SHENANDOAH VALLEY WATER RESOURCES STRATEGIC PLAN

Regional Water Resources Policy Committee – Shenandoah Valley

Prepared with assistance from
AMEC Earth & Environmental, Inc.

Funding provided by the Agua Fund, Inc. and the Shenandoah Valley Counties of Augusta, Berkeley, Clarke, Frederick, Jefferson, Page, Rockingham, Shenandoah, Warren, and the Independent Cities of Harrisonburg, Staunton, Waynesboro, and Winchester

Staff support provided by
Northern Shenandoah Valley Regional Commission

ADOPTED OCTOBER 18, 2006

LETTER FROM THE CHAIR

I am pleased to present the attached Shenandoah Valley Water Resources Strategic Plan. It is the culmination of months of work by the Regional Water Resources Policy Committee (Policy Committee), key government agencies, and water resources stakeholders from across the Shenandoah Valley.

The Strategic Plan was created with the help of AMEC Earth & Environmental, Inc. and funded by local governing bodies as well as the generous support of the Agua Fund, Inc. The Northern Shenandoah Valley Regional Commission provided valuable staff support.

The Strategic Plan was designed to further twelve water resources goals that were adopted by the region in 2004. The Policy Committee adopted the Strategic Plan on October 18, 2006 and it has been forwarded to local governments throughout the Valley for endorsement and funding.

I would like to thank all those who worked hard to create the Strategic Plan and express my personal belief that its implementation will further the economic success of the Valley and preserve its natural resources for generations to come.

John R. Staelin, Chair
Regional Water Resources Policy Committee

MISSION STATEMENT OF THE REGIONAL WATER RESOURCES POLICY COMMITTEE

As a Committee of local elected officials, the mission of the RWRPC shall be to develop an action oriented Strategic Plan that establishes a regionally coordinated policy framework for the long term protection and use of surface and ground water resources in the Shenandoah Valley.

The objective of the Strategic Plan is to preserve the ecological quality and foster resource stewardship for the environmental and economic health of the Shenandoah Valley. This objective will be supported by promoting communication, coordination, and education, and by suggesting appropriate solutions to identified problems.

The Committee shall provide oversight to technical committees in developing the Strategic Plan and ensure stakeholder inclusion and coordination with other Shenandoah Valley governmental entities.

MEMBERS OF THE REGIONAL WATER RESOURCES POLICY COMMITTEE

John R. Staelin, Chair
Larry C. Howdyshell, Vice Chair

Augusta County – Larry C. Howdyshell, Board of Supervisors, North River District

Berkeley County – William L. Stubblefield, Chair, Berkeley County Public Service District

Clarke County – John R. Staelin, Chairman, Board of Supervisors, Millwood District

Frederick County – Gene Fisher, Board of Supervisors, Shawnee District

City of Harrisonburg – Mike Collins, Director of Utilities

Jefferson County – Greg Corliss, County Commissioner
Alternate – Rusty Morgan, County Commissioner

Page County – Charles Hoke, Board of Supervisors, District 2
Alternate – Christ Anderson, County Staff

Rockingham County – Michael A. Breeden, Board of Supervisors, District 5
Alternate – Pablo Cuevas, Board of Supervisors, District 1

City of Staunton – Lacy B. King, Mayor

Shenandoah County – Jim C. Patrick, Board of Supervisors, District 2
Alternate – George Sylvester, Chair, Water Resources Advisory Committee

Warren County – Tony F. Carter, Chairman, Board of Supervisors, Happy Creek District
Alternate – Dick Magnifico, Assistant County Administrator

City of Waynesboro – To be Appointed

City of Winchester – J. Stephen Bauserman, City Council

Staff
Tom Christoffel, AICP, Senior Planner
Northern Shenandoah Valley Regional Commission

As of October 18, 2006

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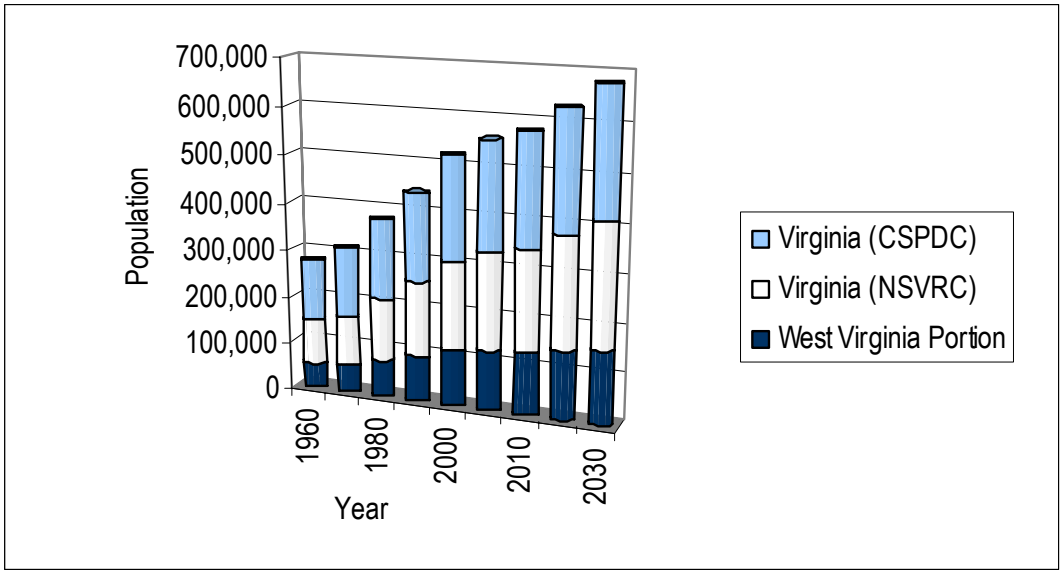
INTRODUCTION TO THE STRATEGIC PLAN

Water has always played a central role in the history of the Shenandoah Valley. Through drought and flood, water has not only shaped the physical landscape, it has shaped the lives of those fortunate enough to call the Shenandoah Valley home. Today, as demand for water grows, so too does the need for a strategic approach to water resources management. In 1960, the Shenandoah Valley planning area (see map on the next page) was home to 277,191 residents. Preliminary estimates for 2005 show that the population has doubled, with 556,974 residents. By the year 2030, the population of the Valley is expected to increase to 678,261.[1][2] This Strategic Plan was developed to provide a framework for local governments and its state, federal, and private non-profit partners to work together towards the long-term protection and use of surface and groundwater resources in the Valley.

Shenandoah Valley Population – Historic and Projected



* CSPDC (Central Shenandoah Planning District Commission) and NSVRC (Northern Shenandoah Valley Regional Commission)

The Shenandoah Valley Water Resources Strategic Plan was developed by the Regional Water Resources Policy Committee (Policy Committee) to meet 12 regional water resources adopted in 2004. These goals are contained in the "Take Care of the Water" Goals Matrix on page 4. The purpose of these goals is to help local decision-makers better focus energy and limited resources as well as to ensure that those responsible for the region's water resources (including government and non-government entities) can synchronize their efforts with the goals embedded in state and federal programs.

The Policy Committee was formed in 2002 by concerned elected officials from the Northern Shenandoah Valley Regional Commission (NSVRC) to begin a broad dialogue among local governments about common water issues. The initial focus was in response to the drought of 1999, which continued through 2002. However, to ensure an integrated approach, the Policy Committee expanded its mission to cover all water

[1] Virginia Employment Commission, State Demographer Projections, 2006.
[2] West Virginia University, Regional Research Institute, West Virginia Population Estimates and Projections, 2006.

resources and invited the participation of upstream and downstream jurisdictions. This made the Policy Committee not only a multi-jurisdictional effort, but a multi-regional and multi-state effort as well. Membership includes: Augusta County; Clarke County; Frederick County; Harrisonburg; Page County; Rockingham County; Staunton; Shenandoah County; Warren County; Waynesboro; and, Winchester in Virginia; and Berkeley County and Jefferson County in West Virginia.

Shenandoah Valley Planning Area

The Policy Committee is supported by the Regional Water Resources Technical Committee (Technical Committee), which is composed primarily of staff from local governments and partnering organizations. The Technical Committee performs research and serves as a forum for in-depth technical discussions. On occasion, the Technical Committee will form ad-hoc subcommittees to deal with specific issues.

While this Strategic Plan represents an important step in water resources protection, it is recognized that progress can only be made if strategies and actions are implemented. As such, this Strategic Plan is a living document – one that should be revisited often, and when necessary, revised and modified. Further, it is also recognized that this Strategic Plan is not all encompassing – nor it is meant to be. Rather, it is meant to focus limited resources in areas where regional cooperation and coordination have the greatest potential to build regional capacity to assist localities in dealing with water resources issues.

REGIONAL WATER RESOURCES GOALS

The Policy Committee recognized that for any plan to be successful, it needed to be goal driven, involve a range of stakeholders, and be based on a sound understanding of available resources. To lay the foundation for the strategic planning process, the Policy Committee first conducted the "Shenandoah Valley Watersheds Policy Integration Assessment." The Assessment was adopted on October 7, 2004 after a year-long data gathering and consensus building process. Among the outcomes of the Assessment was a set of regionally-focused water resources goals. The goal statements form the basis of this Strategic Plan.

The goals developed by the Policy Committee are presented in matrix format on the following page. The goals are divided into "primary goals" and "supporting goals." While all of the goals are inter-related and support the larger concept of "Take Care of the Water" (adopted as the overarching goal statement), the primary goals tend to be physical and measurable, while the supporting goals tend to be more thematic.

Water Resources "Take Care of the Water" Goals Matrix

Primary Goals

WATER SUPPLY SUSTAINABILITY	WATER QUALITY	NATURAL SYSTEMS	PLANNING AND REGIONAL COOPERATION	EDUCATION/ STEWARDSHIP	RECREATIONAL ACCESS
Ensure water supply and demand are kept in balance so that Valley residents, businesses, farms, and aquatic life all have the needed level of sustainable water (ground and surface).	Aggressively achieve the level of water quality (ground and surface) required to support the human, business, and agricultural needs in the Valley, without sacrificing the needs of the watershed's fish and other aquatic life.	Protect and enhance the natural systems that are integral to water resources protection, including: karst geography, floodplains, vegetative buffers, forest and wetlands.	Achieve a broad regional consensus on the direction of water resources policy, planning, and management so that common goals can be achieved and solutions implemented more effectively and cost-efficiently.	Have well informed, conservation-minded citizens, business people, and elected officials that are actively involved in promoting water resources stewardship.	Ensure public access to the Valley's water resources while respecting private property rights and the need to protect water quality.

Actionable Supporting Goals

ECONOMIC ADVANTAGE

Enhance the Valley's economic advantage by protecting and wisely using water resources.

AGRICULTURAL AND OPEN SPACE HERITAGE

Enhance the Valley's agricultural and open space heritage linkage to water resources stewardship.

BUILD ON EXISTING ABILITIES AND RELATIONSHIPS

Strengthen the Valley's ability to address water resources issues by effectively using and adding to the skills of local, regional, state, and national resources.

DATA AND INFORMATION

Provide Valley leaders and citizens alike with accessible, reliable and objective information and scientific data needed to support informed water resources decisions.

FINANCIAL RESOURCES

Provide or obtain the financial resources needed to meet the Valley's water resources goals, continuously prioritizing efforts to maximize the value of each available dollar.

STANDARDS AND REGULATIONS

Optimize the standards and regulatory tools necessary to meet the Valley's water resource protection and planning needs and consistently and equitably enforce these standards and regulations.

STRATEGIES AND ACTIONS

The following strategies and actions were developed by the Policy Committee as practical and realistic measures to help local governments and key partners achieve the region's water resources goals. Strategies and actions were developed over the course of a year using a collaborative consensus building approach described in Appendix A. In developing strategies and actions, the Policy Committee paid particular attention to actions that will allow the region to leverage existing efforts and to seek and obtain state and federal investment.

A summary of strategies is presented on the following page. For each strategy, the Policy Committee has identified objectives, actions, responsible parties, preliminary costs, and time-frames for completion. The initial strategy implementation time-line presented on page 7 is provided as a way to benchmark progress towards meeting regional goals. This timeline is meant to be reviewed annually and to help the Policy Committee to develop an annual work plan and budget request to local governments.

Strategies and Actions Key	
Time Frame: All time frames are provided in fiscal year (July 1 through June 30). The fiscal year is broken into quarters. For instance, the first quarter of Fiscal Year 06-07 is represented as Q1 FY06-07 and would be July 1 through September 30, 2006.	Time frame is described as: ■ Designates a milestone or a due date. ▸ Designates planning and coordination leading up to a milestone or action. ▸ Designates ongoing or potential work after a milestone that depend on a previous action.
Cost: Direct costs are indicated where possible. Many actions rely on staff time, primarily through the Technical Committee, to coordinate activities or to develop recommendations for the Policy Committee.	Staff time is described as: **High** More than 80 hours of estimated cumulative staff time in a fiscal year. **Medium** Between 20 and 80 hours. **Low** Less than 20 hours. For ongoing activities, staff effort may start with one level of effort during start up and change during actual implementation or monitoring.
Responsible Party: Responsible party refers to the organization with primary responsibility for coordinating an effort. Supporting roles may be provided by a number of additional organizations or agencies.	

FUNDING THE STRATEGIC PLAN

Funding for strategy implementation will take place in the form of a new "Shenandoah Valley Water Resources Strategic Plan Fund." It is envisioned that the Policy Committee will make budget requests to participating localities on a per-capita basis based on an annual work plan. The first request will be made to support work in Fiscal Year 2007-2008. Funding will be used to support regional staff, match federal, state, and foundation grants, and hire consultants as deemed necessary and appropriate by the Policy Committee.

Summary of Strategies
Strategy #1 – Meet Virginia DEQ regulatory requirements for water supply planning and similar West Virginia requirements.
Strategy #2 – Establish a regional drought awareness and response system for local governments that allows the timely delivery of conservation awareness messages.
Strategy #3 – Cooperatively build local government tools (model studies, ordinances, policy guidelines, brochures, and similar vehicles) to address mutual water issues in a consistent and cost-effective manner.
Strategy #4 – Develop a "Shenandoah Valley Water Resources Science Plan" to provide decision-makers with the ability to better see how policy actions affect future watershed conditions.
Strategy #5 – Establish partnerships among localities and stakeholders to more effectively pursue financial investments in water quality by state, public, and private and non-profit sectors.
Strategy #6 – Make existing laws more effective through an integrated approach to coordinating enforcement and reporting enforcement actions in a visible manner.
Strategy #7 – Develop a better picture of short and long-term water quality trends and how water quality affects production costs for municipal and individual water supply.
Strategy #8 – Develop and communicate a regionally consistent education and outreach plan that links issues to easily implementable acts of stewardship.
Strategy #9 – Engage more local and regional elected officials and decision-makers in the process of meeting the region's water resources challenges.
Strategy #10 – Further develop "greenways/green space" as a regional water quality tool and develop ways to help localities incorporate these concepts into plans and policies.
Strategy #11 – Develop a marketing strategy that creates economic incentives for agriculture, rural businesses (including ecotourism), industry, and local communities to practice water stewardship.

