Locations	Preservative	Container	Lab Method
Alkalinity	Surface/Bottom	4°C	1 Liter HDPE	SM 2320B
Ammonia	Surface/Bottom	4°C	1 Liter HDPE	L10-107-06-1-J
Total Organic Carbon	Composite	4°C	125ml Glass	SM 5310C 20th Ed
Total Chlorophyll-a	Surface	4°C	1 Liter amber HDPE	SM 10200H
Fecal Coliform	Composite	4°C, sodium thiosulfate	125ml plastic	SM 9221E2
Iron	Surface/Bottom	4°C	1 Liter HDPE	EPA 200.8 Rev 5
Manganese	Surface/Bottom	4°C	1 Liter HDPE	EPA 200.8 Rev 5
Total Kjeldahl Nitrogen (TKN)	Surface/Bottom	4°C	1 Liter HDPE	LACHAT-10-107-06
Nitrate and Nitrite Nitrogen	Surface/Bottom	4°C	1 Liter HPDE	LACHAT-10-107-04
Pesticides	Composite	4°C, Ascorbic Acid	1000ml Amber Glass	EPA 525.2 Rev 2
Total Phosphorus (low level)	Surface/Bottom	4°C	1 Liter HPDE	LACHAT-10-115-01-1-F
Soluble Orthophosphate	Surface/Bottom	4°C, Filtered on collection	125ml HDPE	LACHAT-10-115-01-1-B or -A
Turbidity	Surface/Bottom	4°C	1 Liter HDPE	EPA 180.1 Rev 2

Historical Data Set

WSSC has been monitoring water quality of the reservoirs since 1993; however, consistent sample collection on a monthly schedule has proven difficult without interruption. Field crews collected a *complete* set of samples only 2 (12%) and 4 (25%) of 16 years for Rocky Gorge and Triadelphia Reservoirs, respectively (Tables 3 and 4). Sample collection has been indicated on these Tables if either in-situ measurements or lab samples were collected. On a monthly basis, samples have been collected more consistently from April through August.

The gaps in data collection over the 16-year time span make seasonal trends difficult to determine. Several reasons exist for these data gaps. The main reason is due to low water levels that prohibited boat access (e.g., 2006 in Triadelphia Reservoir). Low water levels result from: 1) required maintenance to the intake structures or dam gates that control releases of water from the reservoirs, 2) operation during high water demand times of the year where water from Triadelphia Reservoir is released to ensure an adequate supply of water in Rocky Gorge, or 3) regional drought conditions. Malfunctioning field equipment (e.g., boat motor, water quality instruments) also contributed to several short-term gaps in the sampling program.

Table 3. Historical Sampling Frequency for Rocky Gorge Reservoir

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Annual Total
1993				X		X	X	X			4
1994		X	X	X	X	X		X	X		7
1995			X	X	X	X	X		X	X	7
1996	X	X	X	X	X	X	X	X	X		9
1997			X	X	X	X	X	X			6
1998	X	X	X	X	X	X	X	X	X		9
1999		X	X	X	X	X		X	X		7
2000	X	X	X	X	X	X	X	X			8
2001	X	X	X	X	X	X	X	X			8
2002		X	X	X	X	X	X				6
2003		X	X	X	X	X	X	X			7
2004	X	X	X	X		X					5
2005		X			X	X		X	X		5
2006	X	X	X		X	X	X	Maintenance			6
2007	X		X	X	X	Maintenance on dam					4
2008	X	X	X	X	X	Water level lowered for maintenance					5
Monthly Total	8 (50%)	12 (75%)	14 (88%)	14 (88%)	14 (88%)	14 (88%)	10 (63%)	10 (63%)	6 (38%)	1 (6%)	

Table 4. Historical Sampling Frequency for Triadelphia Reservoir

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Annual Total
1993				X		X	X				3
1994		X	X	X	X	X	X	X	X		8
1995		X	X	X	X	X	X		X	X	8
1996	X	X	X	X	X	X	X	X	X		9
1997			X	X	X	X	X	X	X		7
1998	X	X	X	X	X	X	X	X	X		9
1999	X	X	X	X	X	X		X	X		8
2000	X	X	X	X	X	X	X	X	X		9
2001	X	X	X	X	X	X	X	X			8
2002		X	X	X	X	X	X				6
2003		X	X	X	X	X	X	X			7
2004	X	X	X	X		X					5
2005		X		X		X		X	X		5
2006	X	Water level lowered for maintenance									1
2007	X		X		X	X	Maintenance on dam				4
2008	X	X	X	X	X	X	X	X	X		9
Monthly Total	9 (56%)	12 (75%)	13 (81%)	14 (88%)	12 (75%)	15 (94%)	11 (69%)	9 (56%)	8 (50%)	1 (6%)	

Evaluation of Results

An evaluation of water quality data has been performed for ten indicators to assess the condition of the Patuxent Reservoirs including: chlorophyll-a, total and orthophosphate phosphorous, nitrogen (Total Kjeldahl, nitrate-nitrite and ammonia), total organic carbon, water transparency (using Secchi depth), chloride, and total algal counts. The ten indicators were chosen for inclusion in this report because of their relevance to nutrient reductions as required by Total Maximum Daily Load (TMDLs) for each reservoir and for their usefulness to operators at the Patuxent Water Filtration Plant.

Median values were chosen to represent the center of each data set because lake water quality data typically contain several extreme values that skew the distribution and influence the mean. The variability of each data set is shown by the use of box plots (Figure 3). Some graphs in this report also include a linear regression of concentration over time to indicate a potential trend.

Two types of graphs are used to present the results for each parameter analyzed. First, time series graphs are used to illustrate variability over time and, in some cases, apparent seasonal patterns. Second, box plots are used to consolidate much of the data for comparisons of median values and ranges. Annual, seasonal, monthly, and by-station box plots are used to show variability over time and among stations. For box plots, the data in each set are ordered from lowest to highest. The range of values is shown by length of the line of each data set; the minimum and maximum values are shown by short horizontal lines. The box represents the interquartile range (IQR) containing the middle 50% of the data from the 25th percentile to the 75th percentile. The median is the middle value of each ordered data set (50th percentile), illustrated by a triangle within the IQR. (Figure 3). Box plots also reveal the distribution of the data as indicated by the position of the box within the range of values; boxes located closely to one end of the range indicate a skewed distribution.

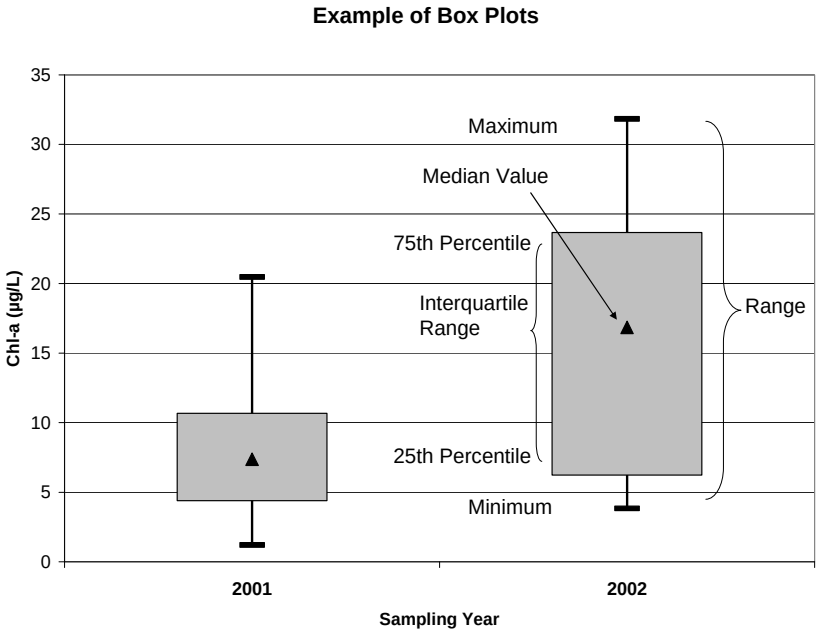

Figure 3. Example of Box Plot

Chlorophyll-a

Chlorophylls are one type of photosynthetic pigment present in algae; chlorophyll-a (Chl-a) is the primary pigment of all photosynthetic organisms, and it is present in almost all algae including blue-green algae (Wetzel, 2001). Due to its presence in almost all algal groups, it is often used as a surrogate to estimate algal abundance.

Therefore, Chl-a is especially important to managers of drinking water supply reservoirs because elevated results often indicate degraded water quality conditions. For instance, an increase in algal populations as indicated by increasing Chl-a often leads to accelerated dissolved oxygen consumption and anoxic conditions in the *hypolimnion* (i.e., relatively cold and undisturbed lower water layer) during summer stratification. Hypolimnetic anoxia may permit the release of nutrients (e.g., phosphorus) and minerals (e.g., manganese) from bottom sediments into the water column, substances that are otherwise bound in the reservoir sediments when the overlying water is oxygenated. Any phosphorous released during summer months may be available to algae when the lake water mixes once again during the autumn months, potentially resulting in algal blooms.

Results and Discussion

All Chl-a results reported represent *total* Chl-a concentrations. Total Chl-a may overestimate algal abundance, however, because it includes other degradation products of Chl-a (e.g., pheophytin) that can interfere with Chl-a calculations (APHA, 1995).

Time Series

The time series graphs of Chl-a concentrations reveal a seasonal pattern of the data at all stations for both reservoirs (Figures 4 and 5).

For Rocky Gorge Reservoir, peak values generally occur during the spring and the lowest values generally occur in autumn and late summer. However, mid-reservoir (RG2) results have peaked in August, and up-reservoir (RG3) results have peaked in October.

For Triadelphia Reservoir, peak values occur throughout the year near the dam (TR1). Mid-reservoir (TR2) results tend to peak in March and August, and up-reservoir (TR3) results tend to peak in August and September. The lowest Chl-a concentrations usually occur in June at all three monitoring station locations.

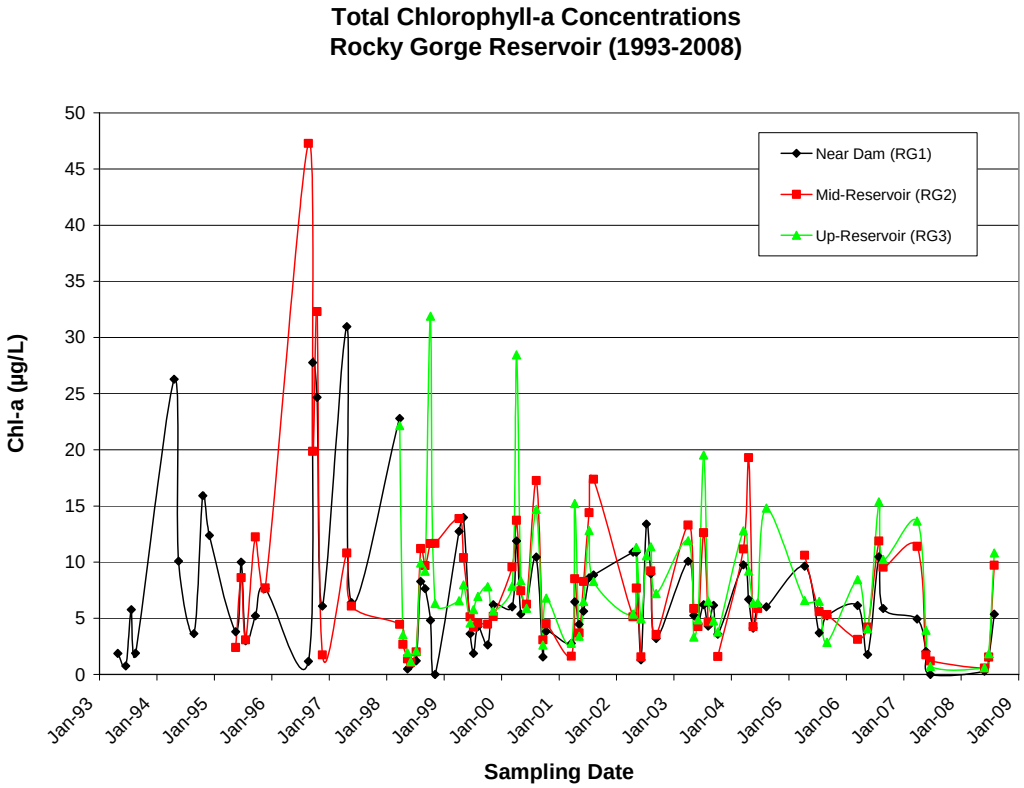

Figure 4. Total Chlorophyll-a Results for Rocky Gorge Reservoir

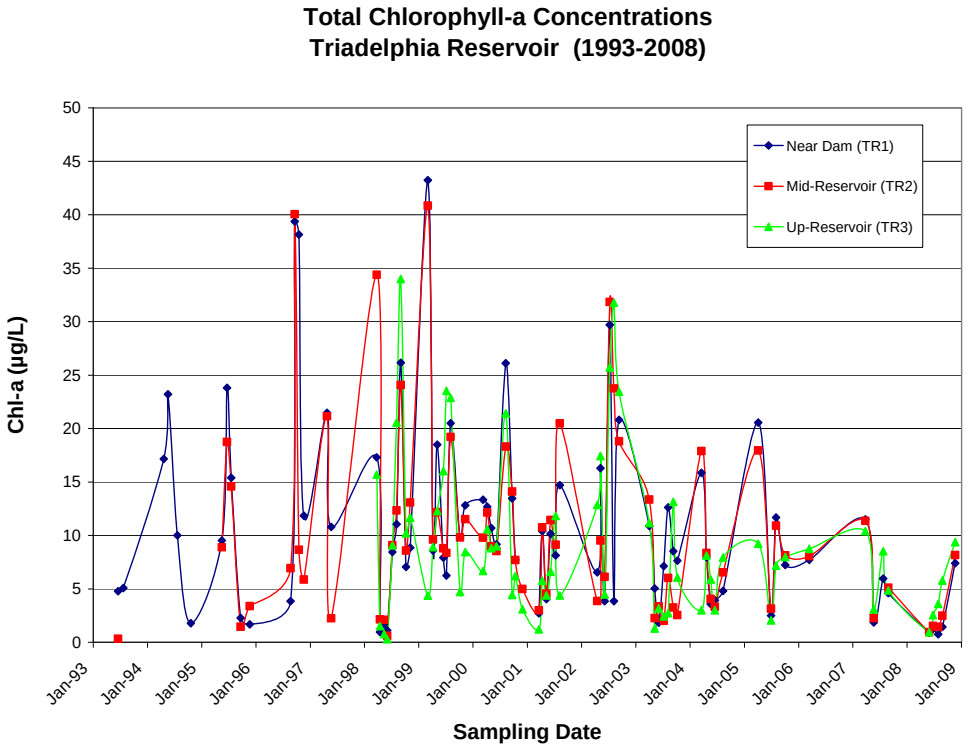

Figure 5. Total Chlorophyll-a Results for Triadelphia Reservoir

Comparison between Reservoirs

Chl-a concentrations are very similar among monitoring station locations within each reservoir and also between reservoirs (Figure 6). Median values are almost identical among stations in Rocky Gorge (about 6 micrograms/Liter (µg/L)) as well as in Triadelphia (about 8 µg/L). Also, Chl-a concentrations do not appear to be *decreasing* as water moves through each reservoir.

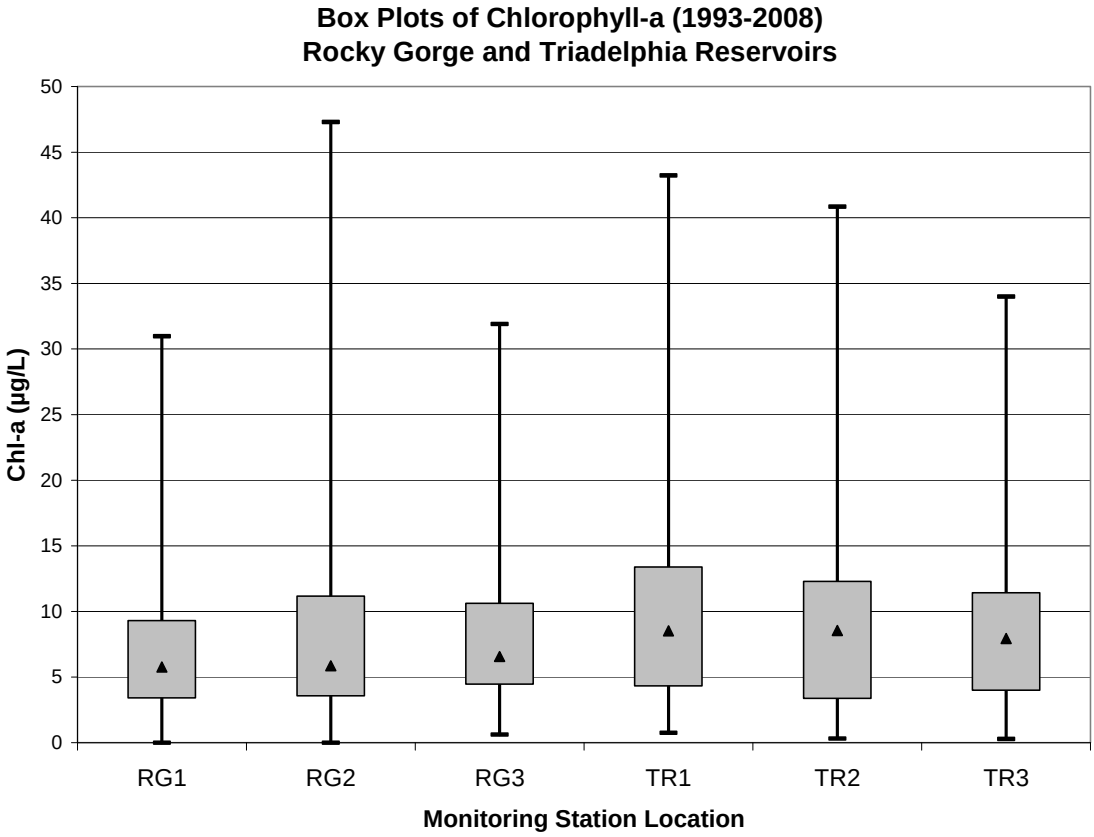

Figure 6. Box Plots of Chlorophyll-a by Reservoir Station Location

Annual Comparisons

For annual comparisons, sampling years are included in this analysis where samples have been collected for at least 6 of the 9 months (67%); sufficient data were available from 1998-2003.

Rocky Gorge

Annual, median Chl-a concentrations of 5-10 µg/L have been consistent since 1998 (Figure 7).

Triadelphia

Annual, median Chl-a concentrations of 5-17 µg/L are more variable compared with Rocky Gorge (Figure 8). In addition, as indicated by larger IQRs and ranges, there is greater variability of Chl-a concentrations in Triadelphia. Unlike Rocky Gorge, there appears to be cyclical pattern in median values over the date range, which could be related to different hydrologic conditions.

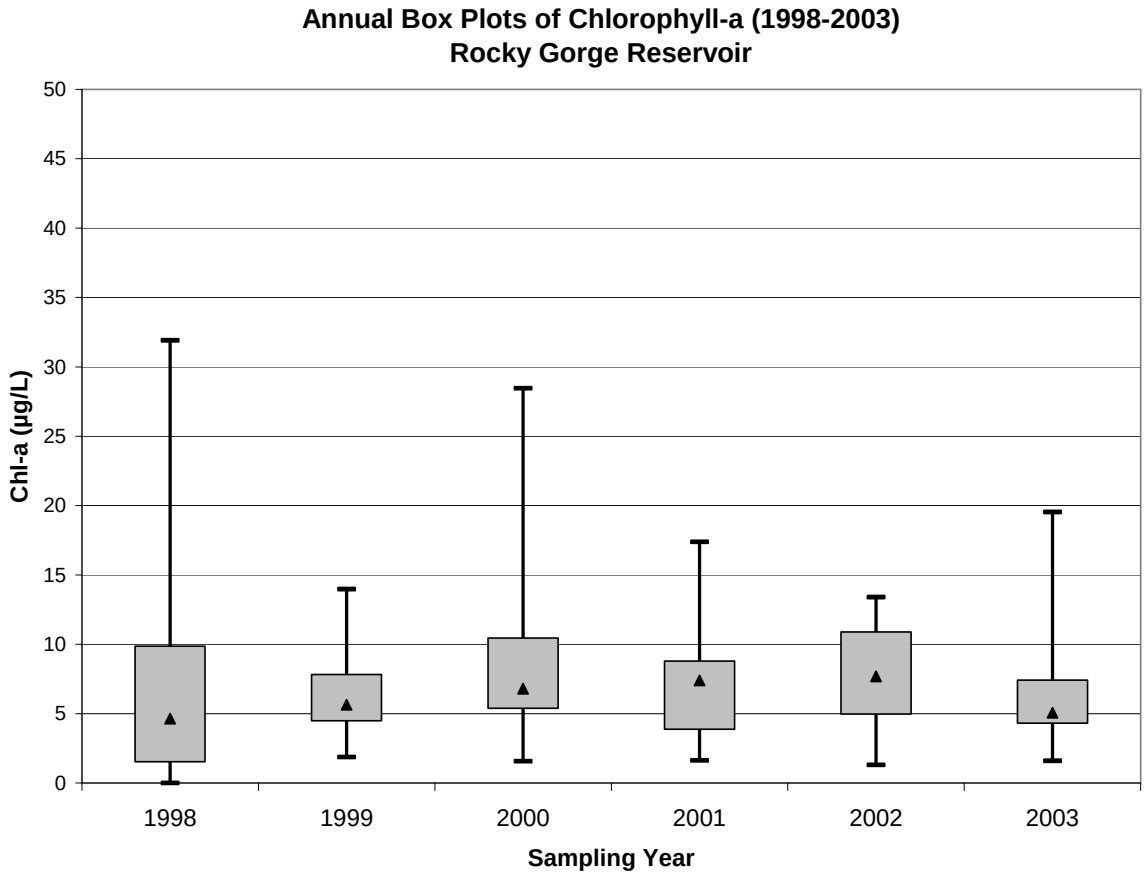

Figure 7. Annual Box Plots of Total Chlorophyll-a for Rocky Gorge Reservoir

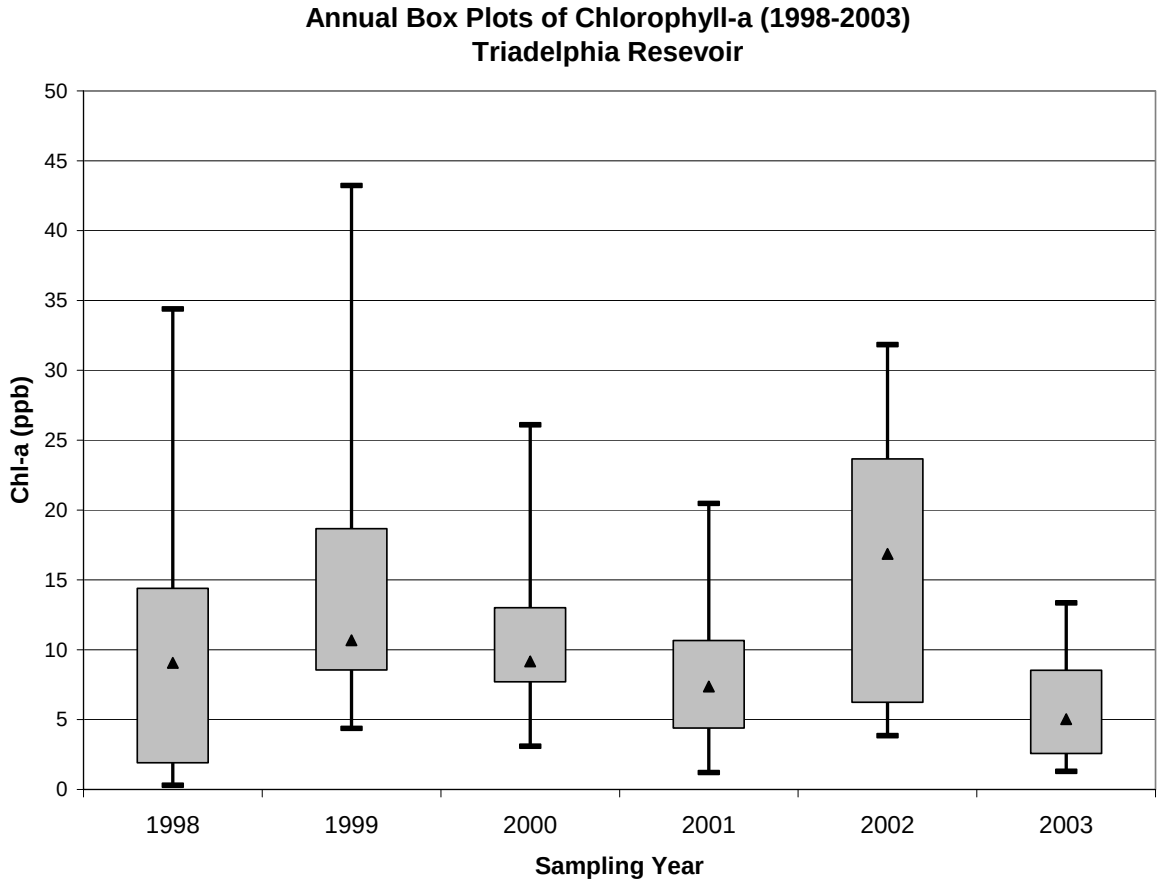

Figure 8. Annual Box Plots of Chlorophyll-a for Triadelphia Reservoir

Monthly Comparisons

Data are included for monthly comparisons from March through October; however, samples were collected in fewer than 50% of the years in March, September, and October for both reservoirs.

Rocky Gorge

Monthly, median Chl-a concentrations peak in April with minimum values occurring in May and June (Figure 9). There appears to be a weak cyclic pattern in Chl-a results beginning with higher values in the spring followed by minimum values reached in May and June followed by higher values in late summer. Results from August have the greatest variability.

Triadelphia

There is a more pronounced cyclic pattern in the Chl-a results and more variation compared with Rocky Gorge reservoir (Figure 10). Monthly, median Chl-a concentrations peak in September with minimum values occurring in May and June.

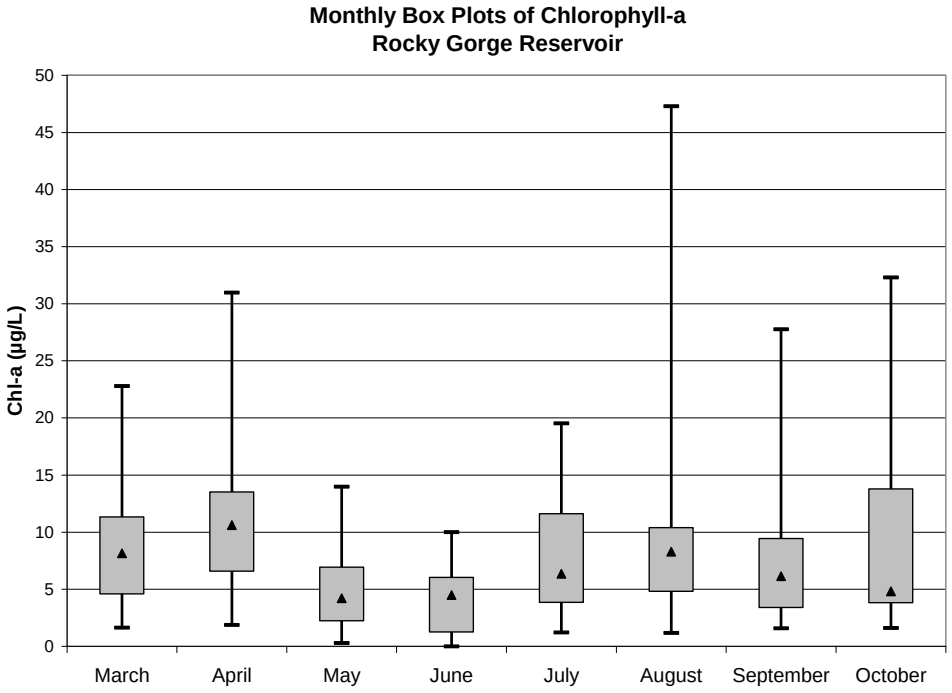

Figure 9. Monthly Box Plots of Chlorophyll-a for Rocky Gorge Reservoir

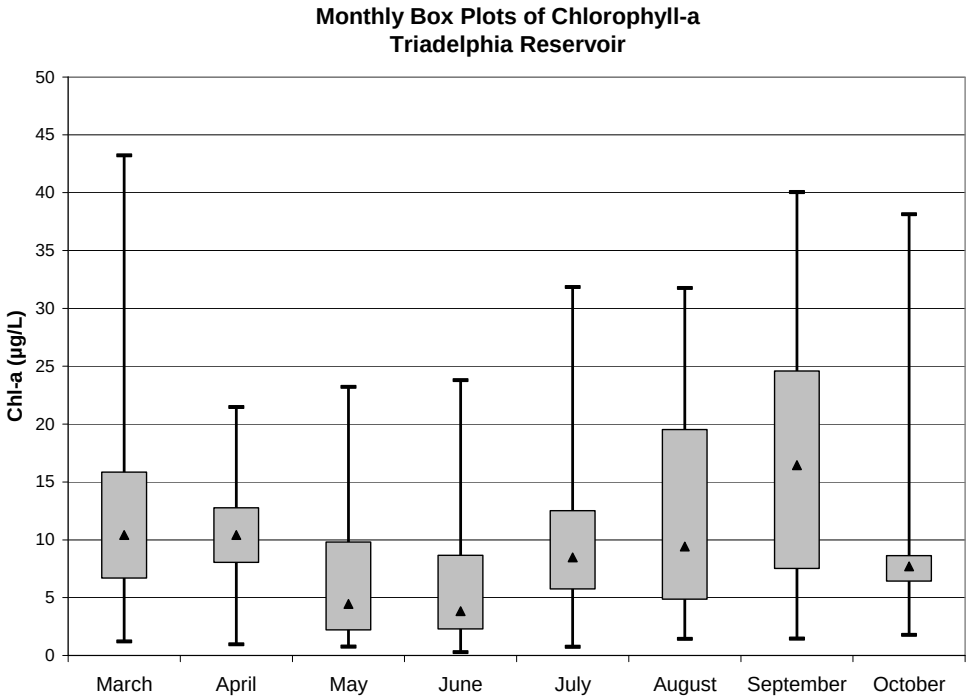

Figure 10. Monthly Box Plots of Chlorophyll-a for Triadelphia Reservoir

Seasonal Comparisons

Seasons comprise three-month time periods for this analysis. March through May represent the spring season; June through August represent the summer season; and September through November represent the autumn season.

For both reservoirs, there is little difference among seasonal median and IQR Chl-a concentrations. For Rocky Gorge, the upper range of values during the summer is greater than the other seasons (Figures 11 and 12).

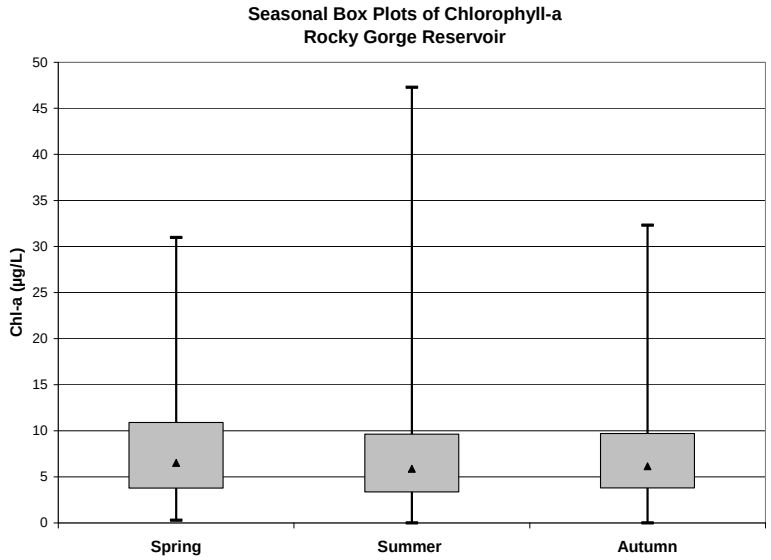

Figure 11. Seasonal Box Plots of Chlorophyll-a for Rocky Gorge Reservoir

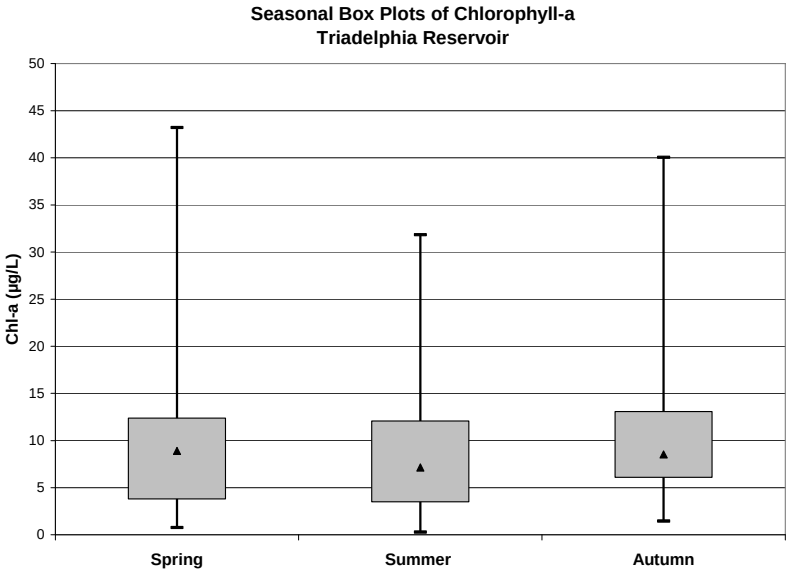

Figure 12. Seasonal Box Plots of Chlorophyll-a for Triadelphia Reservoir

Total Phosphorous and Orthophosphate-Phosphorus

The availability of nutrients strongly influences algal production in reservoirs. Phosphorus and nitrogen are by far the most in demand given their very low supply in reservoir water; therefore, algal growth is limited by the availability of these two nutrients, but especially phosphorous (Wetzel, 2001). For the Patuxent Reservoirs, studies have confirmed that phosphorus is the limiting nutrient for biological productivity (JTC, 1984). Orthophosphate-phosphorous (OP) is significant because it is the only directly utilizable form of soluble inorganic phosphorus (Wetzel, 2001).

Methods

Total phosphorous (TP) and (OP) samples are collected from surface and bottom waters at each monitoring station, and OP samples are filtered on-site prior to analysis.

Results and Discussion

Figures 13-16 display annual bar charts of TP with the OP portion shown in red for both reservoirs. Each annual total represents the average of all monitoring stations.

Annual Comparisons

Data were included for annual average comparisons of TP and OP results when samples were collected for at least six (67%) of the nine monthly sampling events per year.

Rocky Gorge Reservoir

Surface concentrations of TP range from approximately 20-65 µg/L with a maximum occurring in 1998. Annual average surface concentrations also exceed the threshold value of 24 µg/L used in Carlson's Trophic State Index (TSI) between eutrophic and mesotrophic conditions with the exception of 1995 (Figure 13). Surface concentrations of OP have no apparent trend and are less than 10 µg/L.

Bottom concentrations of TP range from approximately 25-80 µg/L with a maximum also occurring in 1998 (Figure 14); furthermore, bottom concentrations are greater than surface concentrations of the same year with the exception of 2003. With one exception (2001), bottom concentrations of OP are less than 10 µg/L and have no apparent trend.

Triadelphia Reservoir

Surface concentrations of TP range from approximately 20-65 µg/L with a maximum occurring in 1998 (Figure 15). Annual average surface TP concentrations are greater than those results from Rocky Gorge. Surface concentrations of OP have no apparent trend and are usually less than 10 µg/L.

Bottom concentrations of TP range from approximately 30-90 µg/L with a maximum occurring in 2002 (Figure 16); furthermore, *bottom* concentrations of TP, like Rocky Gorge, are also greater than corresponding surface concentrations. Bottom OP concentrations appear to be decreasing since 1995 (Figure 16).

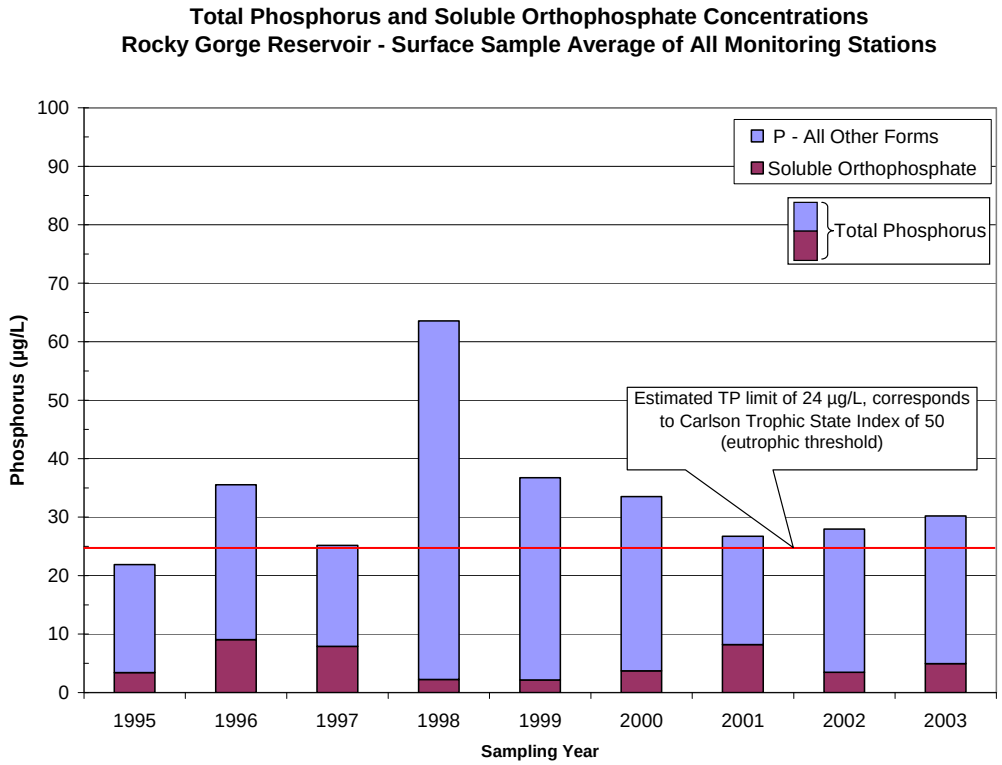

Figure 13. Annual Average TP and Soluble OP for Rocky Gorge Reservoir - surface

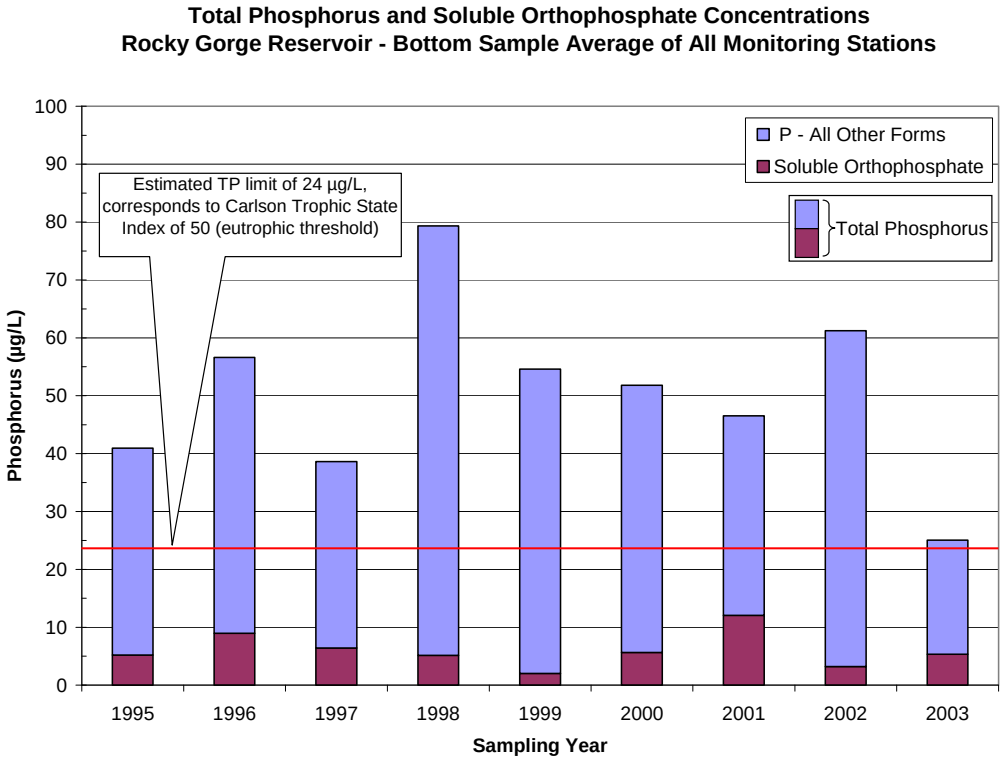

Figure 14. Annual Average TP and Soluble OP for Rocky Gorge Reservoir - bottom

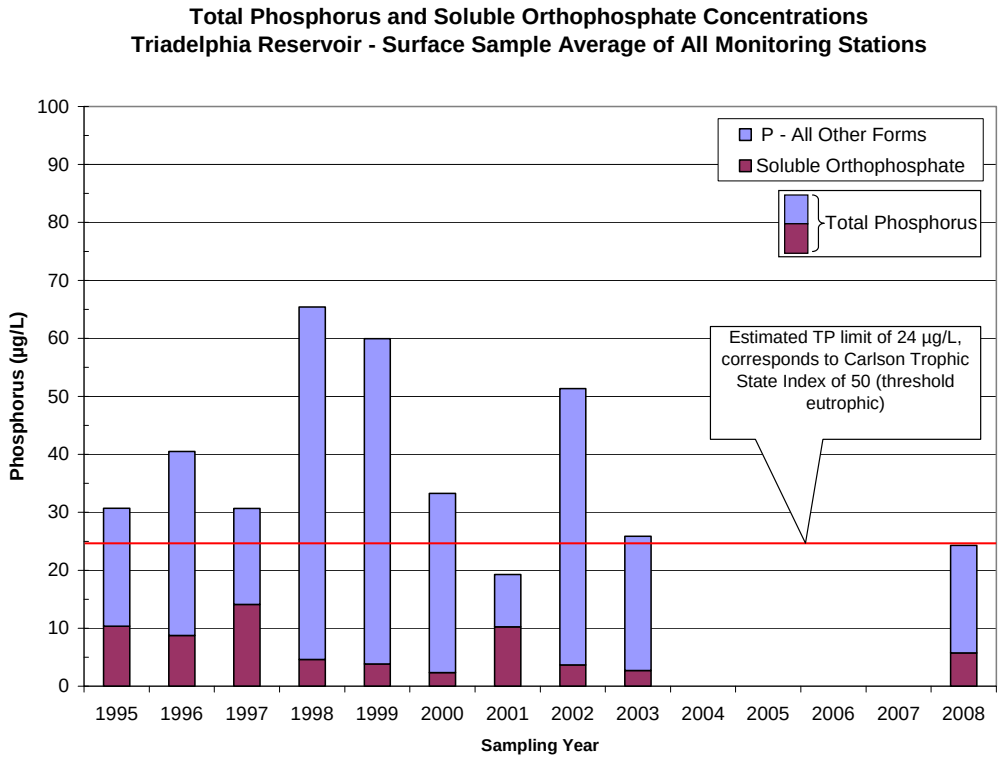

Figure 15. Annual Average TP and Soluble OP for Triadelphia Reservoir - surface

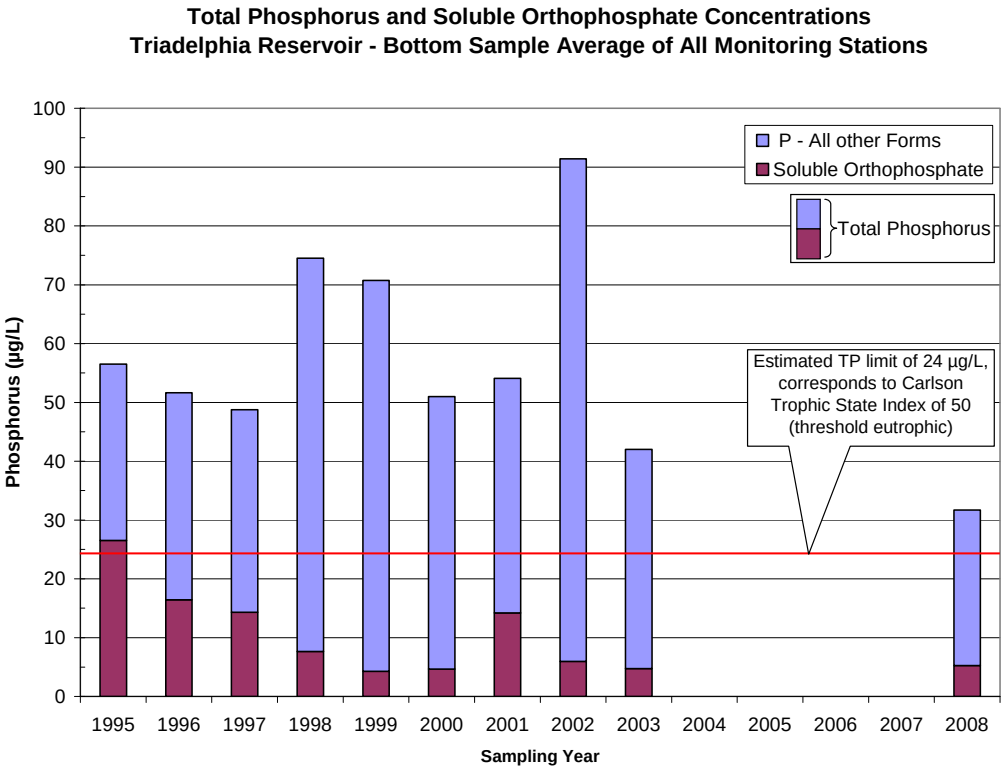

Figure 16. Annual Average TP and Soluble OP for Triadelphia Reservoir - bottom

Comparison between Reservoirs

Monthly TP concentrations are shown for each monitoring station in both reservoirs from 1993 though 2008 (Figures 17 and 18).