Strategy Implementation Time Line

Strategy/Action	FY 06-07				FY 07-08				FY 08-09				FY 09-10				FY 10-11			
Strategy #1	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1: Water Supply Planning Workshop			■																	
2: Regional Water Supply Plan Scope of Work			■																	
Phase I (Data and Projections)					▸	▸	▸	■												
Phase II (Drought Response Plan)									▸	▸	▸	■								
Phase III (Statement of Need)													▸	▸	▸	■				
3: Letters of Intent to Plan Regionally						■														
Strategy #2	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1: Adopt Drought Response Plan					▸	▸	▸	▸	▸	▸	▸	■								
2: Regional Press Release Protocol									▸	▸	▸	■								
3: Identify Education Materials							▸	■												
4: Education Materials Scope of Work									▸	■										
5: Water Supply Web Portal			▸	▸	▸	■														
6: Consider Regional Conservation Plan												■	▸	▸	▸	▸	▸	▸	▸	▸
Strategy #3	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1: Assess Need for Cooperative Tools					■	▸	▸	▸	▸	▸	▸	▸	▸	▸	▸	▸	▸	▸	▸	▸
Strategy #4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1: Develop Water Resources Science Plan – Science Valley			▸	▸	▸	▸	▸	▸	■											
Strategy #5	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1: Legislative Priority Development					■				■				■				■			
2: Executive Budget Requests					■				■				■				■			
3: Coordination with Northern Virginia RC					■				■				■				■			
Strategy #6	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1: Stewardship Recognition Program									▸	▸	▸	■								
2: Environmental Enforcement Media Strategy									▸	▸	▸	■								
3: Strengthen Illicit Discharge Reporting									▸	▸	▸	■								
Strategy #7	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1: USGS Continuous Monitoring Funding			■																	
2: Strategy to Enhance Volunteer Monitoring					▸	▸	▸	■												

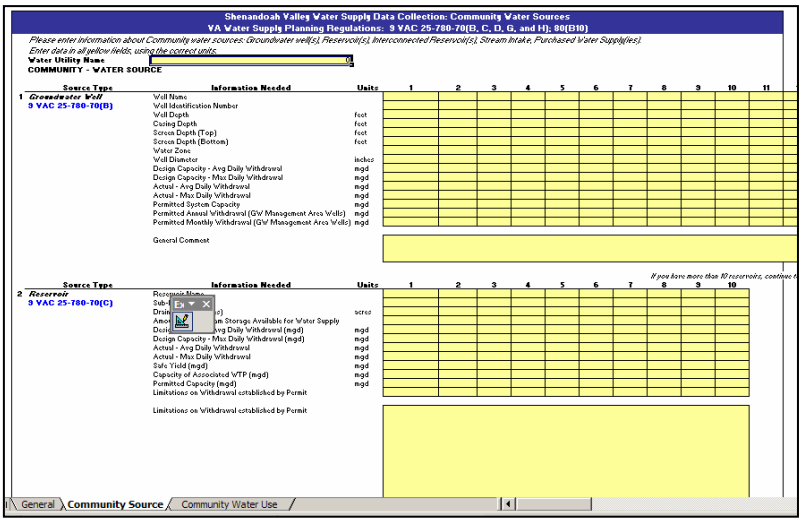
Strategy Implementation Time Line

Strategy/Action	FY 06-07				FY 07-08				FY 08-09				FY 09-10				FY 10-11			
Strategy #8	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1: Regional Education and Outreach Program									▶	▶	▶	■	▶	▶	▶	▶	▶	▶	▶	▶
Strategy #9	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1: Strategic Plan Adoption			■																	
2: Long-Term Staffing and Budget Plan					▶	■														
3: Encourage Local Water Resources Committees					▶	■														
Strategy #10	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1: Support Regional Greenway Efforts			▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶
2: Shenandoah Valley Green Space Vision									■											
Strategy #11	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1: Strengthen Existing Certification Programs									▶	■										
2: Examine Need for New Programs									▶	■										
3: Consider Shenandoah Valley Market Branding Strategy																	▶	▶	▶	■

Strategy #1 – Meet Virginia DEQ regulatory requirements for water supply planning and similar West Virginia requirements.

Notes:

- This strategy builds on an existing commitment to develop a regional water supply plan to meet the Virginia Local and Regional Water Supply Planning Regulations. Work already completed in FY 2006-2007 includes the development of an initial water supply planning database in Access© format reflecting the VDEQ listed requirements, the creation of local government/utility input spreadsheets in Excel© format, and continued coordination with VDEQ as it further defines state-wide data requirements. Efforts to-date have been funded by local governments and The Agua Fund, and were supplemented by VDEQ competitive grants.



Water Supply Plan Data Collection Spreadsheet

- If done regionally, this strategy must be achieved in Virginia no later than November 2011. **Notice of intent to coordinate regionally must be submitted to VDEQ by November 2008.**

- The strategy should maximize the use of available VDEQ and related grants. For FY 2006-2007, VDEQ grants ranged from $20,000 for a single water utility to $50,000 for a regional data collection effort. **The deadline for the next VDEQ grant application is June 2007.**

- The strategy utilizes local staff to the extent possible through the Technical Committee and through the Planning District Commissions.

Objectives	Actions	Details
Maintain the existing cooperative water supply planning effort for the Shenandoah Valley region with completion before 2011.	**1: Water Supply Planning Workshop.** Conduct a regional water supply planning workshop after the Strategic Plan is adopted by the RWRPC to help the region move forward with a coordinated plan. VDEQ has offered to provide the technical presentations.	**Responsible Party:** NSVRC and CSPDC (invitations and meeting logistics) with support from VDEQ (presentations and materials). **Cost:** Staff Time Low (NSVRC and CSPDC). **Time-Line:** Complete by Q3 FY06-07.

Objectives	Actions	Details
	2: Regional Water Supply Plan Scope of Work. Finalize a regional water supply work plan that builds on existing regional data collection efforts. The three remaining phases of implementation include: ▪ Phase I: Complete data collection for remaining localities (9VAC25-780-80 and 9VAC25-780-90), project water demand (9VAC25-780-100), and collect information on water demand management (9VAC25-780-110). ▪ Phase II: Adopt a drought response and contingency plan (9VAC25-780-120). See Strategy #2. ▪ Phase III: Develop a statement of need and analysis of alternatives (9VAC25-780-130).	**Responsible Party:** NSVRC and CSPDC. **Cost:** Staff Time High (contract management by NSVRC, RWRTC involvement, data collection and plan review by local staff). Direct cost is variable, especially for Phase III, which depends on whether the statement of need suggests a more in-depth analysis. The cost of work plan development is expected to be borne by the consultant. For benchmarking purposes, the Region 2000 Regional Commission (Lynchburg area) has estimated a total plan cost of approximately $350,000. However, this includes starting from the beginning with data collection and model development and also includes the drought response element (which is being coordinated through the RWRTC). Costs are based on preliminary estimates: ▪ Phase I approximately $108,000. ▪ Phase II see Strategy #2. ▪ Phase III approximately $96,000. **Time-Line:** Complete work plan by Q3 FY06-07. Estimated plan completion is as follows: ▪ Phase I: Complete by Q4 FY07-08. ▪ Phase II: Complete by Q4 FY08-09 (see Strategy #2) ▪ Phase III: Complete by Q4 FY09-10.
	3: Letters of Intent to Plan Regionally. Secure letters of intent to participate in the regional planning process from all localities involved.	**Responsible Party:** NSVRC and CSPDC, working with individual local governments. **Cost:** Staff Time Moderate (NSVRC and CSPDC). **Time-Line:** Complete by Q2 FY08-09.

Strategy #2 – Establish a regional drought awareness and response system for local governments that allows the timely delivery of conservation awareness messages.

Notes:

- This strategy builds on existing work being conducted through the Technical Committee, which has developed a draft Low Flow/Drought Response Plan for the Shenandoah River Basin. The draft plan is part of the longer-term effort to comply with Virginia water supply planning regulations (9VAC25-780-120). The draft plan presents a framework for determining drought response stages (normal, watch, warning, and emergency) and the voluntary and mandatory restrictions associated with each stage.

- A 2006 report by Virginia Tech entitled "Special Report on the Effectiveness of Drought Management Programs in Reducing Residential Water-Use in Virginia" attempts to quantify the effectiveness of voluntary and mandatory water restrictions in reducing demand. In summary, the study found that estimates cited in the Virginia water supply regulations (5-10% reductions in water-use for voluntary restrictions and 10-15% reductions in water-use for mandatory restrictions) are within the range of possible reductions. However, they are only achieved with significant efforts on the part of local water suppliers to disseminate information and enforce program provisions.

Objectives	Actions	Details
Develop a cooperative inter-jurisdictional drought response agreement that meet's the Virginia water supply planning regulations three phases: watch, warning, and emergency.	**1: Adopt Drought Response and Contingency Plan.** Continue process of reviewing and moving towards adoption of the Technical Committee Drought Response Plan.	**Responsible Party:** RWRTC. **Cost:** Staff Time High (RWRTC). **Time-Line:** Complete by Q4 FY08-09.
Work with local media and stakeholder organizations for the timely delivery of water and climate metrics related to drought conditions.	**2: Regional Press Release Protocol.** Identify local media outlets and develop agreements/protocols on how to publicize drought response under different circumstances.	**Responsible Party:** NSVRC and CSPDC. **Cost:** Staff Time Moderate (NSVRC and CSPDC). **Time-Line:** Complete by Q4 FY08-09.
Cooperatively develop water conservation education materials.	**3: Identify Education Materials.** Work with VDEQ and WVDEP to identify public education and outreach materials for replication.	**Responsible Party:** RWRTC and Pure Water Forum. **Cost:** Staff Time Low. **Time-Line:** Complete by Q4 FY07-08.
	4: Education and Outreach Materials Scope of Work. Develop a scope of work for customizing education/outreach materials for the region or by locality. Apply for appropriate state, federal, or private grants.	**Responsible Party:** RWRTC and Pure Water Forum. **Cost:** Staff Time Moderate. **Time-Line:** Complete by Q2 FY08-09.

Objectives	Actions	Details
Develop a regional drought awareness/information web portal to provide information to both localities and citizens.	**5: Water Supply Web Portal.** Form an ad-hoc subcommittee to pursue the development of a water supply/drought information web portal similar to that developed by the Pennsylvania Department of Environmental Protection. Fund initial effort through grant proposal. Use the subcommittee to determine how to pay for and coordinate long-term web portal maintenance.	**Responsible Party:** RWRTC and Pure Water Forum. **Cost:** Staff Time High. Direct cost approximately $70,000 for initial development plus yearly maintenance fees and staff time. **Time-Line:** Form ad-hoc subcommittee by Q3 FY06-07. Complete work by Q2 FY07-08.
If required, work with stakeholders to develop and mobilize a year around Shenandoah Valley water stewardship/conservation ethic program for citizens and visitors.	**6: Regional Water Conservation Plan.** The scope and necessity of this approach is contingent on the Statement of Needs produced from Phase I of the Water Supply Plan (Strategy #1). Overall water conservation is one of the alternatives that must be evaluated under the regulations if demand outstrips supply. Because of this, the timeframe for discussion would be after FY2008 (after forecasting) and before FY2010 (alternatives analysis). Based on this information, a scope of work for a regional water conservation plan could be developed. Example components from the Metropolitan Washington Council of Government's "Water Wise Use Campaign" are: ▪ Broadcast Media (Radio) ▪ School-Based Education and Outreach ▪ Transit Ads ▪ Partnership Development (Food Chains, Builders, Building Suppliers) ▪ Theater Slides ▪ Campaign Implementation (Staff) ▪ Product Purchases	**Responsible Party:** RWRPC to coordinate with Pure Water Forum and ICPRB. Determine the role of Soil and Water Conservation Districts. **Cost:** Staff Time High. Direct costs will be variable. An example program is the Metropolitan Washington Council of Government's "Water Wise Use Campaign." Annual work plan costs are approximately $123,000, including media buys, staff time, and material purchases. $25,000 of that amount is from a VDEQ grant. Media costs in the Washington region are considerably higher than in the Valley. **Time-Line:** Consider in Q4 FY08-09.

Strategy #3 – Cooperatively build local government tools (model studies, ordinances, policy guidelines, brochures, and similar vehicles) to address mutual water issues in a consistent and cost-effective manner.

Notes:

- This strategy has the potential to apply to a number of objectives and actions. The U.S. EPA's Smart Growth web site provides a starting point in the areas of innovative ordinances, creating partnerships, open space, and funding structures.

Objectives	Actions	Details
Develop tools on an as needed basis. Potential examples include: ▪ A model ordinance for local governments to adopt for the mandatory restriction phase of the drought management agreement. ▪ A model ordinance to meet pending Virginia stormwater management regulatory requirements. ▪ Water conservation public education and outreach materials.	**1: Continuously Assess Need for Cooperative Tools.** Create a subcommittee that will study potential model tools on a case-by-case basis and make recommendations for when the cooperative development of tools may be appropriate.	**Responsible Party:** RWRTC. **Cost:** Staff Time Moderate. Direct costs are variable depending on efforts selected for cooperation. Some efforts may require hiring a consultant, while others may involve researching and highlighting existing efforts. **Time-Line:** Form subcommittee by Q1 FY07-08. Recommendation process ongoing.

Strategy #4 – Develop a "Shenandoah Valley Water Resources Science Plan" to provide decision-makers with the ability to better see how policy actions affect future watershed conditions.

Notes:

- The Policy Committee developed a list of science questions in 2005, which were directed to the USGS Office of the Regional Director in West Virginia. Questions focused on better understanding groundwater pollution, defining groundwater budgets, establishing the interrelationship between stream flow and groundwater flow, and the potential for deepwater reservoirs as either a source of water or as a storage area.

- The existing SHENAIR cooperative process is a potential model for moving forward with a Shenandoah Valley Water Resources Science Plan. In addition, there is a strong linkage between air and water quality, with nearly 30% of nitrogen pollution in the Chesapeake Bay being attributable to air deposition.

- Local funds (Frederick, Clarke, Warren, Jefferson, and Berkeley) have been leveraged in the past for conducting scientific research.

- The Technical Committee is taking advantage of potential opportunities as they arise and plays a lead role in coordinating with the USGS, state and federal agencies, and other potential stakeholders.

Objectives	Actions	Details
Cooperatively develop a regional Water Resources Science Plan.	**1: Pursue Water Resources Science Plan.** Collaborate with state and federal regional partners to develop the synergy needed to pursue a Water Resources Science Plan. Focus on federal partners, including USGS, NRCS, NOAA and others involved in the Great Valley Water Resources Science Forum. Use the Policy Committee as a means of encouraging the development of proposals. An example is the Foundation for Earth Science Water Cluster's interest in developing a "Shenandoah-Opequon Virginia-West Virginia Critical Zone Observatory" proposal to the National Science Foundation for answering Policy Committee science questions.	**Responsible Party:** RWRPC and RWRTC. **Cost:** Staff Time High (RWRTC). The primary focus of RWRTC efforts should be to seek federal or state investment without direct local government funding. Staff resources will be involved as in-kind or to coordinate proposal development. Agua Fund resources may be requested for this planning effort. **Time-Line:** Ongoing. Target date for securing funding Q1 FY08-09.

Strategy #5 – Establish partnerships among localities and stakeholders to more effectively pursue financial investments in water quality by state, public, and private and non-profit sectors.