Rocky Gorge Reservoir

Surface concentrations of TP appear to have two seasonal maximums: one during the spring and another in the autumn. Peak TP concentrations occur in March and October (Figure 17); the lowest TP concentrations occur in the late spring and summer months (May through August). TP concentrations are mostly similar among monitoring stations with the exceptions of RG2 in March and RG3 in November. Also, no consistent decrease in TP concentrations is evident from samples as water moves toward the intake for the water filtration plant.

Triadelphia Reservoir

Surface concentrations of TP may also have two seasonal maximums (spring and autumn), although not as noticeable as in Rocky Gorge Reservoir. Peak TP concentrations occur in March and October (Figure 18); the lowest TP concentrations occur in the late spring and summer months (May through August). TP concentrations are mostly similar among monitoring stations with the exception of TR3 as TP concentrations increase at this station from June through September.

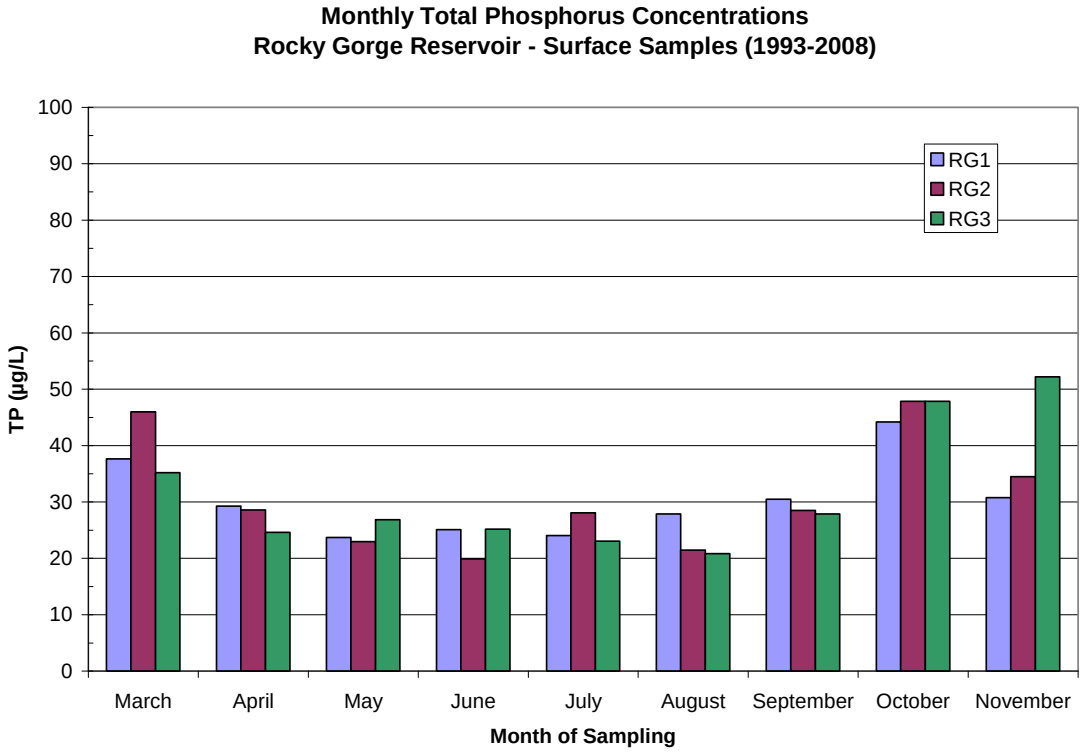

Figure 17. Monthly TP Concentrations by station for Rocky Gorge Reservoir - surface

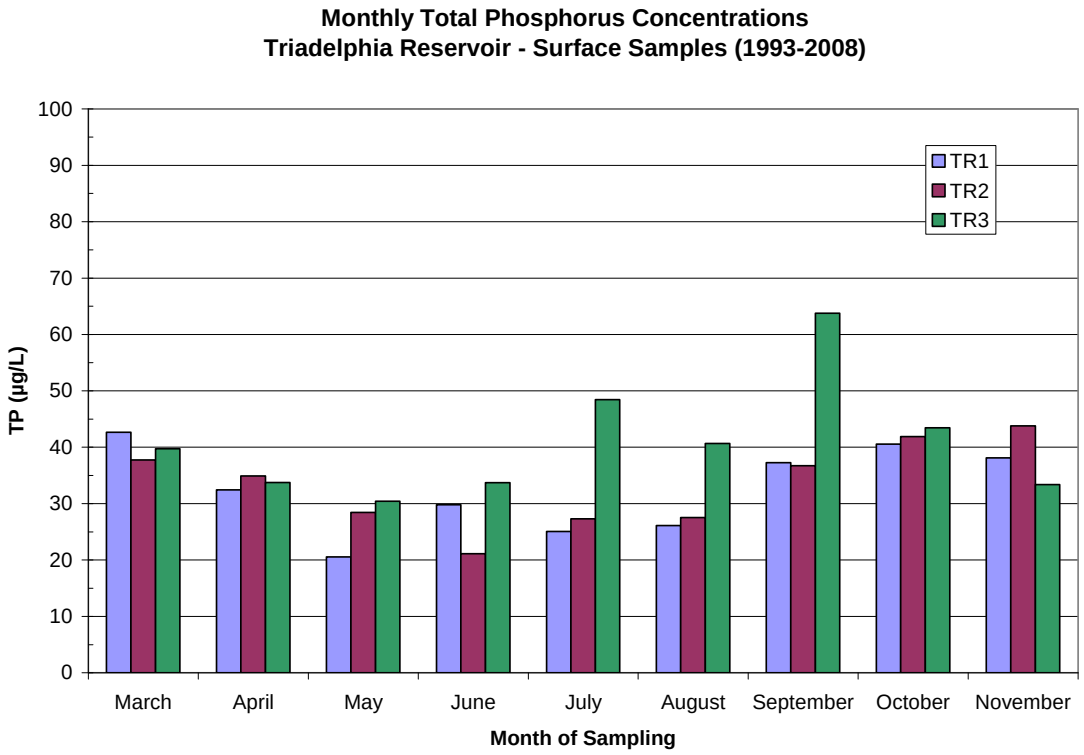

Figure 18. Monthly TP Concentrations by station for Triadelphia Reservoir – surface

Monthly Comparisons

Monthly box plots of TP concentrations are shown in Figures 19-22. Each monthly box plot represents average TP concentrations for all monitoring station locations. Extreme maximum values for several months are not shown on these plots to allow for easier comparisons of median values. For Rocky Gorge Reservoir, data were excluded from this comparison in November because samples were collected in fewer than half of the sixteen sampling years.

Rocky Gorge Reservoir

Box plots of *surface* concentrations of TP show a similar seasonal pattern of median values with two peak periods occurring in spring and autumn as seen in Figure 17. Median TP maximum concentrations occur in March and October. TP concentrations are less variable during the summer than in spring (Figure 19).

Median TP concentrations of the *bottom* waters increase during the late summer months and into the autumn (Figure 20).

Triadelphia Reservoir

Box plots of *surface* concentrations of TP show a similar seasonal pattern of median values with two peak periods occurring in spring and autumn as seen in Figure 18. Median TP maximum concentrations occur in March, September, and October (Figure 21).

Median TP concentrations of the *bottom* waters reveal a more pronounced increase beginning in July (Figure 22). Peak TP concentrations occur in September. The greatest variability in each of the four locations occurs in the bottom waters of Triadelphia.

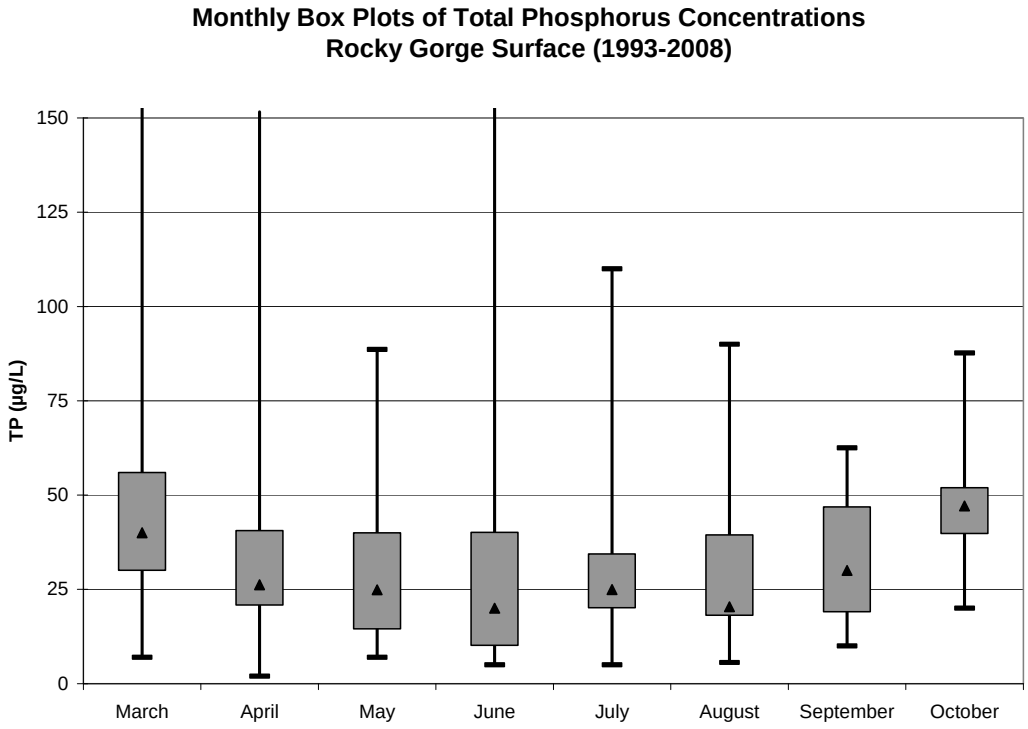

Figure 19. Monthly Box Plots of TP Concentrations for Rocky Gorge Reservoir - surface

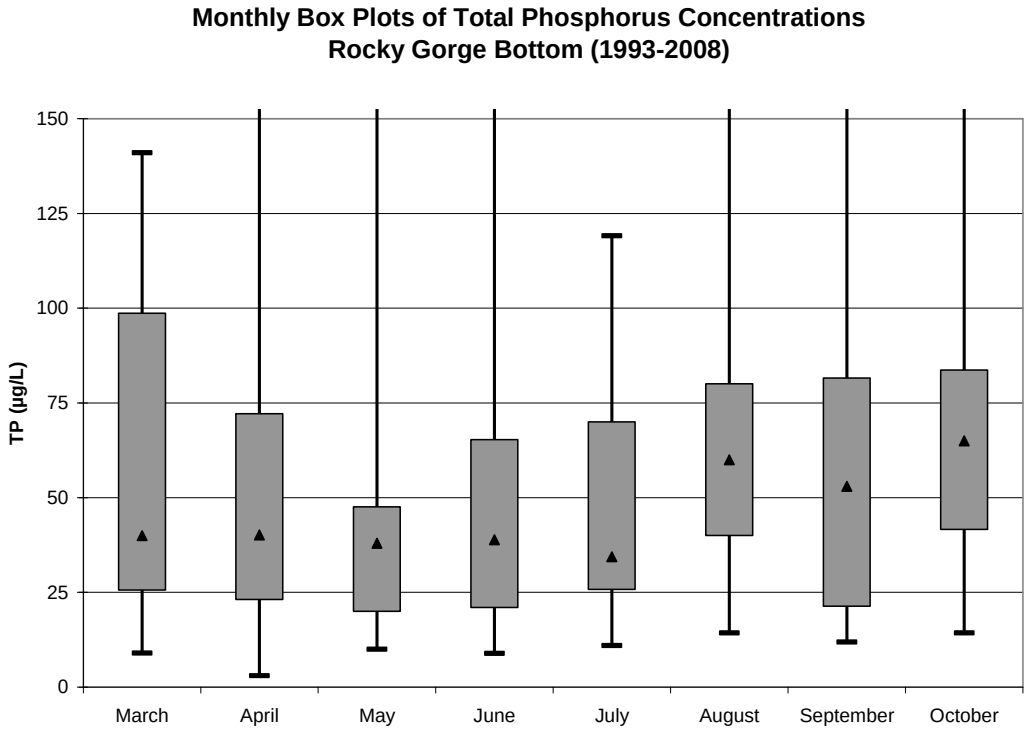

Figure 20. Monthly Box Plots of TP Concentrations for Rocky Gorge Reservoir - bottom

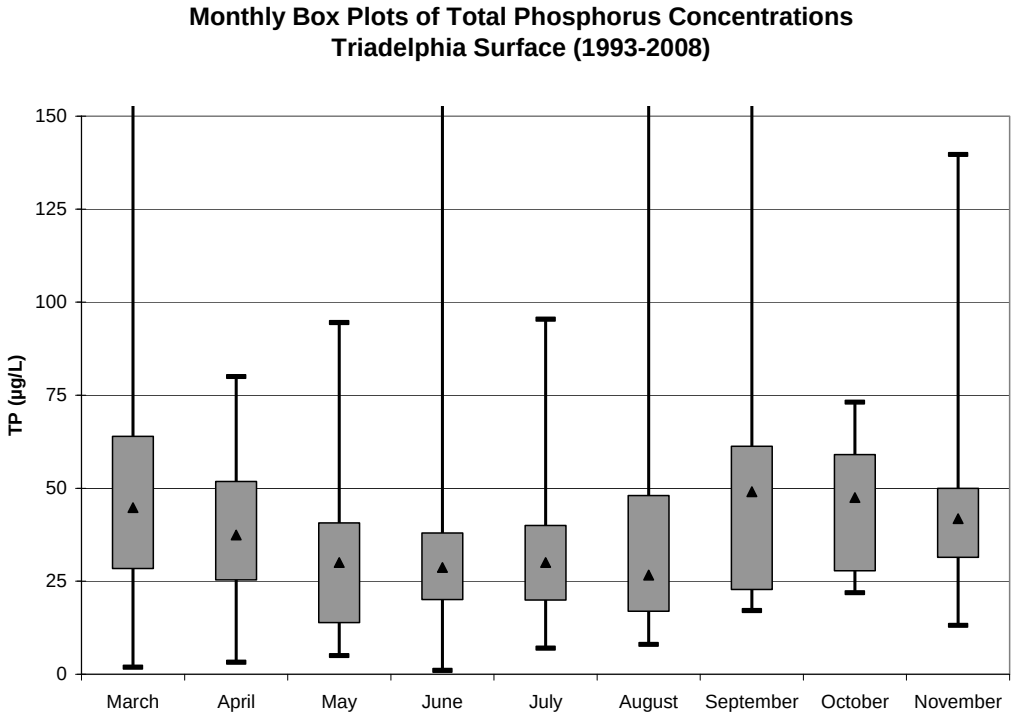

Figure 21. Monthly Box Plots of TP Concentrations for Triadelphia Reservoir – surface

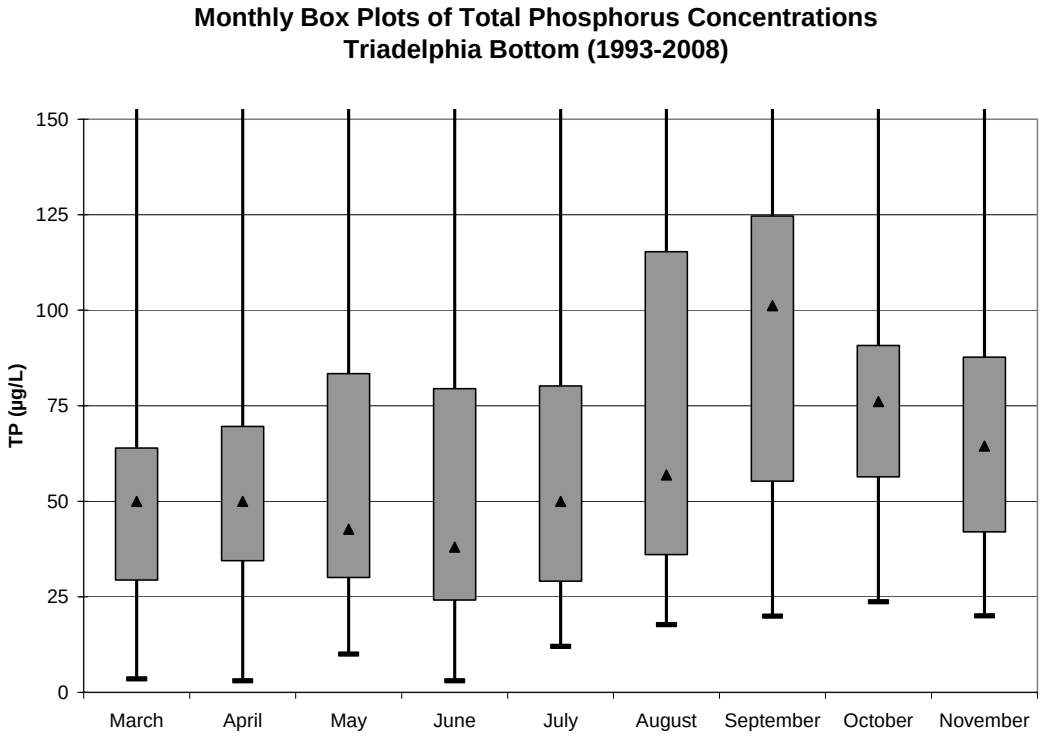

Figure 22. Monthly Box Plots of TP Concentrations for Triadelphia Reservoir - bottom

Nitrogen

Nitrogen occurs in many forms within fresh waters; dominant forms include dissolved molecular N2, ammonia-nitrogen, nitrate, nitrite, and a large number of organic compounds (Wetzel, 2001). Nitrogen fixation by soil bacteria is a major source of reactive nitrogen, and nitrogen fixation by cyanobacteria (blue-green algae) is usually a less significant source (Wetzel, 2001).

Methods

Samples are analyzed for total Kjeldahl nitrogen (TKN), ammonia-nitrogen, and nitrate+nitrite nitrogen (NO3+NO2-N). TKN represents the sum of ammonia-nitrogen and organic forms of nitrogen. Unlike total phosphorous that is measured directly, total nitrogen is calculated by summing TKN and NO3+NO2-N. Like phosphorus, samples are collected from surface and bottom waters at each monitoring station.

Results and Discussion

Time Series graphs

The time series graphs of surface and bottom waters for both reservoirs indicate the likely presence of seasonality in the data sets by the cyclic pattern of NO3+NO2-N concentrations over time (Figures 23-26). Annual maximum concentrations of about 1.5-3.0 milligrams/Liter (mg/L) typically occur during the spring months; annual minimum concentrations occur during the summer and early autumn months.

Rocky Gorge Reservoir

For Rocky Gorge Reservoir, results from all monitoring stations are similar over time with the exception of RG1 exceeding the other stations from 2003-2004. It appears that there is little difference between surface and bottom sample results (Figures 23 and 24).

Triadelphia Reservoir

There appears to be slightly more variability in NO3+NO2-N concentrations in samples from Triadelphia than in sample results from Rocky Gorge. Similar to Rocky Gorge Reservoir, results from all monitoring stations are similar over time with the exception of the up-reservoir station (TR3), which exceeded the other locations from 1998-2000 (Figures 25 and 26).

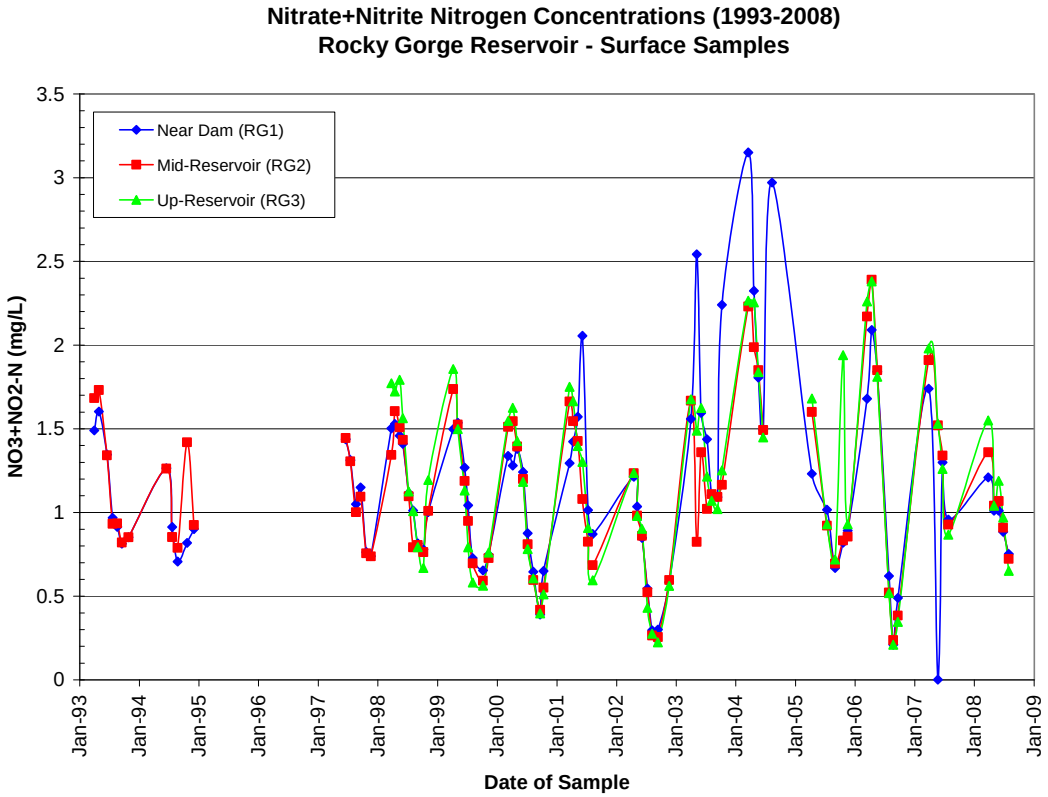

Figure 23. Nitrate+Nitrite Nitrogen Concentrations for Rocky Gorge Reservoir - surface

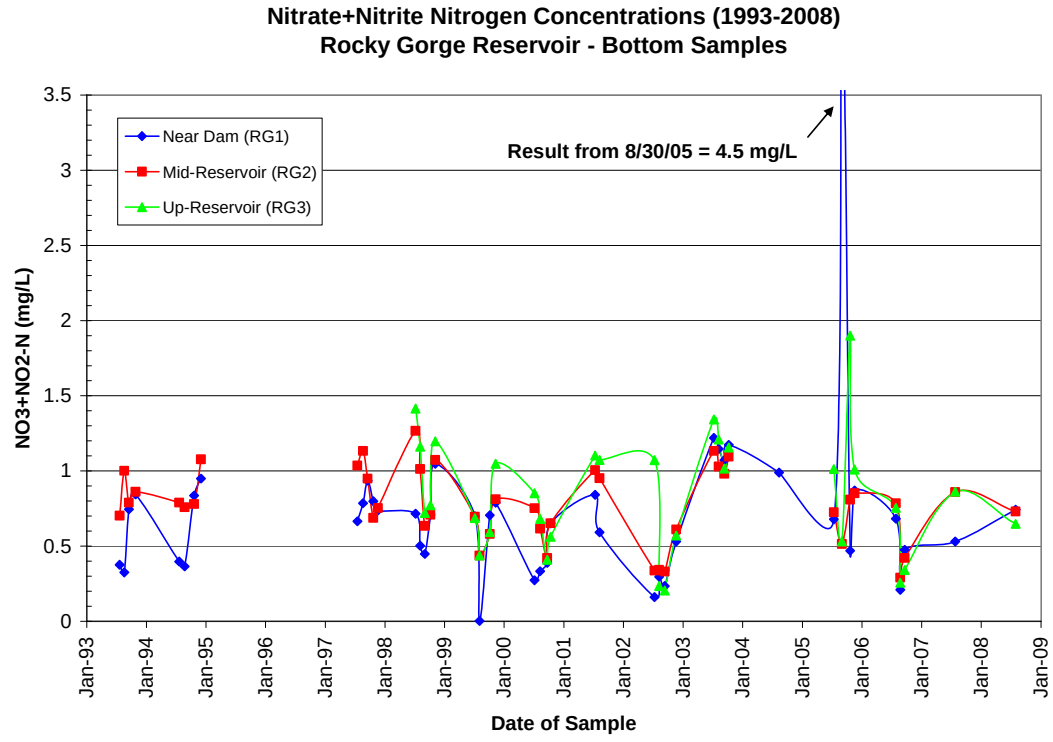

Figure 24. Nitrate+Nitrite Nitrogen Concentrations for Rocky Gorge Reservoir – bottom

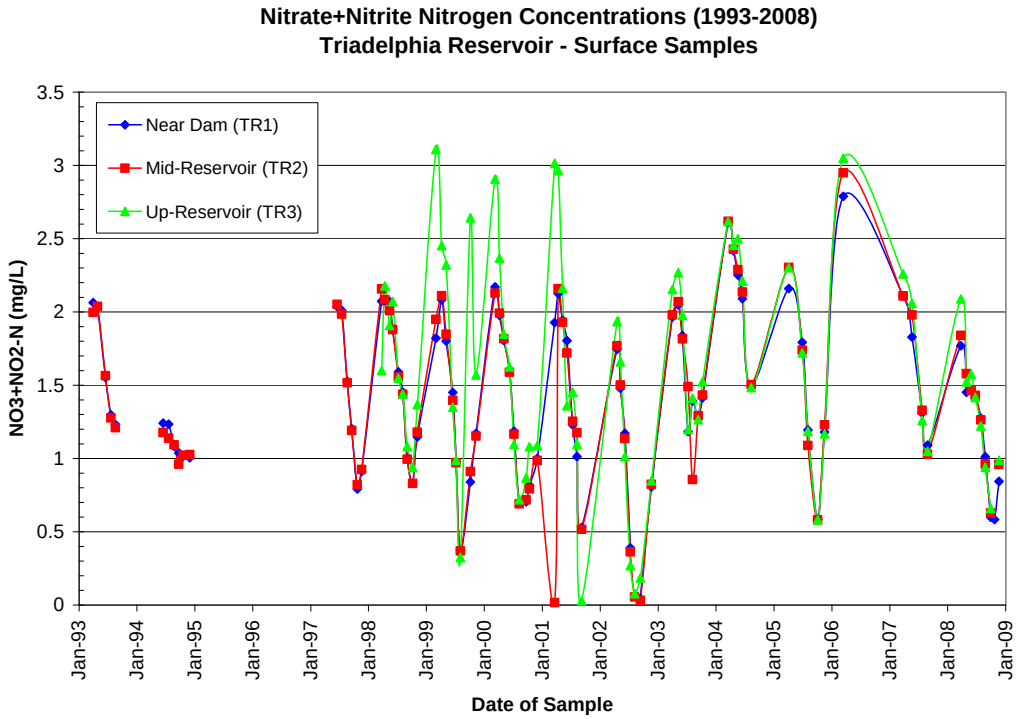

Figure 25. Nitrate+Nitrite Nitrogen Concentrations for Triadelphia Reservoir - surface

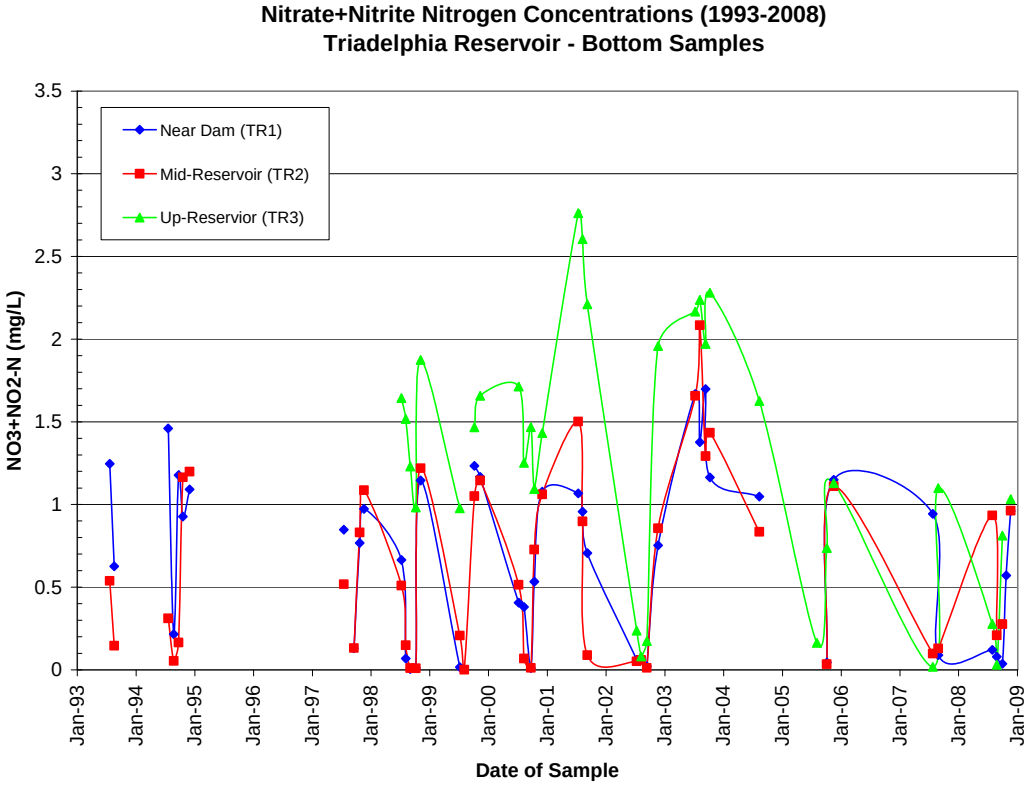

Figure 26. Nitrate+Nitrite Nitrogen Concentrations for Triadelphia Reservoir - bottom

Annual Comparisons

Figures 27-30 display annual stacked bar charts of total nitrogen (TN) as the sum of NO3+NO2-N and TKN (representing organic nitrogen and ammonia nitrogen). Annual TN concentrations represent the average of all monitoring stations within each reservoir. Data were included for annual comparisons of nitrogen results when samples were collected for at least six (67%) of the nine monthly sampling events per year.

Rocky Gorge Reservoir

TN is mostly composed of NO3+NO2-N (about 2/3), then organic nitrogen (1/3) with a small amount of ammonia nitrogen also present for both surface and bottom samples. *Surface* concentrations of TN range between 1-2 mg/L. Very little ammonia nitrogen is present in the surface samples (Figure 27). *Bottom* concentrations of TN are similar to surface concentrations, although more ammonia nitrogen is present in bottom sample results (Figure 28).

Triadelphia Reservoir

TN is mostly composed of NO3+NO2-N (about 3/4), then organic nitrogen (1/4) with a small amount of ammonia nitrogen also present for both surface and bottom samples (Figures 29 and 30). TN results are slightly greater in Triadelphia than in Rocky Gorge. *Surface* concentrations of TN range from about 1.5-2 mg/L and declined from 1998 until 2002. *Bottom* concentrations of TN are similar to surface concentrations; however, like Rocky Gorge, more ammonia is present in bottom samples than in surface samples.

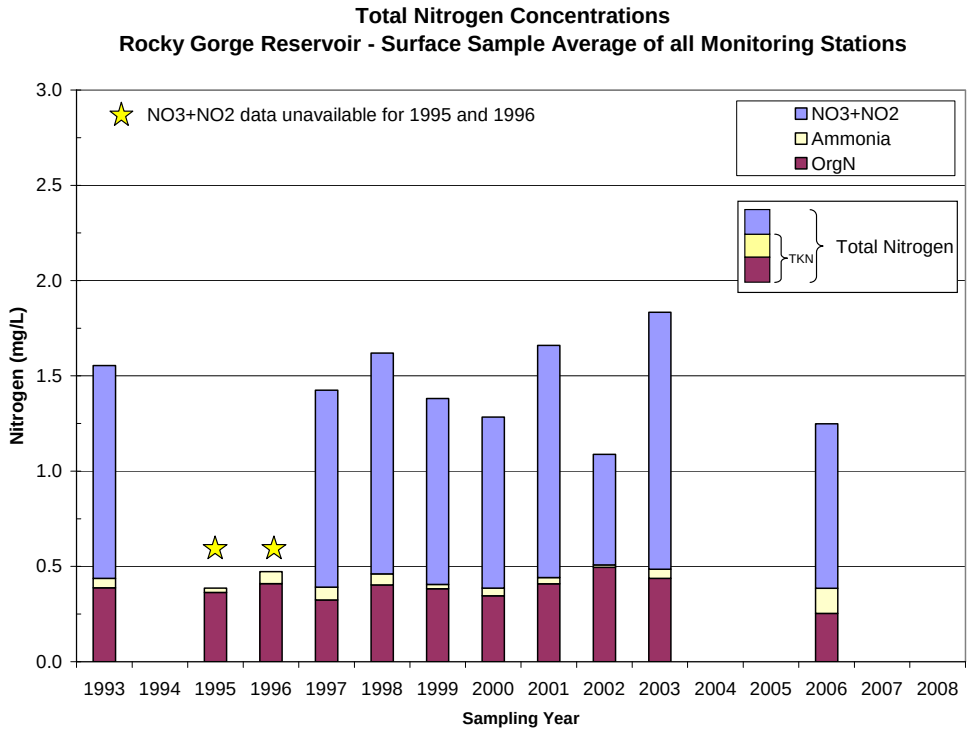

Figure 27. Annual Avg. Total N, TKN, and Organic N for Rocky Gorge Reservoir – surface

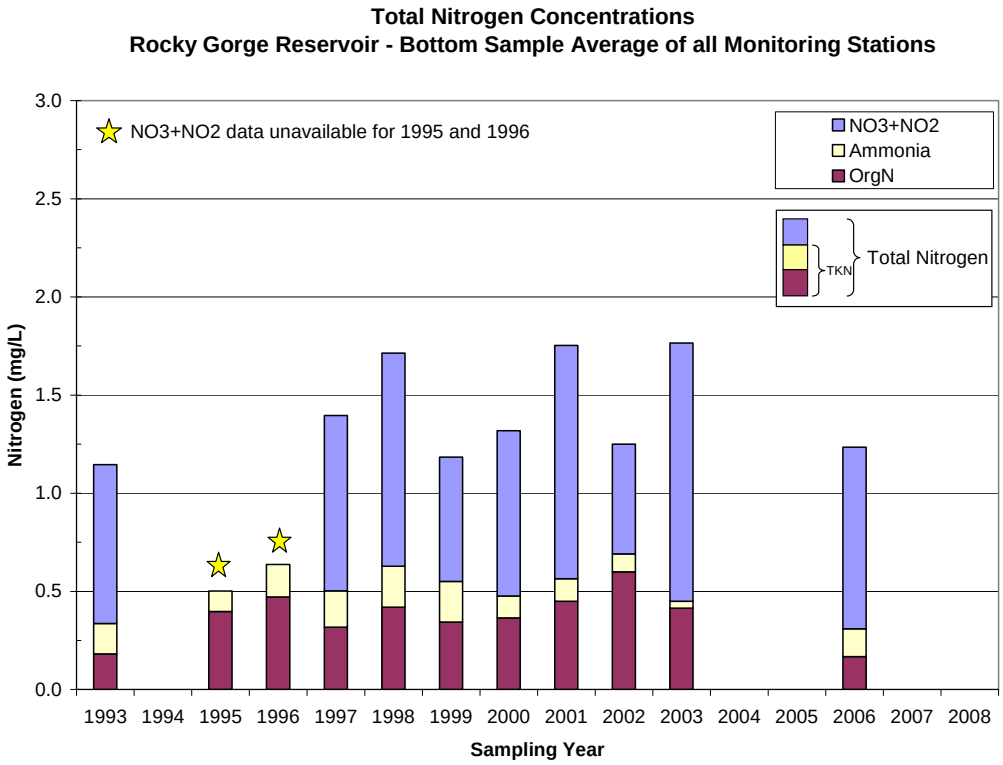

Figure 28. Annual Avg. Total N, TKN, and Organic N for Rocky Gorge Reservoir - bottom

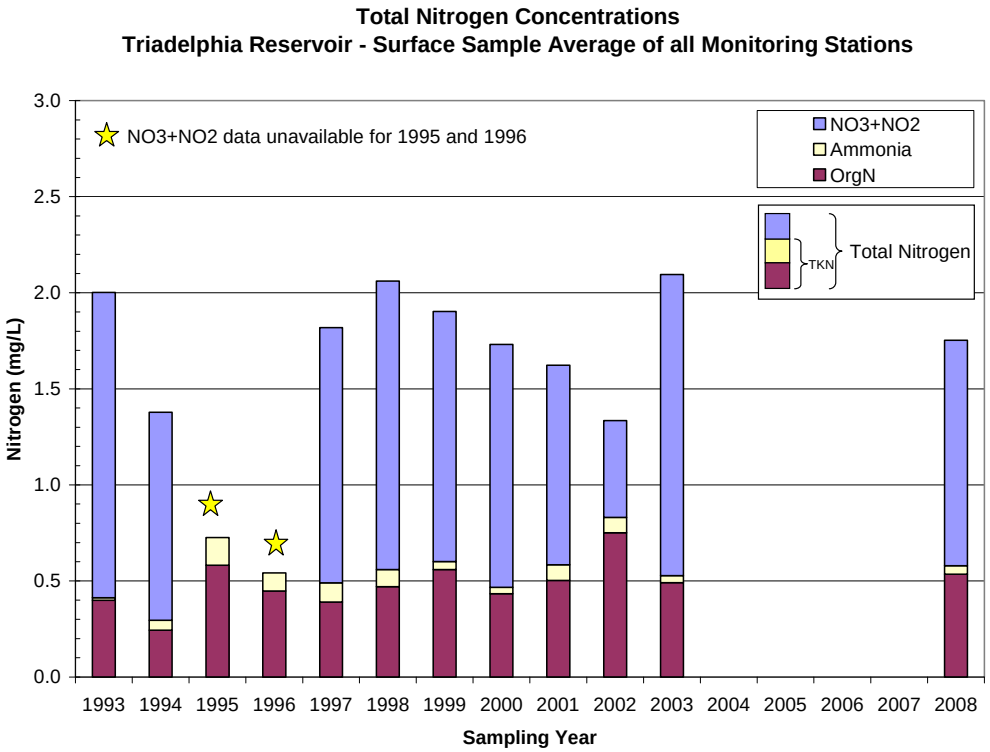

Figure 29. Annual Avg. Total N, TKN, and Organic N for Triadelphia Reservoir – surface

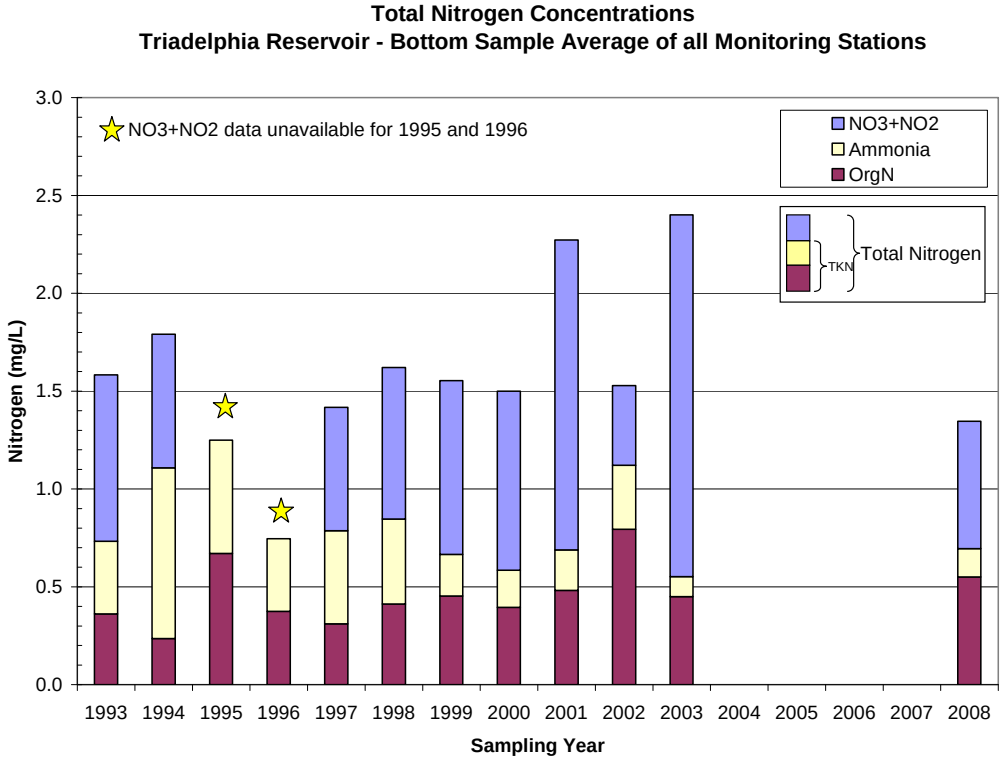

Figure 30. Annual Avg. Total N, TKN, and Organic N for Triadelphia Reservoir - bottom

Monthly Comparisons

The vertical distributions of ammonia and nitrate-nitrogen in *stratified lakes of high productivity* generally show *increasing* levels of ammonia and *decreasing* levels of nitrate nitrogen with depth (Wetzel, 2001). This generalization is apparent in both Patuxent Reservoirs (Figures 31-34). For Rocky Gorge Reservoir, data were excluded from this comparison in November because samples were collected less than half of the sixteen sampling years.

Rocky Gorge Reservoir

Nitrate+Nitrite-Nitrogen

A cyclic pattern is evident, similar to the time series graph of nitrate+nitrite-nitrogen (Figure 23), with a seasonal decreasing concentration in the bottom waters (Figure 31). A similar pattern exists in the surface waters. Maximum values occur in the spring and decrease through the growing season.

Ammonia Nitrogen and TKN

A cyclic pattern is evident in ammonia and TKN concentrations of the hypolimnion. Maximum values occur during the growing season summer months, peak in July, and decrease in the autumn (Figure 32). No pattern is evident in ammonia concentrations of surface waters.

Triadelphia Reservoir

Nitrate+Nitrite-Nitrogen

A cyclic pattern is evident as NO3+NO2-N concentrations in the hypolimnion decrease from spring maximums (Figure 33). Maximum values occur in March and decrease through the growing season. Minimum values occur in August and September. A very similar seasonal pattern exists in the epilimnion.

Ammonia and TKN

An even more pronounced cyclic pattern is evident in hypolimnetic ammonia and TKN concentrations of Triadelphia Reservoir (Figure 34). Maximum values occur later in the year (September vs. July) compared with Rocky Gorge. A slight increase in ammonia of the surface waters may exist during the autumn months, which may indicate a movement of ammonia into surface waters following the fall turnover.

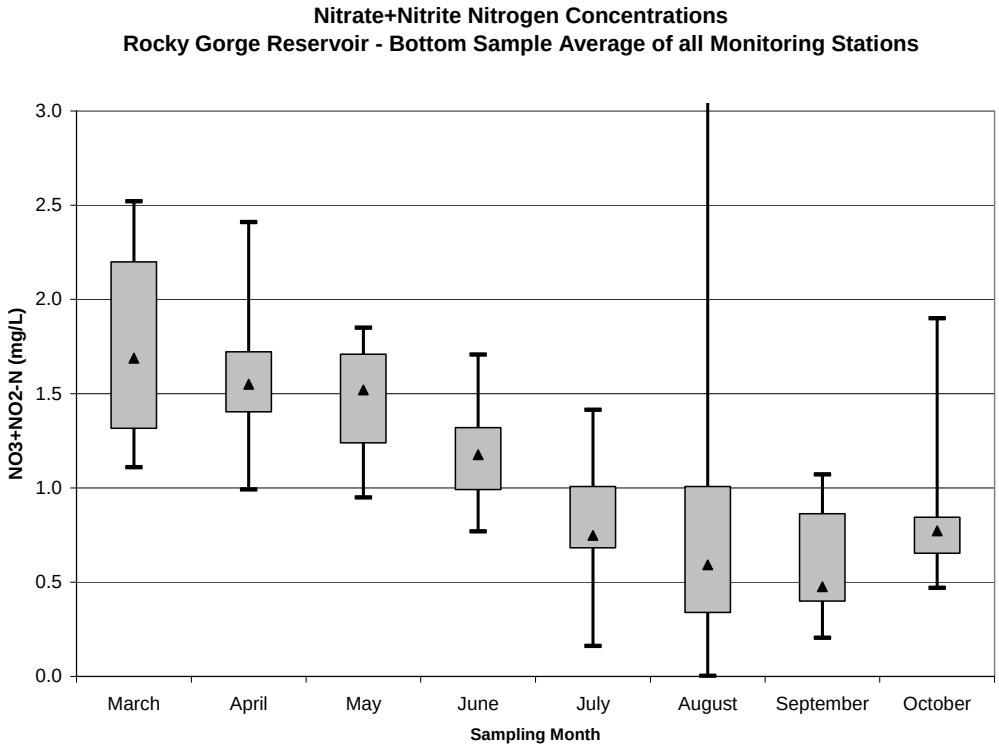

Figure 31. Monthly Nitrate+Nitrite Concentrations for Rocky Gorge Reservoir – bottom

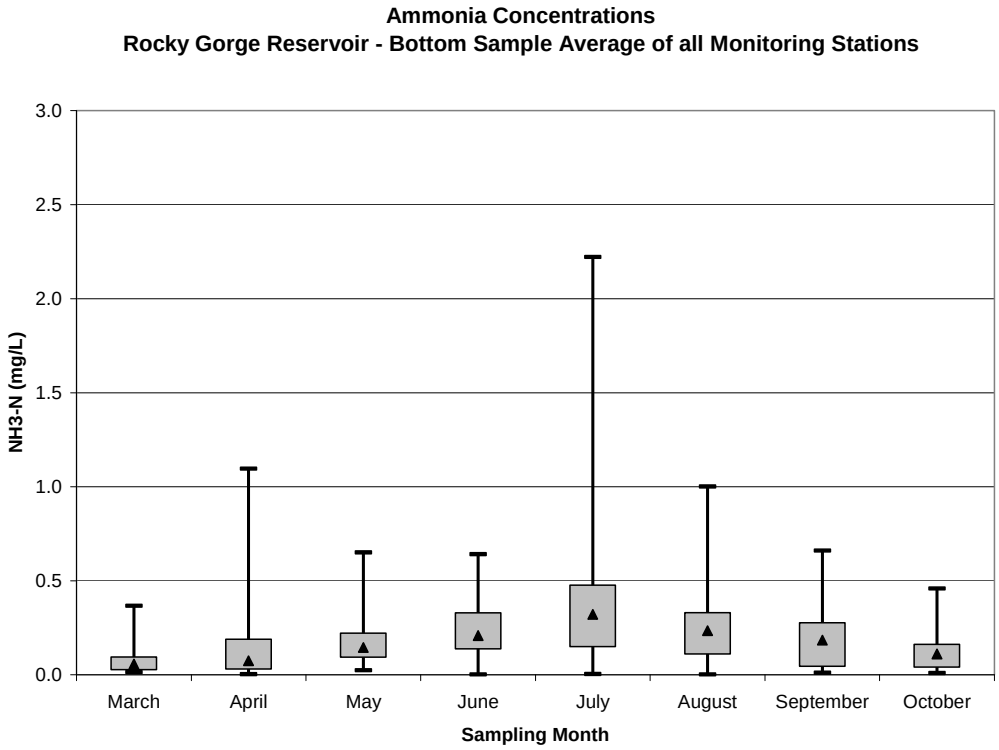

Figure 32. Monthly Ammonia Concentrations for Rocky Gorge Reservoir – bottom

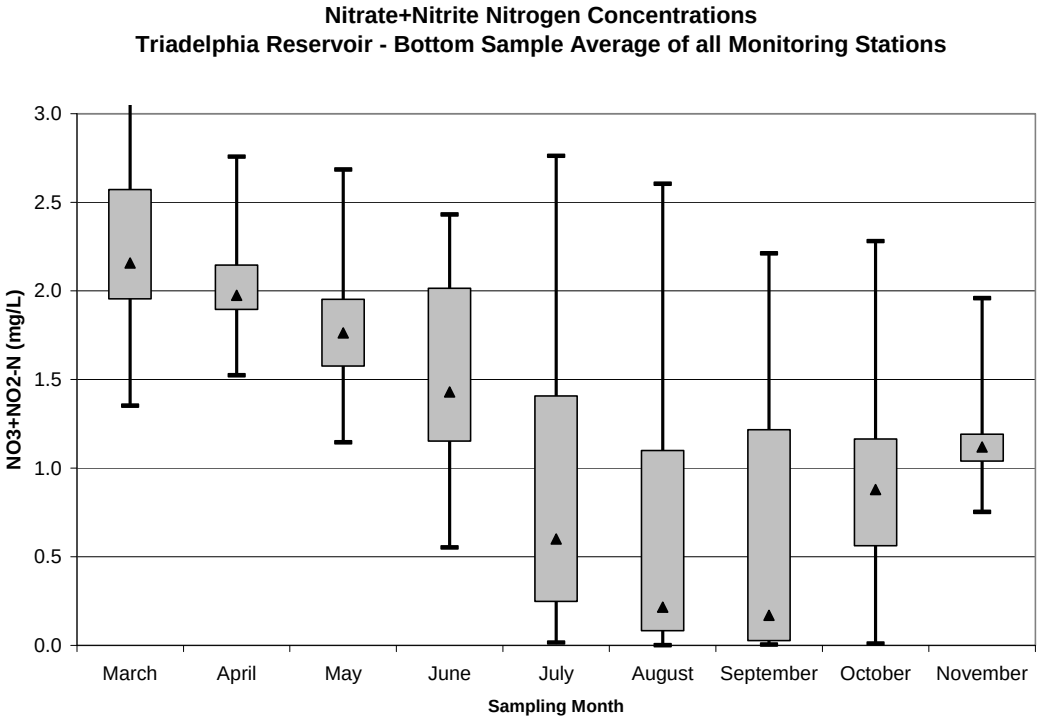

Figure 33. Monthly Nitrate+Nitrite Concentrations for Triadelphia Reservoir – bottom

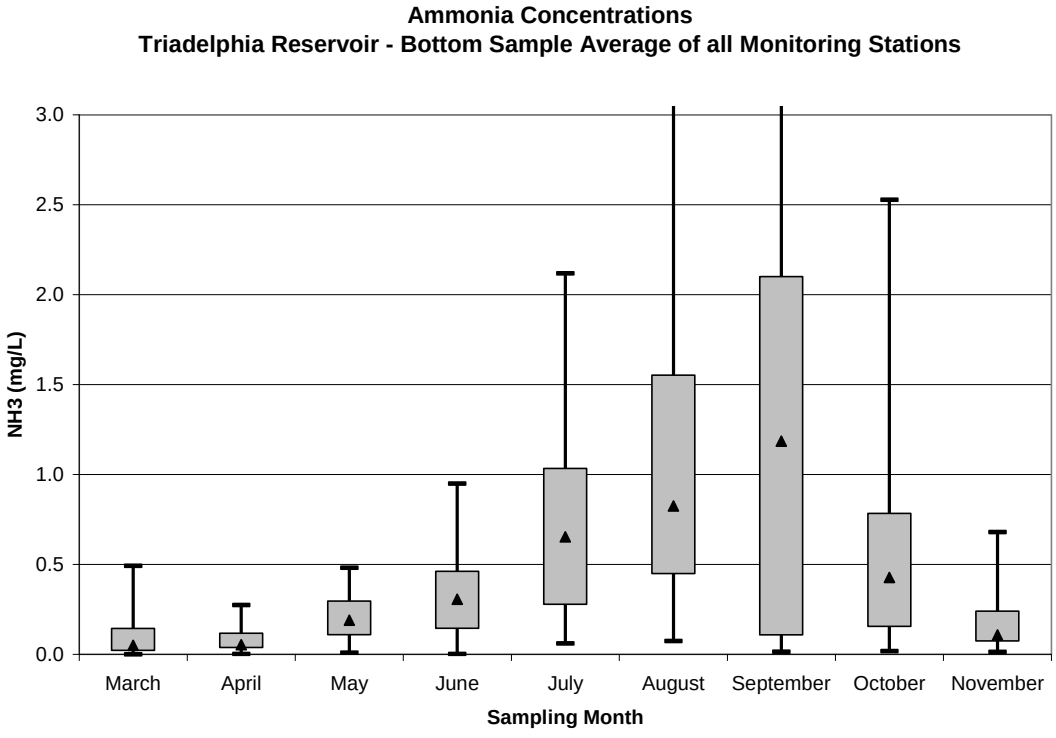

Figure 34. Monthly Ammonia Concentrations for Triadelphia Reservoir – bottom

Total Organic Carbon

In reservoirs used for water supply, some natural organic compounds found in the reservoir can react with disinfection agents used in the water treatment process (e.g., chlorine) to form potentially carcinogenic chemical compounds called disinfection by-products (DBPs) in water distribution systems (NRC, 2000). These organic compounds originate either from a reservoir's watershed (externally) or are generated by algal populations within a reservoir (internally). External sources of organic compounds have been directly correlated to rainfall intensities. Internal sources of these compounds have a definite seasonal cycle and are readily biodegradable compared with more complex compounds carried into reservoirs from external sources (NRC, 2000).

Total Organic Carbon (TOC) is a common measure of these compounds. TOC includes all particulate and dissolved organic carbon, and it includes both natural and human created compounds.

Methods

TOC samples have been collected since 2000 in both reservoirs and represent a composite of surface and bottom waters at each monitoring station location.

Results and Discussion

Time Series Graphs

The time series graphs for both reservoirs may indicate the presence of seasonality in the data sets by the cyclic pattern of TOC concentrations over time (Figures 35 and 36). In addition, sample results from all stations within a reservoir track each other somewhat closely over time.

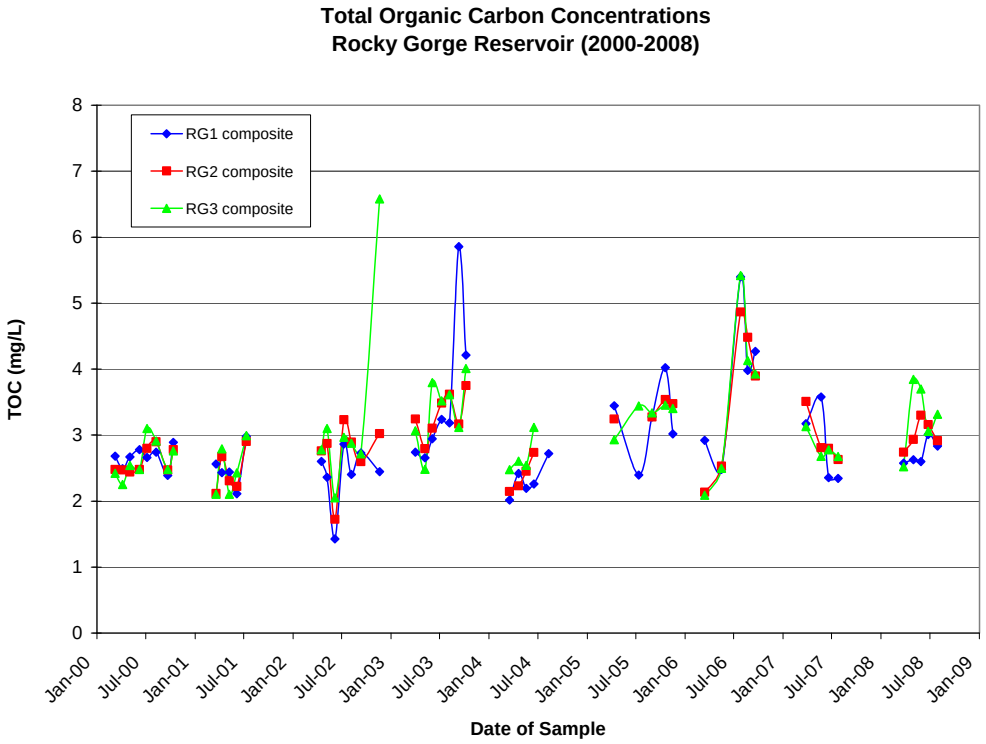

Figure 35. Total Organic Carbon Concentrations for Rocky Gorge Reservoir

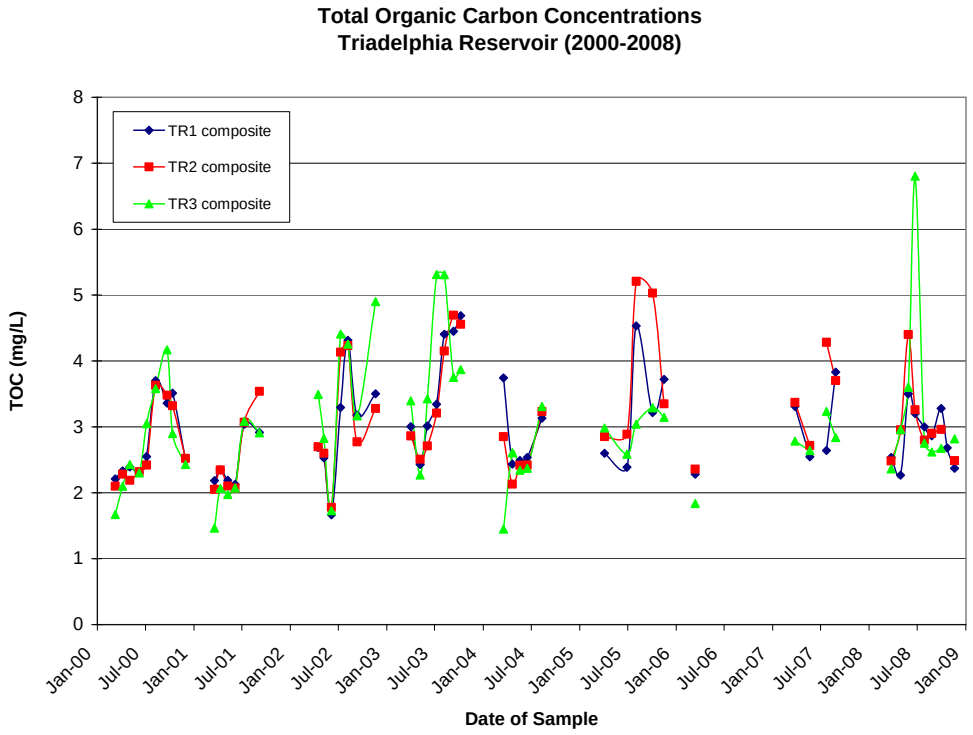

Figure 36. Total Organic Carbon Concentrations for Triadelphia Reservoir

Comparison between Reservoirs

There is very little difference in TOC concentrations among monitoring station locations and between reservoirs. Box plots of TOC by station location reveal almost identical median values (2.75 mg/L) and similar variability as seen from the IQR (Figure 37). In addition, the ranges of values are similar with RG3 and TR3 having the greatest ranges of about 5 mg/L.

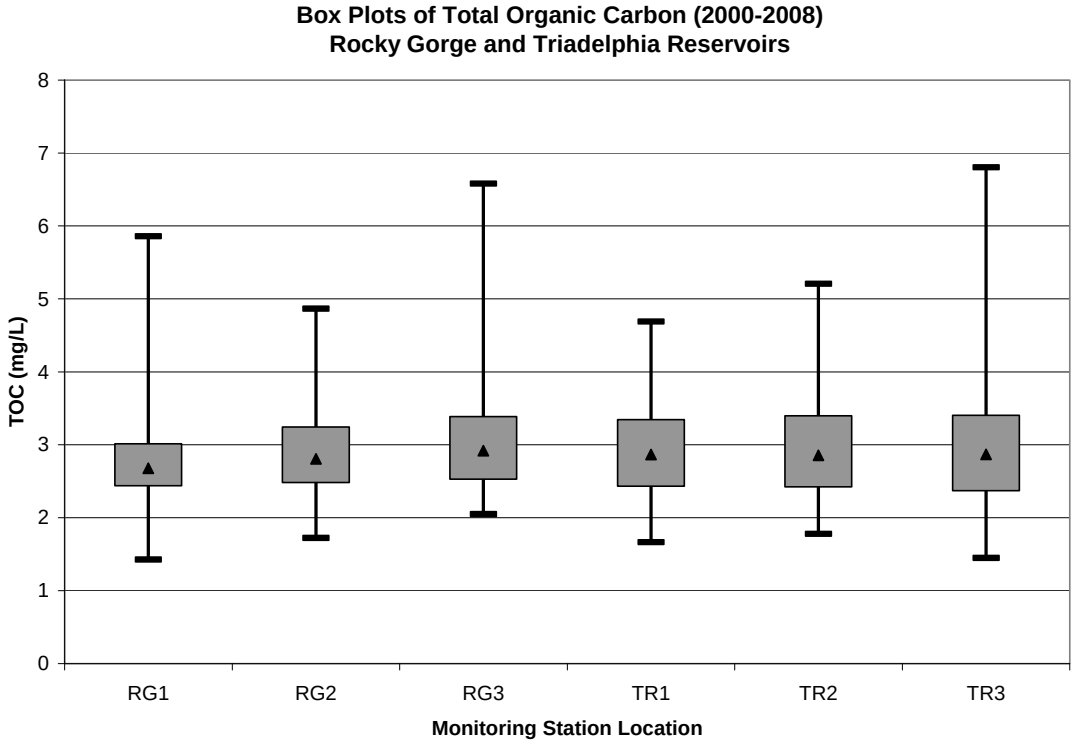

Figure 37. Comparison of TOC results among all monitoring station locations

Monthly Comparison

For a monthly comparison of TOC results, data were included for all months even though fewer than 50% of the possible samples were collected from September through November in Rocky Gorge and October and November in Triadelphia.

Perhaps most noteworthy is the increase in median TOC concentrations as the year progresses in Rocky Gorge (Figure 38). TOC median concentrations in March (2.5 mg/L) increase to a maximum by October (3.4 mg/L) in Rocky Gorge. A similar seasonal increase in TOC concentrations also exists in Triadelphia, but is less pronounced (Figure 39).

For Rocky Gorge, peak values occur in the autumn months, and the lowest values occur in the early spring. For Triadelphia peak values tend to occur in late summer and autumn, and the lowest values occur in the spring.

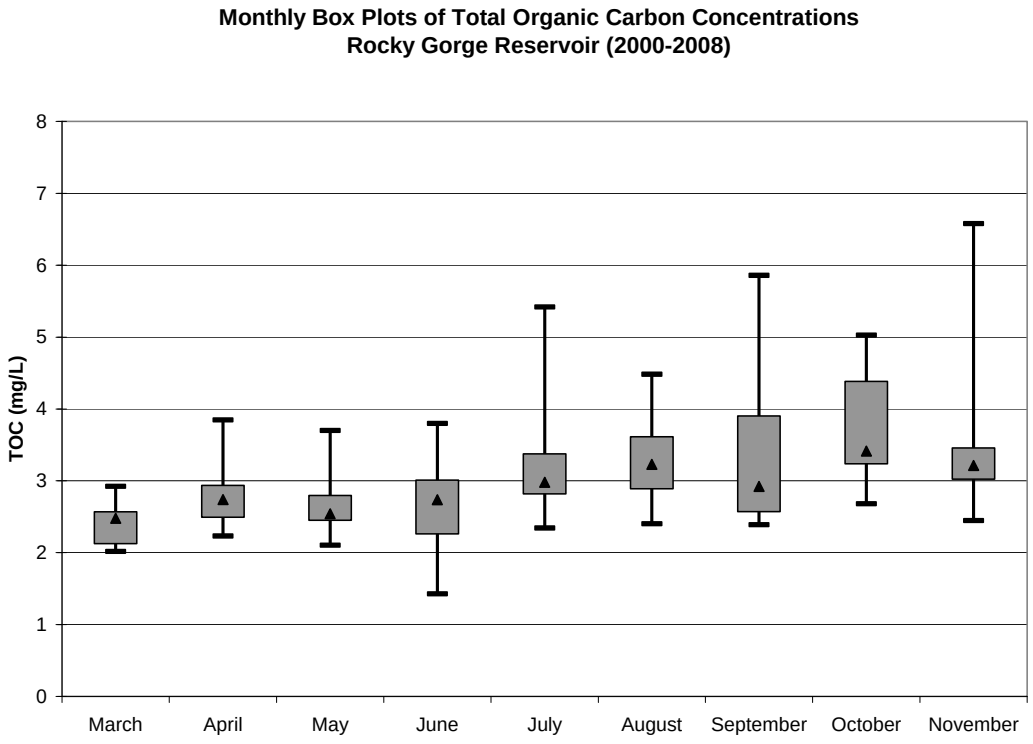

Figure 38. Monthly Box Plots of TOC for Rocky Gorge Reservoir

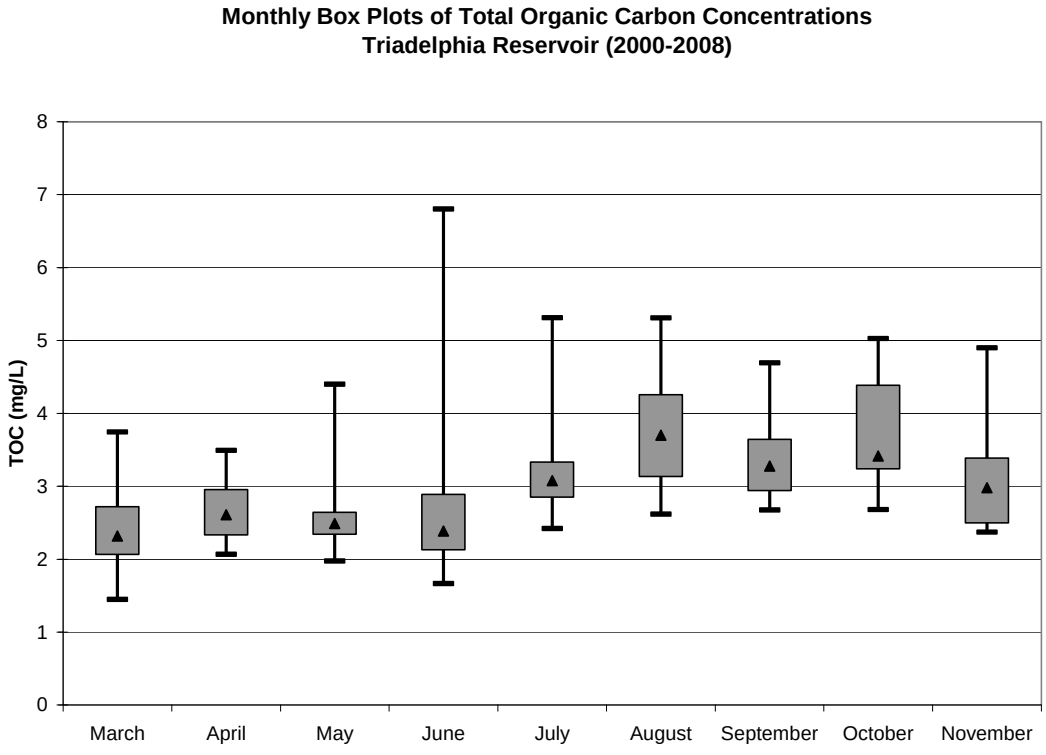

Figure 39. Monthly Box Plots of TOC for Triadelphia Reservoir

Annual Comparisons

For an annual comparison of TOC results, data were included when samples were collected for at least 50% of the nine monthly sampling events per year.

Little change has occurred in median TOC concentrations over the nine year sampling period; annual median TOC concentrations range between 2-4 mg/L for both reservoirs (Figures 40 and 41). TOC results are more variable in Triadelphia compared with Rocky Gorge as seen in larger range of values and interquartile ranges.

The Patuxent Reservoirs Watershed's TAC also selected TOC as a performance measure for the reservoirs as a priority drinking water supply resource in addition to using Chl-a discussed earlier. Two of the goals for TOC are to: 1) reduce TOC by 20% annually, and 2) reduce TOC by 40% for the peak quarter at the monitoring station closest to the withdraw point for potable water supply (station RG1). Since annual TOC concentrations have changed very little over time, the 20% annual reduction goal has *not* been achieved (Figures 40 and 41). In addition, from the limited data collected during the peak quarter (autumn months), TOC concentrations at station RG1 have not decreased by 40% over time (Figure 42).

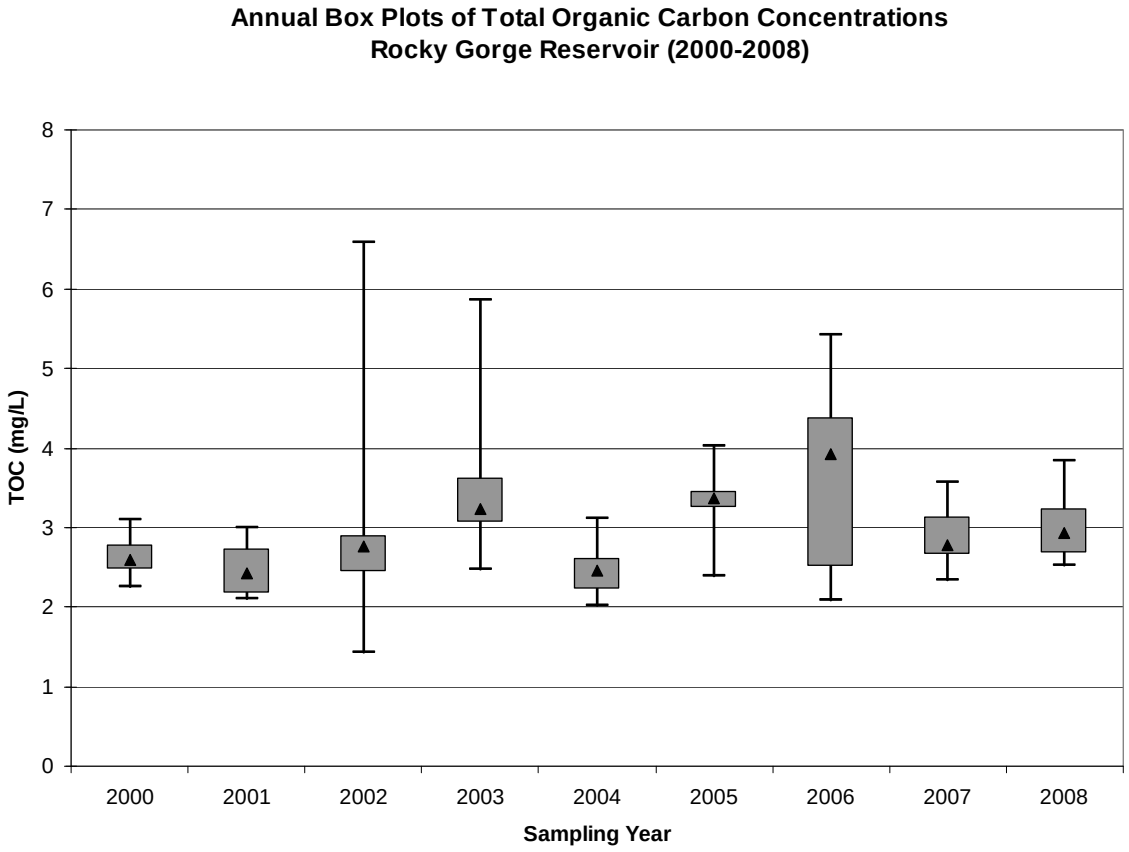

Figure 40. Annual Box Plots of TOC for Rocky Gorge Reservoir

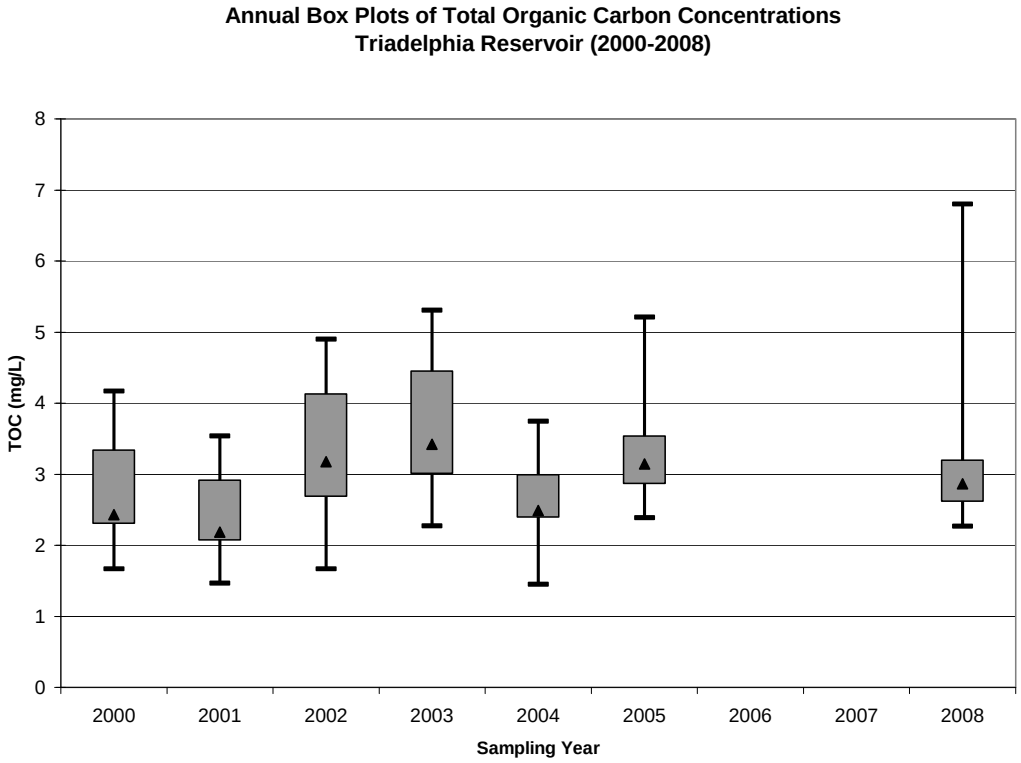

Figure 41. Annual Box Plots of TOC for Triadelphia Reservoir

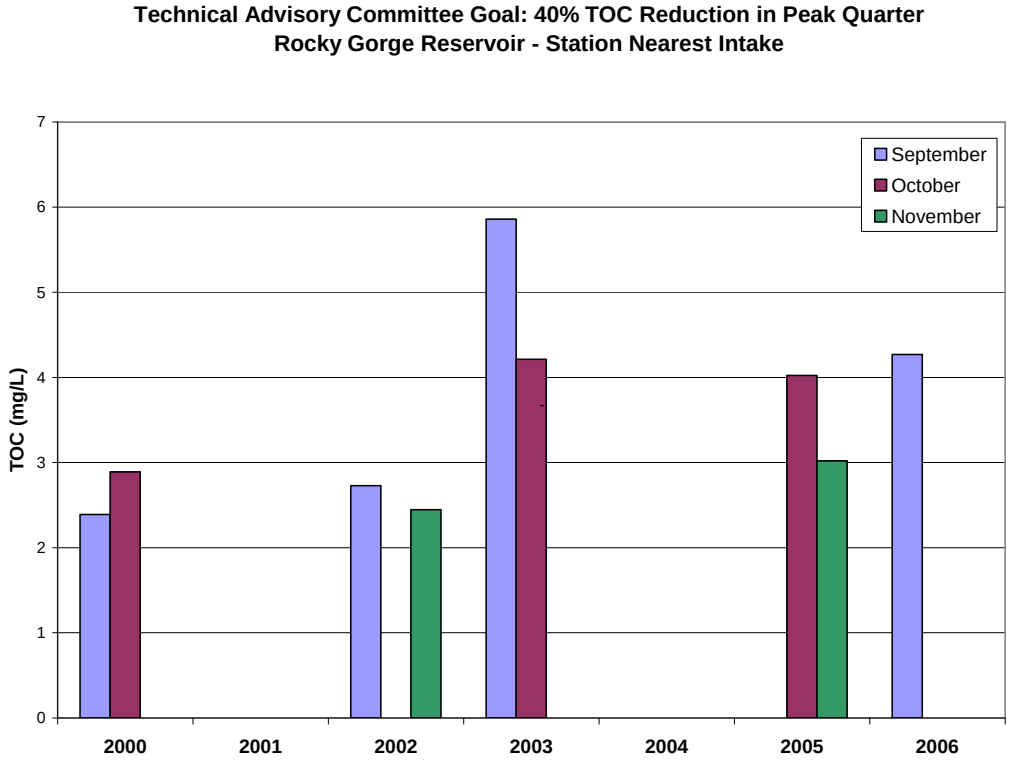

Figure 42. TOC Concentrations during Peak Quarter for Rocky Gorge Reservoir – near intake

Water Clarity

Water clarity is measured in the Patuxent Reservoirs using two different methods one of which is an in-situ measurement and the other a laboratory method. A Secchi disc is used to directly measure water transparency and turbidity samples are collected and measured in the lab. In general, the Secchi disc transparency depth corresponds to the depth of approximately 10% of surface light penetration (Wetzel, 2001).

Method

A Secchi disc is a weighted 8" diameter circular disc with alternating black and white quadrants. It is lowered in to the water column until no longer visible. That depth is recorded along with the depth at which the disc reappears when it is raised from a greater depth than the first value noted. The two depths are averaged to arrive at a final value.

Results and Discussion

Comparison between Reservoirs

Water clarity improves as water moves through both reservoirs, although only a slight increase is apparent (Figure 43). Also, Secchi disc depth (Secchi depth) median values are similar in both reservoirs (1.5-2 meters), but the range of Secchi depths are more variable in Triadelphia (0.5-4 meters) than in Rocky Gorge (1-3.5 meters).

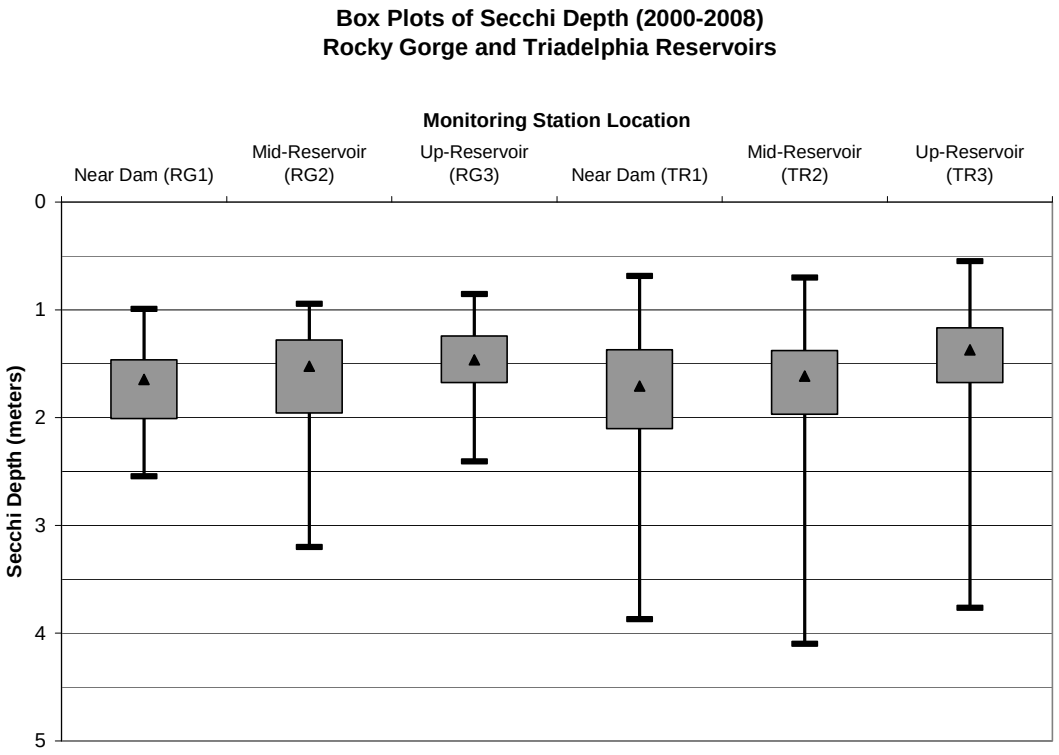

Figure 43. Comparison of Secchi depth among monitoring station locations

Monthly Comparison

For a monthly comparison of Secchi depth results, data are included for all months except October and November because fewer than 50% of the data were available from 2000-2008. Each monthly box plot includes all monitoring stations.

The monthly box plots for both reservoirs indicate the likely presence of seasonality in the data sets by the cyclic pattern of Secchi depth results (Figures 44 and 45). Secchi depths increase from early spring, peak by May and June, and then decrease during the autumn months.

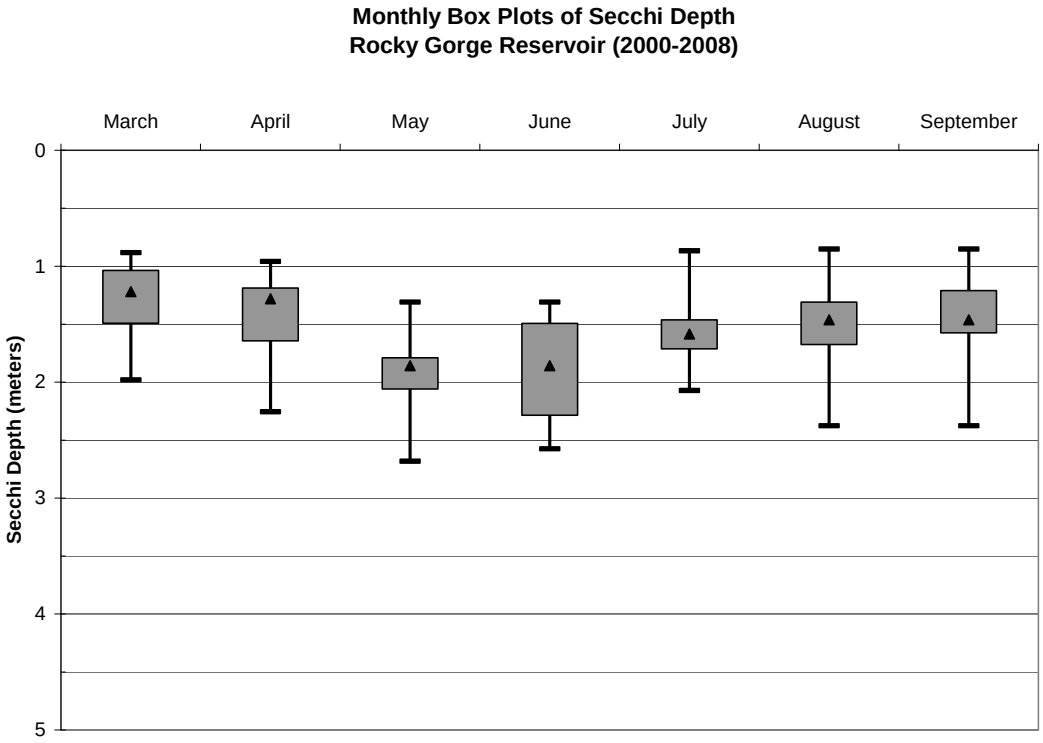

Figure 44. Monthly comparison of Secchi depths for Rocky Gorge Reservoir

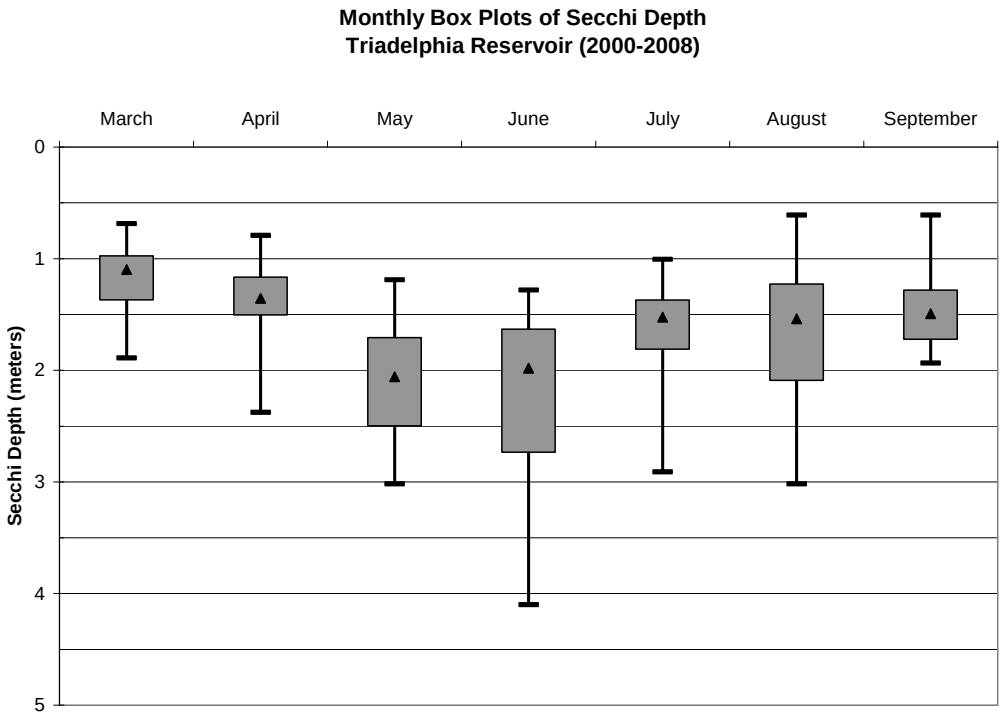

Figure 45. Monthly comparison of Secchi depths for Triadelphia Reservoir

Annual Comparison

For an annual comparison of Secchi depth results, data are included for all years when samples were collected for more than one half of the sampling year. Each annual box plot includes all monitoring stations.