Objectives	Actions	Details
Ensure that key water resources legislative issues are incorporated into the legislative agendas for the NSVRC and the CSPDC with follow-up for inclusion in state agency budgets.	**1: Legislative Priority Development.** Annually present RWRPC legislative priorities to the NSVRC and the CSPDC. **2: Executive Budget Requests.** Determine budget related requests early and send an annual letter to the Governor requesting that items be placed in the introduced budget. Include the Shenandoah Valley delegation on the distribution list.	**Responsible Party:** NSVRC and CSPDC. **Cost:** Staff Time Low. **Time-Line:** Q1 FY07-08 and annually thereafter.
Consider developing an annual legislative program that can be shared with other regions, including Northern Virginia, in order to establish common ground on water resources funding issues.	**3: Coordination with Northern Virginia Regional Commission.** Request to meet with Northern Virginia Regional Commission to discuss opportunities for joint legislative/budget efforts. If successful, continue this dialogue on an ongoing basis.	**Responsible Party:** NSVRC and CSPDC. **Cost:** Staff Time Moderate. **Time-Line:** Q1 FY 07-08 and potentially annually thereafter.

Strategy #6 – Make existing laws more effective through an integrated approach to coordinating enforcement and reporting enforcement actions in a visible manner.

Objectives	Actions	Details
Support recognition programs for groups/individuals who have "cleaned-up after other people's messes."	**1: Stewardship Recognition Program.** Encourage the Pure Water Forum to take the lead in developing a recognition program, including mission, goals, guidelines, nomination process, etc. Provide support as needed.	**Responsible Party:** Pure Water Forum. **Cost:** Staff Time High (if implemented). **Time-Line:** Complete consideration by Q4 FY08-09.
Consider a regional media strategy for highlighting environmental enforcement actions.	**2: Environmental Enforcement Media Strategy.** Encourage the Pure Water Forum to develop a regional media strategy and to engage in message development.	**Responsible Party:** Pure Water Forum. **Cost:** Staff Time High (if implemented). **Time-Line:** Complete consideration by Q4 FY08-09.
Provide better education and outreach on existing ways to report illicit/illegal discharges.	**3: Strengthen Illicit Discharge Reporting.** Establish an ad-hoc subcommittee to determine how existing hot lines can be better utilized and publicized (for instance, a shared web site). Partners should include the Virginia Department of Environmental Quality, the West Virginia Department of Environmental Protection, the River Keeper program and the Health Department. An example is the State of Maryland's "Chesapeake Bay Safety and Environmental Hotline" established in 2005. It is a one-stop-shop for issues dealing with algae blooms, floating debris, sewer leaks, hazardous spills, wetland violations, and other suspicious activity. The program is run through the MDE.	**Responsible Party:** RWRTC. **Cost:** Staff time High. **Time-Line:** Begin in Q1 FY08-09 and report findings in Q4 FY08-09.

Strategy #7 – Develop a better picture of short and long-term water quality trends and how water quality affects production costs for municipal and individual water supply.

Objectives	Actions	Details
Secure funds to continue existing continuous monitoring being performed by the USGS as a result of the fish kill.	**1: USGS Continuous Monitoring Funding.** Develop a strategy for securing continuous monitoring funding, including official communications from the RWRPC.	**Responsible Party:** RWRPC.
		Cost: Staff Time Minimum.
		Time-Line: Complete by Q3 FY06-07.
Enhance the ability of Virginia and West Virginia to fully utilize volunteer water quality monitoring data.	**2: Enhance Volunteer Monitoring.** Establish an ad-hoc subcommittee to assess the status of existing efforts and what actions and resources are needed to enhance volunteer monitoring.	**Responsible Party:** RWRTC.
		Cost: Staff Time Moderate.
		Time-Line: Complete recommendations by 4Q FY 07-08.

Strategy #8 – Develop and communicate a regionally consistent education and outreach plan that links issues to easily implementable acts of stewardship.

Notes:

- The Policy Committee determined that it is not the best entity to implement this strategy. Rather, the Policy Committee will help by endorsing the program and helping to secure funding. The Pure Water Forum is one potential implementation partner.

- The Cuyahoga River Plan in Pennsylvania has been cited as a potential model for public education and outreach. More information can be found at http://www.cuyahogariverrap.org.

- Another potential model is NBC News Channel 4 (Washington D.C.), which incorporated watershed education into the nightly weather forecast. The effort by the National Environmental Education and Training Foundation, Stormcenter Communications, U.S. EPA, the National Ocean Service, the United States Forest Service, several foundations and others was a collaborative project to employ local TV weather reports as a means to teach people about watersheds and to raise the environmental awareness. More information can be found at http://wrc.iewatershed.com.

<table>
<tr><th>Objectives</th><th>Actions</th><th>Details</th></tr>
<tr><td rowspan="3">Engage the services of a media consultant to develop a Valley-specific message, or set of messages, that can be used by localities and stakeholders.</td><td rowspan="3">1: Regional Education and Outreach Plan. Establish a ad-hoc subcommittee to work with the Pure Water Forum to develop a comprehensive education and outreach strategy.</td><td>Responsible Parties: RWRPC with the Pure Water Forum and Soil and Water Conservation Districts.</td></tr>
<tr><td>Cost: Staff Time High.

Direct costs will vary considerably depending on the plan. Any plan should also result in a scope of work that can be submitted to potential state and federal granting agencies.</td></tr>
<tr><td>Time-Line: Provide report and findings by Q4 FY08-09.</td></tr>
<tr><td>Create and deliver a simple media strategy using existing outlets, including the use of press releases, etc.</td><td colspan="2">Same as above.</td></tr>
<tr><td>Develop Valley specific resource materials for teachers to meet the natural resources SOLs in a way that has a local water context and encourages the pursuit of careers in science.</td><td colspan="2">Same as above.</td></tr>
</table>

Objectives	Actions	Details
Utilize the education pamphlets and brochures of Page County and Shenandoah County as models for other Shenandoah Valley communities.	Same as above.	
Develop a goal statement, scope of work, and budget for a regional education and outreach program. Package this in a generic proposal format that can be used to apply for grant funding.	Same as above.	
In partnership with local and regional faith community, develop a "Faith Based Stewardship" program that outlines how to integrate stewardship into faith-based teachings.	Same as above.	
Develop a "teach the teachers" program that provides hands-on experience for teaching the natural resources SOLs in a Valley-specific manner.	Same as above.	

Strategy #9 – Engage more local and regional elected officials and decision makers in the process of meeting the region's water resources challenges.

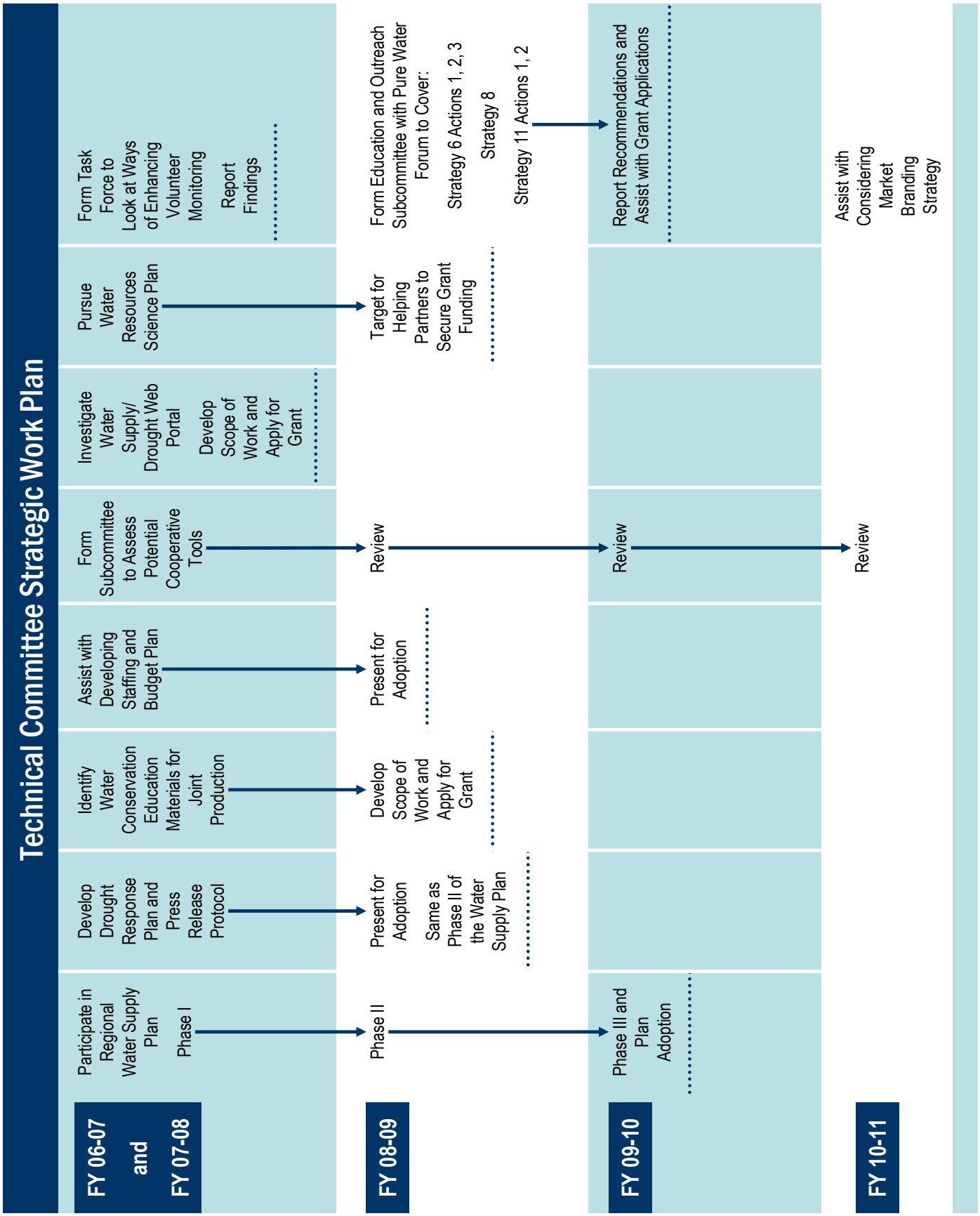
Objectives	Actions	Details
Localities approve the Strategic Plan as the regional framework for long-term water resources planning.	**1: Strategic Plan Adoption.** Present Strategic Plan results to localities and request endorsement and funding. Pursue adopting resolutions by the NSVRC and the CSPDC.	**Responsible Party:** RWRPC, NSVRC, and CSPDC. **Cost:** Staff Time Moderate. **Time-Line:** Q3 FY06-07.
Establish a "budget plan" that incorporates existing plans, such as the South Fork Instream Flow and Water Supply Plan needs, as well as related new strategies.	**2: Long-Term Staffing and Budget Plan.** Establish an ad-hoc subcommittee to assess the "cumulative" impacts of staff demands on the NSVRC and the CSPDC. Focus on work-displacement caused by new RWRPC initiatives.	**Responsible Party:** RWRTC. **Cost:** Staff Time Moderate. **Time-Line:** Complete by Q2 FY07-08.
Encourage the establishment of local water resources committees, such as those in Shenandoah and Page counties, which include stakeholders as a means of expanding resources and knowledge for local elected officials.	**3: Local Water Resource Committees.** Communicate from the RWRPC to localities what Page and Shenandoah counties have done and encourage replication of water resources committees by other localities.	**Responsible Party:** RWRPC. **Cost:** Staff Time Low. **Time-Line:** Q2 FY07-08.

Strategy #10 – Further develop "greenways/green space" as a regional water quality tool and develop ways to help localities incorporate these concepts into plans and policies.

Objectives	Actions	Details
Provide support to local efforts and the efforts of non-profits to enhance greenways/green space as a regional water quality tool. To take care of the water, the Policy Committee has recognized that it is wise to take care of the land.	**1: Support Regional Greenway/Green Space Efforts.** Provide ongoing support and encouragement for regional greenway/green space efforts.	**Responsible Party:** RWRPC. **Cost:** Staff Time Low. **Time-Line:** Ongoing.
Propose consideration of a "Shenandoah Valley Green Space Vision" planning process to consider linkages between economic vitality and quality of life.	**2: Shenandoah Valley Green Space Vision.** Work with the Valley Conservation Council and/or other organizations to express interest in pursuing a regional green space vision. Establish the feasibility of such an effort.	**Responsible Party:** RWRPC and VCC. **Cost:** Staff Time Low. **Time-Line:** Report findings by Q1 FY08-09.

Strategy #11 – Develop a marketing strategy that creates economic incentives for agriculture, rural businesses (including ecotourism), industry, and local communities to practice water stewardship.

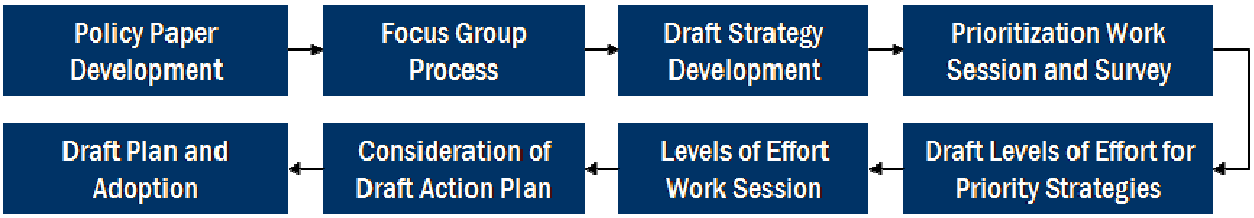
Objectives	Actions	Details
Encourage DCR, DEQ and related State economic development agencies to develop a strategy for more effectively promoting businesses and farms that are certified under existing water quality programs such as environmentally friendly lawn care and the Clean Farm Awards.	**1: Strengthen Existing Certification Programs.** Form ad-hoc committee of RWRPC Technical Committee members and stakeholders to work with DEQ and DCR. The Northern Virginia Regional Commission was awarded a grant in of $15,000 to better publicize DCR's Environmentally Friendly Lawn Care Companies list.	**Responsible Party:** RWRTC. **Cost:** Staff Time Moderate. **Time-Line:** Report by Q2 FY08-09.
Assess areas where additional certifications are needed and work with DCR and DEQ to establish new certification programs. Develop a state/regional strategy for promoting these businesses or farms.	**2: Examine Need for New Certification Programs.** Form ad-hoc committee of RWRPC Technical Committee members and stakeholders to work with DEQ and DCR.	**Responsible Party:** RWRTC. **Cost:** Staff Time Moderate. **Time-Line:** Report by Q2 FY08-09.
Create a larger market branding strategy for Valley products, similar to the Made in Virginia branding strategy. Only products that engage in water-wise practices can participate.	**3: Consider Shenandoah Valley Market Branding Strategy.** Consider this a long-term strategy for consideration by the RWRPC.	**Responsible Party:** RWRPC. **Cost:** Staff Time High. **Time-Line:** Consider in FY10-11.


Technical Committee Strategic Work Plan
FY 06-07 and FY 07-08
Participate in Regional Water Supply Plan
Phase I
Develop Drought Response Plan and Press Release Protocol
Identify Water Conservation Education Materials for Joint Production
Assist with Developing Staffing and Budget Plan
Form Subcommittee to Assess Potential Cooperative Tools
Investigate Water Supply/ Drought Web Portal
Develop Scope of Work and Apply for Grant
Pursue Water Resources Science Plan
Form Task Force to Look at Ways of Enhancing Volunteer Monitoring
Report Findings
FY 08-09
Phase II
Present for Adoption
Same as Phase II of the Water Supply Plan
Develop Scope of Work and Apply for Grant
Present for Adoption
Review
Target for Helping Partners to Secure Grant Funding
Form Education and Outreach Subcommittee with Pure Water Forum to Cover:
Strategy 6 Actions 1, 2, 3
Strategy 8
Strategy 11 Actions 1, 2
FY 09-10
Phase III and Plan Adoption
Review
Report Recommendations and Assist with Grant Applications
FY 10-11
Review
Assist with Considering Market Branding Strategy

APPENDICES

APPENDIX A – STRATEGIC PLANNING PROCESS

The Strategic Plan builds on the water resources goals and was developed using a collaborative process over the course of a year – beginning with a Policy Committee kick-off meeting on November 16, 2005. Overall, the process consisted of input from over 60 dedicated members of the regional community representing a wide range of backgrounds and experience. The process consisted of the following steps.



To set the stage for discussions, AMEC developed six technical papers for review by the Policy Committee, Technical Committee, and stakeholders. Each paper addressed one of the primary water resources goals. The purpose of the papers was to provide an overview of key drivers, existing efforts, and relevant trends that would serve as the basis for focus groups with state, federal, non-profit, and private partners. The draft papers were provided to the Policy Committee at the January 18, 2006 meeting for review and adopted on June 21, 2006. The papers are summarized in Appendix D.

Focus Groups and Strategy Prioritization

To develop preliminary strategies, AMEC facilitated three focus groups in late May and early June 2006. Each meeting dealt with two primary goals and had from five to 20 participants. Participant were asked to focus on the question of how to achieve the water resources goals within a regional context.

Focus Group Process

The Policy Committee discussed the results and further refined focus group ideas on June 21, 2006. At the end of the meeting, 29 potential strategies were presented for prioritization. Prioritization was seen as key to the successful implementation of the Strategic Plan so that the Policy Committee could focus energy in a resource-limited environment. To assist with the prioritization process, AMEC developed an electronic survey for distribution to Policy Committee members as well as stakeholders and interested partners.

The Policy Committee developed the following criteria to help guide the prioritization process:

- Is the strategy appropriate to monitor and/or coordinate at the regional level?
- Does the strategy respect local government sovereignty?
- Is the strategy actionable and can responsibility be assigned?

- Can the strategy achieve a high level of result for a relatively small investment?
- Does the strategy move the region forward and will it be accepted by both citizens and elected officials?
- Is the strategy financially feasible?
- Is the strategy based on sound science and/or information?

Thirty-six responses were received, including six from Policy Committee members, four from members of local boards and commissions, 14 from state, local, federal, and regional staff, and 12 from private non-profits and individual citizens. Rankings and comments were considered at a Policy Committee work session held on July 19, 2006. The result of that work session was 11 prioritized strategies. It is important to note that removal of strategies from consideration didn't necessarily mean a rejection of the strategy, but rather reflected a need to focus on a relatively small number of strategies to maximize the potential for success in implementation.

Action Plan Development

Once the process of identifying strategies was complete, the Policy Committee began identifying implementation actions. AMEC developed potential objectives for each strategy to provide a starting point for the discussion. Objectives were divided into different "levels of effort" depending on how aggressively the Policy Committee wished to pursue the strategy. The levels of effort (base, medium, or high) were not an indication of whether something was a priority, but rather an indication of the Policy Committee's capacity to tackle a specific strategy in the short or mid-term.

Action Plan Work Session

At its August 16, 2006 meeting, the Policy Committee discussed the levels of effort and indicated the level most appropriate (if any) for each strategy. In some instances, the Policy Committee felt that none of the levels of effort were appropriate or feasible, in which case, the Policy Committee either considered other actions or removed the strategy from the priority list.

Based on that feedback, draft actions were refined and assigned accountabilities, time-lines, and planning level costs. A final draft strategy matrix was reviewed at a work session on September 20, 2006 and final recommendations were made for review by the Policy Committee. The final Strategic Plan was approved by the Policy Committee on October 18, 2006 and submitted to local governments for endorsement and participation.

APPENDIX B – TECHNICAL COMMITTEE AND STAKEHOLDER PARTICIPANTS

Regional Water Resources Technical Committee
Chair, Alison Teetor
Vice Chair, Doug Stanley

NOTE: This Committee expanded from the Minimum Instream Flow Technical Committee to meet the needs of the Policy Committee. It continues to support Instream Flow work, with additional subcommittees for: Water Supply Planning; Low Flow/Drought Onset Framework; and, Science Plan Development. Subcommittees are staffed by Tom Christoffel, NSVRC.

Ken Fanfoni	Augusta Service Authority
Mike Collins	City of Harrisonburg
Tom Sliwoski	City of Staunton
Brian McReynolds	City of Waynesboro
Dale Lehnig - Resigned	City of Winchester
Frank Sanders - Resigned	City of Winchester
Perry Eisenach	City of Winchester
Alison Teetor	County of Clarke
Chris Anderson	County of Page
Elina Apostolatova	County of Rockingham
Warren Heidt	County of Rockingham
Rob Kinsley	County of Shenandoah
George Sylvester	County of Shenandoah - Water Committee
Ray Brownfield	County of Shenandoah - Water Committee
Bud Griswold	County of Shenandoah - Water Committee
Doug Stanley	County of Warren
Carl Luebben	Farm Bureau
D.S. Braden	Frederick County Sanitation Authority
Wellington H. Jones	Frederick County Sanitation Authority
Mary Gessner	Friends of the North Fork
Meredith Sine	Friends of the North Fork
Bud Naglevoort	Friends of the Shenandoah River
Charles Newton	Page County Water Quality Advisory Committee
Jim Giraytys	SHENAIR
Trace Noel	Shenandoah River Trips - Outfitters Representative
Jim Lawrence	The Opequon Watershed
David Tyrrell	Town of Berryville
Ron Tewalt	Town of Strasburg
James Didawick	Town of Woodstock

Water Supply Subcommittee
Chair, Frank Sanders – Resigned
Vice Chair, Ken Fanfoni

NOTE: The Water Supply Subcommittee was organized to work on Water Supply elements. Its meetings were part of the Technical Committee during Strategic Plan development.

Jennifer Hoover	Augusta Service Authority
Ken Fanfoni	Augusta Service Authority
Mike Collins	City of Harrisonburg
Chris DeWald - Resigned	City of Staunton
Ned Davis	City of Staunton
Tom Sliwoski	City of Staunton
Brian McReynolds	City of Waynesboro
Dale Lehnig - Resigned	City of Winchester
Frank Sanders - Resigned	City of Winchester
Perry Eisenach	City of Winchester
Alison Teetor	County of Clarke
Elina Apostolatova	County of Rockingham
Warren Heidt	County of Rockingham
George Sylvester	County of Shenandoah - Water Committee
D.S. Braden	Frederick County Sanitation Authority
Wellington H. Jones	Frederick County Sanitation Authority
Sue Lawton	Jefferson County Public Service District
Rodney McClain	Shenandoah County Sanitary Districts
David Tyrrell	Town of Berryville
Bob Holton	Town of Bridgewater
Kyle D. O'Brien	Town of Broadway
Rick Chandler	Town of Dayton
Dan Harshman	Town of Edinburg
Richard Wadkins	Town of Edinburg
Bill Kuser	Town of Front Royal
Joe Waltz	Town of Front Royal
Timothy Crider	Town of Grottoes
Rick Black	Town of Luray
Charlie Moore	Town of Mt. Jackson
Evan Vass	Town of New Market
Larry Dovel	Town of Shenandoah
Terry Pettit	Town of Stanley
Mike Kehoe	Town of Stephens City
Kevin Fauber	Town of Strasburg
Larry Bradford	Town of Woodstock

Low Flow/Drought Onset Framework Subcommittee
Chair, Alison Teetor

Alison Teetor	County of Clarke
Charles Newton	Page County Water Quality Advisory Committee
Dale Lehnig - Resigned	City of Winchester
Frank Sanders - Resigned	City of Winchester
Jim Cummins	Interstate Commission on the Potomac River Basin
Jim Giraytys	SHENAIR
Ken Fanfoni	Augusta Service Authority
Mike Collins	City of Harrisonburg

Science Plan Development Subcommittee
Chair, Dr. Don Orth

Richard Marzolf	Friends of the Shenandoah River
Jim Cummins	Interstate Commission on the Potomac River Basin
Jim Giraytys	SHENAIR
Lowell Smith	SHENAIR
Jim McNeal	U.S. Geological Society
Dr. Don Orth	Virginia Tech

Stakeholder Organizations and Individuals

NOTE: The following individuals and organizations were represented during the process and contributed with direct participation or review of policy papers and documents.

Joe Hankins	Fresh Water Institute
Michael Schwartz	Fresh Water Institute
Bill Gaidos	Friends of the North Fork
Karey Mullins	Friends of the North Fork
Leslie Watson	Friends of the North Fork
Charles Vandervoort	Friends of the Shenandoah River
Milton Boyce	Friends of the Shenandoah River
Karen Andersen	Friends of the Shenandoah River
Richard Marzolf	Friends of the Shenandoah River
Heather Richards	Potomac Conservancy
Kelly McDaniel	Potomac Conservancy
Julie & Paul Clevenger	Preserve Frederick
Bruce Lundeen	Pure Water Forum
Kary Phillips	Pure Water Forum
Tom Benzing	Pure Water Forum
Beverley Fleming	Regional Commission - Shenandoah County
Dick Hoover	Regional Commission - Warren County
John Vance	Regional Commission - Warren County

Lowell Smith	SHENAIR
Lyn Bement	Shenandoah River Sojourn
Jeff Kelble	Shenandoah Riverkeeper
Pat Gochenour	Social Action - United Methodist Women
Rob Arner	Stakeholder
Sara Hollberg	Valley Conservation Council
John Eckman	Valley Conservation Council
Nancy Carr	Virginia Rural Water Association

River Use Committee

Chair, Randy Sprouse
Vice Chair, Tom McFillen
Secretary, Jacqueline Leggett

NOTE: The River Use Committee is composed of local government appointees from the counties of Clarke, Page, and Warren. The purpose of the committee was to take the "Shenandoah River Recreational Use Management Plan Working Committee Report" of March 2001 and produce an action plan. The committee published its report, "Shenandoah Valley River Use – Floating and Fishing: An Action Plan for Recreational Access to and Stewardship of Water Resources," on May 3, 2006. The proposals in this action plan support the Strategic Plan's recreational access goal.

Joe Clotzman	County of Clarke
Randy Sprouse	County of Clarke
Tom McFillen	County of Clarke
Jim Tebbetts	County of Clarke
Alan Eldridge	County of Page
Cara Sottosanti	County of Page
Dane Buse	County of Page
Dot Donato	County of Page
Meryl Christiansen	County of Warren
Jacqueline Leggett	County of Warren
Chris Manion	County of Warren
Trace Noel	County of Warren

Resource Agencies and Organizations

NOTE: The following individuals and organizations were represented during the process and contributed with direct participation or review of policy papers and documents.

John Giles - Resigned	Central Shenandoah Planning District Commission
Ray Griffin	Central Shenandoah Planning District Commission
Steve Kerr	Northern Shenandoah Valley Regional Commission
Carol Runkle	Department of Conservation & Recreation
Jim Echols	Department of Conservation & Recreation
Kelly Vanover	Department of Conservation & Recreation
Nesha Mizel	Department of Conservation & Recreation
Wil Orndorff	Department of Conservation & Recreation

Adrienne Averett	Department of Environmental Quality
Bill Norris	Department of Environmental Quality
Don Kain	Department of Environmental Quality
Gary Flory	Department of Environmental Quality
Joel Maynard	Department of Environmental Quality
Robert Brent	Department of Environmental Quality
Rod Bodkin	Department of Environmental Quality
Scott Kudlas	Department of Environmental Quality
Terry Wagner	Department of Environmental Quality
John Kauffman	Department of Game & Inland Fisheries
Larry Mohn	Department of Game & Inland Fisheries
Paul Bugas	Department of Game & Inland Fisheries
Steve Reeser	Department of Game & Inland Fisheries
David Powell	Department of Forestry
Everette (Buck) Kline	Department of Forestry
Gerald Crowell	Department of Forestry
James Fulcher	Department of Forestry
Mike Foreman	Department of Forestry
Sam Austin	Department of Forestry
Dick Wertz	Earth Sciences Foundation
Jesse W. Moffett	Frederick-Winchester Service Authority
Erik Hagen	Interstate Commission on the Potomac River Basin
Jim Cummins	Interstate Commission on the Potomac River Basin
Joe Hoffman	Interstate Commission on the Potomac River Basin
Diane Helentjaris, MD	Lord Fairfax Health District
Steve Lee	Lord Fairfax Health District - Frederick County Health Department
Herbert Cormier	Lord Fairfax Health District - Shenandoah County Health Department
Cheryl Crowell	Lord Fairfax Soil and Water Conservation District
Joan Comanor	Lord Fairfax Soil and Water Conservation District
Kara Bates	Lord Fairfax Soil and Water Conservation District
David Nelms	U.S. Geologic Survey
Don Hayes	U.S. Geologic Survey
Jack Eggleston	U.S. Geologic Survey
Jennifer L. Krstolic	U.S. Geologic Survey
Jim McNeal	U.S. Geologic Survey
Mark Bennett	U.S. Geologic Survey
Dr. Don Orth	Virginia Tech
Dr. Jim Campbell	VirginiaView – Virginia Tech
Peter Sforza	VirginiaView – Virginia Tech
Douglas M. Caldwell, PE	Virginia Department of Health

APPENDIX C – REGIONAL RELATIONSHIPS MATRIX

Federal	Environmental Protection Agency - Region III												
	U.S. Geological Survey - Great Valley Water Resources Science Forum - VA-WV												
	USGS - Virginia Office											USGS - West Virginia Office	
Interstate	Chesapeake Bay Commission - Chesapeake Bay Program Interstate Commission on the Potomac River Basin												
State	Virginia											West Virginia	
	Dept. of Environmental Quality - Valley Office Virginia Department of Health - Lexington Office Dept. of Conservation & Recreation - Staunton Office Dept. of Forestry											Dept. of Environmental Proctection Dept. of Health and Human Services Div. of Natural Resources Div. of Forestry	
Shenandoah Valley	**Shenandoah Valley Regional Water Resources Policy Committee and Technical Committee**												
Sub-State Region	Central Shenandoah - PD-6					Northern Shenandoah Valley - PD-7						Eastern Panhandle P&DC-9	
County/Ind. City	Augusta Co.	Staunton	Waynesboro	Rockingham Co.	Harrisonburg	Shenandoah Co.	Page Co.	Warren Co.	Frederick Co.	Winchester	Clarke Co.	Jefferson Co.	Berkeley Co.
Municipalities	Craigsville			Bridgewater		Edinburg	Luray	Front Royal	Middletown		Berryville	Charles Town	Martinsburg
				Broadway		Mt. Jackson	Shenandoah		Stephens City		Boyce	Shepherdstown	
				Dayton		New Market	Stanley					Ranson	
				Elkton		Strasburg							
				Grottoes		Toms Brook							
				Mt. Crawford		Woodstock							
				Timberville									

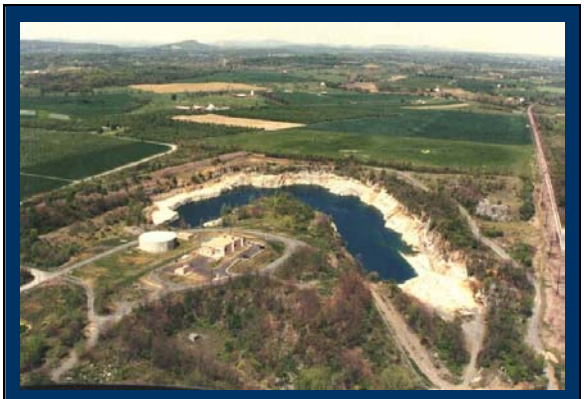
Instream Flow Sub-Committee	Augusta Co.	Staunton	Waynesboro	Rockingham Co.	Harrisonburg	Shenandoah Co.	Page Co.	Warren Co.	Frederick Co.	Winchester	Clarke Co.
						Strasburg		Front Royal			Berryville
						Woodstock					

Pure Water Forum	Augusta Co.	Staunton	Waynesboro	Rockingham Co.	Harrisonburg	Shenandoah Co.	Page Co.	Warren Co.	Frederick Co.	Winchester	Clarke Co.