Rocky Gorge Reservoir

Median Secchi depths have changed little over time (about 1.5 meters). The ranges of values have also been consistent with the exception of 2008 (maximum depth increased to more than 3 meters) (Figure 46).

Triadelphia Reservoir

Median Secchi depths and the ranges of values are similar from 2000-2004, but increased beginning in 2007 (Figure 47).

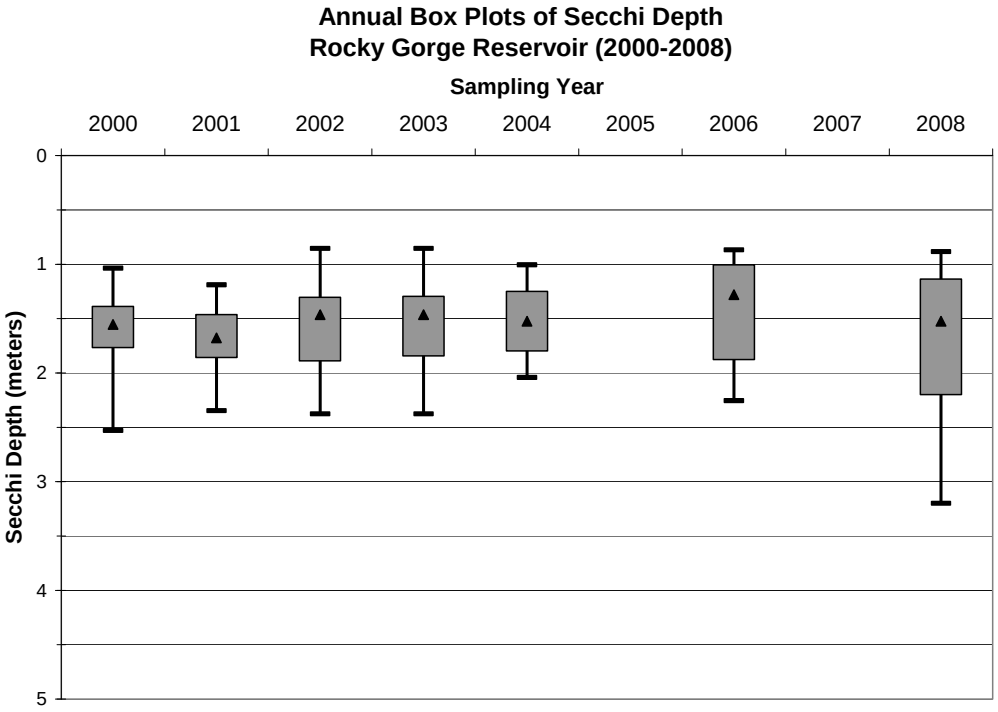

Figure 46. Annual comparison of Secchi depths for Rocky Gorge Reservoir

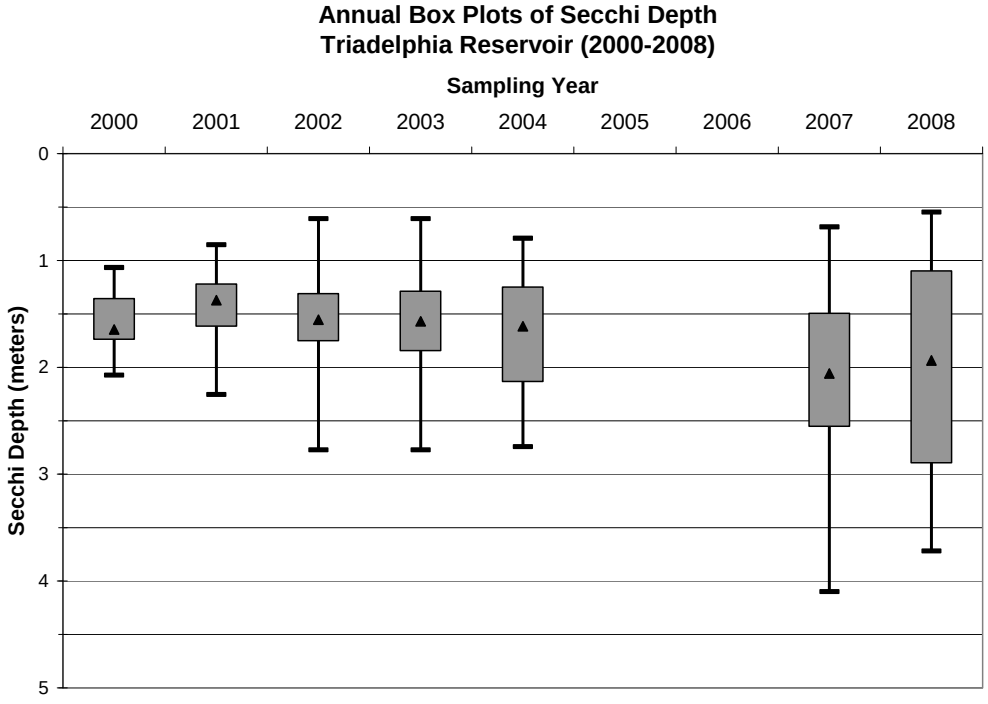

Figure 47. Annual comparison of Secchi depths for Triadelphia Reservoir

Chloride

Although chloride is not a part of the suite of parameters for the reservoir monitoring program, chloride is included in this report because of a long-term increasing trend in raw water samples collected from the Patuxent Water Filtration Plant (WFP). Chloride is not as critical as other water treatment issues such as disinfection by-products; however, finished water with elevated chloride levels may present problems associated with release of lead from home plumbing by adversely affecting the chloride to sulfate mass ratio. It is commonly thought that one of the main sources of the increased levels of chloride is the application of road salts during winter months by state and local highway departments.

Methods

Since 1990, chloride samples have been collected from the Patuxent Water Filtration Plant on a weekly basis (n = 869). The chloride samples collected may not represent a true source water sample, however, since it is occasionally mixed with filter backwash water.

Results and Discussion

Chloride concentrations range from 3-47 mg/L, with the minimum value occurring in 1991 and the maximum value occurring in 2008. The distribution of the data appears to be approximately normal (Figure 48). Assuming normality, about 68% of the values are between 11-24 mg/L and about 95% of the values are between 5-30 mg/L.

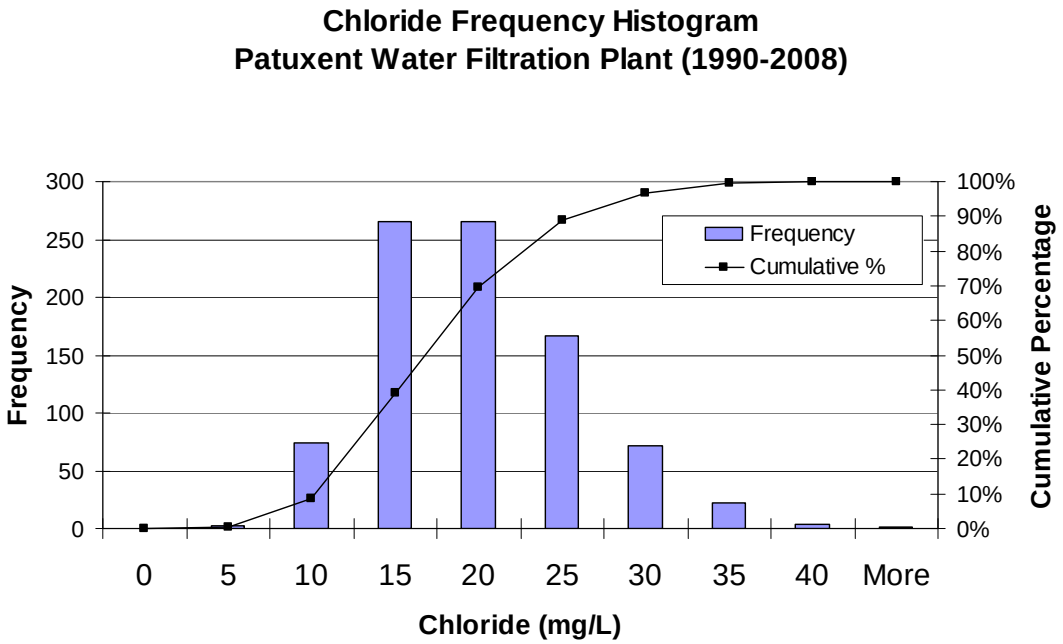

Figure 48. Histogram of Chloride Concentrations at the Patuxent Water Filtration Plant

Time Series

The time series graph indicates an increasing trend over the 19-year sampling period (Figure 49). Over this time period, chloride values have increased from 10 mg/L to 25 mg/L (about 150%), which represents almost an 8% annual increase. The time series graph also indicates the possible presence of seasonality in the data set by the cyclic pattern of chloride concentrations over time. Peak chloride results have mostly occurred during the winter months, which may indicate runoff containing road salt; however, peak concentrations have also occurred at other times of the year.

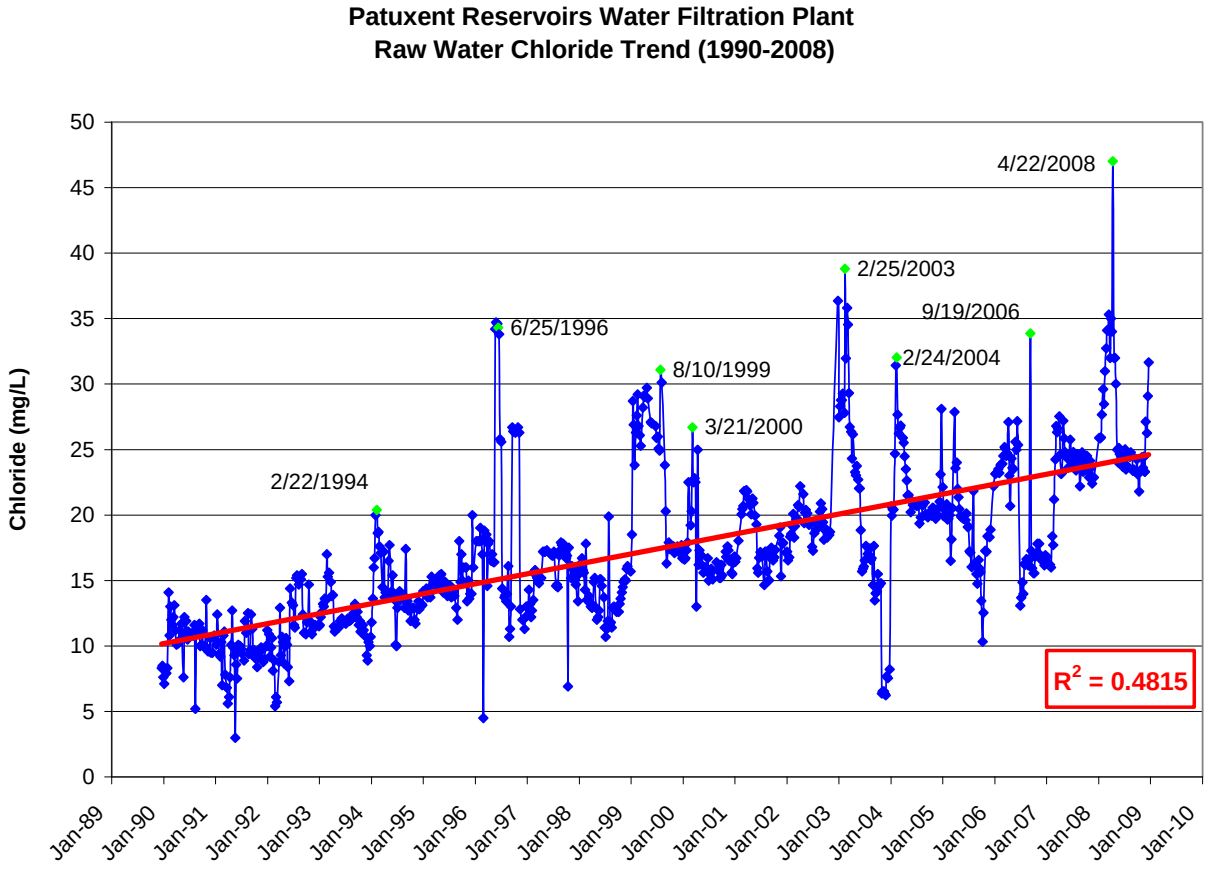

Figure 49. Chloride Concentrations at the Patuxent Water Filtration Plant

Total Algal Counts

The identification and enumeration of algae, like chloride, were not part of the suite of parameters for the reservoir monitoring program; however, algal abundance is often used as a symptom of over-enrichment by nutrients as estimated by Chl-a.

Methods

Similar to the chloride sampling location, algae samples collected at the Patuxent WFP may not represent a true source water sample since it is occasionally mixed with filter backwash water.

Results and Discussion

Time Series

The time series graph indicates the presence of seasonality in the data set by the cyclic pattern of total algal counts over time. Since 1997, peak algal counts have regularly occurred during late winter and early spring (Figure 50).

To date, algal species data have not been recorded in an electronic format, making statistical evaluation difficult. Diatoms have dominated samples collected from the Patuxent WFP when large algal counts have been observed during times of seasonal maximums in the late winter and early spring (personal communication, Joe Pennella, taxonomist WSSC Laboratory, November, 2009); furthermore, blue-green algal species have not become a nuisance during the summer months. Historically, samples have not been routinely collected within either reservoir for algae identification and enumeration.

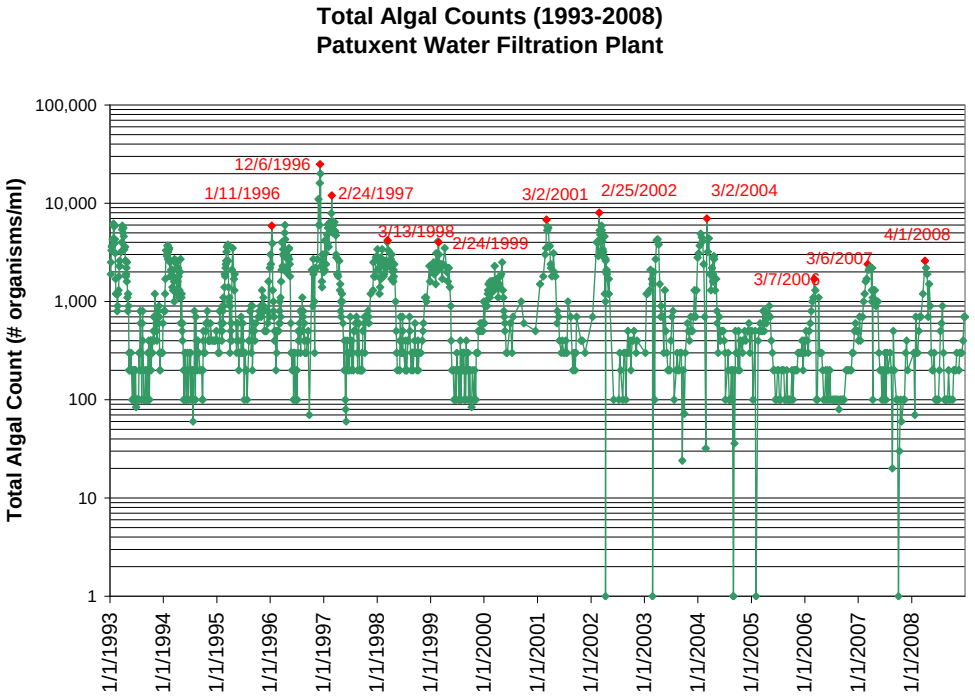

Figure 50. Total Algal Counts at Patuxent Water Filtration Plant (1993-2008)

Reservoir Productivity - Trophic State Assessment

A common approach used to evaluate reservoir productivity or trophic state is to combine related water quality indicators into one index. Trophic State assessments also provide the reservoir manager with a reference point to compare with other water bodies in the region or nationally. Although a trophic state index (TSI) summarizes and simplifies large amounts of data, it cannot substitute for a more detailed statistical analysis (Walker, 1984).

Several multi-parameter indices have been created to evaluate lake and reservoir productivity. Parameters typically used to indicate productivity are chosen because of the relationship between nutrients and their well documented effects on algal production and water transparency. For instance, as more nutrients are supplied to a water body, algal production usually increases, which reduces water transparency.

Carlson's Trophic State Index

Carlson's TSI (1977) is perhaps the most widely accepted index and is often used for assessing trophic state; however, it is important to note that this TSI was developed for lakes in the northern regions of the U.S.. Northern U.S. lakes typically have smaller drainage areas and a shorter growing season than do reservoirs in the mid-Atlantic, which likely results in *less* nutrient inputs and *lower* algal abundance compared with mid-Atlantic reservoirs. These fundamental differences may reduce the usefulness of this particular index when applied to the Patuxent Reservoirs.

Carlson's TSI (C-TSI) defines four trophic state categories from least to most enriched by nutrients: oligotrophic, mesotrophic, eutrophic, and hyper-eutrophic. The common water quality characteristics associated with increasing TSI values are provided in Figure 51. This index assumes a unique relationship between each measurement and a common scale (i.e., that phosphorus exclusively controls chlorophyll and transparency) (Walker, 1984).

TSI < 30	Classic Oligotrophy: Clear water, oxygen throughout the year in the hypolimnion, salmonid fisheries in deep lakes.
TSI 30 - 40	Deeper lakes still exhibit classical oligotrophy, but some shallower lakes will become anoxic in the hypolimnion during the summer.
TSI 40 - 50	Water moderately clear, but increasing probability of anoxia in hypolimnion during summer.
TSI 50 - 60	Lower boundary of classical eutrophy: Decreased transparency, anoxic hypolimnia during the summer, macrophyte problems evident, warm-water fisheries only.
TSI 60 - 70	Dominance of blue-green algae, algal scums probable, extensive macrophyte problems.
TSI 70 - 80	Heavy algal blooms possible throughout the summer, dense macrophyte beds, but extent limited by light penetration. Often would be classified as hypereutrophic.
TSI > 80	Algal scums, summer fish kills, few macrophytes, dominance of rough fish.

Figure 51. Carlson's TSI Values and Corresponding Water Quality Conditions

Methods

For the C-TSI analysis, TSI results were calculated from the median value of all monitoring station results for each sampling event.

Results

Comparison between Reservoirs

Both reservoirs appear to have similar water quality conditions as indicated by C-TSI results of total phosphorus and Secchi depth, although Triadelphia Reservoir has poorer water quality conditions than Rocky Gorge Reservoir as indicated by the greater percentages of Chl-a C-TSI results in the eutrophic range (62% v. 46%) (Table 5).

Table 5. Percent of Results for each Trophic State Category

Reservoir	Metric	Oligotrophic Range (Green)	Mesotrophic Range (Yellow)	Eutrophic Range (Red)
Rocky Gorge	Total Phosphorus	11%	26%	63%
	Chl-a	14%	40%	46%
	Secchi Depth	0%	18%	82%
Triadelphia	Total Phosphorus	8%	25%	67%
	Chl-a	19%	19%	62%
	Secchi Depth	0%	19%	81%

The traffic light pattern (Figures 52-57) reveals the proportion of C-TSI results in each of the trophic categories. Results in the green shaded portion of the graph indicate low productivity (oligotropy), while results in the red shaded portion indicate high productivity (eutrophy). The yellow shaded portion represents a transition or warning zone (mesotrophy).

For both reservoirs C-TSI results for TP mostly indicate eutrophic conditions (Figures 52 and 55). The C-TSI results for Secchi depth indicate more consistent eutrophic conditions than either C-TSI results for TP or Chl-a (Figures 54 and 57).

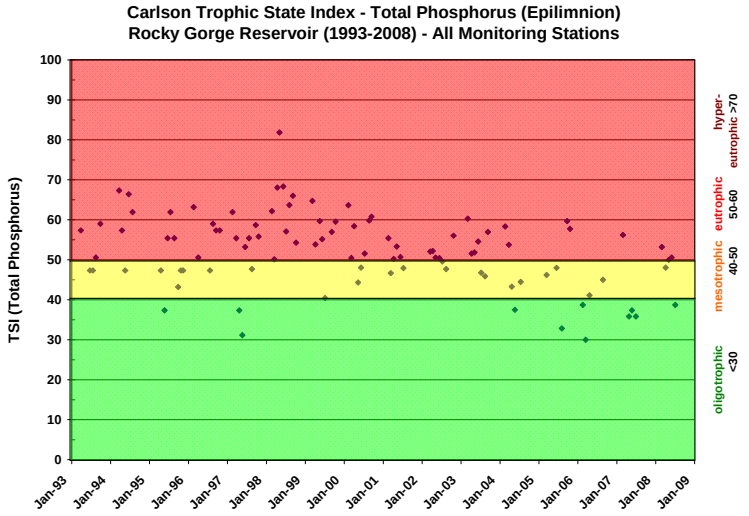

Figure 52. Carlson's TSI for Total Phosphorus for Rocky Gorge Reservoir

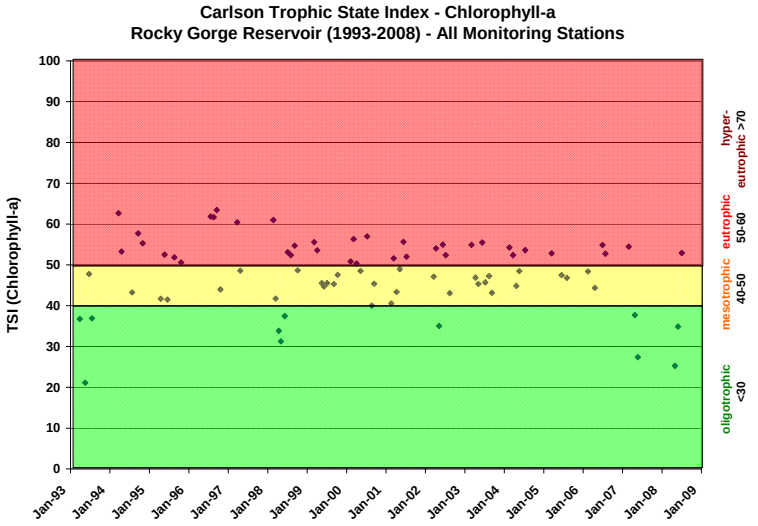

Figure 53. Carlson's TSI for Chl-a for Rocky Gorge Reservoir

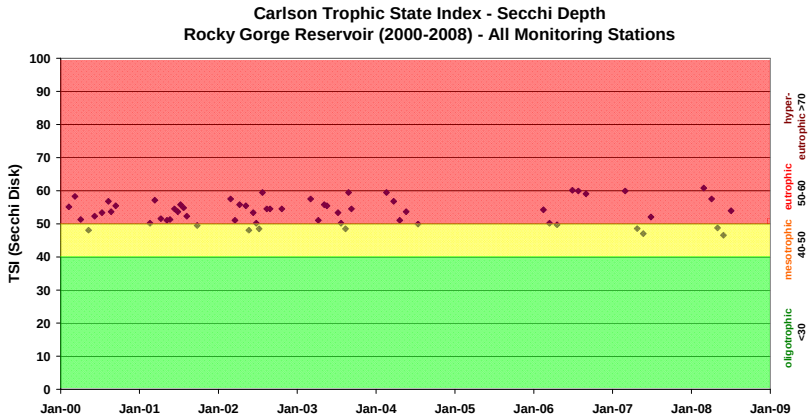

Figure 54. Carlson's TSI for Secchi Depth for Rocky Gorge Reservoir

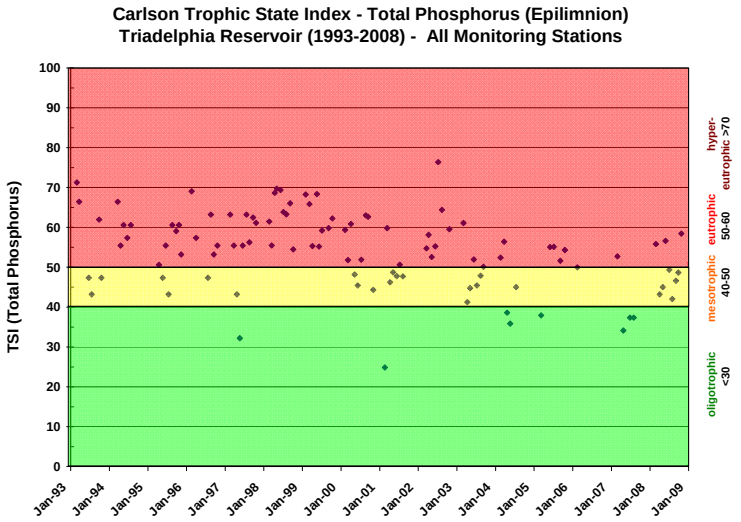

Figure 55. Carlson's TSI for Total Phosphorus for Triadelphia Reservoir

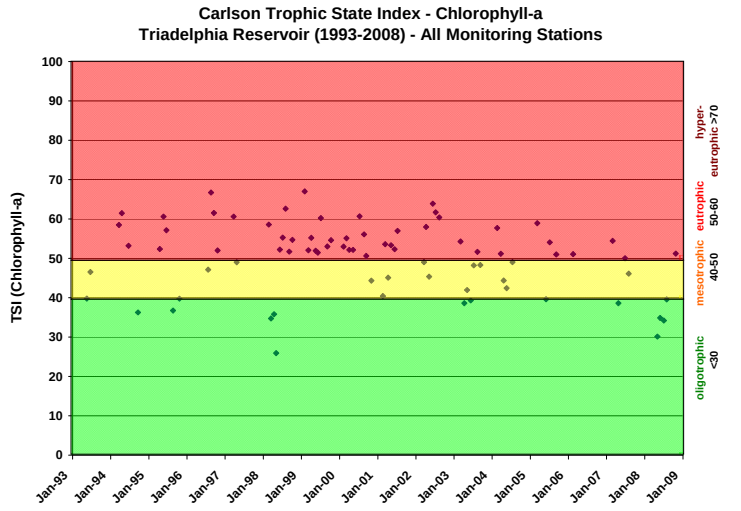

Figure 56. Carlson's TSI for Chl-a for Triadelphia Reservoir

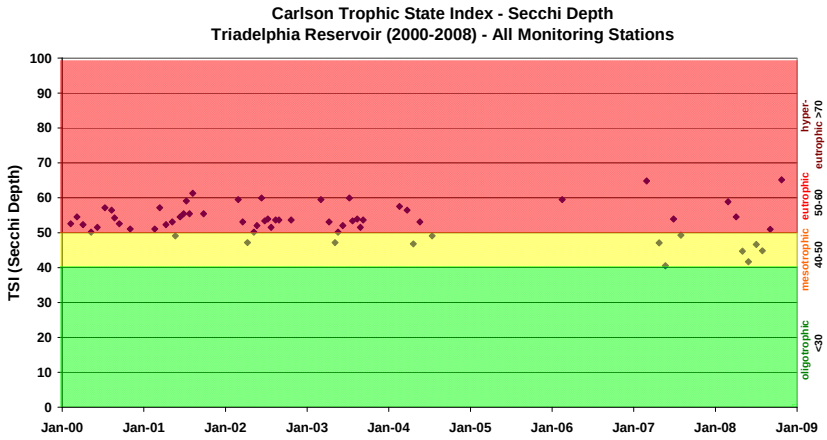

Figure 57. Carlson's TSI for Secchi Depth for Triadelphia Reservoir

Combining All C-TSI Components

C-TSI results of Secchi depth for both reservoirs indicate mainly eutrophic conditions; however, results from the other two components of this TSI often do not agree with Secchi results from the same sampling event (Figures 58 and 59). This lack of agreement suggests that water transparency within both reservoirs may be diminished by *non-algal* turbidity.

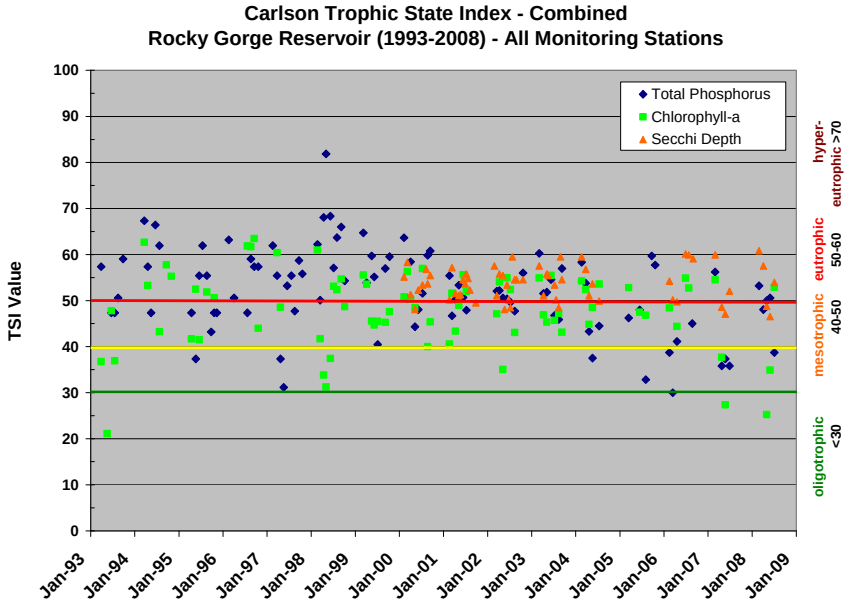

Figure 58. Carlson's TSI Showing All Metrics for Rocky Gorge Reservoir

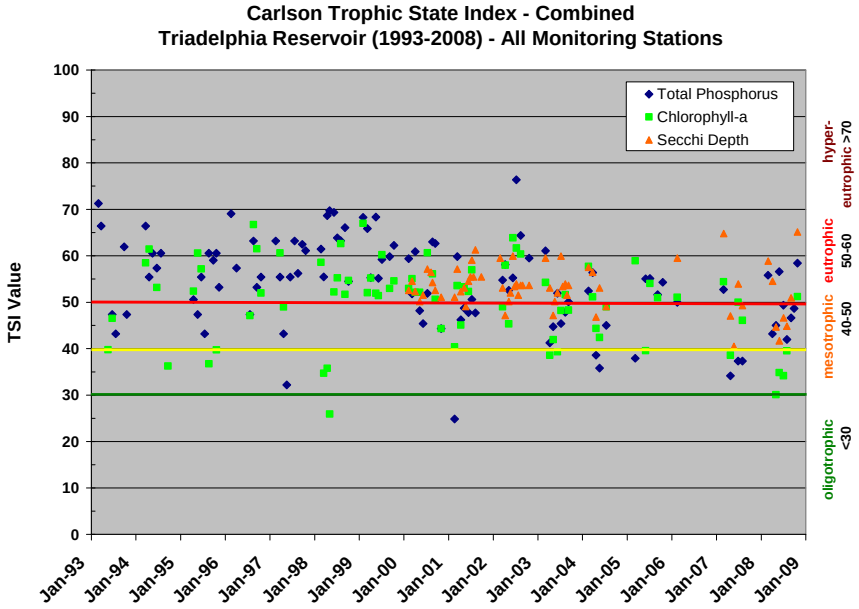

Figure 59. Carlson's TSI Showing All Metrics for Triadelphia Reservoir

Recommendations

The following are proposed changes to the Patuxent Reservoirs monitoring program protocol, which will help improve its usefulness and effectiveness.

1. Obtaining software will significantly improve the storage, manipulation and analysis of data collected for this monitoring effort.
    a. A database software package is recommended to store and retrieve the abundance of monitoring data collected, and to facilitate more efficient data retrieval and analysis.
    b. A statistics package, which contains appropriate statistical tests including screening for seasonality, is recommended for more sophisticated trend analyses.
2. Adopt a formal quality assurance and quality control (QA/QC) program for the monitoring program, and include routine QA/QC data quality evaluations.
3. Remove the seasonality common in the Patuxent Reservoirs data set before definitive trends can be detected.
4. Add the following to the list of parameters for the reservoir monitoring program:
    a. Dissolved organic carbon
    b. Pheophytin-a
    c. Algal speciation
    d. Water color
    e. Chloride

Acknowledgements

This report was written by Steven Nelson. Dr. Martin Chandler performed much of the data compilation and analyses needed for this report. Many thanks go to the editors that included Dr. Chandler, Plato Chen, and Dr. Mohammad Habibian.

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Appendix B

2009 Annual Policy Board Meeting Presentation

Patuxent Reservoirs Watershed Protection Group

2009 Annual Meeting of the Policy Board

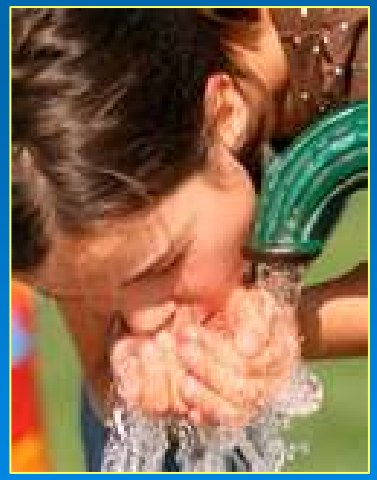
November 3, 2009

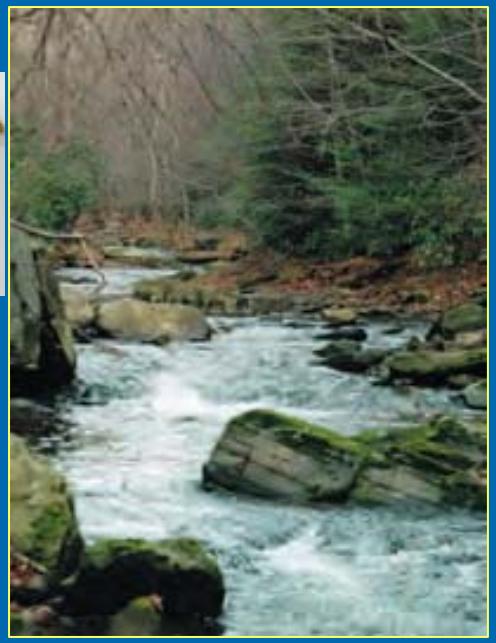
History of Patuxent Reservoirs Watershed Protection Group

- 1996 Agreement Ratified
- Purposes for Agreement
- Formed Policy Board and Technical Advisory Committee
  - Policy Board Roles
    - Consider Strategies to Address Challenges
    - Review & Evaluate TAC information
    - Endorse Work Plan
  - TAC Roles
    - Evaluate Technical Issues
    - Implement Protection Strategies

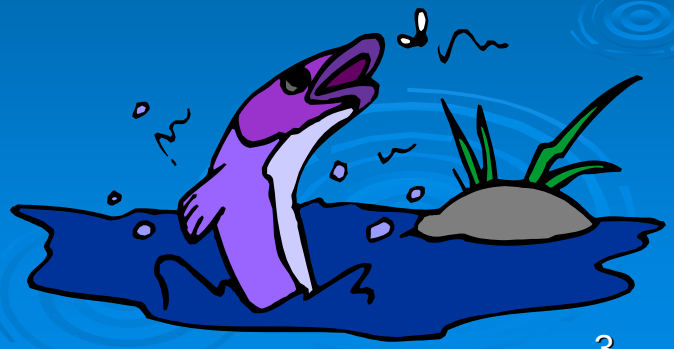
Priority Resources

Reservoirs & Water Supply





- **Terrestrial Habitat**
- **Stream System**
- **Aquatic Biota**



Priority Resources

Public Awareness & Stewardship

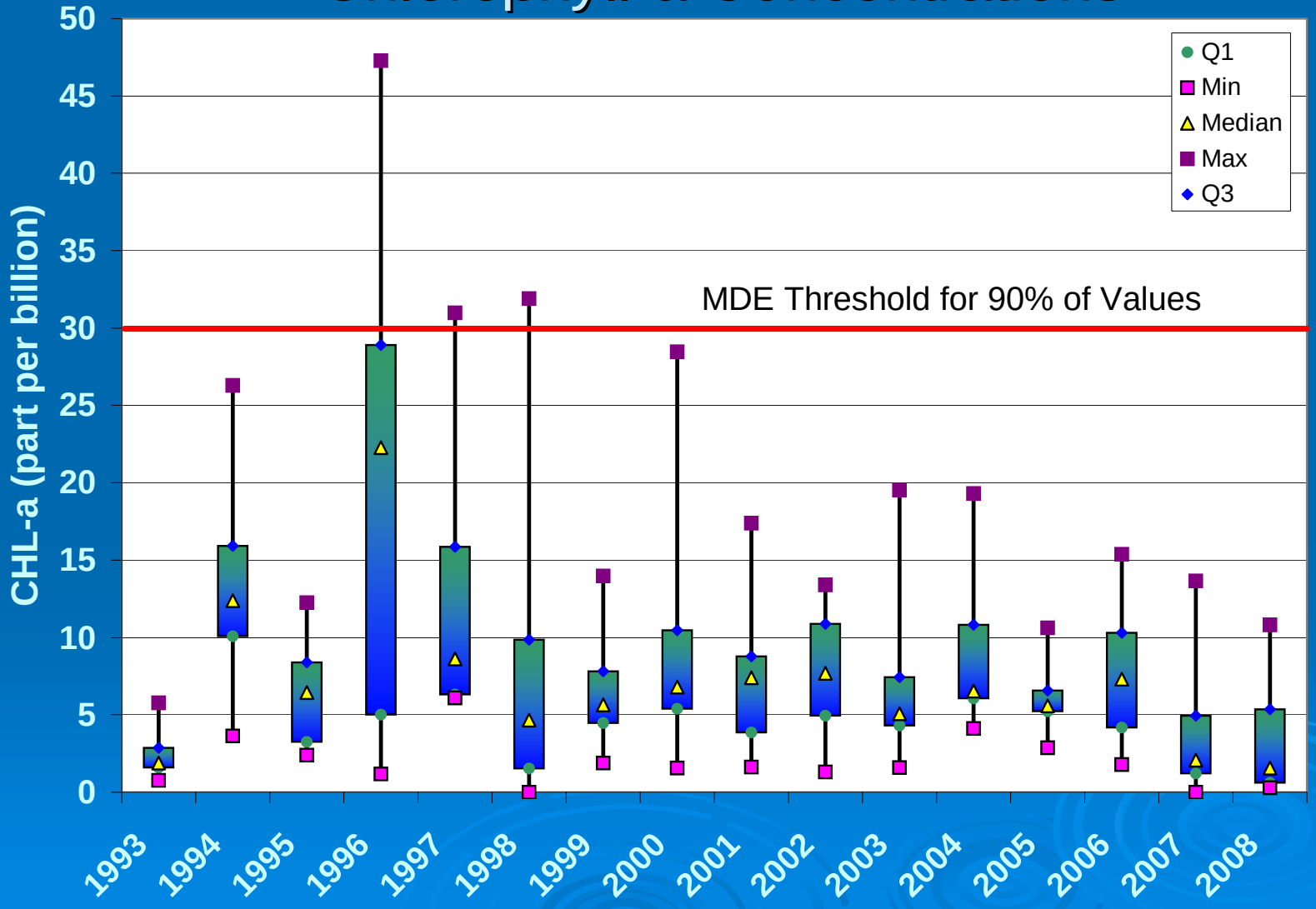
Rural Character & Landscape

Work Plan Expenditures: Reservoir & Water Supply

- Monitoring
  - Reservoir Monitoring - WSSC
    - $93,000 (2009) $89,000 (2010)
  - Stream Flow Gauging Stations - WSSC/USGS
    - $50,000 (2009) $60,000 (2010)
- Water Quality Trends Analysis - WSSC
    - $56,000 (2009) None (2010)