Soil & Water Conservation Districts	Shenandoah RC&D												
	Headwaters SWCD			Shenandoah SWCD			Lord Fairfax SWCD					Eastern Panhandle CD	
	Augusta Co.	Staunton	Waynesboro	Rockingham Co.	Harrisonburg	Page Co.	Shenandoah Co.	Warren Co.	Frederick Co.	Winchester	Clarke Co.	Jefferson Co.	Berkeley Co.

APPENDIX D – CURRENT CONDITIONS AND FUTURE TRENDS

To provide a solid background for the strategic planning process, a series of papers were developed to describe key regulatory drivers, the status of existing efforts, and relevant regional trends associated with each of the six primary water resources goals. The following is a summary of these papers.



Goal: Ensure water supply and demand are kept in balance so that Valley residents, businesses, farms, and aquatic life all have the needed level of sustainable water (ground and surface).

#1 Water Supply Sustainability

Key Regulatory Drivers

Water Supply Planning Regulations

The 2003 Virginia General Assembly amended the Code of Virginia to direct the State Water Control Board to develop a state-wide comprehensive water supply planning process. As a result, the Virginia Local and Regional Water Supply Planning Regulations (9VAC 25-780) went into effect on November 2, 2005. The regulations require the adoption of local or regional water supply plans by all towns, cities, and counties. Jurisdictions with greater than 35,000 residents must adopt plans by 2008, while jurisdictions with 15,000-34,999 residents must adopt plans by 2009. Jurisdictions with less than 15,000 residents are given until 2010. Importantly, if a group of jurisdictions opt to develop a regional plan, they have until 2011. Notification of intent to develop a regional plan must be received by the Virginia Department of Environmental Quality (VDEQ) by November 2008.

VDEQ is responsible for reviewing all local and regional plans for compliance with the regulations. Plans must be reviewed and updated every five years. Each plan must include the following elements:

- A description of existing water sources
- A description of existing water use
- An assessment of projected water demand
- A statement of future need
- An analysis that identifies potential alternatives to address projected deficits in supplies
- A description of existing water resource conditions
- A description of water management actions
- A copy of the adopted documents, e.g. plans, ordinances, etc.
- A resolution approving the plan from each local government that is party to the plan
- A record of the local public hearing, a copy of all written comments and the submitter's response to all written comments received

West Virginia Water Resources Protection Act

The West Virginia Legislature passed the Water Resources Protection Act in 2004 (SB163). The legislation claims all water resources in the state for the benefit of the citizens and empowers the West Virginia Department of Environmental Protection (WVDEP) to conduct a water resources survey of consumptive and non-consumptive surface and groundwater withdrawals in the years 2003, 2004, and 2005 of large quantity users. Large quantity users include those using more than 75,000 gallons a month in any one month of the year. The legislation also requires WVDEP to establish a state-wide registration program to monitor those users starting in 2006. Finally, the legislation requires WVDEP to present a report to the legislature by December 2006 assessing the state's water resources and making recommendations for whether there is a need to implement a water quantity management strategy for all or portions of the state. Potentially, such a recommendation could result in requirements similar to those now mandated in Virginia.

Status of Existing Efforts

Draft Low Flow/Drought Onset Response Plan and Minimum Instream Flow (MIF) Studies

The scope and role of the Regional Water Resources Technical Committee was expanded by the Policy Committee from its original role as the Minimum Instream Flow (MIF) Committee in 2005. A draft Low Flow/Drought Onset Plan has been developed and can serve as the basis for meeting the drought response requirements of the Virginia Local and Regional Water Supply Planning Regulations (9VAC25-780-120). The proposed plan utilizes the Virginia Drought Assessment and Response Plan as a framework, incorporates the recommendations made in the MIF report (described below), and tailors these into a regional format. Local cooperation, coordinated drought response, and public education are the primary goals of the plan.

The Northern Shenandoah Valley Regional Commission originally created the MIF Committee to deal with scientific information needs relative to the potential establishment of a Surface Water Management Area. In 1994 work began with USGS on a Main Stem Demonstration Project. This project was completed in 1998 and served to develop a methodology for studying instream flow on the North Fork. This Instream Flow Incremental Methodology (IFIM) integrates the concepts of water supply planning and analytical hydraulic engineering models to determine habitat availability at varying flow levels.

The Minimum Instream Flow Study for the North Fork was initiated in July 1999 and was completed in July 2004. It evaluated the hydraulics, habitat, and water quality of the North Fork Shenandoah River during low flow conditions. The study was conducted by Virginia Tech and the USGS in cooperation with the Northern Shenandoah Valley Regional Commission, with oversight from the RWRPC. Efforts are currently underway to conduct a similar study for the South Fork with participation of the Central Shenandoah Planning District Commission and its localities.

Great Valley Water-Resources Science Forum

Although not exclusively focused on water supply planning, the Great Valley Water-Resources Science Forum is a recent initiative that serves an important function by helping to coordinate the scientific aspects of various water supply efforts. The Forum was created in January 2003 by the USGS and its cooperative partners. The stated purpose of the Forum is "to enhance the regional integration of USGS Science Programs to address the availability, vulnerability and quality of ground water in the Great Valley of the eastern United States." The Forum includes representatives of the USGS, universities, state and local agencies and public interest groups from Pennsylvania, Maryland, Virginia and West Virginia. The initial

focus of the Forum's efforts is the Northern Shenandoah Valley of Virginia and West Virginia, and contiguous areas of Maryland and Pennsylvania.

Groundwater Characterization

The USGS is currently conducting several groundwater characterization studies, including studies in Frederick County, Clarke County, Warren County, and Berkeley County. A Jefferson County study is also proposed. Additionally, the Shenandoah County Board of Supervisors plans to embark on a limited program to monitor water depth changes in wells throughout the County. To help better characterize the aquifer system in the Shenandoah Valley, and to provide relevant hydrogeological information to help guide the development and management of the region's water resources, the USGS has developed a "Plan for the Multidisciplinary Assessment of Karst and Fractured-Rock Hydrogeologic Systems and Water Resources of the Shenandoah Valley."

Relevant Regional Trends

Water Supply Demands and Resource Analysis in the Potomac River Basin

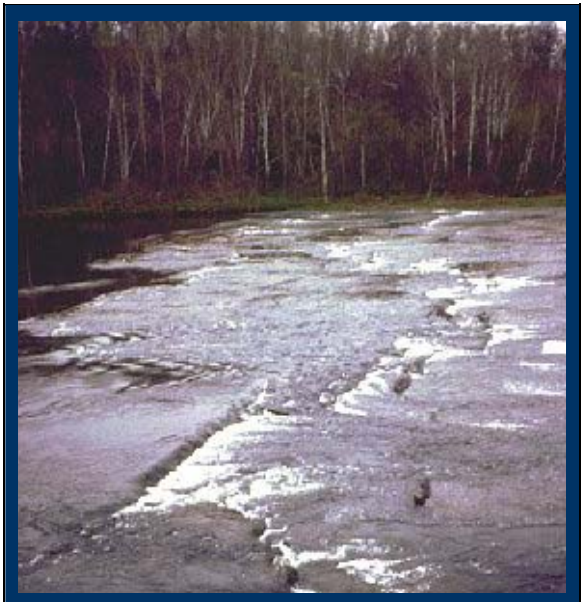
The Interstate Commission on the Potomac River Basin published a report in November 2000 entitled "Water Supply Demand and Resources Analysis in the Potomac River Basin." While the report does not examine the environmental effects of low flow on flora and fauna, or attempt to evaluate future sources of water supply in the basin, the report does forecast consumptive use in the Shenandoah River basin. The following table, reproduced from that report, shows that water use is expected to increase by 30% between 2000 and 2030 in the main stem of the Shenandoah, while water use in the South Fork and North Fork are expected to increase by 16% and 25% respectively.

Sub-Basin	2000	2010	2020	2030
Main Stem	6.0 mgd	6.6 mgd	7.2 mgd	7.8 mgd
South Fork	18.9 mgd	19.9 mgd	20.9 mgd	21.9 mgd
North Fork	8.5 mgd	9.2 mgd	9.9 mgd	10.6 mgd

Shenandoah Valley Regional Water Supply Study

A 2001 study conducted by consultants for the RWRPC predicted a similar increase in demand throughout the Valley. The report entitled, "Shenandoah Valley Regional Water Supply Study," elicited concerns over the possibility for demand to outstrip supply along the North Fork within the next 20 years. The study utilized data for Winchester, Middletown, Strasburg, Woodstock and Broadway. It found that their combined average daily demand for 2001 was 8.6 mgd and estimated the figure would reach 20.0 mgd by 2050. With a 1.6 maximum day peaking factor, maximum daily demand would be 32.0 mgd in 2050. Using a straight-line projection and applying the low flow of record, 23 mgd near Strasburg in 1985, the study found that the North Fork would produce insufficient flow to meet maximum daily demand as early as 2025.

#2 Water Quality



Goal: Aggressively achieve the level of water quality (ground and surface) required to support the human, business, and agricultural needs in the Valley, without sacrificing the needs of the watershed's fish and other aquatic life.

Key Regulatory Drivers

During the last few decades, the federal government has enacted considerable legislation addressing water quality. The Clean Water Act (CWA) is the most prominent, serving as the impetus for a majority of the regulatory drivers. The CWA sets the basic structure for regulating discharges of pollutants to waters and defines levels of accountability. The CWA requires state agencies and local jurisdictions to bear the responsibility of implementing and enforcing the various mandates.

NPDES Phase II Stormwater Requirements

The National Pollutant Discharge Elimination System (NPDES) Phase II stormwater program is a requirement of the federal CWA. In practical terms, the NPDES Phase II program regulates storm sewer outfalls in urban areas of less than 100,000 people (defined by the U.S. Census) as point sources for pollutant discharges. A primary goal of the program is to prevent polluted stormwater runoff from being transported to municipal separate storm sewer systems (MS4s) and ultimately discharged into local streams.

NPDES requires urbanized local governments to develop stormwater management plans (SWMPs) to control pollution to the maximum extent practicable (MEP). The SWMP must address six minimum control measures (MCMs), including:

- Public education and outreach
- Public participation and involvement
- Illicit discharge detection and elimination
- Construction site runoff control
- Post construction runoff control
- Pollution prevention and good housekeeping

In Virginia, the Department of Conservation and Recreation (VDCR) has recently assumed NPDES permitting authority from VDEQ. In West Virginia, the Department of Environmental Protection (WVDEP) is the permitting authority. Localities currently subject to NPDES Phase II permitting requirements in the Virginia portion of the Shenandoah Valley watershed include the City of Winchester, the City of Harrisonburg, and the Town of Bridgewater. In West Virginia, only the City of Martinsburg in Berkeley County is subject to NPDES Phase II. However, as population centers grow, additional localities may fall under the requirements.

Total Maximum Daily Load (TMDL) Requirements

The TMDL requirements of the CWA represent a significant regulatory challenge for the region. TMDL stands for Total Maximum Daily Load, and represents the maximum amount of a pollutant that can enter the stream without violating water quality standards. A TMDL must be developed for any stream identified as violating water quality standards. After the TMDL is set, the affected localities must develop a plan for how pollution will be reduced to the necessary levels.

Significantly, TMDL reduction allocations can be incorporated into local government NPDES Phase II stormwater permits, which has the potential to make them mandatory. Most of the TMDLs address nonpoint source pollution from agricultural sources, although urban source nonpoint sources, point sources, and atmospheric deposition are also major causes for impairment.

Chesapeake Bay Agreement Nutrient and Sediment Reduction Goals

The multi-jurisdictional 2000 Chesapeake Bay Agreement commits Virginia and West Virginia to remove the Chesapeake Bay from the U.S. EPA's list of impaired waters by the year 2010. One potential implication of failing to meet this commitment is that the entire Chesapeake Bay watershed, including the Shenandoah River basin, could be subject to a TMDL. This would essentially replace the voluntary framework established through the Chesapeake Bay Program, meaning that the TMDL will be enforced by the U.S. EPA, not by local governments.

To meet this commitment, Virginia has developed a Nutrient and Sediment Reduction Tributary Strategy for the Shenandoah and Potomac River Basins, which was finalized in March 2005.[17] Virginia's estimated cost to implement the strategy in the Shenandoah River basin is $1.19 billion, funded by both public and private sources.

The WVDEP, the West Virginia Conservation Agency, and the West Virginia Department of Agriculture partnered together to implement a parallel process for the eight Eastern Panhandle counties. West Virginia's estimated cost to implement the draft strategy is $232 million. The strategy focuses on manure transport outside the watershed, compliance with urban storm water regulations, and reductions in point source nutrient loads. For a copy of the latest draft of the West Virginia document, go to www.wvnet.org.

Virginia Stormwater Management Requirements

Current Virginia Stormwater Management Regulations establish mandatory stormwater management guidelines for municipalities. As of 2004, HB1177 requires that any locality regulated under the NPDES Phase II permitting requirements must develop and adopt a local stormwater management ordinance. HB1177 further directs the Department of Conservation and Recreation to administer stormwater management programs where localities are not subject to NPDES Phase II regulations and have chosen not to voluntarily adopt a local ordinance.[18]

[18] For more information, please see Title 4VAC50-60 of the Virginia Administrative Code: http://leg1.state.va.us/000/reg/TOC04050.HTM#C0060.

Virginia Agricultural Stewardship Act

The Agricultural Stewardship Act Program (ASA) solicits farmers to be proactive in addressing water quality problems voluntarily before enforcement action is taken. ASA is a cooperative effort involving the Virginia Department of Agriculture and Consumer Services and Virginia's Soil and Water Conservation Districts. The program offers procedures for notifying individual agricultural producers to potential operational areas that may be causing water pollution and guidelines for developing best management practices to mitigate the problem areas.[19]

CERCLA/Superfund and Hazardous Waste Programs

Comprehensive, Environmental Response, Compensation and Liability Act (CERCLA), better known as Superfund, is the federal government's program to clean up uncontrolled hazardous waste sites. Under the Superfund program hazardous wastes that pose a current or future threat to human health or the environment are cleaned up. Three Superfund sites have been identified within the Valley: Rhinehart Tire Fire Dump in Frederick County, Avtex Fibers, Inc. in Warren County and Leetown Pesticide in Leetown, Jefferson County, West Virginia. Wastewater discharges and groundwater contamination were major concerns in these cases. For more information visit: http://www.epa.gov/superfund/.

Status of Existing Efforts

Pure Water Forum and the Shenandoah Water Window

The Pure Water Forum, established in 1996, is a non-profit organization that promotes activities addressing water quality issues and environmental education in the Shenandoah River watershed. The Forum brings together under one umbrella a diverse group of community interests, including representatives from Valley citizen conservation groups, local and state governments, business and industry, agriculture, educators, conservation and planning districts, and others. The Forum promotes the sharing of resources to achieve the common goal of pure water.

The Pure Water Forum's Shenandoah Water Window represents a major effort to consolidate in a user-friendly format water quality monitoring data collected by the Friends of the Shenandoah River through a network of volunteers in several community watershed organizations. The window provides map-based access to a wealth of water quality data and associated watershed information at nearly 200 locations in the Shenandoah Basin since 1996. The Water Window can be found at www.purewaterforum.org/waterwindow.

Community Watershed Organization Water Quality Monitoring Efforts

Several community watershed organizations in both Virginia and West Virginia collect chemical and biological water quality monitoring data. The Friends of the Shenandoah River, together with the Friends of the North Fork, the Three Rivers Monitors, and volunteers in all counties within the watershed, leads an extensive voluntary monitoring network that includes sites in Augusta County, Clarke County, Frederick County, Jefferson County, Page County, Rockingham County, Shenandoah County, and Warren County. Every two weeks over 75 volunteer monitors take approximately 160 water samples. For more information, see: www.fosr.org/rivmon.cfm.

[19] For more information please visit: http://www.vdacs.virginia.gov/stewardship/index.html.

Chesapeake Bay Watershed Nutrient Credit Exchange Program

In March 2005, the Virginia General Assembly approved HB 2862, which established the Chesapeake Bay Watershed Nutrient Credit Exchange Program (amending Title 62.1 of the Code of Virginia). The adoption and utilization of a watershed general permit and market-based point source nutrient credit trading program will assist in three different goals:

- Meeting cap load allocations cost-effectively and as soon as possible in keeping with the 2010 timeline and objectives of the Chesapeake 2000 Agreement;
- Accommodating continued growth and economic development in the watershed;
- Providing a foundation for establishing market-based incentives to help achieve the Chesapeake Bay Program's nonpoint source reduction goals.

By January 1, 2006, or as soon thereafter as possible, the Board is expected to issue a Watershed General Virginia Pollutant Discharge Elimination System Permit (General Permit) authorizing point source discharges of total nitrogen and total phosphorus to the waters of the Chesapeake Bay and its tributaries. For more information, please see: http://leg1.state.va.us/cgi-bin/legp504.exe?051+ful+CHAP0708.

Shenandoah Valley Wastewater Treatment Plant Network

The purpose of the wastewater treatment plant network is to provide Valley treatment plant operators an avenue to exchange information and technical knowledge about their operations, to enable operators to help each other troubleshoot and problem solve with professionals in the wastewater treatment field, and to provide increased training opportunities for all. The Network currently has 37 members. For more information, please see: www.purewaterforum.org.

North River and Holman's Creek TMDL Implementation Projects

While there are several TMDLs and TMDL implementation plans being developed in the Shenandoah Valley, the North River Tributary in Rockingham County was selected by the Virginia Department of Environmental Quality to serve as a pilot project for actual implementation of on-the-ground best management practices designed to remove the impaired stream segment from the TMDL impaired waters list. This process will serve as a template for similar stream segments subject to TMDL requirements. The Holman's Creek TMDL Implementation Plan was approved by the EPA in 2003 and is currently in the implementation phase.[20]

This program, administered by local Soil and Water Conservation Districts (SWCD), provides funds to farmers to help install conservation practices that protect water and make farms more productive. Funding availability varies by SWCD. The state provides districts funds to target areas with known water quality needs. Areas with the greatest need receive the greatest funding. The cost-share program supports using various practices in conservation planning to treat animal waste, cropland, pastureland and forested land. Some are paid for at a per-acre rate. Others are cost-shared on a percentage basis up to 75 percent. In some cases, USDA also pays a percentage. In fact, the cost-share program's practices can often be funded by a combination of state and federal funds, reducing the landowner s expense to less than 30 percent of the total cost.[21]

[20] For more information, please see: http://www.epa.gov/reg3wapd/tmdl/VA%20TMDLs/Holmans%20Creek/.
[21] For more information, please see: http://www.dcr.virginia.gov/sw/docs/bmpsbro2.pdf.

Department of Forestry Audits

To ensure voluntary compliance with silvicultural water quality guidelines, the Virginia Department of Forestry (DOF) began conducting Best Management Practice Field Audits in 1993. The field audits are conducted twice a year, and provide a useful tool in monitoring the status of Virginia's water resources. Loggers must also provide notification to DOF within three days of the start of a logging operation; failure to provide notication will result in civil penalties.[22]

Virginia Groundwater Protection Steering Committee

The Groundwater Protection Steering Committee was founded in 1986 and represents an allegiance between 11 state agencies including, the Department of Health, DEQ, the Department of Mines, Minerals and Energy, and the Department of Housing and Community Development. The inter-agency advisory committee works together to advocate and further ground water protection efforts. Key accomplishments of the committee include various wellhead protection activities. Currently, the committee is striving to increase education and outreach about groundwater.[23]

Friends of the Shenandoah River: Health of the Shenandoah River Series

The Friends of the Shenandoah River (FOSR) has prepared four reports on the health of the Shenandoah River watershed in Virginia. Once finished, the full report will include several parts and will expound upon water quality monitoring results from across six counties. Most recently, the reports have addressed results from Warren, Clarke, Page and Shenandoah Counties. Ultimately, the purpose of the reports is to provide a quantitative indication of the "health" of the river. Findings thus far indicate that tributaries in Warren County are the least impaired. However, results from monitoring in Clarke, Page, and Shenandoah were not as encouraging. High nitrogen levels were found in tributaries of the Main Stem in Clarke County, of the South Fork in Page County, and of the North Fork in Shenandoah County.

West Virginia University Water Quality Survey

During the summer of 2005, WVU conducted a water quality survey of residents of Virginia and West Virginia, living in the Opequon Creek Watershed. Opequon Creek and some of its tributaries, including Abrams Creek, are listed as impaired due to fecal coliform bacteria and benthic / biological impairments. TMDL plans have been approved for the Virginia part of the watershed and are under development for the West Virginia side. The study conducted by WVU sought to estimate the value of the benefits from TMDL water quality improvement for watershed residents. Results are currently being analyzed. However, the group expects that residents will have a positive willingness to pay for improved water quality and that the surveys will improve public participation and awareness of water quality issues.[24]

Canaan Valley Institute

The Canaan Valley Institute (CVI) was founded in 1995 and is a "nonprofit, non-advocacy organization committed to helping communities improve the quality of life in their watersheds by restoring aquatic resources using cost-effective, locally determined solutions." The Institute addresses the scientific issues of water quality, while supporting local decision-making and sustainability. Its services focus primarily on supporting local-level stream restoration and wastewater treatment projects. In the past, CVI worked

[22] For more information, please see: http://www.dof.virginia.gov/wq/monitoring.html.
[23] For more information, please visit: http://www.deq.state.va.us/gwpsc/homepage.html.
[24] For more information see http://www.caf.wvu.edu/resm/faculty/borisova/OpequonProject.htm.

closely with the Berkeley County Source Water Protection Task Force to produce an educational booklet on drinking water protection.[25]

Soil and Water Conservation Districts (VA) and Conservation Districts (WV)

Soil and Water Conservation Districts (SWCD) and Conservation Districts are local-level actors in promoting water quality. VA SWCDs play several important roles, including assisting with erosion and sediment control ordinances, farm conservation practices, and Chesapeake Bay Preservation Act ordinance implementation. WV Conservation Districts run local level programs including Stream Partners, in which communities work to improve streams and watersheds through various activities.[26]

South River Science Team

The South River Science Team was formed in 2000 as an interdisciplinary team of individuals from industry, government, citizens groups, academic institutions, and private research to revisit the issue of mercury contamination and the consequences caused by DuPont Co. in Waynesboro. The group is involved with long-term DEQ monitoring, scientific studies, and public outreach and education efforts.[27]

Relevant Regional Trends

Shenandoah River Fish Kill

The Department of Environmental Quality and the Department of Game and Inland Fisheries observed a major fish kill on the North Fork of the Shenandoah River in 2004. This continued in April and July 2005 with most reports in April and May. These reports were from the South Fork, North Fork and Main Stem of the Shenandoah River. This fish kill is unusual in that it has been largely confined to adult smallmouth bass and redbreast sunfish and seems to have involved the entire river. Both the adult smallmouth bass and redbreast sunfish exhibited skin lesions on the surface of the body. Their immune systems seem to have been depressed subjecting them to secondary bacterial infections with the added stresses of spring spawning activity and the physical abrasion which occurs with territorial defense and nest building. Stress levels are constantly high because of the nature of the habitat provided by these rivers; quickly changing spring temperatures, occasional long periods of high turbid water that limits feeding, high nutrient content and occasional inputs of other contaminants with high runoff events. Approximately 80% of adult smallmouth bass adults are estimated dead.

Possible contributing factors are being evaluated by the Shenandoah River Fish Kill Task Force, a team assembled in July 2005 by DEQ and DGIF with the goal of identifying possible causes of the fish kill. This group is made up of state and federal water quality and resource management agencies, scientific experts, citizen groups, and the fishing community. The task force is evaluating multiple stressors that may contribute to the fish kill, such as: water quality impacts from point and non-point source pollution, disease, parasites, spawning stress, temperature, sediment chemistry, and fish population dynamics.

The fish kill is significant because it signals that there is a problem whose cause, result, and solution may impact a combination of environmental, economic, health, and recreational factors. In addition, scientists have recently observed “intersex” smallmouth bass, or male fish that are developing eggs. They have been found more frequently in the upper reaches of the Potomac, but have also been sampled in the

[25] For additional information visit http://www.canaanvi.org/.
[26] For more information see http://www.vaswcd.org/districts.htm and http://www.wvca.us/.
[27] For more information see http://www.deq.state.va.us/fishtissue/mercury.html.

Shenandoah in very limited numbers. It is possible that hormone therapy for humans is affecting biological communities through hormone introductions to the rivers through sewer effluents.

Impaired Waters in the Shenandoah Valley Watersheds Planning Area

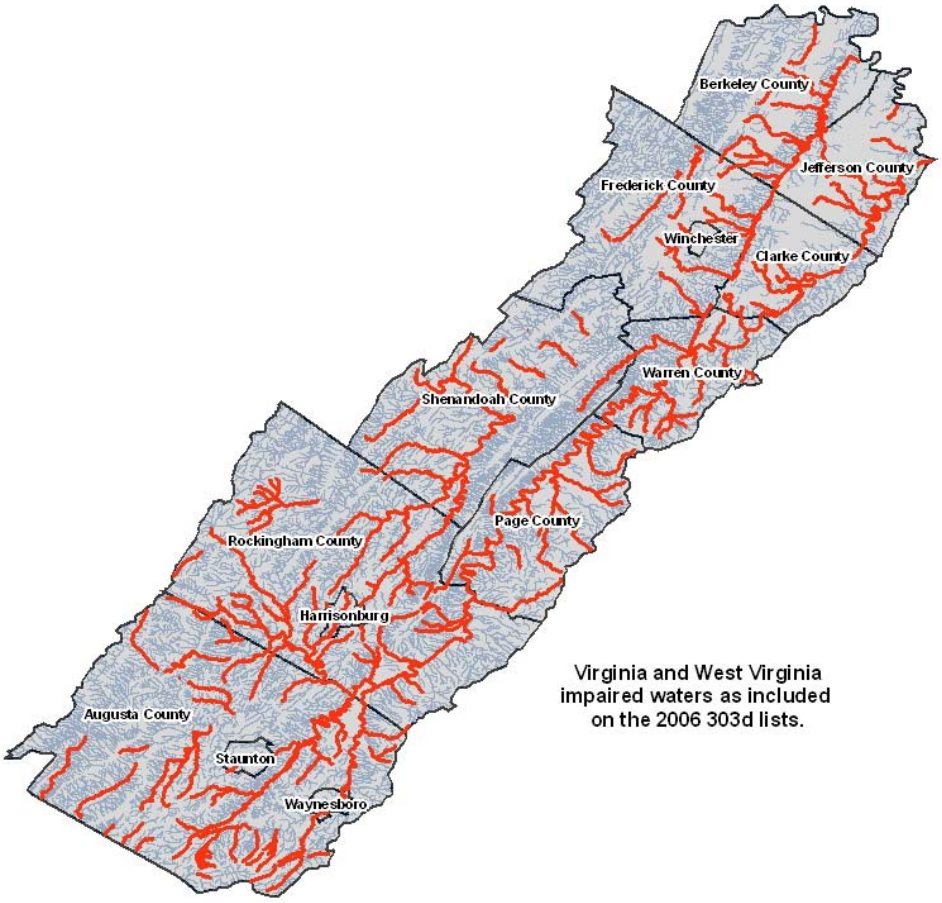
There are a total of 146 impaired waters listed on the Virginia DEQ 2006 Impaired Waters Fact Sheet and the 2006 listing featured on the West Virginia DEP website. The following table depicts the number of impaired waters and approximate mileage and acreage impaired in each county.

County	# Impaired Waters	Total Mileage*	Water Body Names
Augusta	36	515.60 miles, 71.31 acres	Staunton Dam Lake, Elkhorn Lake, Unnamed Tributary to Tunnel Hollow, Back Creek, Edison Creek, Middle River, Cockran Spring Branch, Lewis Creek, Elk Run, Moffett Creek, Christians Creek, Folly Mills Creek, Long Meadow Run, Polecat Draft, North River, Thorny Branch, Mossy Creek, Long Glade Creek, Naked Creek, Loves Run, Pine Run, South River, Coles Run, Johns Run, Kennedy Creek, Orebank Creek, Toms Branch, Meadow Run, Paine Run, Calfpasture River, Little Calfpasture River, Wallace Mill Stream, Hays Creek, Otts Creek, Walker Creek, Saint Marys River
Berkeley	12	97.3 miles	Harlan Run, Dry Run, Tuscarora Creek, Evans Run, Opequon Creek, Middle Creek, Mill Creek, Goose Creek, Torytown Run, Sylvan Run, Silver Spring Run, Eagle Run
Clarke	7	95.18 miles	Opequon Creek, Borden Marsh Run, Shenandoah River, Chapel Run, Spout Run and Page Brook Run, Long Branch Run
Frederick	9	113.49 miles, 67.15 acres	Back Creek, Hogue Creek, Babbs Run, Lick Run, Redbud Run, Crooked Run, Stephens Run, Opequon Creek, Lake Frederick
Jefferson	9	56.1 miles	Teagues Run, Hopewell Run, Elk Branch, Shenandoah River, Evitts Run, Cattail Run, NFSR, Bullskin Run
Page	11	92.77 miles	Naked Creek, Cub Run, Line Run, Roaring Run, Big Run, Mill Creek, East Hawksbill Creek, Hawksbill Creek, Pass Run, Rocky Branch, Jeremy's Run
Rockingham	37	356.41 miles 135.63 acres	North River, Thorny Branch, Briery Branch, Beaver Creek, Rocky Run, Union Spring Branch, Wolf Run, Mossy Creek, Dry River, Skidmore Fork, Honey Run, Muddy Creek, Long Glade Creek, Cooks Creek, Silver Creek, Sunset Heights Branch, Blacks Run, Pleasant Run, Congers Creek, Duck Run, Mill Creek, Deep Run, Lower Lewis Run, Cub Run, Little Dry River, Holmans Creek, Long Meadow Run, NFSR, Turley Creek, Linville Creek, Dry Fork, Fridley Run, Lacey Spring, Mountain Run, Smith Creek, Switzer Lake, Lake Shenandoah
Shenandoah	14	161.43 miles	Holmans Creek, North Fork Shenandoah, Smith Creek, Mill Creek, Laurel Run, Little Stony Creek, Narrow Passage Creek, Pugh's Run, Toms Brook, Tumbling Run, Cedar Creek, Orndorff Spring Branch

Warren	11	70.46 miles	Flint Run, Gooney Run, Happy Creek, North Fork Shenandoah, Passage Creek, Borden Marsh Run, Manassas Run, Willow Brook, Crooked Run, Unnamed Tributary to Crooked Run, Stephens Run

*Many streams cross jurisdictional borders, but are listed as a single impaired reach; therefore, the stream miles per county are estimated if a stream reach crosses one or more counties. This table does not include a segment measuring 128.82 miles that is impaired by mercury. This segment includes the South River, the South Fork, North Fork, and main stem of the Shenandoah River, and crosses through Augusta County, Rockingham County, Page County, Warren County, and the City of Waynesboro.