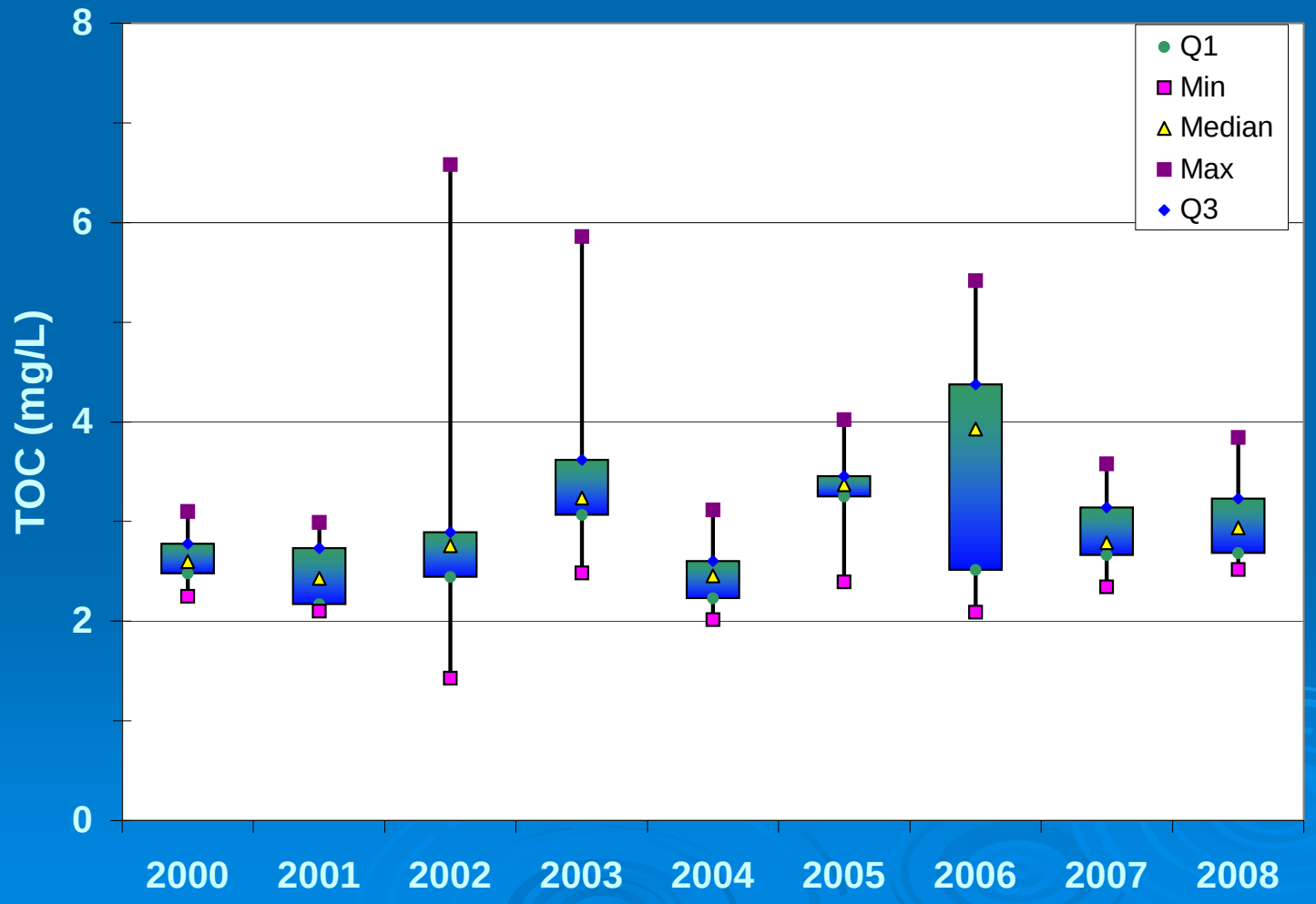
Rocky Gorge Reservoir

Chlorophyll-a Concentrations



Rocky Gorge Reservoir

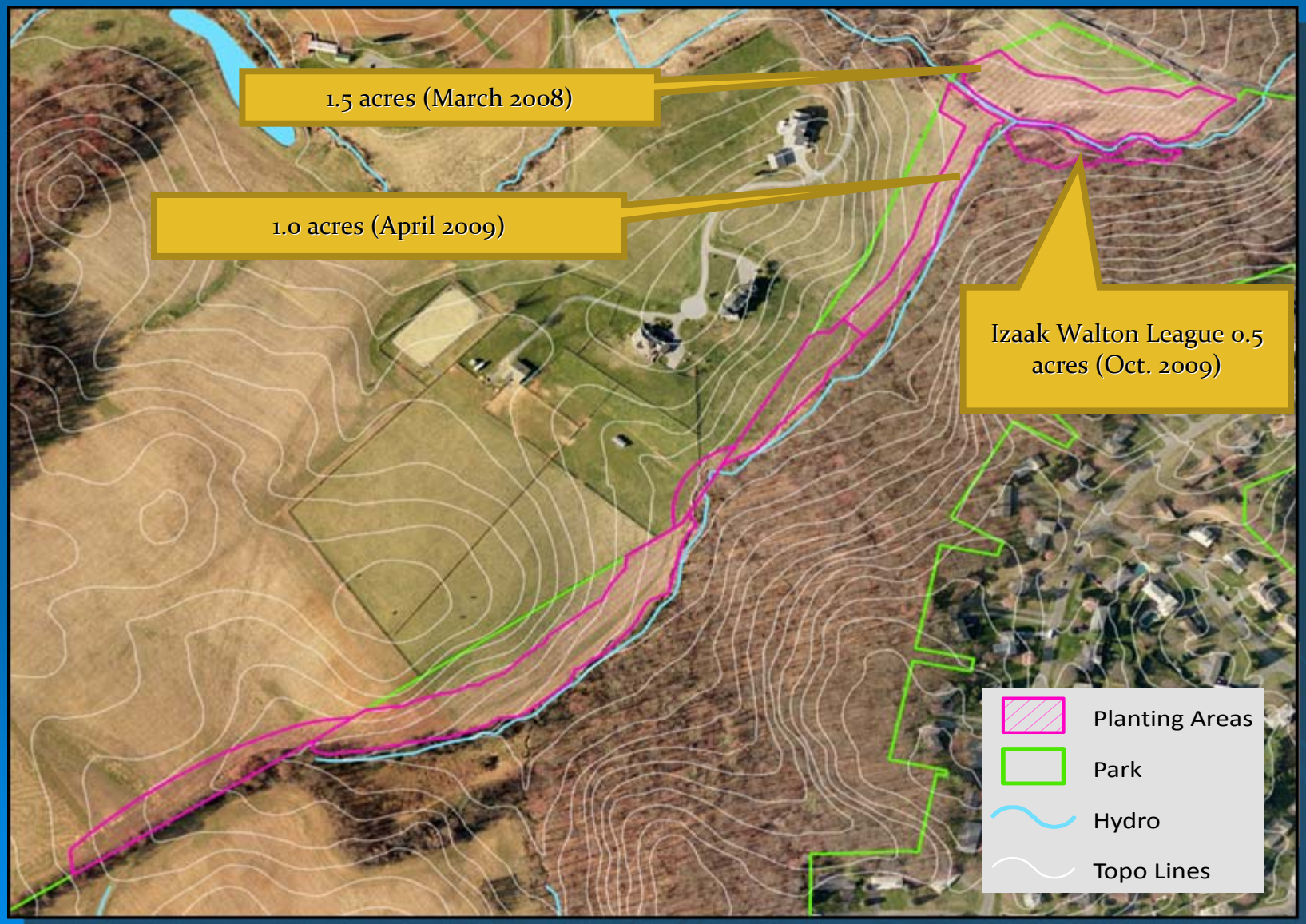
Total Organic Carbon Concentrations



Work Plan Expenditures: Terrestrial Habitat

- Reddy Branch - M-NCPPC, MC, MSCD, DNR
  - $100,000 (2009) $50,000 (2010)

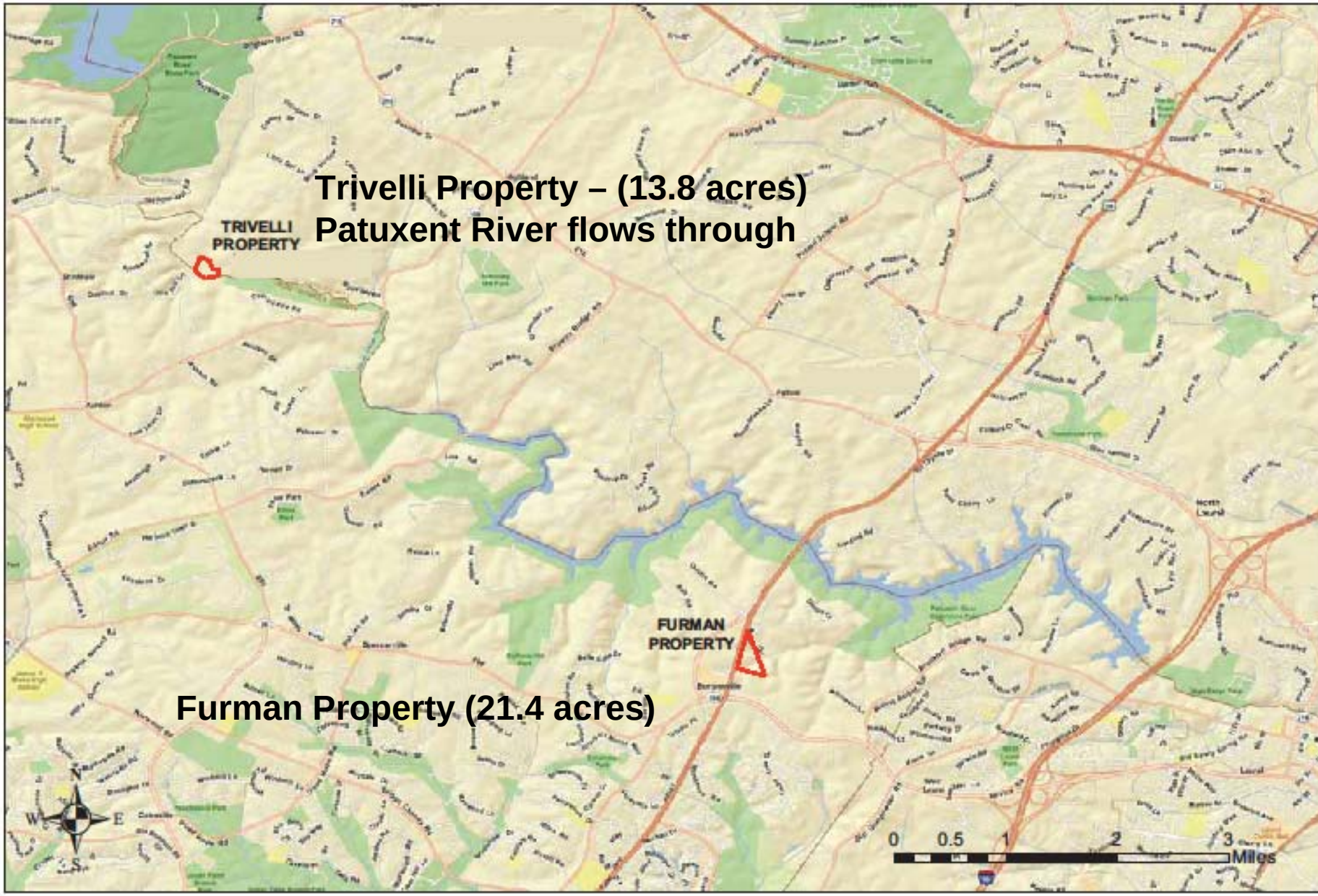
Reddy Branch Stream Buffer Planting



Reddy Branch Stream Buffer Planting

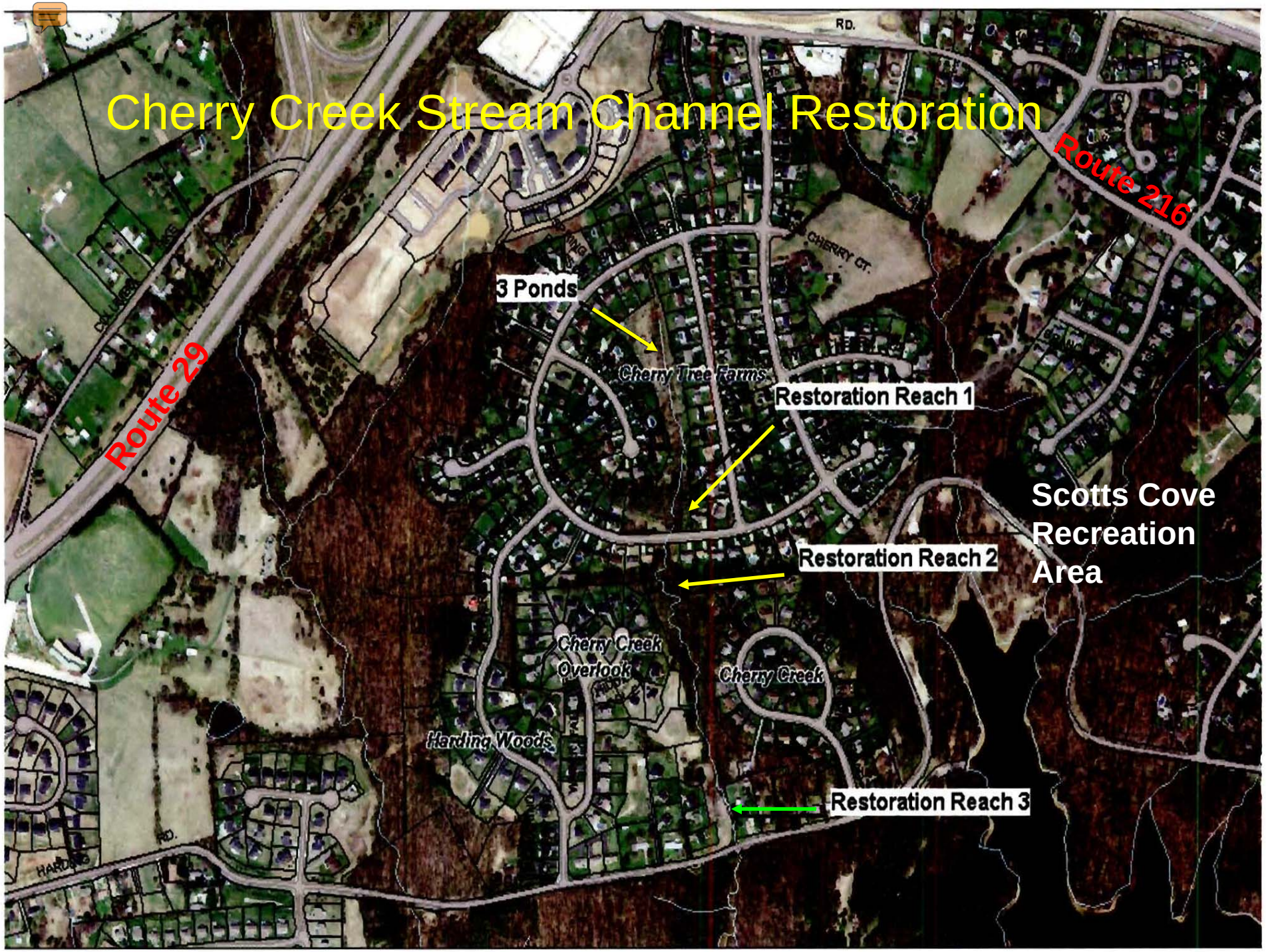
- Another 1 ½ Acres of Trees Planted
- Partnerships and Collaborative Effort
  - Intra-agency/Multi-agency
  - Volunteers (Izaak Walton League)
- Future efforts
  - Another 1 acre of trees to plant this winter
  - Land swap with neighboring property

PROPERTIES ACQUIRED BY WSSC FOR PATUXENT RESERVOIRS BUFFER WATER SUPPLY PROTECTION SEP
October 2009



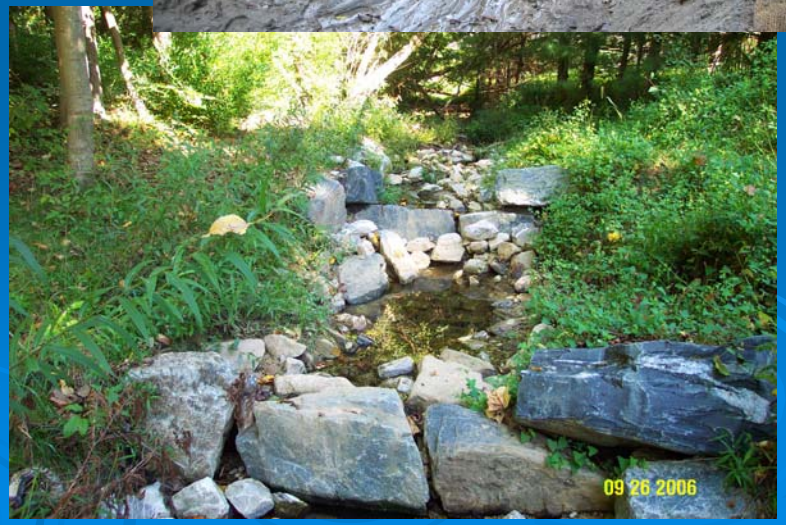
Work Plan Expenditures: Stream Systems

- Cherry Creek Stream Channel Restoration (Phase 2) – Howard County
  - $ 440,000 (2009) None (2010)


Cherry Creek Stream Channel Restoration
RD.
Route 216
CHERRY CT.
3 Ponds
Cherry Tree Farms
Route 29
Restoration Reach 1
Scotts Cove Recreation Area
Restoration Reach 2
Cherry Creek Overlook
Cherry Creek
Herding Woods
Restoration Reach 3

Cherry Creek
Stream Channel Restoration

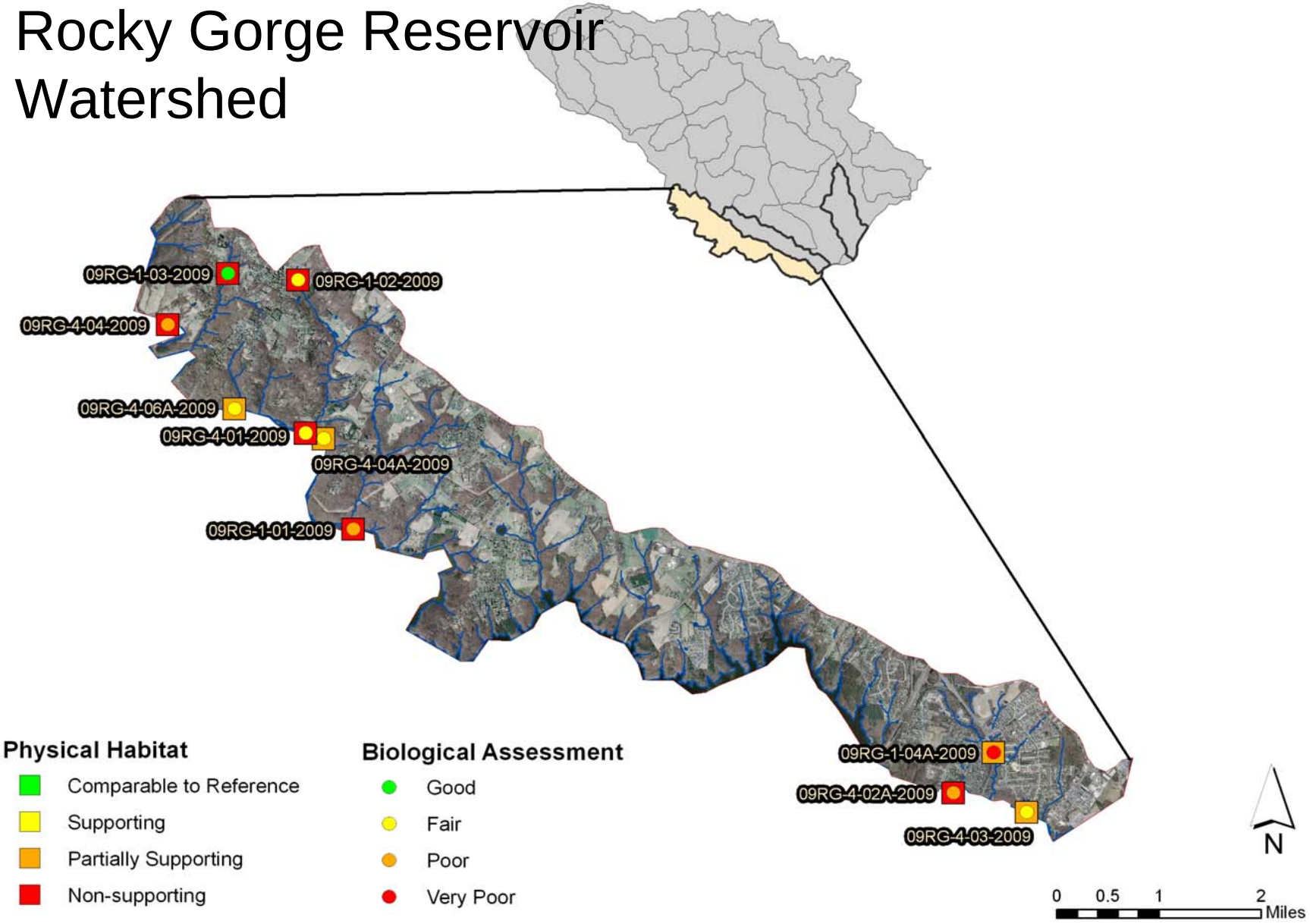
Before and After



Work Plan Expenditures: Aquatic Biota

- Stream Habitat & Biological Monitoring
  - Assessment of Howard County Portion of Rocky Gorge Reservoir Watershed - DPW
    - $ 37,000 (2009) $75,000 (2010)
  - Assessment of Hawlings River Restoration Project in Montgomery County - DEP
    - $25,000 (2009) None (2010)

Howard County Portion of the Rocky Gorge Reservoir Watershed



Work Plan Expenditures: Rural Character & Landscape

- Agricultural Land - Howard & Montgomery SCDs
  - Program Oversight for Implementation of Agriculture Efforts in Patuxent Watershed
    - HSCD: $80,000 (2009) $80,000 (2010)
    - MSCD: None (2009) $20,000 (2010)
  - Patuxent Cost-Share Program
    - Original Contribution Total of $150,000 in FY00 & FY01 by Howard, Montgomery, and WSSC
    - MSCD Account Balance of $51,846
    - No funds added (2009) No funds added (2010)

Practices Installed in 2009 with Patuxent Cost-Share Program Funds

- Three Contracts Signed All with Horse Owners

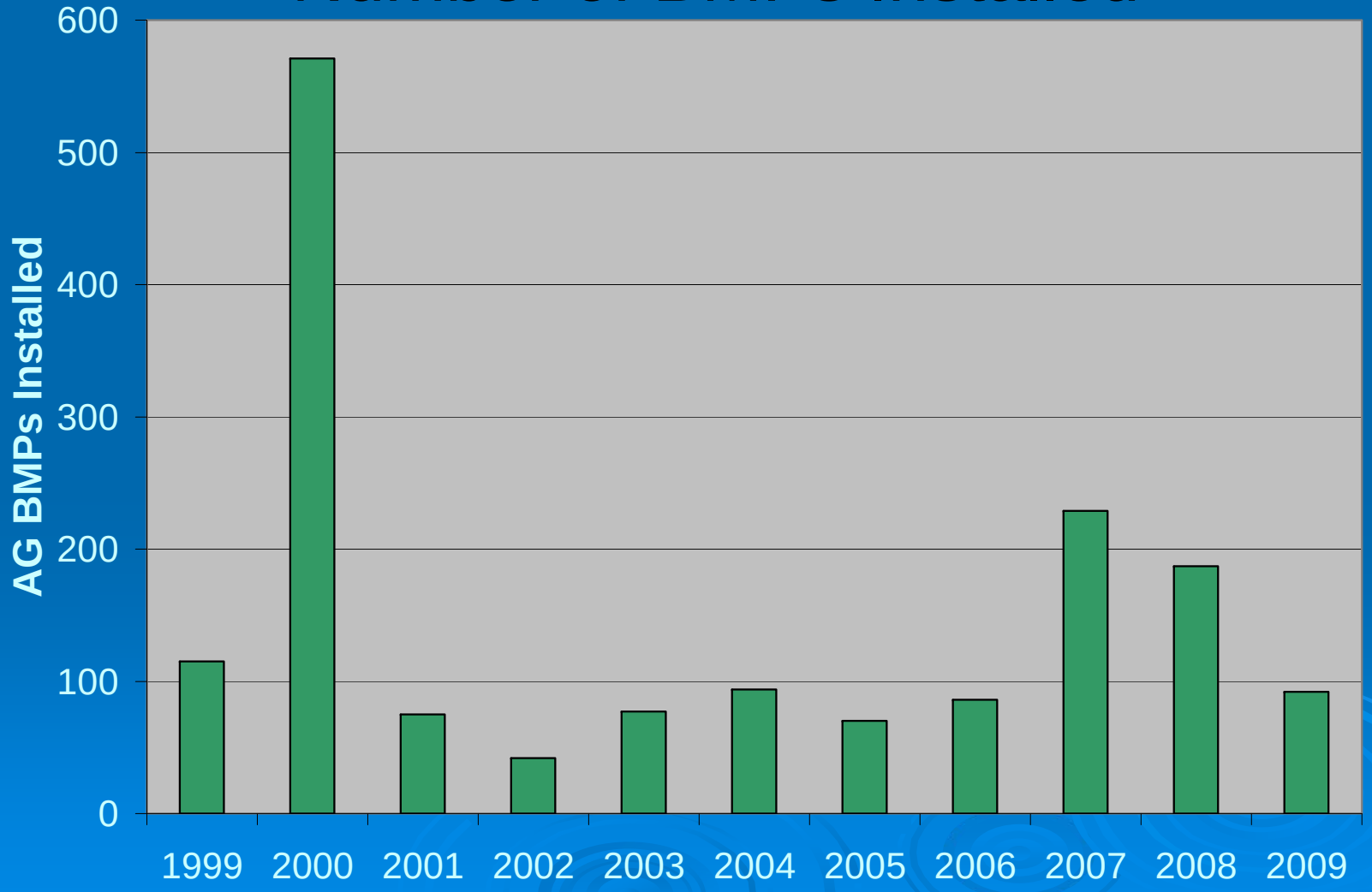
Water Trough: alternative water source for animals to drink rather than stream

Fencing along Streams to exclude animals

Agricultural Efforts

- MDA-supported SCD staff to reach Small Horse Operations
- Soil Conservation & Water Quality Plans
  - 29 Written or Revised (1,233 acres or ~2 sq. miles)
- Nutrient Management Plans (1,881 acres or ~ 3 sq. miles)
- 92 BMPs Installed

Historical Progress
Howard & Montgomery SCDs
Number of BMPs Installed



Work Plan Expenditures: Public Awareness & Stewardship

- Public Outreach
  - Earth Month, Campfire and other events
    - WSSC: $135,500 (2009) $140,000 (2010)
    - Other TAC: $2,500 (2009) $2,500 (2010)
  - Rainscapes Program - Montgomery County
    - $5,000 (2009) None (2010)
  - Rainscapes Rewards - Montgomery County
    - Rebate of $1,200 (max. per property) for urban BMPs

Public Awareness & Stewardship

- Many outreach events held this year
  - H2O Fest and Annual Campfire
  - Patuxent River Clean-Up
  - Rainscapes Rewards Program – BMPs at home
    - Low response from home-owners in Patuxent thus far

Public Awareness & Stewardship

- More outreach events
  - Volunteer Efforts
    - Izaak Walton League of America in Damascus
      - Spring & Fall Watershed Clean-Ups
      - ‘Make and Take’ Rain Barrels
      - Invasive Plant Management
  - Soil Conservation Districts
    - HSCD – three events (46 attendees)
      - Equine Seminar held at Circle D Farm in Woodbine
      - Mid-Winter Meetings – targeted traditional farming
    - MSCD – one event (50 attendees)
      - Horse Pasture Mgmt Workshop held at U of MD Research Farm in Clarksville

Patuxent Reservoirs Interim Watershed Management Report

- Completed in 2009 by Versar, Inc.
- Provides useful GIS analyses
- Summarizes many historical reports completed since 1980 into key topics and challenges
- Provides series of recommendations to guide future TAC efforts to develop a watershed management plan

Work Plan Budget for 2010 (FY2011)

Priority Resource	2010 (FY 2011) Planned Costs
Reservoir & Water Supply	$149,000
Terrestrial Habitat	$50,000
Aquatic Biota	$75,000
Rural Character & Landscape	$110,000
Public Awareness & Stewardship	$142,500
Administration & Coordination	$60,200
Total Planned Expenditures	$576,700*

* Compare with $686,200 for 2009 (FY 2010)

Our Partnership - Our Challenges

- Addressing TMDLs for the Reservoirs
- Exploring Opportunities for Continued Resource Protection with Funding Limitations

TMDLs as Regulatory Drivers

- Significant reductions needed to meet TMDLs
- Burden falls to non-point sources of pollution (e.g., large lot residential, & agricultural lands)

	Triadelphia	Rocky Gorge	Triadelphia
Pollutant	Phosphorus (lbs/yr)	Phosphorus (lbs/yr)	Sediment (tons/yr)
Starting Point	65,593	46,935	32,141
% Reduction Needed to meet TMDL	58%	48%	29%
TMDL Goal	27,700	24,406	22,820
Point Sources	19%	30%	2%
Non-Point Sources	76%	65%	98%

Resource Protection Opportunities using Existing Funding Sources

- Forest Conservation Act - Howard
- Stream ReLeaf - Howard
- Leaves 4 Neighborhoods – M-NCPPC
- Patuxent Ag. Cost-Share Program - SCDs
- Conservation Reserve Enhancement Program (CREP) – SCDs
- Rainscapes Rewards - Montgomery
- Green Schools – Counties, WSSC

Appendix C

2009 Annual Policy Board Meeting Summary

Patuxent Reservoirs Watershed Protection Group

Annual Policy Board Meeting Summary

November 3, 2009

Washington Suburban Sanitary Commission, Auditorium

Policy Board:
Joshua Feldmark (Chair), Howard County
William Barnes, Howard Soil Conservation District
Robert Hoyt, Montgomery County
Jerry Johnson, Washington Suburban Sanitary Commission
George Lechlider, Montgomery Soil Conservation District
Oscar Rodriguez, M-NCPPC (represented by Katherine Nelson)
Charles Wilson, Prince George's County, (represented by Jerry Maldonado)

Technical Advisory Committee (TAC) Members Present:
Martin Chandler (WSSC); Ken Clare (PGCHD); Meo Curtis (MCDEP); Jerry Maldonado (PGCDER), Kristal McCormick (HSCD), Katherine Nelson (M-NCPPC), Susan Overstreet (HCDPZ), David Plummer (MSCD), Stan Wong (MCDPS)

Other Attendees:
Sandy August (WSSC), Gary Gumm (WSSC), Mohammad Habibian (WSSC), Kim Knox (WSSC), Angela Morales (HCDPW), Steve Nelson (WSSC), Mark Symborski (M-NCPPC), Debra Weller (PGCDER)

Welcome and Introductions
The meeting was called to order at approximately 1:45 p.m. Joshua Feldmark welcomed everyone present and asked the Policy Board members to introduce themselves. Mr. Feldmark noted a change to the agenda since Ms. Patricia Keilholtz, a Howard County landowner was unable to attend the meeting and present her experience using the Patuxent Ag BMP cost-share funds. He then welcomed the TAC Chair, David Plummer to present this year's accomplishments.

2009 Annual Report of Accomplishments
Mr. Plummer briefly presented the historical background of the partnership and the priority resources. He then summarized the TAC's accomplishments from 2009 related to each priority resource, including work plan expenditures.

During the presentation of the Reddy Branch Stream Buffer Planting, Ms. Nelson commented that tree plantings should be completed by the fall of 2010. Policy Board members inquired whether there would be additional opportunities for volunteer plantings at the site. Mrs. Nelson

indicated that there may be more volunteer projects once MNCPPC completes a land swap with the adjoining landowner.

The final two slides of the presentation covered the topics of TMDLs as regulatory drivers and the potential opportunities for resource protection using *existing* funding sources, many of which are already available to the TAC partnership agencies. Mr. Hoyt suggested that since TMDLs were a focus of future efforts that the NPDES, MS-4 Storm Water permit compliance process may overlap with efforts from the partnership. Ms. Curtis followed by stating that the implementation plan for the Patuxent Reservoirs Watershed as required by Montgomery County's pending permit should be completed by late summer/early fall of 2010. She also noted that this permit only covers the point source portion of the TMDL; non-point sources of pollution will not be addressed by these implementation plans.

New Implementation Items for 2010 and Beyond

After the presentation, Ms. Overstreet and Mr. Symborski each gave a brief summary and status of their respective County efforts to incorporate the Water Resources Element into County Master Plans. Ms. Overstreet mentioned that, under the current schedule, the element will be amended to the Howard County General Plan 2000 by April 2010. The Proposed Water Resources Element (WRE) will be released by November 5, 2009, and presented to the Planning Board on December 3. The County Council should take up discussion of the amendment early in 2010. The Proposed WRE contains Policies and Actions to increase funding and support for implementation of the Patuxent Reservoirs Priority Resource Protection Program. Mr. Symborski followed with the status of Montgomery County's Water Resources Functional Master Plan. He noted that Montgomery's process is similar to the Howard County process. A draft of the Montgomery County plan should be released on November 10, 2009 with a 30-day comment period.

Discussion of Annual Report

Following Mr. Plummer's presentation, Mr. Feldmark began the discussion by asking TAC members what have been the most important achievements that would *not* have been possible without the PRW protection partnership. Ms. Nelson responded by stating that the stream buffer planting efforts at Reddy Branch would not have been possible without the coordination by former contract employee Carrie Capuco, funded by WSSC. Mr. Plummer added that even though a major grant sought in 2009 for establishing a composting facility for horse manure in the watershed was not funded, Ms. Capuco also helped coordinate efforts between both Soil Conservation Districts. Ms. Overstreet also added that Howard County DPW selected the Cherry Creek Stream Restoration Project because of the established Reservoirs Watershed Protection Agreement even though other, more developed watersheds are a higher restoration priority for the NPDES stormwater permit. Ms. Curtis indicated that Montgomery County DEP selected the Hawlings River watershed for the same reason as Howard County's selection of Cherry Creek. She added that DEP needs to balance priorities between the Patuxent Reservoirs Watershed (PRW) and other more heavily populated watersheds in Montgomery County. Dr. Habibian concluded this discussion by adding that perhaps the most important achievement (after many years of work) was the establishment of a <u>quantitative</u> nutrient load reduction goal via the TMDLs, which will help to direct future restoration efforts.

Mr. Feldmark prompted another discussion by asking if the best role for the Policy Board is to help support projects and direct funding to the PRW. Ms. Morales responded that the Patuxent partnership is needed to foster communication among the seven member agencies.

Mr. Hoyt asked if the Interim Watershed Management Report written by Versar, Inc. contained a list of prioritized projects. He was informed that it did not.

Endorse Proposed Work Program

Mr. Feldmark called for a vote to endorse the budget and work plan, as presented by Mr. Plummer. It was unanimously approved by the Policy Board.

Discussion of Future Direction of the Patuxent Partnership

Mr. Feldmark opened this discussion by asking how the Policy Board interacts with the TAC. Ms. Curtis provided a historical perspective and commented that at the start of this partnership the Policy Board consisted of members at the executive levels of each member agency, but over time some of these executives have delegated their role to staff level representatives. She added that the historical role of the Policy Board was to endorse the work plan and corresponding budgets needed to accomplish the action items.

Mr. Feldmark asked for specific examples of actions that Policy Board members could take. Mr. Plummer and Ms. Curtis added that in the near future with upcoming challenges, the Policy Board should advocate the inclusion of funding for the Patuxent Reservoirs Watershed in their respective agency budgets. Ms. Overstreet added that the Policy Board could also get the message about the importance of resource protection in the PRW to political representatives and other internal agencies.

Ken Clare commented that Prince George's County is in a unique position because of the small portion of the watershed within the County, but the large percentage of the County served by WSSC.

Mr. Hoyt asked if one strategy to advocate for additional funding could be to connect the idea of improving reservoir water quality with reducing water treatment costs. He then asked about other roles for the Policy Board. Ms. Morales responded by stating that a proactive approach to acquiring land within the watershed would be more beneficial than restoring resources as a result of other land use decisions.

The Policy Board then discussed why there is a need for the significant phosphorus and sediment reductions specified in the TMDLs if reservoir chlorophyll-a levels appear to be below one of the two proposed water quality standards (as shown in Mr. Plummer's presentation). (Note: chlorophyll-a results from both reservoirs have regularly exceeded the second proposed threshold, which was not shown during the presentation.) A discussion followed about how recently proposed chlorophyll-a water quality criteria by MDE affects the PRW and provides a useful indicator for determining if the reservoir TMDLs have been achieved.

Ms. Curtis commented that the TMDL addresses only one of the six priority resources: Reservoir and Water supply. Dr. Habibian stated that future climate changes may negatively affect both the quality and quantity of the Patuxent Reservoirs as a water supply. He emphasized that there is no alternative water source to the Patuxent Reservoirs. He added that, similar to the Chesapeake Bay, non-point sources of pollution play a significant role in addressing the challenges of nutrient inputs.

Mr. Gumm asked if TMDLs are going to be much of a regulatory "hammer" for the Patuxent Reservoirs considering the majority of pollutant load reductions needed to meet the TMDL goal are attributed to non-point sources. Mr. Hoyt added that the NPDES MS4 storm water permit now addresses one type of agricultural non-point source pollution: concentrated animal feeding operations (CAFOs). Mr. Plummer mentioned that after attending a recent EPA briefing on proposed federal efforts to address the Chesapeake Bay TMDL, agriculture will be one of the primary areas to address. Mr. Plummer mentioned the need to continue to update the Policy Board members throughout the year with quarterly update letters.

Administrative Business
Mr. Feldmark passed the chair to Mr. Hoyt for 2010.

All present were thanked for their attendance and the meeting adjourned at approximately 3:00 p.m.

Appendix D

2009 Policy Board Correspondence

October 19, 2009

Mr. William Barnes, Chairman
Board of Supervisors
Howard Soil Conservation District
708 Lisbon Center Drive, Suite E
Woodbine, MD 21797

Dear Mr. Barnes,

I would like to introduce myself and encourage your participation as a Policy Board member in the upcoming annual meeting of the Patuxent Reservoirs Watershed Protection Group (PRWPG). I am the Director of Howard County's Office of Environmental Sustainability, and I have been designated as Howard County Executive Ken Ulman's representative to the PRWPG. Howard County is committed to this collaborative, multi-jurisdictional effort and to the long term resource protection goals that this initiative was originally designed to address. The future implementation of the PRWPG strategies and objectives depends on the continued support of each Policy Board member and their respective agencies.

With the important local, regional, and global challenges we face regarding water supply, environmental health, and climate issues, this meeting could not be more timely or relevant. There have probably been few times since the inception of the PRWPG that so many issues have demanded the attention of our partnership. Our collective responsibilities to assist with and/or implement TMDLs, the Water Resources Element (HB 1141), NPDES Storm water permits, and the Chesapeake Bay Executive Order represent opportunities to capitalize on the strengths of our partnership.

The PRWPG Technical Advisory Committee (TAC) has experienced a number of changes this year at the staff level, and will need our full support as they continue to focus their priorities for the coming year. During these times of limited resources, we must ensure that the benefits and value gained from this effort are commensurate with the time and energy our organizations have invested. The future success of the PRWPG will require commitment from all of us.

I realize that last year's Policy Board meeting represented a scheduling conflict for many of the principal Policy Board representatives. The TAC has gone to considerable lengths to coordinate this year's meeting, scheduled for 1:30 pm on November 3, 2009 at WSSC Headquarters, with Policy Board members' schedules. I look forward to seeing you at the Policy Board meeting and hearing your ideas for the continued success of this valuable partnership.

Sincerely,

Joshua Feldmark, Policy Board Chair
Patuxent Reservoirs Watershed Protection Group

Technical Advisory Committee

Gul Behsudi, MDE ..... *Martin Chandler, WSSC*.....*Kenneth Clare, PGDH*
Meosotis Curtis, MCDEP..... *Dwight Dotterer, MDA*..... *Jerry Maldonado, PGDER*
Kristal McCormick, HSCD..... *John McCoy, MD-DNR* .....*Katherine Nelson, M-NCPPC*
Bert Nixon, HCHD .....*Susan Overstreet, HCP&Z*..... *David Plummer, MSCD*
Howard Saltzman, HCDPW.....*Stan Wong, MCDPS*.....

Appendix E

2009 Technical Advisory Committee Meeting Agendas and Summaries

Patuxent Reservoirs Watershed Protection Group
Technical Advisory Committee Meeting

WSSC Training Room (6104)
January 13, 2009
1:30 p.m. – 4:00 p.m.

AGENDA

Call To Order/Opening Remarks	Chair - McCormick
Administrative Business	15 Mins
Approval of September 2008 TAC meeting summary	Chair – McCormick
Passing of Chairmanship and Vice-Chairmanship	McCormick
Opening Remarks	Chair -- Plummer
Old Business	
Work Program Update	All -- 15 Mins
H20 Festival	August 15 Mins
Watershed Plan	Versar (Roth) 15 Mins
New Business	
Montgomery County MS4 Permit	Curtis 15 Mins
Implementation Financing Options	
2010	Raulins (DNR) 15 Mins
Flush Tax and Septics	Shan Abeywickrama(MDE) 15 Mins
Discussion	All -- 20 Mins
Policy Board Update Memo	Plummer – 5 Mins
Next Meeting-Topics and Date	All – 5 Mins
Adjournment	Chair

Patuxent Reservoirs Watershed Protection Group

Technical Advisory Committee

Meeting Summary of January 13, 2009

TAC Members in Attendance: Martin Chandler (WSSC), Meosotis Curtis (MCDEP), Jerry Maldonado (PGDER), Kristal McCormick (HSCD), Katherine Nelson (MNCPPC), Bert Nixon (HCHD), Susan Overstreet (HCDPZ), Dave Plummer (MSCD), Howard Saltzman (HCDPW).

TAC Members Absent: Gul Behsudi (alternate, MDE), John McCoy (DNR), Paul Meyer (PGHD), Royden Powell (MDA).

Other Attendees: Shan Abeywickrama (MDE), Sandy August (WSSC), Carrie Capuco (Capuco Consulting Services, Inc.), Ned Cheston (Howard County), Mohammad Habibian (WSSC), Brenda Morgan (Versar), Angela Morales (HCDPW), Jennifer Raulins (DNR), Nancy Roth (Versar), Stan Wong (MDPS).

Meeting was called to order at approximately 1:40 p.m. by Vice-Chair David Plummer.

Administrative Business – Mr. Plummer welcomed guests and noted that the agenda item for "Passing of Chairmanship" would be moved to the end of the agenda because Ms. McCormick had not yet arrived. He asked if there were comments on the summary of the September 2008 meeting. Being none, the summary was approved without change.

Old Business

Work Program Update

Ms. Nelson reported that **planting** did not go forward in **Reddy Branch Stream Valley Park** in the fall of 2008 due to funding appropriation issues. Instead, the planting will occur in the spring of 2009. Ms. Curtis queried whether the spring planting would be coordinated with the planned planting by the Isaac Walton League Wildlife Achievement Chapter (IWL-WAC). Ms. Nelson reported that there will be a section of the park specifically designated for IWL-WAC planting. It will be 1.5 acres on the east side of the stream that is relatively clear of invasive plants and hard to reach by vehicles. Ms. Curtis requested whether a fall planting would be possible, and Ms. Nelson assured her that it would. Mr. Plummer offered volunteers to help with the planting. Ms. August offered that there is a strong environmental club at the local high school. Ms. Nelson indicated that she is ultimately seeking a group to adopt the park. Ms. August offered to contact the high school to see it they could adopt the park.

Mr. Saltzman reported that the **Cherry Creek restoration** project had received approximately $150,000 from MDE pollution control funds to implement restoration in the summer of 2009.

Mr. Chandler reported that the 5-year **water quality monitoring trend analysis** is underway. He also reported that WSSC recently purchased a new Hydrolab sonde for approximately $4,000. Dr. Habibian added that WSSC is still seeking a replacement for Tobias Kagan. Mr. Plummer requested that the position description be forwarded to the TAC to facilitate distribution of the available opening.

Ms. August reported on **public outreach and involvement** plans for the H2O Festival on April 18, 2009 at Duckett Dam in Prince George's County. Currently 18 presenters have signed up to participate in addition to a Girl Scout troop and one school. She is seeking participation from 2 other schools. Ms. August indicated that the advertising for 2009 will be better than 2008. Among the presentations at the Festival will be:

- WSSC will be offering tours of the dam
- WSSC will also have a display on sewers and water quality monitoring
- Montgomery County will offer its rainscapes program information and auction off 20 rainbarrels for $5 tickets. Proceeds from the raffle will be given to the WSSC Water Fund
- Prince George's County will staff an enviroscape display
- Montgomery County is also sending a composting demonstration
- DNR Stream waders will also have a presentation.

Ms. August reiterated that she is seeking child-friendly presentations. She indicated a desire for presentations on TAC-specific activities since WSSC provides this Festival for the benefit of the TAC. She reminded TAC members that in 2008 there were displays for Cherry Creek that were seen by the nearly 250 Festival participants.

Ms. Curtis asked whether there is a way to document Festival participant's county of residence because she is required to justify the expenditure for Montgomery County stakeholders. Ms. August responded that the brochure is distributed in all three counties of the watershed. She also indicated that Montgomery County schools are invited. Duckett Dam is the chosen location due to its accessibility. Ms. Curtis asked if it would be possible to have a map of the watershed and ask Festival participants to place a pin where they live. Ms. Morales suggested that a door prize be offered for those who sign a slip of paper that would include their county of residence.