See the map below for geographical locations of impaired waters. The map references the 2006 303d listings.



2006 Water Quality Assessment Integrated Report

The 2006 Water Quality Assessment Integrated Report is a summary of the water quality conditions in Virginia from January 1, 2000, to December 31, 2004. The Virginia Department of Environmental Quality develops and submits this report to the U.S. Environmental Protection Agency every even-numbered year. The report satisfies the requirements of the U.S. Clean Water Act sections 305(b) and 303(d) and the Virginia Water Quality Monitoring, Information and Restoration Act. The goals of Virginia's water quality assessment program are to determine whether waters meet water quality standards, and to design and implement a plan to restore waters with impaired water quality. The Integrated Report combines both the

305(b) Water Quality Assessment and the 303(d) Report on Impaired Waters. This report was available for public comment from July 10, 2006 through August 11, 2006.

2006 Proposed TMDLs

Water Body ID	Stream	County/City	Length	Cause
VAV-B17R	North River	Rockingham	25.12 Miles	Bacteria
VAV-B18R	Beaver Creek			Benthic
VAV-B21R	Dry River	Rockingham	2.86 Miles	Temp*
VAV-B23R	North River	Rockingham, Augusta	16.13 Miles	Benthic
VAV-B38R	Mill Creek	Page	6.73 Miles	Bacteria
VAV-B45R	North Fork Shenandoah River	Rockingham, Shenandoah, Broadway, Timberville, Mt. Jackson	4.86 Miles	Benthic
VAV-B45R	North Fork Shenandoah River	Rockingham, Shenandoah, Broadway, Timberville, Mt. Jackson	14.27 Miles	Bacteria
VAV-B47R	Smith Creek	Rockingham, Shenandoah	31.18 Miles, 15.71 Miles	Bacteria Benthic
VAV-B29R	Mill Creek	Montgomery, Rockingham	5.68 Miles, 2.66 Miles	Bacteria
VAV-B48R	Mill Creek	Shenandoah	15.03 Miles	Benthic
VAV-B49R	Stony Creek	Shenandoah	5.65 Miles	Bacteria
VAV-B50R	Toms Brook	Shenandoah	7.18 Miles	Benthic
VAV-B39R	Hawksbill Creek	Page	19.3 Miles	Bacteria
VAV-B52R	Cedar Creek	Shenandoah	18.94 Miles	Temp*

*indicates natural condition

Groundwater Quality

The USGS 2004 Water Resources Data[28] report contains groundwater data for Frederick, Clarke, and Warren Counties. Data is available for dissolved oxygen content, pH, alkalinity, and tritium. All measurements for the three counties were within acceptable ranges according to the standards.

[28] United States Geological Survey. Water Resources Data. Virginia. Water Year 2004. Volume 2: Groundwater level and groundwater quality records. VA-04-2

#3 Natural Systems

Goal: Protect and enhance the natural systems that are integral to water resources protection, including: karst geography, vegetative buffers, forests, and wetlands.

Key Regulatory Drivers

2000 Chesapeake Bay Agreement

In July 2000, Virginia, Maryland, Pennsylvania, the District of Columbia, the Chesapeake Bay Commission and the U.S. Environmental Protection Agency signed the Chesapeake Bay Agreement, which created a strategic plan to achieve a vision for the future of the Chesapeake Bay watershed. Since that time, West Virginia has also committed to the Agreement. Elements of the Agreement that focus on the preservation and restoration of natural systems include:

- Living Resource Protection and Restoration*: Restore, enhance, and protect the finfish, shellfish and other living resources, their habitats and ecological relationships to sustain all fisheries and provide for a balanced ecosystem.*
- Sound Land Use: *Develop, promote and achieve sound land use practices which protect and restore watershed resources and water quality.*
- Vital Habitat Protection and Restoration: *Preserve, protect and restore those habitats and natural areas that are vital to the survival and diversity of the living resources of the Bay and its rivers.*

The Agreement includes specific actions regarding wetlands and watersheds. These strategies prioritize a "no-net loss" of existing wetland acres and functions. Virginia committed to restoring 6,000 new acres within the Chesapeake Bay watershed. Additional watershed strategies address the development and implementation of watershed management plans and corresponding stream corridor restoration goals.

Virginia Open Space Preservation Goal

In 2006, Virginia's Governor announced an initiative to preserve 400,000 acres of open space, farms, and forests by 2010. The goal is both part of the Chesapeake Bay 2000 Agreement and Virginia' efforts to celebrate the 400th anniversary of the founding of Jamestown. Virginia's conservation tax credit program, one of the most ambitious in the nation, allows a property owner to take a credit for 40% of the value of a property if he/she places it under a permanent conservation easement.

Virginia Wetland Regulations

The Virginia Water Protection Permit Program has served as Virginia's Section 401 Certification process for both tidal and non-tidal wetland impacts permitted under the Clean Water Act since 1992. As of 2000, the State non-tidal wetlands program is no longer dependent on the issuance of a federal permit. This enables VDEQ to use the Virginia Water Protection Permit Program (VWP) to regulate activities in all wetlands. Permits are required for numerous activities including dredging, filling, dumping and discharging any pollutant into or adjacent to surface waters.

West Virginia Wetland Regulations

The West Virginia Environmental Quality Board currently regulates wetlands under its requirements governing water quality standards. In 2001, a bill was introduced in the West Virginia legislature that would expand the state's water quality laws by authorizing the Division of Environmental Protection to promulgate rules relating to operating permits. Under the current law and the proposed bill, wetlands are protected as waters of the state. West Virginia issues certification based on a project's compliance with state water quality standards. Most of the certifications issued are for dredge and fill operations regulated by the US Army Corps of Engineers.

Status of Existing Efforts

Riparian Buffer Tax Credit Program

The 2000 Virginia General Assembly enacted the Riparian Buffer Tax Credit to provide a nonrefundable tax credit to individuals, S-corporations or partnerships who own land on which timber is harvested, which abuts a waterway, and who forbears timber harvesting on certain portions of the land for 15 consecutive years. The amount of the credit is equal to 25% of the value of the timber retained as a buffer up to $17,500. The buffer must be at least 35 feet wide and no more than 300 feet and be intact for 15 years. The applicant must have a Stewardship Plan for the tract to qualify.

Reforestation of Timberlands Program

The Virginia legislature authorized the Reforestation of Timberlands Program (RT) in 1970 as a financial incentive for private landowners to plant pine seedlings. The idea for the program was conceived by leaders of forest industry and state government in response to over-harvesting of pine timber. Funds for the program come from three sources: forest industry, the Commonwealth, and private landowners. The industry pays into the fund through a self-imposed severance tax when pine timber is harvested. This money is matched with General Revenue funds. The Virginia Department of Forestry's field offices located throughout the state run the program.

Virginia Natural Heritage Program

DCR maintains a comprehensive natural heritage inventory, which documents the location and ecological status of rare plant and animal species and natural communities. The inventories provide a scientific basis for land management and are often used to assist private and public land managers. The South Fork Shenandoah, North Fork Shenandoah, and Shenandoah River watersheds provide habitats for 11 State-listed endangered species. Among those listed, at least three are species of mussels. The presence of endangered species is a measure for biodiversity within the region and serves as a means for prioritizing preservation efforts.

Sharp Logger

The Virginia Sustainable Forestry Initiative offers a volunteer training program called SHARP (Sustainable Harvesting and Resource Professional). Students in the program receive 18 hours of classroom and field training in safety, sustainable forestry, harvest planning, and land management. Since 1996, more than 2,200 loggers, foresters and others have received this training through the SHARP Logger program. This represents the vast majority of the logging firms that operate in Virginia.

Wetland Mitigation

The Virginia Water Protection Permit Program (VWP) regulates activities and impacts to state waters, including wetlands. Permits authorizing impacts to wetlands reflect a public policy that attempts to balance wetland protection with alternative land uses. As stated in VWP permit regulations, mitigation refers to "sequentially avoiding and minimizing impacts to the extent practicable, and then compensating for remaining unavoidable impacts of a proposed action" (9 VAC 25-210-10). DEQ outlines three primary means of wetland mitigation: mitigation banks, compensatory mitigation, and in-lieu-of-fee funds. Each mitigation method requires cooperation with regulatory bodies in order to achieve some variation of wetland restoration, creation, enhancement or preservation.

Open Space Preservation

A number of organizations are involved in open space preservation in the Valley. For instance, the Valley Conservation Council (VCC) promotes land use that sustains the farms, forests, open spaces, and cultural heritage of the Shenandoah Valley region of Virginia. The VCC educates Valley citizens on the value of open space conservation and the options for protecting local character.

The Virginia Outdoors Foundation (VOF) holds over 330,000 acres of open space easements in Virginia and is very active in the Shenandoah Valley, with an office located in Staunton. Other land trusts that hold open space easements in the Valley include the Potomac Conservancy, the Shenandoah Valley Battlefields Foundation, Lord Fairfax Soil and Water Conservation District, Headwaters Soil and Water Conservation District, the Piedmont Environmental Council, and several other private and public organizations.

Transfer of Development Rights

Transfer of Development Rights (TDR) programs allow landowners to transfer the right to develop between different parcels of land. TDRs are effective ways to compensate owners for putative losses with payments from those who obtain the transferred rights. WVC § 7-1-3mm authorizes counties designated as growth counties to establish a transfer of development rights program, in order to preserve natural resources, protect scenic, recreational, and agricultural qualities of open lands and facilitate measured growth. The regulation also requires that the establishment of a transfer of development rights program must be approved by the majority of voters in a growth county. The market based technique encourages the voluntary transfer of growth from places where a community would like to see less development (sending areas) to places where a community would like to see more development (receiving areas).

The Virginia General Assembly recently gave TDR authority to local governments. Senate Bill 373 is effective July 1, 2006. The bill allows localities to provide for the transfer of development rights from a parcel of property located in the locality to another parcel of property located elsewhere in the locality.

Purchase of Development Rights

The purchase of development rights (PDR) allows a landowner to continue to live on, own, and operate a property, while the land is put under easement and is permanently protected from future development. Although such easements are often donated by private landowners, PDR programs provide landowners with some compensation from the County for the relinquishment of development rights. Local governments within the region, including Clarke County, are pursuing and developing PDR programs. Shenandoah County's Comprehensive Plan, adopted June 28, 2005, contains specific Implementation Action which reads: "Convene an ad hoc advisory committee to study the merits of the purchase of development rights

as a means of permanently preserving agricultural land in the county." The ad hoc committee has not yet been formed. For more information visit http://www.shenandoahvalleynetwork.org.

Wellhead Protection

The purpose of Wellhead Protection Programs is to protect and prevent contamination of wellheads and well fields used to supply water for public water systems. Wellhead Protection typically involves three key steps: Delineation of the Wellhead Area, inventory of potential contaminant sources and the development of a Management and Contingency Policy. West Virginia's Wellhead Protection program hinges on the use of existing regulations that affect groundwater, such as NPDES, Underground Injection Control (UIC) and Underground Storage Tank (UST). Virginia's recently approved Wellhead Protection Program is a voluntary program coordinated by DEQ.

Forest Legacy Program

The Forest Legacy Program (FLP) involves a partnership between State and Private Forestry and National Forest System mission areas of the U.S Forest Service, State Foresters lead agencies, local governments, land trusts, and interested landowners. It provides an incentive based mechanism to protect critical important fish and wildlife habitat, conserve watershed functions, and maintain recreation opportunities. The program emphasizes protection of significant forests of regional and national significance and those that that can be effectively protected and managed. The FLP distributes grant funds to aid with conservation projects and land acquisition.

Land Conservation

The Virginia Outdoors Plan is Virginia's official conservation, outdoor recreation, and open space plan, and is intended to serve as a guide to all levels of government and the private sector in meeting the land conservation, outdoor recreation and open needs of the state. The most recent VOP was adopted in 2002. As of the completion of this Strategic Plan, public hearings are being conducted on the 2007 Virginia Outdoors Plan. The latest VOP can be found at www.state.va.us/dcr/prr/vop.htm.

Relevant Regional Trends

Chesapeake Bay Agreement Progress

According to the 2004 Annual Report on Implementation of the Chesapeake Bay Agreement, encouraging progress was made during the four years subsequent to implementation. In Virginia, DCR conducted a series of workshops and develop two Local Watershed Management Planning guides. As of the 2004 report, approximately 21% of Virginia communities within the Bay watershed were covered by watershed management plans and approximately 65 local watershed plans were under development.

Cooperative efforts between state and federal agencies have been the primary drivers for wetland restoration. By 2003, a total of 794 acres of wetlands were restored within the Chesapeake Bay; this amounts to 13% of the 2010 goal for restoring 6,000 acres. DCR supports efforts by landowners to restore wetland acreage through the Conservation Reserve Enhancement Program (CREP), however voluntary restoration has been nominal.

During spring 2002, Virginia achieved its goal to restore 610 miles of riparian forest buffer, 8 years ahead of schedule. This included a state Executive Order (48 (99)) for a 20% increase the amount of riparian buffers

on state-owned or managed land. As of June 2003, 1,983.2 miles of riparian forest buffers had been implemented in Virginia.

Virginia Outdoors Survey

According to the Virginia Outdoors Survey, conducted in 2006 as part of the effort to update the Virginia Outdoors Plan, nearly 78% of respondents answered "yes" to the question "Should the state spend public funds to prevent the loss of exceptional natural areas to development?" When asked how important is it to protect Virginia's natural and open space resources, 67% said it was "very important" and 28% said it was "important." Less than two-percent said it was not important. The survey had a margin of error of plus/minus two percent. Top outdoor activities identified in the survey included walking for pleasure (1st) and several water-related activities including swimming (4th), fishing (7th), and boating (10th).

#4 Planning and Regional Cooperation

Goal: Achieve a broad regional consensus on the direction of water resources policy, planning, and management so that common goals can be achieved and solutions implemented more effectively and cost-efficiently.

Status of Existing Efforts

Northern Shenandoah Valley Regional Commission
The Northern Shenandoah Valley Regional Commission (NSVRC) was created under the Virginia Area Development Act and is composed of five counties (Clarke, Frederick, Page, Shenandoah, and Warren), one city (Winchester) and 14 towns (Berryville, Boyce, Edinburg, Front Royal, Luray, Middletown, Mount Jackson, New Market, Shenandoah, Stanley, Stephens City, Strasburg, Toms Brook, and Woodstock). The NSVRC provides a variety of technical services to its member local governments including: planning, mapping, grant application assistance, and network meetings. The NSVRC formed the RWRPC in 2002 and provides ongoing support for this effort.