Discussion then turned to refreshments at the Festival. Ms. August indicated that she is seeking donations from a company that has a compostable corn product water bottle. Other issues related to food vendors are under consideration by WSSC's General Counsel Office. She also indicated that WSSC is looking at the possibility of using a water wagon at the Festival.

Ms. August reported that there may be information on pharmaceutical take-back opportunities at the Festival. This is because the brochure advertising the Festival includes one panel on the Festival, one on the recently formed Friends of Brighton Dam (FOBD) organization, and one panel on pharmaceutical disposal. Ms. Morales offered that the Federal web sites have useful information on the topic. She also suggested that the FOBD efforts emphasize the "adopt a restoration site" concept similar to "adopt a highway." Ms. Curtis stated that Montgomery County has a type of "adopt a site" program through its Weed Warriors program.

Ms. Roth then offered an update of progress on the **Reservoirs Watershed Plan**. She reminded the TAC that in September a list of watershed plan objectives was distributed. In October a conference call was held to discuss the objectives and meeting notes were distributed. Ms. Roth then distributed an outline describing how the plan will focus on multi-jurisdictional concerns and result in a multi-jurisdictional document.

Initially the plan will state the plan's goals and objectives. It will then review previous watershed studies and plans. Ms. Roth then offered a list of existing plans and asked that the TAC offer any additions (see attachment). The plan will then move into an assessment and ranking using existing subwatershed layers based on Center for Watershed Protection guidelines. She asked that if another analysis is needed, to please let Versar know (NRoth@versar.com 410-740-6091 and BMorgan@versar.com 410-740-6102).

Discussion followed on data sources. Ms. Morgan indicated that most of the GIS layers had come from the counties and DNR. Ms. Nelson and Mr. Maldonado offered to provide green infrastructure layers to Versar. Ms. Curtis indicated that MDE has sewer layers that would be helpful. Mr. Abeywickrama offered to provide those to Versar. Ms. Curtis then also suggested that Versar contact Tim Rule at MDE to obtain copies of the layers used in the development of the Total Maximum Daily Load (TMDL) regulations for the Reservoirs Watershed. In addition, Ms. Nelson and Ms. Overstreet offered to provide forest layers for 2008. Ms. Roth offered to provide an updated list of data sources to the TAC in 3 weeks.

Ms. Roth then explained that the last section of the watershed management plan will contain recommendations intended to be rolled up into future implementation plans. She indicated it will include project effectiveness and a ranking criterion. Ms. Roth reported that she intends to have a draft plan in April and complete the plan in June 2009.

Ms. Overstreet asked what plans were being made for stakeholder involvement. Ms. Capuco reported that contact had been initiated with the Patuxent Riverkeeper. Ms. Overstreet reviewed the notes of the October meeting and requested that a proposal be provided for ensuring stakeholder involvement. Ms. Capuco agreed to develop a small stakeholder involvement plan.

New Business

Montgomery County MS4 Permit – Ms. Curtis provided a handout summarizing the status of Montgomery County's impending issuance of its third-round Municipal Separate Storm Sewer System (MS4) permit by MDE. She reported that efforts were made to have the permit strengthened. She anticipates it will be issued in late February 2009.

Ms. Curtis reported that permit changes include runoff management to the maximum extent practicable for 1200 additional acres. It also addresses trash in the Potomac. It adds Montgomery County Public Schools as co-permittees holding MCPS responsible for stormwater control during and post construction on school properties. The cities of Gaithersburg, Rockville, and Takoma Park are not co-permittees.

Another significant change noted by Ms. Curtis is the requirement for completion within 12 months of permit issuance of implementation plans for achievement of TMDLs in the county. These plans will necessitate methods of tracking progress, pollution reduction benchmark development, cost estimates of implementing best management practices, annual reporting, and public comment and hearing opportunities.

Ms. Curtis then referred to the second side of her handout (attached) which lists other conditions of the permit. She reported that the cost is unknown until completion of the implementation plans, but that preliminary indications are that implementation will cost approximately $108 million.

Mr. Saltzman asked whether stormwater control will meet the TMDL. Ms. Curtis indicated that quantity control may support quality control. Mr. Saltzman indicated that even with stormwater management on every piece of land, TMDLs may not be met. Ms. Curtis responded that the next step would then be pollutant elimination (such as a phosphorus ban). She then indicated that Montgomery County welcomes the challenge to make the TMDL process real.

Implementation Financing Options

Ms. Raulin then offered a summary of the status of the **Chesapeake and Atlantic Coastal Bays 2010 Trust Fund**. She reported that the initial pool of money was allocated between Maryland Department of Agriculture, MDE, and DNR. The funding source is a tax on fuel and rental cars. Due to reductions in driving caused by the extreme prices of gasoline, the total funding available for FY09 will be between 8 and 13 million dollars as opposed to the anticipated 50 million dollars.

Overall, MDE received 58 proposals, and DNR received 31. The total value of all proposals was approximately 100 million dollars. Ms. Raulin indicated that she was impressed by the proposals considering that not much time was given for proposal development. The proposals were reviewed by staff and then ranked by the Governor's Scientific Advisory Panel. From the MDE pool a top 16 proposals have been identified, for DNR the top 10 proposals were identified. Ms. Raulin had hoped to notify grant recipients before the New Year, but now anticipates it will be at a later date, with hope for implementation beginning in July 2010.

For FY12, the request for proposals (RFP) will be released in July 2009. All agencies will work together to evaluate responses to one request rather than the 3 that were used for FY10. Mr. Plummer indicated that the TAC would be interested in discussing the RFP after its issuance. Ms. Raulin indicated willingness to attend another TAC meeting.

Ms. Raulin then presented information on the Watershed Assistance Collaborative (see attachment) for capacity building assistance to local governments. The $200,000 funds two watershed restoration specialists to build capacity in local governments.

Mr. Abeywickrama then offered a summary of the **Flush Fee or On-Site Disposal (Septics) System Grants Program.** He reported that the Bay Restoration Fund finances this program through a $30 annual fee that is charged annually to property owners with septic tanks. This

generates approximately $6.5 million per year. Tax collection began in January 2007 and now the fund has accumulated $15 million which should be spent before June 30, 2009. Homeowners are notified of the program through postcards, CDs, and brochures that are distributed to eligible properties. After completion of an application, the homeowner will receive grant funding to replace or enhance their current septic system with one of ten best available technologies (BAT) listed on the MDE website. Average cost of BAT is $13,000 to $15,000. There are two levels of funding – general and low-income (which receive a greater amount of assistance). All applicants are accepted.

The program goal is to reduce the amount of nitrogen leaving septic systems by 50 percent using proven technologies. State priorities are: (1) failing systems in the critical areas; (2) other failing systems; (3) systems in the critical areas; (4) non-critical area systems.

Mr. Abeywickrama provided a map showing county grant awards and MDE grant awards. Some counties receive funds directly from MDE and administer the program themselves applying their own priorities. For example, Anne Arundel County knew exactly how many septics existed in the county and so was well suited to implement. Other counties are not as well mapped and so MDE administers the grant applications for them.

Mr. Nixon reported that Howard County is not yet actively involved, but it is now advertising and looking for grant applicants. He indicated that most Howard County systems are not failing.

Dr. Habibian stated that the TAC's focus is the fresh water reservoirs. He inquired whether this program has any application to phosphorus removal. Mr. Abeywickrama reported that is does not reduce phosphorus.

Ms. Morales asked how the Fund is controlled to avoid promoting development. Mr. Abeywickrama responded that the counties control that aspect. For example, in Queen Anne's County BAT is now required. In time, as all older tanks install BAT the funds will become available to enhance newer systems. $6.5 million is generated yearly and so over time more of the state will implement BAT. Mr. Nixon commented that larger homes have larger systems and so might result in an overall larger reduction in nitrogen if prioritized.

Mr. Plummer asked whether the Fund could be used for costs of administering the program. Mr. Abeywickrama responded that twenty percent of the cost of setting up a program could be provided.

Ms. Curtis asked whether the Fund could be used for direct hook-ups in older communities. Mr. Nixon added that denying hook-up assistance increases pressure to sub-divide older communities. Mr. Abeywickrama responded that for now MDE knows the location of the approximately 390,000 homes in Maryland with septic systems. MDE has been able to map these homes using tax records since the fee is paid in conjunction with property taxes. Areas where trunk lines are missing can be easily identified using the tax data.

Additional questions were then asked regarding maintenance. Mr. Abeywickrama indicated that the BAT is warrantied for five years which includes two annual visits by the manufacturer and then ongoing maintenance of $150 per year.

Discussion then turned to the Bay Restoration Fund's use overall. Mr. Abeywickrama indicated that 60%of the revenue generated each year is given to MDE for the On-site Sewage Disposal System grants and 40% to MDA for cover crop. He stated that pressures exist to modify these allocations to increase nitrogen reduction in agricultural areas such as the Eastern Shore.

Mr. Plummer thanked Mr. Abeywickrama and asked Ms. Capuco to provide copies of an e-mail from Ken Shanks (MDE) addressing **319 Funding** opportunities (attached). Mr. Saltzman stated that 319 Funds cannot be used for actions otherwise required by permit. Ms. Curtis responded that she raised that point with MDE and was told that once the MS4 permit is in place 319 Funds cannot be used for implementing TMDL compliance activities. Mr. Saltzman concurred, and reported that Howard County has given up seeking 319 Funds.

Policy Board Update Memorandum – Mr. Plummer summarized the content of the letter to be provided to the Policy Board this quarter. The items listed included: a summary of the funding presentation; notice of the watershed's TMDL approval; an update on Montgomery County's MS4 permit; expression of TAC concern over WSSC staffing loss and contract end dates; and an invitation for the WSSC Interim General Manager and the Policy Board to attend the April TAC meeting. Mr. Plummer will circulate a draft of the memorandum before distribution to the Policy Board.

Mr. Plummer then summarized FY09 TAC plans drafted by Ms. Capuco, Ms. Nelson, Mr. Chandler and himself, and he asked Ms. Capuco to circulate the draft plan among the TAC. He stated that the April TAC meeting will be focused on water issues. It will include presentations on the upcoming H2O Festival, WSSC Trend Analysis, and MNCPPC Water Quality Plan. He also expressed interest in having representation from the Baltimore County Reservoirs Protection Group to discuss their "State of the Reservoirs" reports and to discuss TMDL implementation. Ms. Curtis suggested that Forest Conservation Plan implementation should also be discussed with the Baltimore Reservoirs Protection Group. Additionally, TAC Members present asked that Mr. Rule of MDE be invited to the meeting in case TMDL implementation questions arose.

Howard County Sediment and Grading Control – At the request of HSCD, Mr. Plummer then asked Ned Cheston of Howard County Government Affairs to brief the TAC on requested legislation to change oversight of sediment and grading plans in Howard County. Mr. Cheston reported that the County will save $200,000 by moving a portion of this authority from the HSCD to existing HCDPZ staff. He does not anticipate any changes to the standards or their application will result. However, a legislative action is required to make the staffing change. The resulting outcome will be a reduction in force of two inspectors in HSCD. Mr. Plummer clarified that the TAC needed to be notified of the issue due to rumors of developer influence that might result from these changes. Ms. Curtis reported that Montgomery County has operated with similar executive control for a period of time and that Montgomery County's is looked upon as a model program. Mr. Maldonado offered that Prince George's County currently administers

its program similarly to Howard County. Mr. Cheston continued that the legislation is in the drafting phase.

Transfer of Chair – Ms. McCormick then assumed responsibility for the meeting, thanked Mr. Plummer for assistance in her absence, and transferred the Chairmanship to Mr. Plummer and Vice-Chairmanship to Ms. Nelson.

There being no further business, the meeting was adjourned at 3:55p.m.

Next Meeting – April 14, 2009, at 1:30pm

Agenda items will include: presentations on the upcoming H2O Festival, WSSC Trend Analysis, and MNCPPC Water Quality Plan, Baltimore County Reservoirs Protection Group "State of the Reservoirs" reports, and TMDL implementation.

This meeting summary was prepared by Carrie Capuco and finalized by Steven Nelson.

Outline - Patuxent Reservoirs Watershed Management Plan
Versar, Inc. - January 13, 2009

1. Introduction
   - Goals
     - reservoir source water protection; watershed land use management; bolster multi-jurisdictional cooperation
     - serve as a key resource in the grant application process

   - Objectives of the watershed plan

     - Watershed Assessment: The Plan will include a compilation of existing information to provide a State of the Watershed characterization and evaluation.

     - Incorporate Existing Plans: The Plan will serve as a compilation of existing studies and plans for subwatersheds in the Patuxent Reservoirs watershed. The overall Plan will provide a qualitative characterization and assessment of the Patuxent Reservoirs watershed. The existing plans and studies will be included and referenced as appendices, providing data and specifics regarding particular subwatersheds.

     - Incorporate TMDLs: The Plan will reference MDE's finalized TMDLs for phosphorous and sediment.

     - Address elements required for EPA 319 funding, to the extent possible

2. Review of Previous Watershed Studies
   - See inventory (attached)

3. Assessment and Ranking of Conditions, by Subwatershed
   - Analysis using GIS data (see attached list)
   - Develop matrix of subwatershed indicators (table)

4. Recommendations
   - Include ongoing and proposed restoration efforts
   - General recommendations for management practices for various land uses in the watershed, e.g. forest, agriculture, parks
   - Recommendations for future TAC workplans
   - Identify data needs
   - Propose approach for future evaluation of project effectiveness – quantitative estimates of pollutant reductions
   - Establish performance measures

Schedule
April TAC Meeting – draft Plan
June TAC Meeting – final Plan

Patuxent Reservoirs Watershed Management Plan
Potential List of Factors for Subwatershed Characterization and Ranking Matrix
January 13, 2009

Background:

Stream miles
Watershed (subwatershed, catchment) area
Watershed area within pertinent jurisdiction

Impairment factors:

% Industrial/commercial land use
% Residential land use
% Agricultural land use
% Impervious surface
# storm outfalls/per stream mile
Gaps in green infrastructure
303d impaired stream miles
Inadequately buffered stream miles (from Stream Corridor Assessments, SCA)
Bank erosion stream miles
Unforested stream corridor (from detailed forest layer)
Age of development/age of sanitary sewer system
# of Agricultural BMPs

Value/in need of protection:

Environmentally Sensitve Areas
Green infrastructure
Forest Interior Dwelling species (FID) habitat
Wetlands
Easements

Opportunities:

Stormwater management ponds (for retrofit/maintenance/upgrade)
Institutional/public lands
Parks/open space
Gaps in green infrastructure
Stormwater BMPs (for retrofit/maintenance/upgrade)

Inventory of Currently Available Patuxent Watershed-Related Reports

Patuxent Watershed-Specific Resources

TMDLs for Triadelphia and Rocky Gorge Reservoirs (2008)

Modeling Report for Triadelphia and Rocky Gorge Reservoirs (2007)

Reservoir Data Analysis Prepared for WSSC (2003)

Sediment Mapping and Sediment Oxygen Demand of Triadelphia and Rocky Gorge Reservoirs (2007)

Hawlings River Watershed Restoration Study (2003)

Hawlings River Watershed Assessment (1999)

Biological Assessment of the Cattail Creek, and Brighton Dam Watersheds, Howard County, Maryland (2006)

Biological Assessment of the Rocky Gorge, Hammond Branch, and Dorsey Run Watersheds, Howard County, Maryland (2004)

Hawlings River Watershed Restoration Action Plan (2003)

Forest Conservation Plan for Washington Suburban Sanitary Commission Reservoir Properties (2007)

Upper Patuxent Watershed Study (2001)

Patuxent River Water Resources Reconnaissance Study (USACE 1996)

Comprehensive Watershed Management Planning Study for the Patuxent Reservoir Watershed (1997)

Patuxent Reservoirs Triadelphia and Rocky Gorge Source Water Assessment for WSSC Patuxent Water Filtration Plant (2004)

Patuxent River Reservoirs Watershed Protection Program Prepared for WSSC (1981)

On-Site Wastewater Management Practices in the Upper Patuxent Watershed – WSSC (1997)

Patuxent River Policy Plan – A Land Management Strategy (1984)

Functional Master Plan for the Patuxent River Watershed, (1993)

Developing a Patuxent Reservoir Protection Strategy – Interim Report of the Patuxent Reservoir Protection Group (1995)

Patuxent River Reservoirs Water Quality Assessment Prepared for WSSC (1984)

Patuxent River Tributary Team Water Quality and Habitat Summary Report (1998)

Managing Patuxent River Water Quality – Looking Beyond Science and Politics to the Economics of Decision-Making (NOAA 2007)

Tributary Strategy for Nutrient Reduction in Maryland's Patuxent Watershed (1995)

Water Quality Assessment for Patuxent Watershed (Task 1-G Report) (1987)

Olney Family Neighborhood Park Water Quality Monitoring: Final Report (2000)

Olney and Vicinity Environmental Resources Inventory (2002)

Public Awareness &Education Marketing Plan for Triadelphia and Rocky Gorge Reservoir Watersheds (SOS 1995)

The Upper Patuxent Curriculum: Our Water, Our Land, Our Community (Year - ?)

Technical Report Patuxent River Watershed, Montgomery County, Maryland (MNCPPC 1990)

Patuxent River 20/20: The Need for Effective Action and Effective Solutions (Patuxent Riverkeeper 2007)

TAC Meeting Minutes and Notes (2002-present)

<u>Non-Specific Resources</u>

Maryland Biological Stream Survey, Vol. III (2004)

From the Mountains to the Sea - The State of Maryland's Freshwater Streams (1999)

Recommended Model Development Principles – Baltimore County (2006)

CWP – Better Design – A Manual for Changing Development Rules In Your Community

The Economic Benefits of Land Conservation (2007)

Integrating Water and Waster Programs to Restore Watersheds (US EPA 2007)

Managing Wet Weather with Green Infrastructure Action Strategy (2008)

National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System (MS4) Permit
Montgomery County, MD

I. Background

Federal Clean Water Act Permit to control pollutants discharged through the County's storm sewer system. The Maryland Department of the Environment is delegated to issue these Permits to all municipalities and entities that own or manage storm drain systems. In Maryland, there are 9 jurisdictions and the SHA that have Phase 1 permits and many smaller municipalities, state, and federal facilities under Phase 2 permits. The Phase 1 permits include more stringent monitoring, tracking, and restoration requirements than the Phase 2 permits which focus on implementation of six best management measures. Both require annual reports to MDE.

II. Third-round permit issuance

The MS4 permits are issued for a five-year period. Montgomery County has been awaiting the issuance of its third-round permit since July 2006. Regional environmental groups, including the Chesapeake Bay Foundation and the Natural Resources Defense Council, lobbied MDE successfully to increase the accounting required and to provide a better link between activities under the MS4 permit and progress toward achieving existing water quality standards.

The MDE issued a Tentative Determination permit in September, held a public meeting in November, and received many comments. Almost all of the public meeting comments were from environmental groups, many from outside the County, and many requested additional requirements to assure that water quality standards and the voluntary Potomac Trash Free Treaty goals would be met. The MDE has indicated its intention to issue a Final Determination during winter 2009.

III. Significant changes

A. Provide runoff management to the Maximum Extent Practicable (MEP) for acreage equal to 20% of the impervious not currently controlled to the MEP. The County must also complete projects identified in the previous permit to achieve the 10% restoration goal. Estimated additional acreage is approximately 1,200 impervious acres.

B. Within one year of permit issuance, the County must develop implementation plans with best management practices, pollutant reductions, tracking process, benchmarks, timelines, and costs estimates to meet the MDE specified wasteload allocations for Montgomery County for any EPA-approved TMDLs. There are currently six in the County: three in the Anacostia (bacteria, nutrients, sediment); bacteria in Rock Creek and Cabin John; and phosphorus in Clopper Lake.

C. Multiple conditions related to trash management in the Potomac watershed, including public outreach campaign, establish Anacostia baseline conditions and develop a trash reduction strategy and workplan to meet the 2013 goal, and show progress to meet Trash Free Potomac Watershed Initiative 2006 Action Agreement. The signatories pledged to support regional strategies and collaborations aimed at reducing trash and increasing recycling; increase education and awareness of trash issues throughout the Potomac Watershed; and meet annually to discuss and evaluate measures and actions addressing trash reduction.

D. Addition of Montgomery County Public Schools as co-permittee. The MCPS is responsible for during construction E&SC and SWM and post-development site management to reduce pollutants getting into the storm drain system. The DEP is responsible for maintaining stormwater management facilities. Cities of Gaithersburg, Rockville, and Takoma Park are not co-permittees, nor are WSSC and MNCPPC.

IV. Other conditions

A. Continue pollutant source inventory (GIS mapping for storm drain and stormwater management systems, land cover and land uses, potential pollutant sources e.g. industrial faciliteis)

B. By State law, the County must modify its existing stormwater management law and regulation to meet the changes anticipated to the Maryland Stormwater Design Manual. The Permit will require that the County review its existing regulatory and planning process and identify obstacles that prevent as well as opportunities to facilitate environmental site design (ESD) implementation to the MEP within one year after State adoption and then initiate changes within two years after State adoption of regulations.

C. Continue watershed restoration monitoring using paired outfall and instream, water chemistry, biology, stream physical condition, and hydrology. Likely to be in Anacostia.

D. Continue monitoring of design manual effectiveness. Intend to continue in Clarksburg, north central part of County.

E. Complete watershed assessments which have been completed on about 40% of all County acreage, including almost all of most densely-developed watersheds. Assessments include stream resource and physical condition, structural, low impact design, and source control project inventory, cost estimates, priorities for implementation, and link to achieving TMDL and restoration goals.

Currently, COE is leading watershed assessment for about an additional 10% in central part of County including much of City of Gaithersburg (Great Seneca and Muddy Branch). Subwatersheds that remain for assessment include: Patuxent: Brighton Dam and Lower Patuxent; Seneca: Little Seneca and Dry Seneca; Lower Potomac Direct including Horsepen Branch, Broad Run, and Rock Run; and Upper Potomac Direct including Lower Monocacy, Bennett Creek, Little Bennett Creek, and Fahrney Branch.

F. Continue legal authority, erosion and sediment control, stormwater management, illicit discharge identification and elimination, pollution prevention at County facilities and through County operations, public outreach, and coordination with co-permittees.

G. Continue annual reports including budgets and expenditures.

V. Costs

Unknown until implementation plans are completed. Estimate presented to Executive and Council for additional 20% watershed restoration was $108 million over 5 years in addition to currently programmed $5M in CIP per year. During FY03-08, reported $77M for NPDES MS4 permit compliance. This includes DEP, Permitting, and Transportation but not solid waste services.

VI. Connection to Patuxent Reservoirs Watershed Protection Agreement

Once the TMDL is approved by EPA, the County will move forward to develop an implementation plan to achieve the wasteload allocations as required by the MS4 permit. Ongoing efforts, such as monitoring the Patuxent watersheds as part of the countywide monitoring programs and voluntary LID practice installation through the countywide Rainscapes Rewards program will be reflected in the implementation plan.

Watershed Assistance Collaborative

Putting the Resources at the Level Where Work Gets Done

~$200K

Meeting the Challenge of Chesapeake Bay Restoration by Ensuring that Local Communities get the Information – and the Resources – that they Need...

The Chesapeake and Atlantic Coastal Bays 2010 Trust Fund was passed in response to the continued decline of water quality and natural resources in our State waters. After 25 years of dedicated effort to restore the Chesapeake and Coastal Bays, it is clear that Maryland and our partners are not achieving our goals. The 2010 Trust Fund was established to target limited financial resources to the most effective nonpoint source areas in the State, and show tangible results...

The State's Local Implementation Grant (LIG) has been established in response to the 2010 Trust Fund to provide implementation dollars directly to Maryland's local governments. Through this initiative, best practices of the State will be leveraged, internal resources tapped and human capital shared, to demonstrate what State and local partnerships can accomplish...

What is the Watershed Assistance Collaborative?

The State has developed a new service that will connect Maryland communities interested in undertaking comprehensive watershed restoration projects to the people and programs that will help them accomplish their goals...

- √ **The Training:** The University of Maryland Environmental Finance Center, along with State partners will provide hands on trainings for communities interested in watershed targeting, planning, and the financing of long-term restoration efforts...
- √ **The Resources:** In partnership with the Chesapeake Bay Trust, the State will offer planning and design grants and technical assistance to meet the needs of local governments & communities preparing to undertake a comprehensive restoration effort...
- √ **The Support:** In partnership with Maryland Sea Grant and the University System of Maryland, the State will provide Regional Watershed Specialists to provide implementation assistance focused on helping local and county governments within the watershed reduce or eliminate nonpoint sources of pollution...

Advancing Coastal Management

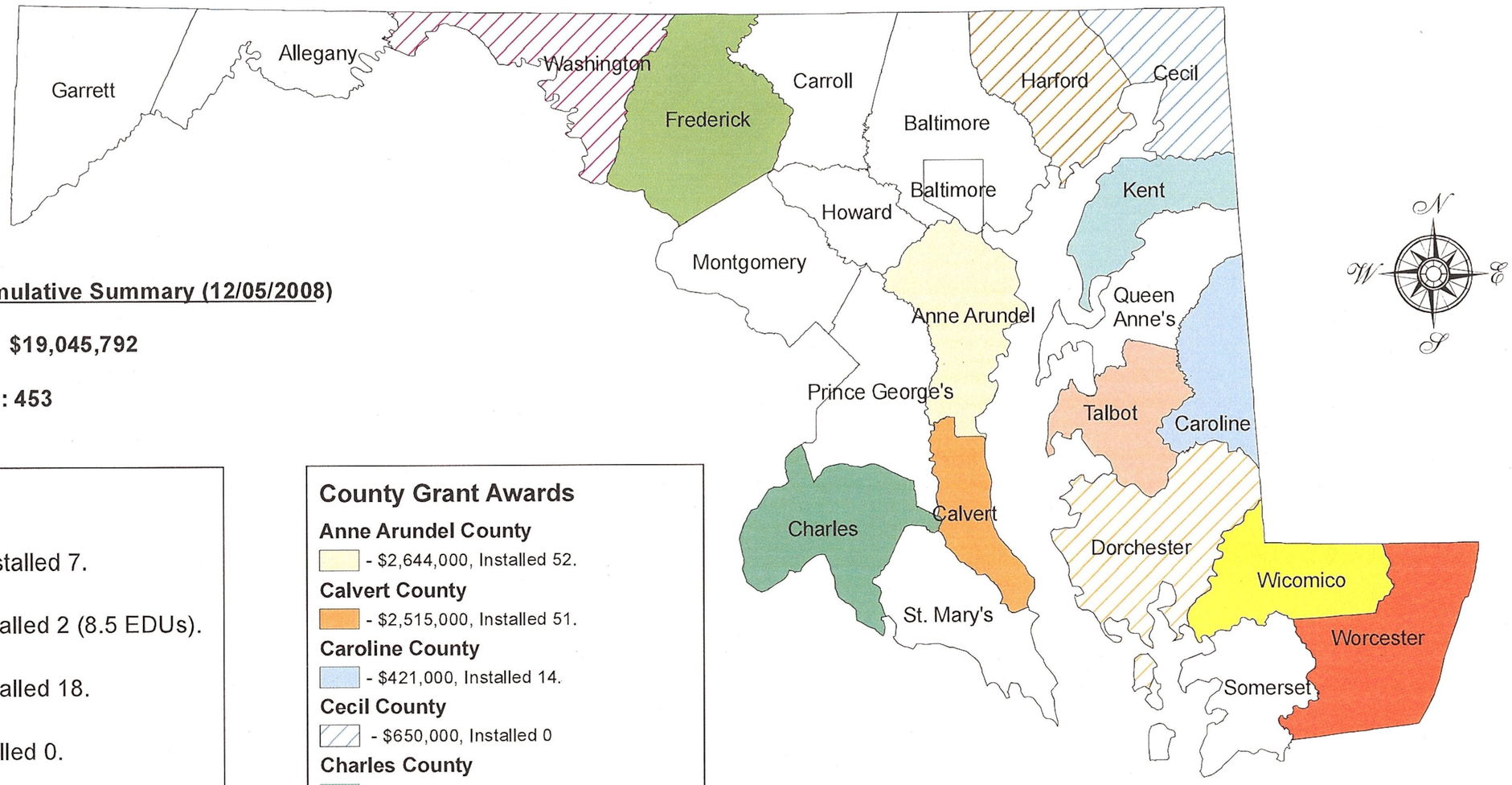
Please visit us at: http://www.dnr.state.md.us/bay/czm/index.html for more information or Call Carrie Decker at 410-260-8723 cdecker@dnr.state.md.us

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Chesapeake & Coastal Program
Maryland Department of Natural Resources
Tawes State Office Building, E-2
580 Taylor Avenue

Toll Free: 1-877-620-8367
Out of State: 410-260-8730
http://dnr.maryland.gov

Bay Restoration Fund OSDS Grant Awards and Installations (12/05/2008)



Cumulative Summary (12/05/2008)

Total grant awards: $19,045,792

Total installed units: 453

MDE Direct Awards

Baltimore County
Award $253,572, Pending 11, Installed 7.

Carroll County
Award $146,064, Pending 3, Installed 2 (8.5 EDUs).

Dorchester County
Award $244,079, Pending 2, Installed 18.

Garrett County
Award $41,049, Pending 2, Installed 0.

Harford County
Award $117,258, Pending 6, Installed 3.

Howard County
Award $177,476, Pending 6, Installed 4.

Montgomery County
Award $386,670, Pending 11, Installed 18.

Prince George's County
Award $62,731, Pending 4, Installed 1.

Queen Anne's County
Award $425,353, Pending 17, Installed 22.

Somerset County
Award $1,294,902, Pending 67, Installed 45.

St. Mary's County
Award $181,124, Pending 4, Installed 11.

Washington County
Award $78,815, Pending 3, Installed 2.

Wicomico County
Award $21,926, Pending 1, Installed 1.

County Grant Awards

Anne Arundel County
- $2,644,000, Installed 52.

Calvert County
- $2,515,000, Installed 51.

Caroline County
- $421,000, Installed 14.

Cecil County
- $650,000, Installed 0

Charles County
- $604,000, Installed 37.

Dorchester County
- $409,000, Installed 0

Frederick County
- $712,000, Installed 19.

Harford County
- $1,038,000, Installed 0

Kent County
- $597,000, Installed 26.

Talbot County
- $1,168,000, Installed 67.

Wicomico County
- $2,719,000, Installed 45.

Worcester County
- $1,142,000, Installed 8.

Queen Anne's County (Corsica River)
- $287,000, Installed 0.

Washington County
- $750,00, Installed 0

Award: Includes installed and pending installation.

Pending: Unit selected and awarded, not in ground.

*** Includes 2008 Board of Public Works Approvals**

MDE MARYLAND

Martin O'Malley, *Governor*
Anthony Brown, *Lt. Governor*
Shari Wilson, *Secretary*
Robert M. Summers, *Deputy Secretary*

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard, Baltimore, MD 21230-1708
(410) 537-3000 • 1-800-633-6101 • **http://www.mde.state.md.us**

Bay Restoration Fund – Onsite Sewage Disposal Systems (OSDS) Application For Financial Assistance

Project Location Information

Project Address	
Zip Code	
County	
Facility Type	☐ Individual Residence ☐ Other

Contact Information

Applicant Name	
Applicant Address (if different from project address)	
Zip Code	
Phone Number	
Fax Number	
E-Mail Address	

Reset Form | Print Form | Submit by Email

Note to Applicant

(1) Upgrade costs pertain only to the cost of the unit, installation, any associated plumbing and electricity to unit and five year operation and maintenance warranty. All other necessary sewage disposal system cost including conventional tank, distribution network, or effluent dispersal method replacements encountered or required by the local approving authority during the unit installation are to be paid by the owner/applicant. If homeowner is classified as low income (for requirements call (410) 537-4195 or visit www.mde.state.md.us/septic) funds maybe available for full cost of repair and replacement of pretreatment and disposal field.

(2) To apply for Low Income Eligibility Funding please complete form at www.mde.state.md.us/septic or cal (410) 537-4195

(3) Please note this is only an application and the completion of this form does not guarantee the availability of funds.

(4) By submitting this form you are agreeing to have your application information release to BAT vendors an installers.

Date Received:___/__/____

MDE/WMA/FIN.020
10/15/2008
TTY Users 1-800-735-2258

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard, Baltimore, MD 21230-1708
(410) 537-3000 • 1-800-633-6101 • **http://www.mde.state.md.us**

Bay Restoration Fund – Onsite Sewage Disposal Systems (OSDS) Qualification for Low Income Funding

Contact Information

Applicant Name	
Project Address	
Zip Code	
Applicant Address (if different from project address)	
Phone Number	
Fax Number	
E-Mail Address	

Qualification Criteria

Do you meet following income criteria?	Yes ○ No ○

MD Department of Human Resources Office of Home Energy Programs Income Eligibility 2009		
Household Size	**Maximum Monthly Income Standards**	**Maximum Yearly Income Standards**
1	$1,516.65	$18,200.00
2	$2,041.65	$24,500.00
3	$2,566.65	$30,800.00
4	$3,091.65	$37,100.00
5	$3,616.65	$43,400.00
6	$4,141.65	$49,700.00
For each additional person, add	$525.00	$6,300.00

Do you receive two or more of the following?	Yes ○ No ○

- Receiving energy assistance subsidy;
- Receiving public assistance - supplemental security income (SSI) or food stamps;
- Receiving veterans or social security disability benefits;

Reset Form | Print Form | Submit by Email

Note to Applicant

(1) Applicant will need to provide necessary documentation for processing.

Date Received:___/__/____

Patuxent Reservoirs Watershed Protection Group
Technical Advisory Committee Meeting

WSSC Training Room (6104)
April 14, 2009
1:30 p.m. – 4:00 p.m.

AGENDA

Call To Order/Opening Remarks	Chair - Plummer
Administrative Business	10 Mins
Approval of January 2009 TAC meeting summary	Chair
Old Business	
Work Program Update	All -- 15 Mins
H20 Festival	August 15 Mins
Watershed Plan	Versar (Roth) 15 Mins
New Business	
Reservoirs 5-Year Trend Analysis	Chandler – 15 Mins
Baltimore "State of the Watershed"	Gould Charshee - 15 Mins
Water Resources Functional Master Plan	Symborski – 15 Mins
TMDL Implementation	All – 30 Mins
Policy Board Update Memo	Plummer – 5 Mins
Next Meeting-Topics and Date	All – 5 Mins
Adjournment	Chair

Patuxent Reservoirs Watershed Protection Group

Technical Advisory Committee

Meeting Summary of April 14, 2009

TAC Members in Attendance: Martin Chandler (WSSC), Meosotis Curtis (MCDEP), Jerry Maldonado (PGDER), Katherine Nelson (MNCPPC), Bert Nixon (HCHD), Susan Overstreet (HCDPZ), David Plummer (MSCD), Howard Saltzman (HCDPW).

TAC Members Absent: Gul Behsudi (alternate, MDE), Kristal McCormick (HSCD), John McCoy (DNR), Paul Meyer (PGHD), Royden Powell (MDA).

Other Attendees: Sandy August (WSSC), Alexi Boado (Versar), Carrie Capuco (Capuco Consulting Services, Inc.), Gould Charshee (BMCOG), Dwight Dotterer (MDA), Paul Emmart (MDE), Mohammad Habibian (WSSC), Nancy Roth (Versar), Tim Rule (MDE), Mark Symborski (MNCPPC).

Meeting was called to order at approximately 1:40 p.m. by Chair David Plummer.

Administrative Business – Mr. Plummer welcomed guests and asked that all participants introduce themselves. He then asked if there were comments on the summary of the January 2009 meeting. Being none, the summary was approved without change.

Old Business

Work Program Update

Ms. Nelson reported that MNCPPC continues to fund maintenance at Reddy Branch Stream Valley Park for weeding and mowing.

Mr. Saltzman reported that Howard County had received $340,000 in grant money from Maryland DNR for restoration and enhancement in the Little Patuxent Watershed with partners Columbia Association and General Growth Properties. Ms. Curtis pointed out that a substantial amount of the 2010 and other Bay Restoration Funds (i.e., those designated for nitrogen removal equipment on septic systems) have been moved to increase cover crops. Mr. Dotterer confirmed that MDA is hoping for an additional $12 million.

Ms. August reported on **public outreach and involvement** plans for the H2O Festival on April 18, 2009 at Duckett Dam in Prince George's County. She distributed information on the presenters and exhibitors. She also shared information on the Charity Bike Ride associated with the Festival. She reported that the Festival had been promoted using the flyers, the Customer Notification System (CNS) electronic mail system, on the WSSC web site, via electronic signs, and also using an on-site sandwich board. She especially thanked Prince George's County for

the support Tammy Butler and Beverly Warfield provided. She acknowledged that although there are many competing programs this time of year, Prince George's County was very helpful. Discussion followed regarding several of the exhibits. Ms. August concluded with the statement that her goal was to double the number in attendance from the previous year. Ms. Curtis queried whether a map would be available for participants to mark their home. Ms. August assured her that a map and push pins would be available.

Ms. Roth then introduced Versar's report on the status of the **watershed management plan.** She introduced Alexi Boado, the project lead. He began his report with a summary of why the plan is important and a review of the stakeholders in the watershed. TAC members requested that MDE and DNR be explicitly added as stakeholders due to the amount of publically owned land in the watershed. Mr. Boado then restated the plan's requirements and their relationship to the TAC priority resources. He reported that the literature review has been completed, and GIS analyses are in progress. Mr. Saltzman reported that Howard County has some recent storm water studies that include new locations which would be useful for plan development. Ms. Nelson offered the 2008 forest layer and forest conservation easement layers. Ms. Curtis commented that a layer showing existing storm water management should be included. Ms. Roth and Mr. Boado confirmed that it would be reviewed.

Mr. Maldonado asked whether the analysis would include any further modeling. Ms. Roth confirmed that it would not since extensive modeling was conducted to prepare the TMDL. Dr. Habibian stated that water quantity is becoming a new "hot issue" in terms of climate change and groundwater regeneration.

Ms. Curtis also requested that the goals and timelines for implementation in the 2003 Annual Report be included. Dr. Habibian clarified that the goals of the past plan must be compared against the TMDL requirements.

Ms. Overstreet noted that Howard County has an updated agricultural easement layer available as well. Mr. Plummer emphasized that all information is needed before the public briefings in May.

Ms. Curtis then asked that a draft of the public briefing presentation be made available. She encouraged the Versar team to make the needed links between the local water quality and recreation and quality of life as most of the watershed residents do not get their drinking water from the reservoirs.

New Business

Dr. Chandler then reported on the ongoing **Reservoirs 5-Year Trend Analysis**. He indicated that the last analysis was conducted in 2002 using 1993 – 2000 data. He explained that each reservoir has three monitoring stations and described the field measurements taken. Preliminary trends noted included:

- Slight calcium increase over 18 years
- Chloride shows an upward trend
- Chlorophyll has decreased in the past 15 years

- Fecal coliform is slightly downward over 9 years
- Phosphorus analysis is challenging, it seems to be down in general, but may have small increases at the surface.
- Dissolved Oxygen is showing a potentially upward trend in oxygen deficit.

Ms. Curtis asked if there were any concerns over continued funding of the monitoring. Dr. Chandler reported that there were not. He concluded by stating that a final analysis report would be provided to the TAC for inclusion in the Annual Report.

Mr. Charshee then reported on the Baltimore Reservoir Watershed Management Program's ongoing efforts in tracking and reporting. He explained that this coming June, the original Baltimore Reservoir Watershed Management Agreement will have been in effect for 25 years. The agreement was called for in the late 70s due to taste and odor complaints. It covers 3 reservoirs – Loch Raven, Prettyboy, and Liberty. He indicated that the original agreement set qualitative not quantitative goals for the reservoirs. It established a technical advisory committee and a policy committee. In 2005 the agreement was updated. The updated agreement was accompanied by an updated Action Strategy. The 2005 Action Strategy included 93 different "commitments" addressing a wide variety of current issues in the three watersheds. Most of the commitments include qualitative not quantitative goals. Each commitment was given a unique digital index number. The commitments are organized into categories and periodically revisited in a biannual report. The forthcoming biennial Progress Report describes all actions taken since the Agreement was signed in 2005, referring to each commitment by its index or tracking number.

Among the commitments are several tracking tasks. Mr. Charshee commented that Bill Stack in the City of Baltimore has done similar trend analysis to that reported by Mr. Chandler. He encouraged the TAC to pursue a comparison of the two analyses.

He also stated that one action item for the Baltimore Reservoirs program is to work with MDE staff towards establishing a method for TMDL load tracking for phosphorus and sediment loads in the reservoir watersheds. Agricultural data provided by MDA has been used to track progress on the tributary strategies and probably will be used for the reservoir watershed TMDL tracking. Ag BMP applications and "savings" are tracked by sub-watershed. Baltimore County is estimating nutrient and sediment load reductions resulting from certain types of urban BMPs and reporting the load reductions in its annual MS4 report to MDE.

Mr. Charshee further reported that the agreement includes an annual assessment of the water users to cover his salary. The assessment is based on water use. He indicated that he maintains a mailing list of interested citizens who received the biennial progress reports. He also attends citizen group meetings on behalf of the watershed partnership signatories.

Mr. Symborski then reported on the status of the Montgomery County **Water Resources Functional Master Plan.** He indicated that the Montgomery County water resources element requirement will be met by completion of this plan. It addresses the adequacy and capacity of waste water and drinking water resources. It also addresses stormwater through nutrient management loading requirements. He expressed confidence that the 2030 scenarios will not

change much due to build out. He reported that the draft recommendations section of the report will be provided to the TAC for review and comment in late April. He requested that the TAC consolidate its comments into one set. Mr. Plummer and Ms. Capuco offered to consolidate the comments. The full report will go before the planning board in October 2009.

Mr. Rule then reported on **TMDL Implementation Tracking**. He first thanked the TAC for its patience during the development process. He then introduced Paul Emmart from the implementation side of MDE's TMDL group. Mr. Emmart began by expressing the importance of the watershed management plan for obtaining funding. He explained that although there is a Federal requirement for the State to develop TMDLs, there is no requirement to develop implementation plans to achieve the TMDL. Consequently, guidance has been developed in the form of the "a – i" criteria. *The Draft Reservoirs Watershed Management plan under development will not meet all these criteria.* He then provided a handout with a graphic depicting the three prongs of water quality goal achievement – tributary strategy implementation, TMDL implementation, and water resources element – that result in watershed management.

Mr. Emmart then explained the forthcoming Bay TMDL that is under development for each of the quality impaired segments (71 in total). He reported that there is a conflict regarding whether the existing TMDLs will be applied or more strict loading requirements as indicated in the Bay TMDL. He acknowledged that tracking questions will arise repeatedly. Mr. Maldonado then asked whether the state will provide a central location to enter tracking data. Mr. Emmart reported that MDE would like that, but that it is not yet available. He emphasized that MDE believes the accounting system is one of the most important parts of the implementation. He continued by indicating that the 2009 water resources element will focus on the non-point sources. Mr. Symborski noted that the hand out diagram omits the MS4 permits. He encouraged MDE to clarify the relationship between those permits and the other 3 prongs.

Ms. Curtis, MS4 Stormwater Permit coordinator, pointed out that the link already exists. The State's next round MS4 permits will require counties to develop implementation plans to meet the wasteload allocations for any approved TMDLs. All permitted facilities and jurisdictions must meet their assigned wasteload allocations. For the Patuxent Reservoirs, most of the reductions must come from non-point sources that are non-regulated. Dr. Habibian agreed that the State needs to provide more guidance on how the non-point source allocations will be achieved. Discussion continued among the TAC as to who is to resolve these questions (the State or the counties?).

Policy Board Update Memorandum – Mr. Plummer stated that a letter will be provided to the Policy Board summarizing the day's meeting. He apologized that the meeting ran a little late. Mr. Plummer then explained that the next meeting would emphasize trees. He indicated that Howard and Baltimore counties would be invited to discuss their reforestation efforts on private lands; he anticipated discussion FY11 budgets; and welcoming the replacement for Mr. Kagan. Dr. Chandler reported that an offer had been made and that it was anticipated the new hire would assume the responsibilities fulfilled by the Versar/Capuco Consulting contract

There being no further business, the meeting was adjourned at 4:05p.m.

Next Meeting – June 9, 2009, at 1:30pm

Agenda items will include: Howard and Baltimore county reforestation efforts on private lands; FY11 budgets; and welcoming the replacement for Mr. Kagan.

This meeting summary was prepared by Carrie Capuco and finalized by Steve Nelson.

Patuxent Reservoirs Watershed Protection Group
Technical Advisory Committee Meeting

WSSC Training Room (6104)
June 9, 2009
1:30 p.m. – 4:00 p.m.

FINAL AGENDA

Call To Order/Opening Remarks	Chair - Plummer
Administrative Business	10 Mins
Approval of April 2009 TAC meeting summary	Chair
Old Business	
1. Work Program Update	All - 15 minutes
2. H20 Festival, Water Festival Sandy August, WSSC	15 minutes
3. Watershed Management Plan Alexi Boado, Versar	20-30 minutes
New Business	
1. Howard County Backyard Stream ReLeaf Program Howard Saltzman	20 minutes
2. Montgomery County Reforestation Efforts Katherine Nelson, M-NCPPC a. Plant A Tree Program Update b. Reforestation Efforts in Reddy Branch	20 minutes
3. Cherry Creek Sediment Control Project Kim Knox, WSSC's Outreach Office	15 min.
4. FY11 Work Program and Budgets	All – 15 Mins
5. Policy Board Update Memo	Plummer – 5 Mins
Next Meeting-Topics and Date	All – 5 Mins
Adjournment	Chair

Patuxent Reservoirs Watershed Protection Group

Technical Advisory Committee

Meeting Summary of June 9, 2009

TAC Members in Attendance: Martin Chandler (WSSC), Ken Clare (PGHD), Meosotis Curtis (MCDEP), Jerry Maldonado (PGCDER), Kristal McCormick (HSCD), Katherine Nelson (MNCPPC), Bert Nixon (HCHD), Susan Overstreet (HCDPZ), David Plummer (MSCD), Howard Saltzman (HCDPW).

TAC Members Absent: Gul Behsudi (alternate, MDE), John McCoy (DNR), Dwight Dotterer (MDA).

Other Attendees: Sandy August (WSSC), Alexi Boado (Versar), Carrie Capuco (Capuco Consulting Services, Inc.), Mohammad Habibian (WSSC), Kim Knox (WSSC), Steve Nelson (WSSC), Nancy Roth (Versar), Mark Symborski (MNCPPC), Stan Wong (MCDPS).

Meeting was called to order at approximately 1:33 p.m. by Chair David Plummer.

Administrative Business – Mr. Plummer welcomed guests and asked that all participants introduce themselves. He encouraged the new WSSC staff member, Steve Nelson, to briefly explain his past experience and anticipated role with the TAC. Mr. Nelson described his experience with Carroll County and the Piney Run Reservoir. He also described the functions he would be fulfilling for the TAC – namely administrative support and ongoing reservoir water quality monitoring. Mr. Plummer welcomed him to the TAC.

Mr. Plummer then asked if there were comments on the summary of the April 2009 meeting. Being none, the summary was approved without change.

Mr. Plummer then presented a certificate of appreciation to Ms. Capuco for her three years of contract support of the TAC. Ms. Nelson emphasized the important role the coordination position had played in the reforestation efforts at Reddy Branch – which tied into other reforestation efforts throughout Montgomery County. Ms. Curtis offered a cake, and all TAC members present signed a card of appreciation. Ms. Capuco expressed her thanks for the recognition and her continuing interest in the TAC's activities.

Old Business

Work Program Update

Cherry Creek Stream Restoration

Mr. Saltzman reported that the **Cherry Creek Reach 2** preconstruction meeting was recently held and that he anticipated work to begin very soon with a two-month stream restoration completion goal.

Public Outreach and Involvement

Ms. August reported on recent **public outreach and involvement** activities. The first item concerned the H20 Fest which was held April 18, 2009 from 12 – 4 pm at Duckett Dam. There were 33 presenters which was an increase from 2008. There was nearly double the number of participants (~400). The event boasted nice weather, a native tree raffle (20 trees), rain barrel raffles (20), a charity bike ride with 20 participants, and new food vendors. Approximately 250 participants took a tour of Duckett Dam, walking across the dam and witnessing the opening and closing of gates. She expressed excitement that the increased publicity helped the event. There were event notices in the local papers and e-newsletters, on several news stations, two electronic message boards, road signs, and through the Customer Notification System (CNS).

Ms. August then reported on plans for the 2010 H20 Fest. She indicated that the theme would again be *Thinking Green to Protect Blue*. Goals include increasing publicity, including more schools as active participants by offering a schools contest, a recycled materials fashion show, more kid-interactive displays, and recruitment of vendors with products that enhance source water protection. Ms. August did caution that $10,000 has been eliminated from the FY10 budget for the tent and that she is actively seeking a corporate sponsor for the tent in 2010.

Ms. August then offered a report on the Green Schools program. She noted that the Patuxent Reservoirs currently has 10 schools from Howard County, one from Montgomery County, and 3 from Prince George's County participating in the program. She noted that the recently enacted "No Child Left Inside" legislation will push schools into mandated environmental education. Discussion followed, regarding possibilities for expansion.

Ms. Curtis noted that it is difficult for Montgomery County to allow installation of BMPs because the volunteers eventually move on to Middle School and High School which leaves maintenance responsibilities to facilities staff. As a result, Montgomery County now has an applications process for any project on a school site. Ms. Curtis also noted that all available space on Montgomery County public school grounds is needed for the "learning cottages" that allow for capacity increases when needed. The TAC then discussed ways to encourage stormwater management on school properties. It was agreed that any new construction will be subject to the requirements of the new stormwater management requirements from MDE.

Mr. Plummer then encouraged all TAC members to strive to involve schools in buffer installation and maintenance projects. Ms. Nelson expressed interest for Reddy Branch. Mr. Maldonado noted that each year, Prince George's County Department of Environmental Resources partners with a school for a significant reforestation event on Earth Day. Ms. August also noted that the Howard County curriculum requires all fifth grade students to be involved in a tree planting. Mr. Plummer concluded with an offer to work through the Montgomery Forestry Board to encourage school involvement with Reddy Branch and other future buffer installation efforts.

Patuxent Reservoirs Watershed Management Plan

Ms. Roth then introduced Versar's report on the status of the Patuxent Reservoirs **Watershed Management Plan (PRWMP).** She introduced Alexi Boado, the project lead. He began his report with a summary of progress thus far. He then offered example recommendations from the PRWMP for TAC discussion on topics such as: forest buffers; on-site sewage treatment; agriculture; and imperviousness.

The TAC then discussed remaining data needs. The TAC requested that Versar map the counties separately. Ms. Overstreet requested clarification that TMDLs will be discussed in the report. Mr. Boado assured her that they would.

Mr. Plummer then requested a summary of the next steps. The group agreed that Versar would obtain the remaining data, finish the recommendations section, and then provide a draft of the PRWMP to the TAC via Versar's FTP site. Mr. Nelson offered to compile TAC comments on the draft, provide that compilation to the TAC, and then facilitate provision of final comments to Versar for incorporation into a final report.

New Business

Reforestation Programs on Private Land

Mr. Saltzman then offered a summary of the **Howard County Stream Re-Leaf** program. He explained that the program originated in the County's Recreation and Parks Department, moved to Public Works briefly and has now returned to Recreation and Parks. He expressed his opinion that its success is attributed to having a dedicated staff person who literally knocks on homeowners' doors encouraging them to participate. The program was begun with a grant from the USDA. The process includes a letter notifying homeowners that their home will receive a visit from the coordinator, followed by a personal visit. A forester works with the landowner to select species. Trees are delivered in the fall to the homeowners' curbside. There is a 12 tree/shrub minimum. If the homeowner (or group of homeowners) installs more than 100 trees, the County will also plant the trees. The homeowner must attend a maintenance class, sign a maintenance pledge, and grant a right of entry to the County. Stock is 2-3 foot shrubs and 5-6 foot trees.

Ms. Curtis mentioned that **Montgomery County's Rainscapes program** requires a letter of agreement to receive County money for trees. In return, participants can receive up to a $600 rebate for planting 1-inch caliper trees. Mr. Saltzman stated that Howard County strives to make the program administratively simple. Ms. Morales explained that the educational component through the home visit is the key to Howard County's success. Mr. Plummer asked whether there have been any complaints. Mr. Saltzman reported that the main concern participants express is resistance to taking up too much back yard space.

Mr. Plummer thanked Mr. Saltzman and reported that although Baltimore County was not able to participate, he would still strive to have a report on their program in September.

Ms. Nelson then offered a report on **Montgomery County's Leaves for Neighborhoods** program. This program is a coupon program whereby County residents may purchase a tree from one of several partnering nurseries and receive $25.00 off. The nurseries are reimbursed by the County. The County coupons can be used in conjunction with the state coupons for a significant savings. The program has the following benefits:

- It promotes the County's urban canopy desires,
- Promotes good public relations,
- Moves the forest conservation funds directly into tree plantings, and
- Makes enforcement of existing forest conservation easements more feasible, because it offers landowners opportunities to re-plant easement areas that may have languished into meadow.

Ms. Morales asked how the participating nurseries were selected. Ms. Nelson responded that the ones already identified by the state for its program were approached and then a relationship cultivated by the assigned planner.

Reddy Branch Stream Valley Park

Ms. Nelson then announced new advances at **Reddy Branch Stream Valley Park.** She reported that an additional 1.5 acres was reforested in mid-May. She also showed a map of an additional 1.5 acres that will be planted in the fall. She noted that deer protection is still challenging and that invasives are being addressed. She reported that because the stream is migrating onto private land, MNCPPC is negotiating purchase of that land. She expressed appreciation to Ms. Capuco for pushing this project relentlessly for the past 3 years and indicated that it has set a precedent that led to another similar project in Chevy Chase.

Grant Opportunity

Ms. Knox then offered an introduction to a WSSC initiative to address erosion at an un-named tributary next to Cherry Creek at Scotts Cove. She reported that WSSC is seeking funding from the National Fish and Wildlife Foundation in a November 2009 grant cycle because the eroded stream channel flows directly into the reservoir. She requested a letter of support from the TAC and technical advice on bank stabilization. She also asked for volunteers to maintain the restoration. Mr. Maldonado suggested that she approach the Center for Watershed Protection for design assistance.

Mr. Plummer suggested that Ms. Knox summarize the project and her requests for circulation to the TAC. Ms. Curtis expressed support that the TAC provide a letter of support.

Policy Board Update Memorandum – Mr. Plummer stated that a letter will be provided to the Policy Board summarizing the day's meeting. He apologized that the April meeting summary was not completed and so will be incorporated into this June summary. He asked for suggestions for a location of the Policy Board Meeting in October. There was consensus that WSSC Headquarters is the simplest location.

Mr. Plummer asked that all TAC members check with their Policy Board representative to see if October 20th or 27th is a preferred date. The TAC agreed that at the 2008 Policy Board meeting the incompleteness of the budget was a concern to the Policy Board. Consequently, the TAC will strive to complete its budget requests before the Policy Board meeting.

There being no further business, the meeting was adjourned at 4:05 p.m.

Next Meeting – September 15, 2009, at 1:30 p.m.
NOTE: Our usual meeting location (Chesapeake Room) was already reserved for the September meeting; the Potomac Room (Room 6109) has been reserved instead. This room is on the same floor and just down the hall.

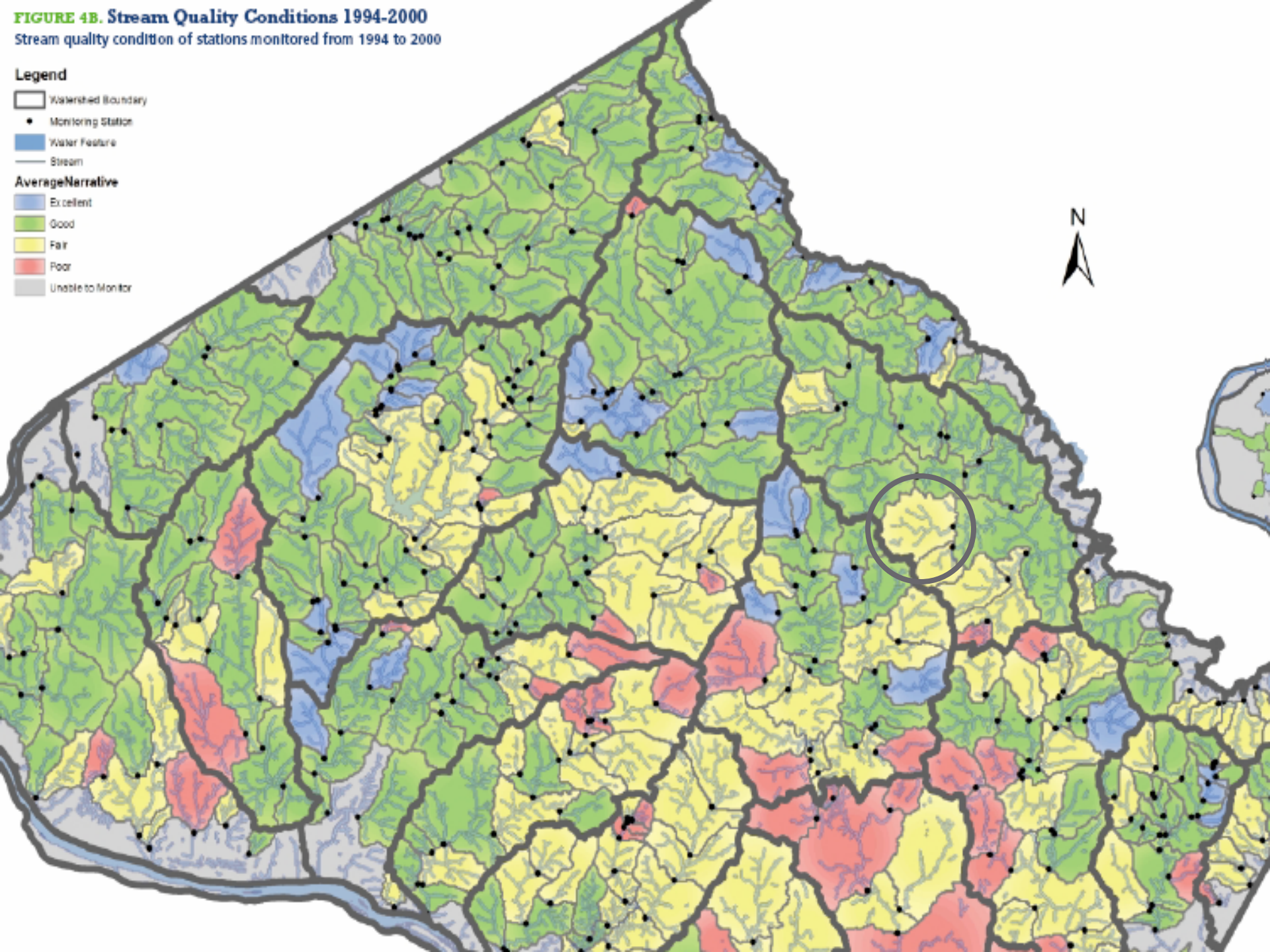
This summary was prepared by Steven Nelson.

Reddy Branch Reforestation Project

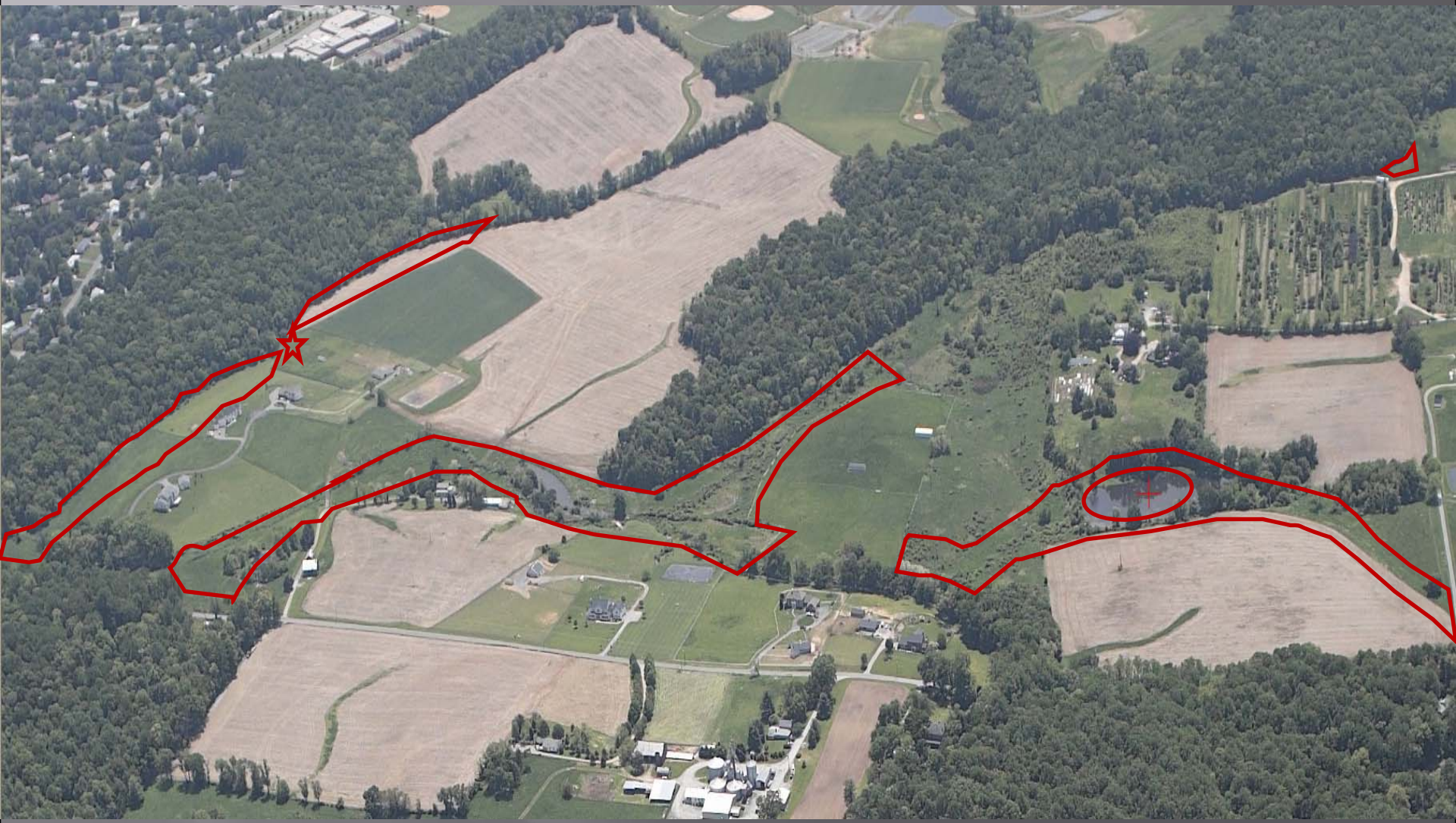
Reddy Branch Planting Schedule

FIGURE 4B. Stream Quality Conditions 1994-2000

Stream quality condition of stations monitored from 1994 to 2000




Brookeville Road
1.5 acres
1.5 acres



Patuxent Reservoirs Watershed Protection Group
Technical Advisory Committee Meeting

WSSC (6th floor) Room 6109 – Potomac Room*
September 15, 2009
1:30 p.m. – 4:00 p.m.

AGENDA

Call To Order/Opening Remarks	Chair – David Plummer
Administrative Business	Chair (10 minutes)

- Approval of June, 2009 TAC Meeting Summary
- Welcome Ken Clare as new TAC representative from PG Health Department

Old Business

- Outreach Update — Sandy August (10 minutes)
- *Your Backyard to the Bay* Homeowner's Guide — Kathy Zimmerman, Howard County Econ. Development Authority (10 minutes)
- Work Program Updates (10 minutes)
  - Reddy Branch Tree Planting — Katherine Nelson
  - Cherry Creek Stream Restoration — Howard Saltzman
- Watershed Management Plan — All (30 minutes)
  - Next Steps

New Business

- Annual Report Development Schedule — Steve Nelson (15-20 minutes)
  - Distribute schedule
- 2009 Policy Board Meeting — Chair (30-45 minutes)
  - Meeting Agenda
  - TAC presentation to the Policy Board
  - Current Issues

2010 Meeting Topics and Dates	All (20-30 minutes)
Adjournment	Chair

*This is not our usual meeting room. The Potomac Room is located beyond the Chesapeake Room on the right.

Patuxent Reservoirs Watershed Protection Group
Technical Advisory Committee Meeting Summary
September 15, 2009

TAC Members Present	TAC Members Absent	Other Attendees
Martin Chandler (WSSC)	Gul Behsudi (MDE)	Sandy August (WSSC)
Kristal McCormick (HSCD)	Ken Clare (PGHD)	Mohammad Habibian (WSSC)
Katherine Nelson (M-NCPPC)	Meo Curtis (MCDEP)	Angela Morales (HCDPW)
David Plummer (MSCD)	Dwight Dotterer (MDA)	Steve Nelson (WSSC)
Howard Saltzman (HCDPW)	Jerry Maldonado (PGCDER)	Tom Devlin (PGHD)
	John McCoy (DNR)	Kathy Zimmerman (Howard County Economic Development Authority)
	Bert Nixon (HCHD)	
	Susan Overstreet (HCDPZ)	

Administrative Business

- The meeting was called to order at 1:40 pm by Chair David Plummer.
- There were no comments or corrections regarding the meeting summary for the June, 2009 TAC meeting; the minutes from that meeting were approved by those in attendance.
- Mr. Tom Devlin from PGHD introduced himself as Ken Clare's representative for this meeting.

Work Program Updates

Public Outreach

- Ms. August reported on the next upcoming event: the WSSC Annual Family Campfire. This event will be held on Friday, October 2, 2009 from 6:30-8:30 pm at Brighton Dam. Ms. August brought fliers of this event for the group. Mr. Plummer will attend this event and greet the audience on behalf of the TAC. Ms. August noted that two volunteers (Mr. Ed Grimes and his wife) will be recognized for their continued service. Ms. August expects a large crowd for this event that is growing in popularity. She noted that the biggest advanced registration for this event was 600 people. As in the past, this event will have a source water protection educational component with information displays posted. In preparation for this event, help will be provided by local Boy and Girl Scouts (Ashton and Sherwood). The Boy Scout troop will help build the campfire, and the Girl Scouts will help prepare the refreshments.
- Planning for the 2010 H2O Fest event will begin shortly. A committee will be forming near the end of October 2009 to help coordinate this event.
- Green School Certification
  - Projects, such as reef ball construction, are already underway at certain schools.
  - Ms. August asked if anyone was interested in certain schools achieving this certification. Mr. Plummer expressed interest in Laytonsville Elementary School on Route 108 in the Hawlings River watershed. Ms. August also mentioned that Bond Mill Elementary School (PG County near Rocky Gorge Reservoir) is another possibility.

  - Ms. August wishes to reach out to 4th Grade staff development employees who can identify teachers that would likely participate.

- Ms. McCormick also reported on an upcoming outreach event to the horse owners within the watershed of Howard County. The event, which is planned to occur on September 17 will be conducted at the Peterson's farm. A horse pasture walk is planned.
- Kathy Zimmerman from Howard County's Economic Development Authority was invited to speak about the development of an environmentally related resource guide entitled *From My Backyard to the Bay*. The target audience for this guide is home owners (including the agricultural community) living in the Patapsco and Patuxent watersheds. This homeowner's guide covers topics including: soil testing, oil contamination of groundwater, and source water protection among others. Information from Montgomery and Howard Soil Conservation Districts will also be included. Twenty-thousand copies will be printed and another subsequent printing is possible. Two features should add to the guide's effectiveness: 1) a check-off list included in the guide of best management practices around the home; and 2) a follow-up survey to about a few thousand home owners to determine if the guide is changing attitudes and lifestyles.
  - Ms. Zimmerman commented that a local business has shown interest in partially funding this document.
  - Mr. Plummer suggested that WSSC should review the source water protection section in the document.
  - Ms. Morales questioned the need for another guide, its agricultural emphasis, and its longevity.
  - Ms. Zimmerman said that it will hopefully be considered as an environmental 'yellow pages' with a significant amount of contact information included.
  - Ms. Zimmerman said than an on-line version of the guide will be available on multiple web sites and offered to send the guide electronically to the TAC.
  - Mr. Plummer commented that this guide will be used as an education tool to be sent home with kids who visit the Agricultural History Farm Park.
  - Ms. Zimmerman's contact information:

Kathy Zimmerman
Agricultural Marketing Specialist
Howard County's Economic Development Authority
6751 Columbia Gateway Drive, Suite 500
Columbia, MD 21046
410.313.6500
410.3136525 (fax)
kzimmerman@hceda.org

Reddy Branch Riparian Buffer Reforestation

Ms. Nelson provided an update on the status of the tree planting efforts in this watershed (see attached presentation).

- The most recent planting (1 acre) in the spring of 2009 consisted of about 200 trees. The trees planted in this area appear to be in good condition.
- Ms. Nelson said that the size and species of tree used for planting will be large trees of native riparian species. The planned planting density will be 200 trees/acre as recommended by staff at Department of Parks.

- The next opportunity to plant trees will occur on October 17. Volunteers from the Izaak Walton League will coordinate this planting effort of about 60 trees on ½ acre. Ms. Nelson is planning to help with the planting.
- Ms. Nelson commented that one reach of stream has been especially challenging to protect because the stream has migrated off of park property and onto property of an adjacent land owner. Ms. Nelson said that M-NCPPC is pursuing a land swap with this land owner to provide a protective buffer to this stream reach. Mr. Plummer commented on the land owner's desire for continued access to a fence gate adjacent to this channel.
- Ms. Nelson expressed the need to protect the headwaters of this stream system (indicated by large ellipse on slide 2 of presentation). This area is encumbered by a Forest Conservation Easement, and M-NCPPC is attempting to obtain ownership for added protection.
- TAC member agreed that this watershed protection effort should be included in the upcoming presentation to the Policy Board.

Cherry Creek Stream Restoration – Phase 2

Mr. Saltzman distributed a handout of a map of the Cherry Creek watershed (see attached). He provided a history of the efforts by Howard County within this 115-acre watershed.

- Mr. Saltzman estimated that Howard County has spent about $1.25 M on Phases 1 and 2. The work included the installation of three, small storm water management ponds in series and the restoration of two different stream reaches (see table below).

Project Component	Project Phase	Estimated Cost
Study Design	Both	$125,000
Stream channel restoration (300 linear feet)	Phase 1	$125,000
Pond design & construction	Phase 1	$525,000
Stream channel restoration - design and construction (600 linear feet)	Phase 2	$440,000

- Mr. Saltzman commented that Phase 3 of this watershed restoration effort, originally part of the study design, will continue to be deferred due to higher priorities elsewhere in the county and the large amount of money already spent on this small watershed.
- The construction of the stream restoration of Phase 2 is almost finished. The tree planting along stream is one of the last items to be accomplished and should be completed this Fall.
- Mr. Plummer commented that it seems difficult to plan for these efforts when funding continues to shrink. Mr. Saltzman commented that a larger percentage of the shrinking funds will be directed towards monitoring effectiveness of watershed efforts.
- TAC members again agreed that this watershed protection effort should be included in the upcoming presentation to the Policy Board.

Watershed Management Plan

Discussion continued on the revised draft of the interim watershed management report recently completed by Versar, Inc.

- Ms. McCormick questioned the accuracy of the sections of the report relating to agriculture noting that one section of the report (citing a recent NOAA document) did not document the participation of Howard SCD.

- Dr. Chandler commented on several useful parts of this report such as: 1) the distillation of numerous resource protection issues into several core issues along with their associated challenges; 2) the value of the recommendations section; and 3) the GIS analysis performed suggests where to target future funding efforts. He continued that the report lacks a prioritization of those findings needed for further action, but that the TAC should prioritize those recommendations.
- Ms. Nelson added that the focus or goal for the report was to develop a product to overcome the barrier for grant funding. It was to be a unifying document to be used as a basis of support for future funding.
- It was suggested that Mr. Plummer and Ms. Nelson along with Ms. Curtis and Ms. Overstreet should discuss and develop a plan for next steps in this process.

New Business

2009 Annual Report to the Policy Board (Board)

- Mr. Nelson proposed a schedule for completing the 2009 Annual Report in time for the upcoming Policy Board meeting (see attached).

2009 Policy Board Meeting

The Policy Board presentation from 2008 was reviewed to begin discussion on what topics to present at this year's meeting. A discussion on how to improve the presentation to the Board followed. In previous presentations to the Board, student presentations have been effective and a refreshing change.

- It was decided that progress on both the Cherry Creek and Reddy Branch watershed restoration efforts should be included in the presentation.
- After some discussion, Mr. Plummer suggested that a historical overview (typically included in the presentation) should also be included in this year's presentation, especially since the newly appointed WSSC General Manager may not be familiar with the background of the Protection Group.
- Ms. Morales suggested inviting those from the agricultural community who have benefited from partnering with either SCD to give a presentation on how they have benefited from the assistance. This type of presentation would highlight the positive impacts that both SCDs have had in the agricultural community. Mr. Plummer and Ms. McCormick added that perhaps a recipient of the Patuxent Reservoirs Watershed Protection Program's Cost-Share Agreement could present to the Board, especially horse-owners.
- Mr. Plummer will ask Ms. August if students involved in watershed protection efforts could take part in the presentation this year.
- Dr. Chandler recommended that those executives who originally attended be encouraged by their TAC representatives to attend this year's meeting, especially since the new WSSC General Manger is planning to attend. Dr. Habibian concurred.
- Ms. Nelson commented that since Judy Morgan (past representative on the Board) left M-NCPPC, nobody has been delegated to serve on the Policy Board. She suggested that Oscar Rodriquez be contacted via a letter from the Board's chair to delegate this duty to more appropriate personnel within this agency such as the Planning Director from each county.
- Dr. Habibian suggested that this year's Policy Board chair contact the other agencies to strongly encourage their Board representatives to attend this year's meeting. Mr. Plummer concurred.

- Dr. Habibian also suggested that a progress report of WSSC's land acquisition program in reservoir watershed be presented at the meeting. Thus far, WSSC has spent about $1.65 M of the required $3.3 M, and has acquired two parcels of land.
- Mr. Nelson then showed several charts as examples of historical accomplishments of both SCDs in the watershed (see attached). The group discussed aspects of certain graphs, but no consensus was reached on the most effective view of the information.
- Mr. Plummer asked if the TAC could improve the effectiveness of showing the work plan tables to the Board. Dr. Chandler suggested that the approximate dollar value of IN KIND responses in the table be estimated to give a more accurate estimation of total financial contribution to protection efforts. Ms. Morales suggested that the entire Work Program table be split into sections corresponding to each topic and distributed throughout the presentation.
- Dr. Habibian and Mr. Saltzman both commented that there is no requirement that funding planned in the work plan be incorporated into agency budgets; however, Dr. Habibian said that the Board's process includes endorsement of these planned activities and suggested funding.
- Mr. Plummer added that the presentation should be tailored to proposed action items. Dr. Chandler confirmed that this was the method that each agency has used in the past.
- Ms. Morales asked about any new initiatives to include from the Board
- Mr. Plummer reiterated a request that members' contributions to the Annual Report and Policy Board presentation include slides with the most 'impact' plus specifying all IN KIND funding amounts.
- A brief discussion followed on the day of the Annual Meeting that included ideas such as posters and finger foods in the lobby area.

Meeting Dates and Topics for 2010

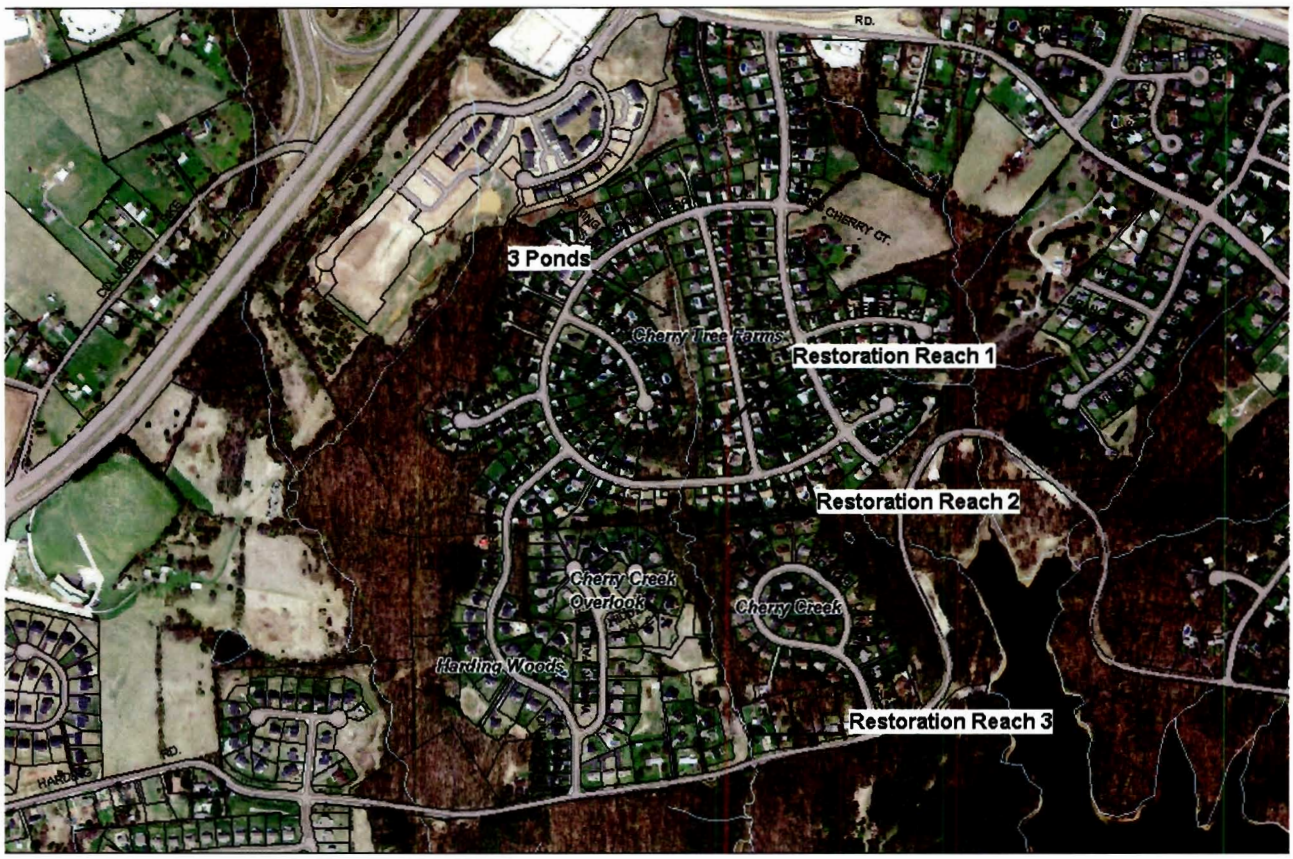
Meeting dates for 2010 were selected as the second Tuesday of the month (except for June). **Those dates are: January 12, April 13, June 15, and September 14.**

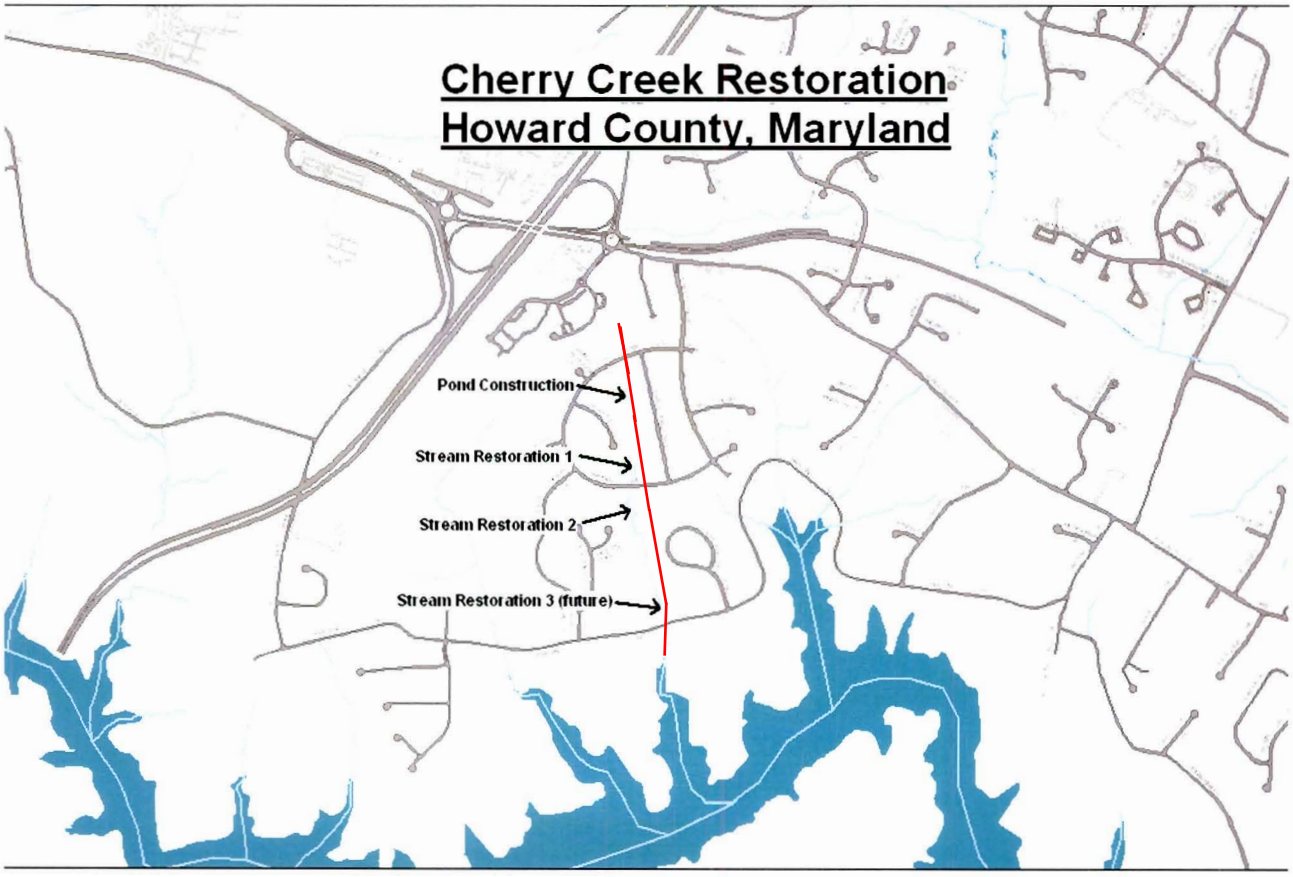
Meeting Topics discussed included:

1. Mr. Plummer suggested revisiting the issue of reforesting privately owned lands. Don Outen from Baltimore County's DEPRM could not attend the June 2009 meeting to speak on a promising, new initiative developed to cooperate with land owners interested in planting trees on their properties.
2. Mr. Nelson suggested devoting a meeting to agricultural issues in the watershed especially considering the large percentage of TMDL load reduction allocated to non-point sources.

The meeting adjourned at 4:10 pm. **The TAC will next convene at the Policy Board meeting on November 3rd at 1:30 pm.**

This summary was prepared by Steve Nelson.


3 Ponds
Cherry Tree Farms
Restoration Reach 1
Restoration Reach 2
Cherry Creek Overlook
Cherry Creek
Harding Woods
Restoration Reach 3


Cherry Creek Restoration
Howard County, Maryland
Pond Construction
Stream Restoration 1
Stream Restoration 2
Stream Restoration 3 (future)

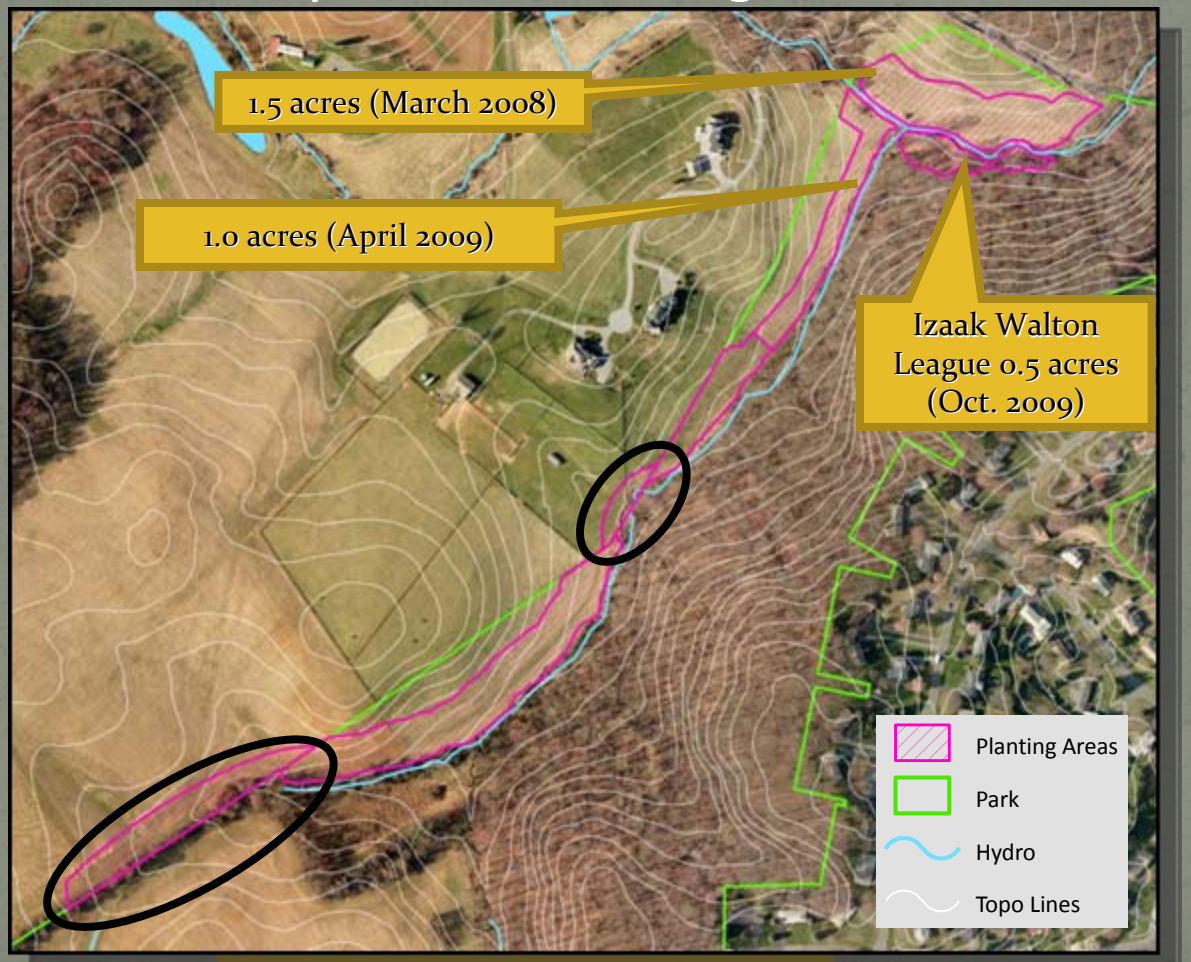
Reddy Branch
Riparian Buffer Planting

An Update

9/15/2009

Reddy Branch Reforestation Project

Reddy Branch Planting Schedule

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Appendix F

Public Briefings for Patuxent Reservoirs
Interim Watershed Management Report

Patuxent Reservoirs Watershed Management Report
Summary of Public Briefings

May 5, 2009 - Reservoir High School - 11550 Scaggsville Rd, Fulton, MD 20759

and

May 14, 2009 - Wildlife Achievement Chapter – Izaak Walton League - 26430 Mullinix Mill Rd., Mt Airy, Md. 21771

7:00 PM – 8:00 PM

Background: In the process of developing a comprehensive watershed management plan, the Patuxent Reservoirs Watershed Protection Group's Technical Advisory Committee (TAC) attempted to engage stakeholders beyond those participating in the TAC. Two public meetings were held in May 2009. One meeting was held in the northern portion of the watershed and one in the southern portion of the watershed. Both meetings were facilitated by Capuco Consulting Services, Inc. with technical presentations by Versar, Inc. Both meetings were staffed by representatives from the Washington Suburban Sanitary Commission, Montgomery County Department of Environmental Protection, Howard County Planning Division, and Howard County Department of Public Works. Three additional stakeholders attended each meeting.

Introductory Comments: For both briefings, the meeting was called to order at approximately 7:10 p.m. All participants introduced themselves and referenced the organization they were representing. Alexi Boado of Versar, Inc. presented the agenda for the evening explaining that there would be a brief informational presentation followed by a question and answer period.

Informational Briefing: Mr. Boado spoke for approximately 30 minutes with the assistance of a slide presentation. He presented information on the following topics:

- The history of the Patuxent Reservoirs protection agreement and its associated TAC
- The priority resources and regulatory requirements affecting watershed protection and enhancement
- The purpose of the watershed plan
- Preliminary analyses of recommendations for watershed management
- Next steps in development of the watershed management plan
- Ways for stakeholders to become involved.

Public Comment Period: Intermittently throughout the briefing and following the briefing, stakeholders presented a variety of comments. Many in the form of questions. TAC members present and the consultant team offered suggestions on how these comments may be addressed in the draft watershed management plan. The questions and comments are summarized below:

- Are there shared septic units in the watershed?
- How will the watershed plan accommodate the Bay TMDL?
- How do educational efforts address the agricultural community?
- How does economic development tie in with the TAC's priorities?
- What is the intended use of the plan?
- How does the plan fit into the county water resource element plans?
- What are the sources of phosphorus?
- What percent of the residences are on septic?
- How can we better capture the true amount of pasture land such as that found in farmettes?
- Will accelerating phosphorous bans help with TMDLs?
- How will private land owners be involved with TMDL implementation?
- What is the water quality of private wells?
- Implementation is the paramount challenge.

Informal Discussion Period and Meeting Conclusion: Shortly after 8 p.m. for both briefings Ms. Capuco noted that in respect for the stakeholder's time, the formal discussion would conclude. At that time Mr. Boado thanked all who were present and concluded the discussion. Although some informal discussion followed, all participants had left the meeting facility by 8:30 p.m.

Appendix G

Annual Report of Deer Management Program of WSSC Owned Lands

ANNUAL REPORT
2009 – 2010

WASHINGTON SUBURBAN SANITARY COMMISSION

Deer Damage Mitigation Program for the Triadelphia and Rocky Gorge Reservoirs & Piscataway Wastewater Treatment Plant

BACKGROUND

The WSSC Deer Damage Mitigation Program was initiated in 2000 by the Watershed Manager in cooperation with the Maryland Department of Natural Resources (DNR) (**WSSC MANAGED DEER HUNT ANNUAL TOTALS: 2000 – 2010)** in response to severe damage to existing forest resources on the Triadelphia/Rocky Gorge Reservoirs buffer property. Since then several hunt areas have been added in response to complaints from farmers and home owners adjacent to watershed property, as well as other agencies and groups (**WSSC MANAGED DEER HUNT STATISTICS: 2009 - 2010)**. Hunts have also been conducted on the grounds of the Piscataway Wastewater Treatment Plant in southern Prince Georges County as a result of a request from the Plant Manager.

Browse damage on most of the WSSC watershed property is severe, with the average adult deer eating up to seven pounds of forage per day (2,555 pounds/year). The elevated deer population has been called, "the biggest threat to agriculture in Montgomery County". Additionally, there are over 2000 reported deer/auto collisions in Montgomery County annually. Maryland also has one of the highest incident rates of Lyme Disease in the U.S, and Howard County reportedly has the highest rate of all Maryland Counties. Infra-red deer population density studies carried out by the Howard County Department of Recreation and Parks in 2009 indicate that deer densities are generally well above the recommended fifteen per square mile. Twenty-five Program hunts were conducted on WSSC properties in Montgomery, Howard, and Prince Georges Counties during 2009 – 2010.

THE 2009 – 2010 SEASON

TRIADELPHIA AND ROCKY GORGE RESERVOIRS WATERSHED

Since Program inception we have conducted managed shotgun hunts on the WSSC reservoir buffer property in response to the deer problem. By utilizing managed shotgun-only hunts we are able to track the success of our program and control hunting access and safety in an area that is being increasingly urbanized. Several areas on the watershed property are also open to bow hunting during the Maryland bow hunting season. However, this Program is not able to immediately track bow hunt areas due to the fact that those hunts are tracked via the State check-in system only.

All hunt areas have been reviewed by the Maryland Department of Natural Resources (DNR) and WSSC biologists. A total of 24 hunts were conducted beginning in October 2009 and ending in January 2010. There were three locations in Montgomery County, five in Howard County, and one in Prince Georges County. A total of 574 hunter-days were spent afield, with 182 deer killed in Howard County, 134 in Montgomery County, and 24 in Prince Georges County, for a total of 340. In Montgomery County the Triadelphia Lake Road Area accounted for 108 deer, while 18 were killed at Link, and 8 at Dustin Road. In Howard County 95 were killed at Bufort Park, 31 at Pigtail, 28 at Reservoir Overlook, 9 at Big Branch, and 19 at Fox Haven. Twenty-four were killed at the Supplee Lane site in Prince Georges County.

Each hunt area is managed to account for unique factors including: desired harvest, acreage, access, terrain, urban density, and safety considerations. Hunts were managed utilizing rotating selection of qualified public applicants from a list pre-approved by the WSSC Office of Security and Safety Services. All hunters were required to successfully complete a State-certified Hunter Safety Course and obtain a current State Shooter Qualification Card or equivalent. Attempts were made to accommodate groups and family members who wished to hunt together, and hunters with disabilities were accommodated as needed.

Of the 340 deer harvested this season, 176 were does, 75 were button-bucks, and 89 were antlered bucks. A hunter was permitted to take one antlered buck at any time and a second antlered buck after killing two antlerless deer on any WSSC Managed Hunt. There was no bag limit on antlerless deer.

TRIADELPHIA LAKE ROAD AREA

Official data for this Montgomery County area (2000 – 2010) show that 959 deer have been removed to date. Five hunts this season produced 108 deer, compared to 98 taken last season. Although adjacent landowners and watershed staff are reporting fewer deer sightings in this area over the last several years, the number of deer taken continues to be high. Visual observations are supported by recruitment in forested parcels where there is a heavily vegetated shrub layer that was previously extremely sparse.

DUSTIN DRIVE AREA

The Program completed the sixth year of managed deer hunts at this area of Rocky Gorge Reservoir, Montgomery County, in response to the Timber Hill Home Owners' Association and other landowner requests. Eight deer were removed, an increase from the 3 taken last season. The effort put forth this area has not produced a consistent number of deer: one hunt was conducted in order to track the situation. Although residents continue to experience severe damage to landscaping and gardens, the large size of private lots allows deer access to extensive areas of habitat outside the managed WSSC portion of the watershed.

LINK AREA

The Link Area on Rocky Gorge, Montgomery County, was hunted this season for the sixth time, in response to damage complaints from an adjacent farm. Eighteen deer were killed in two hunts, up slightly from 16 in two hunts last year. This number is within the range expected for this season. The deer kill seems to have stabilized, and program management does not intend to drop below two hunt days next season.

BUFORT PARK AREA

The Bufort Park Area, on Rocky Gorge, Howard County, was hunted for the seventh season. Home owners in the area who requested the hunts seven years ago continue to experience deer damage to gardens and shrubbery, and citizen support for the hunts remains high. Ninety-five deer were killed in five hunts this season, a significant increase from 63 last season; five hunts were conducted compared to four held last year. Management efforts continue to be necessary, with 445 deer removed from the area to date.

PIGTAIL AREA

On Triadelphia Reservoir, Howard County, this area has been part of the Program for seven seasons, and frequency of hunts was reduced from four to three. The area is also open to bow hunting during the State season. Thirty-one deer were killed, up from last season due in part to the fact that the area was extended to Brighton Dam Road at the request of owners of adjacent property experiencing extensive browse damage to shrubbery and a high incidence of Lyme Disease. Thus far 174 deer have been removed from the area as a result of the Program hunts.

RESERVOIR OVERLOOK

Five years ago the Reservoir Overlook Home Owners' Association, at Rocky Gorge, Howard County, requested that WSSC conduct hunts to reduce the deer population damaging lawns, gardens, and ornamental plants in the neighborhood. Thus far 172 deer have been removed from this area, which is nearly surrounded by urban development. During the first season 65 deer were taken in 3 hunts, and neighbors immediately reported a reduction in deer damage. The following season 26 deer were killed in the same number of hunts. This season the area was extended to Rocky Gorge Dam (T. Howard Duckett Dam), and 28 deer were taken in two hunts. We expect to conduct two hunts in the area again next season, as it appears that two hunts are adequate to keep the deer population at a socially acceptable level.

FOX HAVEN

The Fox Haven Home Owners' Association at Rocky Gorge, Howard County, requested that WSSC reduce the deer population in their area four years ago. WSSC and DNR biologists surveyed adjoining WSSC property and concluded that a hunt was justified and could be safely conducted. Lot size in the development is large, including abundant deer habitat throughout. Nineteen deer were killed in two hunts this year, an increase over the 9 taken last year in the same number of hunts. Two managed hunts are expected to maintain an acceptable population level, given that the area is also open to bow hunting during the State season.

SUPPLEE LANE

The Supplee Lane area at Rocky Gorge Reservoir, Prince Georges County, is another heavily urbanized area bordered by I-95, the reservoir, Supple Lane, and Brooklyn

Bridge Road. The hunts were scheduled in response to homeowner complaints regarding the deer damage. Since this area is so close to homes, the dam structure, a recreation area, and roads, special precautions were taken. Hunters were kept as far from homes and recreation areas as possible, escorted to hunt locations after daylight, and required to hunt from elevated stands. Some stand locations were restricted in regards to shooting lanes to eliminate any chance of an accident. The Hunt Manager began to drive deer immediately after hunters were in place. Hunts were also scheduled late in the season after the reservoirs had closed, when it was assumed that cold temperatures would reduce the number of persons utilizing the nearby recreation areas. Finally, WSSC Security Personnel were on site during the three hunts. A cooperative public was appreciated by the Program.

Habitat remains severely impacted, and the deer population appears to be unacceptably high, with twenty-four deer taken in the three hunts this season. Body fat was absent or severely reduced in all deer carcasses checked by the hunt manager, a sign of overpopulation and dietary stress. Indications are that the deer are in less than prime condition.

Even though hunt dates were expanded to three this season, the kill did not increase. The earliest hunt date was the most productive, and future plans are to reduce the number of hunt dates to two, and hold hunts earlier in the season. It appears that the deer are utilizing this habitat very little in the late season since there is virtually no browse to sustain them.

PISCATAWAY WASTEWATER TREATMENT PLANT

Last year a request was received from the manager of the Piscataway Wastewater Treatment Plant (Prince Georges County) to conduct a hunt due to the high amount of deer damage to vegetation on the plant grounds. WSSC and DNR biologists confirmed that there were severe impacts to the vegetation from deer.

One hunt was conducted this season during a snow event, and twelve deer were taken, four more than last year. All carcasses were examined at the end of the hunt, and the deer appeared to be in poor condition, as there was no body fat present. The condition of vegetation and damage to the property will continue to be monitored prior to making a determination regarding the number of future hunts.

OUTLOOK

The 2009-2010 deer damage mitigation efforts were very successful. Our pre-season goal of 250 was exceeded by 90 deer on the Patuxent Watershed hunts. The most significant difference between this year and last was the good mast crop compared to none last year. The deer appeared to stay in forested areas because there was adequate food particularly during the early part of this year’s hunting season.

The success rate on WSSC managed hunts was significantly higher this season, with 62% of the man days accounting for a deer killed. Last season's rate was 49%. The data will be analyzed, and a hunt plan customized for next year accordingly. Every attempt will be made to mitigate documented deer damage while allocating limited time and staff resources. All precautions will be taken to insure the continued success of the Program by WSSC in cooperation with the Maryland DNR.

Of the 340 deer harvested on our managed Patuxent Watershed hunts this year 134 were killed in Montgomery County, 182 in Howard County, and 24 in Prince Georges County. The deer kill in Montgomery was up by seventeen, and the Howard County kill increased by a significant 76 deer, while the Prince Georges County kill dropped by two. Environmental factors, mast production, and weather proved favorable and hunter success ran high.

Currently, the Program can document progress in several areas such as: Triadelphia where ground vegetation is making a comeback, and Reservoir Overlook where residents noticed a significant reduction in deer damage. This season efforts were very successful in the Bufort Park Area as well. Other areas like Supplee Lane and Big Branch still have need for more deer reduction. We will also continue to monitor the deer impacts at the Piscataway Wastewater Treatment Plant.

It is important to note that the Deer Management Plan, the cooperation of DNR and WSSC Safety and Security Services staff, and qualified hunters from the public sector were key to the continuing success of the Program. Local residents have also been cooperative and supportive of efforts to reduce deer numbers to a more environmentally/socially compatible level.

Work with stakeholders to adjust mitigation efforts for maximum success in 2010-2011 will continue.

B. James Benton
Watershed Manager

Appendix H

Patuxent Reservoirs Watershed Protection Agreement

PATUXENT RESERVOIRS WATERSHED PROTECTION AGREEMENT

This agreement is effective this 29th day of October, 1996, by and among Howard County, Montgomery County, Prince George's County (a body corporate and politic), the Howard Soil Conservation District (HSCD), the Montgomery Soil Conservation District (MSCD), the Maryland National Capital Park and Planning Commission (M-NCPPC), and the Washington Suburban Sanitary Commission (WSSC)

WHEREAS, the parties agree that the Patuxent Reservoirs Watershed includes the Triadelphia and T Howard Duckett (Rocky Gorge) reservoirs, the contributing Patuxent River and its tributary streams and associated groundwater resources,

WHEREAS, the parties to the agreement recognize the importance of protecting the long-term biological, physical, and chemical integrity of the Patuxent Reservoirs Watershed;

WHEREAS, the parties recognize the work of the Patuxent Reservoirs Protection Group (PRPG) as valid and recognize that an interjurisdictional partnership is needed to promote reservoir watershed protection strategies.

WHEREAS the parties desire to develop and implement a multi-barrier watershed management approach to assure the integrity of a continued supply of high quality potable water at reasonable cost.

WHEREAS, the parties acknowledge the importance of integrating a Patuxent Reservoir Protection Strategy with the Patuxent Tributary Strategy to address the goals of the 1987 Chesapeake Bay Agreement; and

WHEREAS, the parties desire that the benefits of and responsibilities for necessary actions be shared equitably by all parties.

NOW, THEREFORE, BE IT RESOLVED, that in consideration of the covenants and agreements set forth hereinafter, it is mutually covenanted and agreed as follows:

ARTICLE I - ESTABLISHMENT OF A PATUXENT RESERVOIR PROTECTION STRATEGY

The need for establishing a protection strategy as outlined in the interim report Developing a Patuxent Reservoir Protection Strategy (March 1995) is hereby recognized by the parties. The parties hereby agree to cooperate with each other regarding initiatives that will help fulfill recommendations of the "Interim Action Plan for Reservoir Protection" and to the "Development of a Long-Term Reservoir Protection Program" as outlined in that report.

ARTICLE II - POLICY BOARD

A Members

The Policy Board ("Board") shall be composed of the County Executives for Howard County, Montgomery County, and Prince George's County; the Chairpersons for the Howard Soil Conservation District (HSCD) and the Montgomery Soil Conservation District (MSCD) Boards, the Executive Director for the Maryland-National Capital Park and Planning Commission (M-NCPPC); and the General Manager of the Washington Suburban Sanitary Commission. Any Board member may designate an alternate by written notification to other Board members.

The Policy Board may change its membership by consensus among existing members.

B Functions

The Board shall meet yearly to receive the Technical Advisory Committee's annual report and to review ongoing activities and the results of studies targeted toward protecting the reservoirs and their resources. The Board may meet more frequently to consider issues and make recommendations as necessary. The Board shall encourage cooperative arrangements to ensure that all parties participate actively in programs and policies that maintain and improve water quality and habitat throughout the reservoirs watershed.

The Board shall consider:

1. Review and evaluation of information from the Technical Advisory Committee;
2. Strategies to address present or anticipated problems;
3. Work activities among parties for the coming year; and
4. Other matters found necessary or desirable for reservoir watershed protection.

The Board will agree by consensus on all recommendations, determinations, and proposals. The Board's decisions shall be advisory only, and shall not be binding on any political subdivision or agency participating in this agreement. An annual summary of the Board's decisions shall be prepared and made available to the public.

C Chairpersons

The County Executives of Howard County, Montgomery County, and Prince George's County will serve successive terms as the Chairperson The Chairperson will serve from July 1st of one year to June 30th of the following year The County Executives will agree upon the order of the succession

ARTICLE III - TECHNICAL ADVISORY COMMITTEE

A Members

The Technical Advisory Committee ("Committee") consists of representatives from. (1) Howard County· Department of Health; Department of Planning and Zoning; and Department of Public Works; (2) Montgomery County· Department of Environmental Protection and Department of Permitting Services; (3) Prince George's County: Department of Environmental Resources and Department of Health; (4) the M-NCPPC, (5) the HSCD, (6) the MSCD, (7) State of Maryland: Department of Agriculture; Department of the Environment; and Department of Natural Resources; and (8) the WSSC.

The Committee will meet at least once per year to review the results of that year's work efforts, to recommend a work plan for the next year, and to prepare the annual report to the Board. The Committee will meet more frequently as needed to review, evaluate, and make recommendations on reservoir-related concerns.

The Committee may propose standing subcommittees or ad hoc workgroups as needed to evaluate specific reservoir protection issues. The subcommittees and workgroups may request representatives from agencies or groups that are not permanent members of the Committee to participate.

B Functions

1 The Committee or designated workgroups shall meet as necessary to periodically review and evaluate existing problems and proposed actions which may affect the reservoirs and the watersheds, including the following functions:

a. Providing sources of high quality raw water as a regional water supply system;

b. Providing habitats to support high quality aquatic and riparian communities;

c. Providing desirable places for environmental enhancement and wildlife habitat; and

d. Providing aesthetic, recreational, and other beneficial uses.

2 The Committee or designated workgroups will work cooperatively to expeditiously recommend balanced pollution control strategies and management measures to

a Control sediment loadings to the reservoirs;

b Minimize the levels of nutrients and pollutants entering the reservoirs and the tributary streams;

c. Prevent degradation of the high quality, interconnected surface and groundwater resources of the tributary streams and throughout the watershed; and

d Encourage stewardship of the reservoirs watershed and resources

3. The Committee may develop and formulate public education and outreach initiatives, urban, forestry, and agricultural best management practices; innovative site designs; alternative on-site disposal systems, natural resource management strategies; stream restoration projects; and any other measures that protect and enhance water quality or habitat throughout the watershed.

Whenever major reservoir water quality problems must be addressed, the Committee shall evaluate alternative solutions and the cost-effectiveness of these measures in making recommendations for reservoir resource protection.

4 The Committee shall prepare a written report to submit to the Board for its annual meeting *The Annual Report shall include:*

a. Results of reviews and evaluations on reservoir protection issues;

b. Progress on programs and practices being implemented by the parties to protect the reservoirs and their resources;

c. Recommendations on strategies to encourage reservoir resource protection; and

d. A recommended work plan for the coming year.

C <u>Chairpersons of Committee and Workgroups</u>

The Committee and its workgroups shall agree by consensus on the method of selection and terms for Chairpersons to lead all meetings.

ARTICLE IV - MODIFICATIONS AND AMENDMENTS

A Membership of the Policy Board

Any changes in Policy Board membership, except designation of an alternate, shall initiate the process for modification of this agreement The modified agreement must indicate the change(s) in Policy Board composition and shall become effective after being signed by all members of the modified Policy Board

B Modification or Amendment of the Agreement

This agreement may be modified or amended by consensus of the Policy Board members The Policy Board shall consider changes in membership or any other modifications and amendments of this agreement at its annual meeting

Changes based on consensus among Policy Board members will initiate the process for agreement modification The modified or amended agreement will not become effective until signed by all members of the Policy Board as defined in the modified or amended agreement

ARTICLE V - RIGHTS OF PARTIES NOT TO BE ABROGATED

A. Nothing in this agreement shall limit or abrogate any right or rights delegated to any of the governments or agencies which are parties to this Agreement by acts of the General Assembly of the State of Maryland.

B Each party hereto agrees that participation by any party to the agreement may be terminated by that party with three months written notice to the other parties of the agreement.

PATUXENT RESERVOIRS WATERSHED PROTECTION AGREEMENT

Charles I. Ecker
County Executive
Howard County

10/29/96
Date

Douglas M. Duncan
County Executive
Montgomery County

11/6/96
Date

Wayne K. Curry
County Executive
Prince George's County

10/29/96
Date

William E. Barnes
Chairman
Howard Soil Conservation District
Board of Supervisors

10/29/96
Date

George E. Lechlider
Chairman
Montgomery Soil Conservation District
Board of Supervisors

10-29-96
Date

Trudye Morgan Johnson
Executive Director
Maryland-National Capital
Park and Planning Commission

October 29, 1996
Date

Cortez A. White
General Manager
Washington Suburban Sanitary Commission

10/29/96
Date

A-6

Appendix I

Patuxent Reservoirs Protection Strategy Agricultural MOU and Amendments

Patuxent Reservoir Protection Strategy
Memorandum of Understanding

This memorandum is effective this 1st day of October, 1998, by and among Howard County (HC), Montgomery County (MC), Prince George's County (PGC, a body corporate and politic), the Howard Soil Conservation District (HSCD), the Montgomery Soil Conservation District (MSCD), Maryland-National Capital Park and Planning Commission (M-NCPPC) and the Washington Suburban Sanitary Commission (WSSC).

Whereas, on October 29, 1996, the parties signed the Patuxent Reservoir's Watershed Protection Agreement which recognizes the importance of protecting the long term biological, physical and chemical integrity of the Patuxent Reservoir's Watersheds;

Whereas, the parties desire to develop and implement a multi-barrier watershed management approach to assure the integrity of a continued supply of high quality potable water at reasonable cost;

Whereas, the parties recognize the economic benefit of agriculture within the reservoir's watersheds;

Whereas, on October 6, 1997, the parties adopted the 1997 Annual Report and Action Plan which established two agricultural initiatives;

Whereas, the first initiative will accelerate the volunteer agricultural conservation planning outreach through the two soil conservation districts, and the second initiative is the development of a local cost-share program for the installation of stream-side best management practices;

Now, Therefore, subject to available funding and future appropriations and in consideration of the covenants and agreements set forth hereinafter, the parties mutually covenant and agree as follows:

Article I - Funding

A. General

An amount not to exceed $100,000 will be provided by equal contributions of $33,333 from WSSC, Howard and Montgomery Counties for the initial year of the program. Funding thereafter is contingent upon the success of the program as determined by WSSC, Howard and Montgomery Counties and their respective budgetary constraints. The amounts required by HSCD and MSCD will be equally divided within their respective districts between the planner position initiative and the stream-side best management practices initiative. Any surplus funds will be either: 1) redirected to the funding account for the other initiative; 2) equally disbursed to WSSC, Howard and Montgomery Counties; or 3) rolled over into the next fiscal year as determined by

consensus of the Technical Advisory Committee as established in the Patuxent Reservoir's Watershed Protection Agreement.

The initial contribution of $100,000 is to be made on July 1, 1998, (or thereafter), with payment of $75,000 to MSCD and $25,000 to HSCD.

B. Stream-Side Cost-Share Program

The need for development of stream-side cost-share programs will be funded through an annual $50,000 contribution (subject to future appropriations) equally in the amount of $16,666 from the WSSC, Howard and Montgomery Counties, respectively. This annual $50,000 appropriation will be divided between the two districts as mutually agreed upon by a vote of the two district boards (HSCD and MSCD, majority vote of combined board members). Howard and Montgomery Counties' funding shall be spent within their respective county boundaries.

C. Conservation Planner Position

The need for accelerated volunteer conservation planning assistance to those agricultural operations within the reservoir watersheds will be funded through an annual $50,000 contribution (subject to future appropriations) equally in the amount of $16,666 from WSSC, Howard and Montgomery Counties, respectively.

Article II - Conservation Planner

A. Administration

The $50,000 annual contribution for the planner position will be paid to MSCD. MSCD will in turn hire a contractual conservation planner in consultation with the HSCD. MSCD will administer the position. The position will be limited to serving the agricultural community as defined by the HSCD's and MSCD's respective Agricultural Unit Inventory within the reservoir watersheds. The planner will contact landowners on the importance of soil conservation and water quality plans. The planner will also prepare conservation plans for the landowners in the HSCD and MSCD respectively and assist with the five-year implementation of those plans which are to be based upon volunteer participation and public outreach efforts. The planner will answer administratively to the MSCD Board of Supervisors or their designee, except that when the planner is working within the HSCD, the supervision of the planner's workload priorities will be provided by the HSCD Board of Supervisors or their designee.

B. Work Plans

The accelerated conservation planning assistance will support the respective five-year work plans for the landowners of the two districts. In working with an anticipated customer base that consists of farmettes and horse operations as well as the remaining traditional agricultural operations, extensive public education will be a top priority in selling the importance of conservation plans.

Direct mailings, personal visits, community meetings, tour and brochures are examples of those educational tools that may be used.

Every landowner within the reservoir watersheds that has been identified by the HSCD and MSCD as needing to be educated will be contacted. Over the five years the goal is to contact 471 landowners. These contacts will be opportunities to educate landowners on how practicing conservation will aid in improving water quality within the two reservoirs. It's estimated that this outreach effort will result in the following number of five-year work plans:

Fiscal Year	Landowners Contacted	Plans Prepared	Acreage of Plans Prepared
1999	40	24	1368
2000	90	54	3078
2001	114	68	3876
2002	114	68	3876
2003	113	67	3819
	471	281	16017

Article III - Cost-Share Program

HSCD and MSCD will each develop a local stream-side cost-share program that will supplement the current state and federal agricultural cost-share programs that currently pay up to 87-1/2% of installation costs of stream-side best management practices. The programs to be developed by HSCD and MSCD are intended to reimburse applicants for up to 12-1/2% of their out-of-pocket costs for the installation of stream-side best management practices. The combined cost-share between the current federal and state programs and the program to be developed by HSCD and MSCD are not to exceed 100% of the installation costs. The amount of the applicants' reimbursement will be based upon the HSCD and MSCD respective adopted cost-share flat rates. All eligible applicants will be required to install their best management practices in accordance with USDA Natural Resources Conservation Service standards and specifications.

Article IV - Accomplishments

The HSCD and MSCD shall prepare a joint report of annual accomplishments documenting the progress of the two agricultural initiatives and provide an accounting of appropriations/expenditures

The report will be forwarded to the Patuxent Technical Advisory Committee for inclusion in their Annual Report.

The report will be prepared on a July 1 - June 30 fiscal year cycle. The report shall be submitted to the Technical Advisory Committee by September 1 of each year.

In addition, the HSCD and MSCD will present updates during the periodic Technical Advisory Group meetings. The updates will focus upon landowner contacts, plans prepared and best management practices installed.

Article V - Termination

Each party hereto agrees that participation by any party to this agreement may be terminated by that party upon thirty (30) days written notice to the other parties to this agreement.

In the event of termination all applications received for payment prior to the termination date will be processed for payment subject to eligibility requirement and built according to HSCD and MSCD respective approval. No applications will be accepted on or after the termination date. Any remaining funding after eligibility payments will be disbursed equally to WSSC, Howard and Montgomery Counties.

Charles I. Ecker
County Executive
Howard County

11-20-98
Date

Douglas M. Duncan
County Executive
Montgomery County

11/8/98
Date

AS TO FORM AND LEGALITY
COUNTY ATTORNEY

11/24/98

Wayne K. Curry
County Executive
Prince George's County

11/24/98
Date

210521

Patuxent Reservoir Protection Strategy

Memorandum of Understanding

Amendment #1

This amendment is by and among the following parties: Howard County, Maryland (HC) a body corporate and politic; Montgomery County, Maryland (MC) a body corporate and politic; Prince George's County, Maryland (PGC) a body corporate and politic; the Howard Soil Conservation District (HSCD), the Montgomery Soil Conservation District (MSCD), Maryland-National Capital Park and Planning Commission (M-NCPPC), and the Washington Suburban Sanitary Commission (WSSC), and is effective this 30th day of November, 2000.

The parties entered into a Memorandum of Understanding (MOU) effective October 1, 1998 The purpose of this amendment is: 1) to delete the provisions for the hiring of a Conservation Planner position; 2) to modify the stream-side cost-share program in Article III of the MOU; and 3) to add provisions for amending the MOU.

Under Article III of the MOU, the Howard Soil Conservation District (HSCD) and the Montgomery Soil Conservation District (MSCD) would utilize funding provided via the MOU to reimburse owners of agricultural-zoned property for up to 12-1/2% of their out-of-pocket cost for installation of stream-side best management practices. This reimbursement would supplement state and federal cost-share programs that presently pay up to 87-1/2% of installation costs of stream-side best management practices (BMP's). The Technical Advisory Committee (TAC) decided that cost-share funds from this MOU instead should be spent on implementing stream-side best management practices for non-agricultural zoned property owners (who are not presently eligible for the state and federal cost-share programs). This new incentive program will provide reimbursement payments to non-agricultural zoned property owners for installation of approved stream-side best management practices, such as the creation of riparian buffers, the fencing of streams, and similar approved BMP's.

Changes

1) On page 1, the sixth paragraph is revised to read as follows: "Whereas, the first initiative will focus upon the volunteer agricultural conservation planning outreach efforts of the two soil conservation districts, and the second initiative is the development of a local cost-share program for the installation of stream-side best management practices;"

2) Article I - Funding, A. General is revised as follows:

a. The third sentence is revised to read as follows: "The amounts required by HSCD and MSCD will be approved within their respective districts for the stream-side best management practices initiative."

b. The fourth sentence is revised to delete number 1, and numbers 2 and 3 are respectively renumbered as 1 and 2.

c. Article I - Funding, C. Conservation Planner Position. The entire section is deleted.

3) Article II - Conservation Planner, A. Administration is deleted and the following is inserted instead: "The Howard and Montgomery Soil Conservation Districts will provide existing resource staff toward the development of soil conservation and water quality plans. This staff will be serving the agricultural community as defined by the respective district's Agricultural Unit Inventory within the Patuxent reservoir watersheds. This staff will contact landowners on the importance of soil conservation and water quality plans. Staff will prepare conservation plans for the landowners and assist with the implementation of those plans. Those efforts will be based upon the volunteer participation of landowners and district public outreach efforts."

4) Article II - Conservation Planner, B. Work Plans. The word "accelerated" is deleted from the first sentence.

5) Article III – Cost Share Program, is deleted and the following is inserted instead: "HSCD and MSCD will jointly develop and approve a local stream-side cost-share/incentives program and payment schedule that will encourage landowners of non-agricultural zoned property to install best management practices that protect and improve water quality in the Patuxent Reservoirs Watershed. The program will provide cost share up to 80% of the approved program costs or incentive payment schedule (to be approved and distributed by the two soil conservation districts), not to exceed $5,000 per property owner, regardless of the number of projects to be implemented by the property owner or the number of non-agricultural zoned properties owned. All eligible applicants will be required to install their best management practices in accordance with USDA Natural Resources Conservation Service standards and specifications."

6) A new Article V, is added to read as follows:

Article V – Amendments

This agreement may be amended at any time by written agreement of the parties. The Technical Advisory Committee (TAC) may initiate action to amend this agreement and propose terms for the amendment. The TAC will employ the following process for obtaining consensus regarding review and approval of any proposed amendments:

1) Any amendment pertaining to the appropriation, allocation or expenditure of funds may be adopted by the written agreement of the following three entities providing funds: Montgomery County, Howard County and the WSSC. This adoption will be evidenced by an amendment document executed by the official representatives of the respective three entities.

2) Amendments of a non-funding nature shall require the written approval of all parties.

7) The old Article V – Terminations becomes Article VI

8) All provisions of the Memorandum of Understanding remain in effect unless specifically changed by this amendment.

Signature Page

James N. Robey
County Executive
Howard County, Maryland

7/12/00
Date

Douglas M. Duncan
County Executive
Montgomery County, Maryland

6/6/2000
Date

Wayne K. Curry
County Executive
Prince George's County, Maryland

10/12/00
Date

John R. Griffin
General Manager
Washington Suburban Sanitary Commission

8-21-00
Date

William Barnes
Chairman
Howard Soil Conservation District

7/19/00
Date

George Lechlider
Chairman
Montgomery Soil Conservation District

5/31/2000
Date

Trudye Morgan Johnson
Executive Director
Maryland-National Capital Park & Planning Commission

11/30/00
Date

Attest: Patricia-Colbert Barney
Secretary-Treasurer

APPROVED AS TO FORM AND LEGALITY.

APPROVED AS TO LEGAL SUFFICIENCY

11/8/00

Cortez A. White
Cortez A. White
General Manager
Washington Suburban Sanitary Commission

11/13/98
Date

William E Barnes
William Barnes
Chairman
Howard Soil Conservation District

11/14/98
Date

George Lechlider
George Lechlider
Chairman
Montgomery Soil Conservation District

10-1-98
Date

Trudye Morgan Johnson
Trudye Morgan Johnson
Executive Director
Maryland-National Capital Park & Planning Commission

11/9/98
Date

Attest: A. E. Navarro
Secretary-Treasurer

Patuxent Reservoir Protection Strategy

Memorandum of Understanding

Amendment #2

This amendment is by and among the following parties. Howard County, Maryland (HC) a body corporate and politic, Montgomery County, Maryland (MC) a body corporate and politic, the Howard Soil Conservation District (HSCD), the Montgomery Soil Conservation District (MSCD), and the Washington Suburban Sanitary Commission (WSSC) and is effective this 7th day of June 2004

Background

The parties entered into a Memorandum of Understanding (MOU) October 1, 1998 to develop a program for encouraging and supporting streamside best management practices in the Patuxent Reservoir watershed

The Technical Advisory Committee (TAC) during its deliberation in the year 2000 recommended that the cost-share funds from this MOU should be spent on implementing streamside best management practices for non-agricultural zoned property-owners who are not eligible for the state and federal cost-share programs This recommendation was approved on November 30, 2000 via Amendment #1. In light of the fact that no non-agricultural applicants have been interested in this cost share program in Montgomery County, Amendment #2 is developed to modify Art. III regarding the eligible streamside properties for the cost-share program. Modifications include 1) replacing "land owners of non-agricultural zoned properties" in line 3 of Art III with "property owners", and 2) removing "non-agricultural zoned" in the 8th line of Art. III The modifications read as follows:

1) Article III The Howard Soil Conservation District (HSCD) and the Montgomery Soil Conservation District (MSCD) will jointly develop and approve a local stream-side cost-share/incentives program and payment schedule that will encourage property owners to install best management practices that protect and improve water quality in the Patuxent Reservoirs Watershed The program will provide cost share up to 80% of the approved program costs or incentive payment schedule (to be approved and distributed by the two soil conservation districts), not to exceed $5,000 per property owner, regardless of the number of projects to be implemented by the property owner or the number of properties owned. All eligible applicants will be required to install their best management practices in accordance with USDA Natural Resources Conservation Service standards and specifications

2) All provisions of the Memorandum of Understanding and Amendment #1 remain in effect unless specifically changed by this Amendment

Signature Page

James N. Robey
County Executive
Howard County, Maryland

ATTEST:

5/4/04
Date

Raquel Sanudo
Raquel Sanudo
Chief Administrative Officer

5/4/04
Date

Douglas M Duncan
County Executive
Montgomery County, Maryland

5/23/04
Date

APPROVED AS TO FORM AND LEGALITY
OFFICE OF COUNTY ATTORNEY
BY Eileen T. Basenow
DATE 5/21/2004

John R Griffin
General Manager
Washington Suburban Sanitary Commission

6/7/04
Date

William E. Barnes
William Barnes
Chairman
Howard Soil Conservation District

2/26/04
Date

George Lechlider
George Lechlider
Chairman
Montgomery Soil Conservation District

3/12/04
Date

Approved as to Legal Sufficiency
this 4th day of May 2004.

Barbara M. Cook
Barbara M. Cook
Howard County Legal Department

Date

Approved as to Legal Sufficiency

Gilles T. Bissonnet
Montgomery County Legal Department

5/21/2004
Date

Approved as to Legal Sufficiency

Washington Suburban Sanitary Commission
General Counsel's Office

5-26-04
Date

Appendix J

2009 List of Contacts for Patuxent Reservoirs Watershed Protection Group Technical Advisory Committee

Patuxent Reservoirs Watershed Protection Group - Technical Advisory Committee (2009)

TAC - MEMBERS

	NAME	COMPANY/AGENCY	ADDRESS	VOICE	FAX	E-MAIL
1	Gul Behsudi	Maryland Department of the Environment	1800 Washington Blvd., Suite 450 Baltimore, MD 21230-1708	410-537-3585	410-537-3157	gbehsudi@mde.state.md.us
2	Martin Chandler	Wash. Suburban San. Comm. Environmental Group	14501 Sweitzer Lane Laurel, MD 20707	301-206-8052	301-206-8057	mchandl@wsscwater.com
3	Ken Clare	Prince George's County Health Department Div. of Environmental Health	9201 Basil Court, Suite 318 Largo, MD 20774	301-883-7689	301-883-7266	kaclare@co.pg.md.us
4	Meosotis Curtis	Montgomery County Dept of Environmental Protection	255 Rockville Pike, Suite 120 Rockville, MD 20850	240-777-7711	240-777-7715	meosotis.curtis@montgomerycountymd.gov
5	Dwight Dotterer	Maryland Department of Agriculture Office of Resource Conservation	50 Harry S. Truman Parkway Annapolis, MD 21401	410-841-5877	410-841-5736	dotterdd@mda.state.md.us
6	Jerry Maldonado	Prince George's County Dept of Environmental Resources	9400 Peppercorn Place, Suite 610 Largo, MD 20774	301-883-5943	301-883-9218	jgmaldonado@co.pg.md.us
7	Kristal McCormick	Howard Soil Conservation District	708 Lisbon Center Drive, Suite E Woodbine, MD 21797	410-489-7987	410-489-9120	KMcCormick@howardcountymd.gov
8	John McCoy	Maryland Department of Natural Resources	580 Taylor Avenue, Tawes E-2 Annapolis, MD 21401	410-260-8795	410-260-8779	jmccoy@dnr.state.md.us
9	Katherine Nelson	MNCP&PC Environmental Planning Division	8787 Georgia Ave. Silver Spring, MD 20910	301-495-4622	301-495-1303	Katherine.Nelson@mncppc-mc.org
10	Bert Nixon	Howard County Health Department	7178 Columbia Gateway Dr Columbia, MD 21044	410 313-1785	410-313-2648	bnixon@howardcountymd.gov
11	Susan Overstreet	Howard County Dept of Planning & Zoning	3430 Courthouse Drive Ellicott City, MD 21043	410-313-4345	410-313-3467	soverstreet@howardcountymd.gov
12	Dave Plummer	Montgomery Soil Conservation District	18410 Muncaster Road Derwood, MD 20855	301-590-2855	301-590-2849	david.plummer@montgomerycountymd.gov
13	Howard Saltzman	Howard County Dept Public Works Stormwater Management Division	6751 Columbia Gateway Dr. #514 Columbia, MD 21046	410-313-6416	410-313-6490	hsaltzman@howardcountymd.gov
14	Mark Symborski	MNCP&PC	8787 Georgia Ave Silver Spring, mad 20910	301-495-4636	301-495-1303	mark.symborski@mncppc-mc.org
15	Stan Wong	Montgomery County Dept of Permitting Services	255 Rockville Pike, 2nd floor Rockville, MD 20850	240-777-6310	240-777-6339	stan.wong@montgomerycountymd.gov

Patuxent Reservoirs Watershed Protection Group - Technical Advisory Committee (2009)

TAC - INTERESTED PERSONS AND STAFF

	NAME	COMPANY/AGENCY	ADDRESS	VOICE	FAX	E-MAIL
1	Sandy August	Wash. Suburban San. Comm. Environmental Group	14501 Sweitzer Lane Laurel, MD 20707	301-206-8240	301-206-8057	saugust@wsscwater.com
2	Carrie Capuco	Capuco Consulting Services, Inc.	214 Duke of Gloucester Street Annapolis, MD 21401	410-353-2262	410-990-0152	ccapuco@capucoconsulting.com
3	Bob Ensor	Howard County Soil Conservation District	708 Lisbon Center Drive, Suite E Woodbine, MD 21797	410-489-7987	410-489-9120	rensor@howardcountymd.gov
4	Mohammad Habibian	Wash. Suburban San. Comm. Environmental Group	14501 Sweitzer Lane Laurel, MD 20707	301-206-8083	301-206-8057	mhabibi@wsscwater.com
5	Angela Morales	Howard County Dept Public Works Stormwater Management Division	6751 Columbia Gateway Dr. #514 Columbia, MD 21046	410-313-6586	410-313-6490	amorales@howardcountymd.gov
6	Steve Nelson	Wash. Suburban San. Comm. Environmental Group	14501 Sweitzer Lane Laurel, MD 20707	301-206-8072	301-206-8057	snelson@wsscwater.com
7	Debbie Weller	Prince George's County Dept of Environmental Resources	9400 Peppercorn Place, Suite 610 Largo, MD 20774	301-883-7161	301-883-9218	DMWeller1@co.pg.md.us
8	Frank Wise	Prince George's County Health Department	9201 Basil Court, Suite 318 Largo, MD 20774	301-883-7651	301-883-7266	flwise@co.pg.md.us