Central Shenandoah Planning District Commission
The Central Shenandoah Planning District Commission (CSPDC) is composed of five counties (Augusta, Bath, Highland, Rockbridge and Rockingham); five cities (Buena Vista, Harrisonburg, Lexington, Staunton, and Waynesboro); and eleven incorporated towns (Timberville, Broadway, Elkton, Dayton, Bridgewater, Mt. Crawford, Grottoes, Craigsville, Glasgow, Goshen, and Monterey. Each member government is entitled to planning and technical services assistance provided by the CSPDC. A majority of the CSPDC Board is comprised of local government elected officials.

Eastern Panhandle Regional Planning and Development Council
The Eastern Panhandle Regional Planning and Development Council of West Virginia is made up of elected and appointed representatives from Jefferson County, Berkeley County, Morgan County and several additional municipalities within. The Council exists to assist local governments in resolving their common problems, engage in area-wide comprehensive and functional planning, identify, apply for, and administer certain federal and state grants, and provide a regional focus in regard to multiple programs undertaken on an area-wide basis.

Interstate Commission on the Potomac River Basin
The Interstate Commission on the Potomac River Basin (ICPRB) is an interstate compact commission established by Congress in 1940 to help the Potomac basin states and the federal government enhance, protect, and conserve the water and associated land resources of the Potomac River basin through regional and interstate cooperation. The ICPRB is represented by appointed commissioners from Maryland, Pennsylvania, Virginia, West Virginia, the District of Columbia, and the federal government.

Soil and Water Conservation Districts (SWCD)

The Virginia Association of Soil and Water Conservation Districts (VASWCD) is a private nonprofit association of 47 soil and water conservation districts in Virginia. SWCDs are voluntary, nongovernmental associations which provide support and leadership in the conservation of natural resources through stewardship. The Northern Shenandoah Valley conservation districts include the Shenandoah Valley SWCD (Rockingham, Page, Harrisonburg), Lord Fairfax SWCD (Shenandoah, Winchester, Frederick, Clarke,), and Headwaters SWCD (Waynesboro, Augusta).

The Shenandoah Valley Air Quality Initiative (SHENAIR) – Local Government Committee

The SHENAIR Local Government Committee held its organizational meeting April 4, 2004. It is designed to serve the same nine county, four independent city region as the Regional Water Resources Technical Committee. Startup funding has been provided through a grant from NOAA, which has enabled the establishment of the SHENAIR Institute at James Madison University and the establishment of scientific partnerships with Virginia Tech, the University of Virginia, and other institutions. The Local Government Committee is staffed by the Northern Shenandoah Valley Regional Commission.

#5 Education and Stewardship

Goal: Have well informed, conservation-minded citizens, business people, and elected officials that are actively involved in promoting water resources stewardship.

Key Regulatory Drivers

Virginia Academic Standards

The Standards of Learning for Virginia Public Schools describe Virginia's expectations for student learning and achievement in grades K-12 in English, mathematics, science, history/social science, technology, the fine arts, foreign language, health and physical education, and driver education. Sixth grade students are introduced to natural resource management, its relation to public policy, and cost/benefit tradeoffs in conservation policies. Relevant SOL criteria include:

Matter

6.5 The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment.

Living Systems

6.7 The student will investigate and understand the natural processes and human interactions that affect watershed systems.

Resources

6.9 The student will investigate and understand public policy decisions relating to the environment.

NPDES Phase II Stormwater Requirements

All localities subject to NPDES Phase II regulations must address six minimum control measures, including public education and outreach and public participation and involvement

Status of Existing Efforts

Pure Water Forum – Shenandoah Valley

The Pure Water Forum coordinates and builds upon existing watershed and environmental educational programs in communities and schools. One of the goals of the Pure Water Forum is to facilitate communications that will connect the water user community and decision-makers, creating an increased level of environmental awareness. Citizens are encouraged to participate in the Forum through local constituent organizations.

The Pure Water Forum website hosts the *Shenandoah Valley Water Resources Information Clearinghouse,* which contains Shenandoah River Basin-related documents and other resources applicable to the area

Shenandoah Basin Project

The Shenandoah Basin Project is a multiyear effort designed to help community watershed organizations increase their capacity and improve their watersheds. The SBP is a collaborative partnership of two primary non-profit partners – the Shenandoah Valley Pure Water Forum and River Network – and includes affiliate organizations from the Shenandoah, Potomac, and Chesapeake watersheds. The SBP offers technical assistance and has grant programs in the following categories: (1) Organizational Capacity Building, (2) Education and Outreach, (3) Water Quality Monitoring, and (4) Riparian Restoration. Friends of the North Fork and Friends of the Shenandoah River have received funds in all categories, with current emphasis on Organizational Capacity Building. More information can be found at www.purewaterforum.org.

Virginia Naturally Program

Virginia Naturally is an educational program operated by VDEQ. It was adopted in 2000 as the official environmental education initiative goals of the Commonwealth, and strives to link Virginians to environmental information and promote lifelong learning about Virginia's environment. Virginia Naturally provides a gateway to statewide environmental education resources including information about volunteer opportunities, educational classes, places to visit, community events, watershed maps, lesson plans, and recreational activities. It also links public and private groups from all sectors of the Commonwealth to promote a better understanding of scientific and economic challenges.

Virginia Naturally published the *Virginia's Natural Resources Education Guide*, which contains resources and activities for teachers. Chapter 10 describes the water resources of the Commonwealth.

Stewardship Virginia

Stewardship Virginia is a statewide initiative held twice annually to help citizens with projects that enhance and conserve Virginia's natural and cultural resources. Citizens and stakeholder groups can register their stewardship projects by completing a registration form on the Stewardship Virginia website. The event will be added to website calendar, ensuring greater exposure. Volunteers are rewarded with "Thank You" certificates signed by the Governor.

Virginia and West Virginia Envirothon

The Envirothon is a natural resources competition for high school students that is coordinated through soil and water conservation districts. Students who participate learn stewardship and management concepts and work to solve real and hypothetical environmental problems. The program is field oriented, community based and gives students an opportunity to work with natural resource professionals.

Adopt-a-Stream Program

Adopt-a-Stream is a statewide program run by the Department of Conservation and Recreation to reduce litter while advancing citizen stewardship. Adopt-a-Stream promotes education, public outreach, citizen involvement, partnership and community capacity-building through Virginia's diverse constituencies. Volunteer groups agree to at least one, preferably two, cleanups per year for at least two years. The minimum length of shoreline a group can adopt is one-quarter mile. DCR helps by providing trash bags, gloves, safety vests, and instructional and promotional documents. DCR also gives each group custom signage featuring the adopted waterway and organization.

Project WET (Water Education for Teachers)

Project WET is a national nonprofit water education program and publisher for educators and young people ages 5-18. The program facilitates and promotes awareness, appreciation, knowledge, and stewardship of

water resources through the dissemination of classroom-ready teaching aids and the establishment of internationally sponsored Project WET programs. The centerpiece of the Project WET program is the Project WET Curriculum and Activity Guide. This guide contains over ninety broad-based water resource activities that were developed and field-tested by over 600 educators and resource managers working with 34,000 students nationwide.

Other National Programs

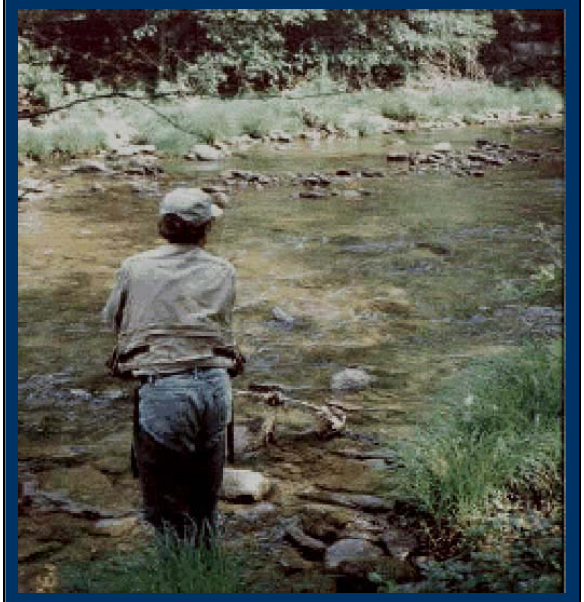
There are a number of other national programs aimed at education and outreach. The Izaak Walton League of America's Save Our Streams program and the Future Farmers of America and 4H projects in high schools are just a few examples.

Relevant Regional Trends

Chesapeake Bay Public Opinion Poll

In a 2002 survey on the knowledge, attitudes, and behavior regarding the Chesapeake Bay, respondents from North-Central Virginia and the Shenandoah and Potomac Regions had the highest knowledge scores when asked about the definition of a watershed. In general, regions with agricultural environments and regions with a lower population density scored higher on this knowledge index. Respondents from the Shenandoah and Potomac basins also believed that wastewater treatment plants and population growth are the greatest potential sources of water pollution. However, respondents from the North-Central Virginia and Shenandoah and Potomac region had the lowest recycling rates. See: http://www.chesapeakebay.net/survey.htm.

#6 Recreational Access



Goal: Ensure reasonable public access to the Valley's water resources while respecting private property rights and the need to protect water quality.

Key Regulatory Drivers

The Virginia Department of Conservation and Recreation, through its Division of Planning and Recreation Resources, is the official state office to "create and put into effect a long range plan for the acquisition...and development of a comprehensive system of outdoor recreation facilities." The Virginia Outdoors Plan (VOP) is the comprehensive outdoor plan for the Commonwealth, § 10.1-207 of the *Code of Virginia* and specifies that "[a]ll departments, commissions, boards, agencies, officers, and institutions of the Commonwealth, or any political subdivision thereof and park authorities shall cooperate with the Department in the preparation, revision and implementation of a comprehensive plan for the development of outdoor recreational facilities, and such local and detailed plans as may be adopted pursuant thereto." The VOP constitutes the official State Comprehensive Outdoor Recreation Plan for Virginia.

Status of Existing Efforts

Virginia Outdoors Plan

The *Virginia Outdoors Plan (VOP)* is Virginia's official conservation, outdoor recreation and open space plan. The latest VOP was adopted in 2002, although a new VOP is expected to be published in 2007 after a lengthy review process. The VOP is intended to serve as a guide to all levels of government and the private sector in meeting the conservation, outdoor recreation, and open space needs of Virginia. The VOP recommends that local governments be more involved in providing water access opportunities. City, county, and town governments should take the initiative to provide access areas and facilities on those bays, rivers and streams of primary interest to their own citizenry. A significant opportunity exists locally for public/private cooperation in the provision of water access in these regional locations:

Central Shenandoah Planning District:

A variety of natural and recreational resources are present in the Central Shenandoah Planning District (CSPD). Federal holdings total more than 618,170 acres, and include the Shenandoah National Park and George Washington and Jefferson National Forests. The Appalachian Trail skirts the eastern boundary of the region. Douthat State Park, state-owned wildlife management areas, forests and other state resources contribute an additional 66,132 + acres of valuable open space, and provide numerous and varied recreational opportunities, as do the regional recreational areas of Natural Chimneys and Grand Caverns. The following VOP recommendations are related to water resources in the CSPDC:

- The private sector has numerous opportunities to become involved in the recreation-tourism economic activities that result from the region's unique natural, cultural, and historic resources. The increased demand for facilities to house, feed, and provide services to the millions of visitors is obvious. Private companies support the most of the demand for canoes and other recreational watercraft for visitors seeking to explore the legendary South Fork of the Shenandoah, the James and Maury Rivers. However, additional opportunities exist to provide access points and visitor accommodations.

- The Virginia Department of Game and Inland Fisheries is the primary agency responsible for providing boating access to the public waters of the state. They should coordinate with all public land managing agencies, local governments and other user groups to identify opportunities and help develop appropriate access sites on the free flowing streams of the region.

- Additional public water access opportunities are needed on most of the streams of the region, including the Maury and James rivers in Rockbridge County, the South Fork of the Shenandoah River, and the other larger headwater streams of Highland and Bath counties. Where appropriate, portages should be created around dams and other river obstacles.

- Scenic Rivers The following river segments should be evaluated to determine their suitability as Virginia Scenic Rivers: the Calfpasture River in Rockbridge and Augusta counties from Marble Valley to Goshen Pass; and the South Fork of the Shenandoah River in Rockingham County.

Northern Shenandoah Valley Regional Commission (NSVRC):
Within the region, there are about 2,300 acres of state lands and more than 168,400 acres of federal lands available for most types of dispersed recreational use. Due to the vast tracts of forests and national parks, the significant water resources, and the private resorts, the Northern Shenandoah Valley region receives a large influx of recreational users from other parts of Virginia and from outside the state. Collectively, visitors seeking recreational opportunities contribute significantly to the tourism revenue generated in this region. The following VOP recommendations are related to water resources in the NSVRC:

- The private sector has played a major role in the establishment of the northern Shenandoah Valley as a tourist destination area. The increasing demand for camping, fishing and other on-water activities could prompt private investors to establish recreation and tourism-driven businesses.

- The Seven Bends Area of the North Fork of the Shenandoah River in Shenandoah County has beautiful scenery and excellent fishing and canoeing in a pristine setting. The area could provide a rare opportunity for the acquisition and development of a multipurpose river park that could contain significant historic and natural features, and would afford easy access to import resources of the region, including several near-by battlefields. This site would provide an excellent opportunity to serve the conservation, recreation and environmental education needs of the region.

- The Virginia DGIF should establish a state fish and game management area on the Shenandoah River to serve the conservation and recreation needs of the region.

- As the primary agency responsible for providing boating access to the public waters of the Commonwealth, DGIF should coordinate with all land managers and user groups to identify locations and help to develop additional access sites on the free flowing streams of the region.

- The Avtex Fibers Plant is a Superfund site on the Shenandoah River at Front Royal. It is being redeveloped into a "green" industrial park. A recreational park, Conservancy Park is part of the site rehabilitation and consists of almost 350 acres fronting the river. Park developments will include access to the river, restroom facilities, picnic areas, natural areas and open space, a trails network and a variety of other day-use activities, including soccer fields. Conservancy Park could help address issues identified in the recreational use management plan. Funding should be made available as part of the mitigation plan and the site should be developed as an early phase of the rehabilitation, which could be completed in five to seven years.

- Additional public access is needed to all the major streams of the region, including both the North and South forks and the main stem of the Shenandoah River, Passage Creek and Cedar Creek. Where appropriate, portages should be created around dams and other river obstacles.

- A multi-objective river recreation plan has been prepared to address recreation and water resource management issues for the South Fork and Main Stem of the Shenandoah River in Page, Clarke and Warren counties. The plan, developed by an advisory committee composed of farmers, outfitters, other riparian owners, local government, DCR, DGIF, USFS and others, contains numerous recommendations for managing the recreational use on the river while protecting the resource. Recommendations of that plan should be implemented quickly. Other communities should consider the findings and recommendations of this plan as a model for implementing management strategies on other heavily used river segments.

- Scenic Rivers. The following river segment has been evaluated and determined to qualify for Virginia Scenic River designation: the North Fork of the Shenandoah River from Burnshire Bridge to Route 648 in Front Royal.

- The following river segments should be evaluated to determine their suitability as Virginia Scenic Rivers: the South Fork of the Shenandoah River in Page and Warren counties from Port Republic to Route 684, and from Overall to Front Royal; the North Fork of the Shenandoah River in Shenandoah and Warren counties from New Market to Burnshire Bridge; Cedar Creek in Shenandoah, Frederick and Warren counties — the entire stream

Shenandoah Sojourn

Each spring, the Pure Water Forum coordinates a raft trip to bring together volunteers, technical professionals, elected officials, water enthusiasts, educators, and students. The Sojourn is an educational tool that combines historical site visits, aquatic ecology and fisheries demonstrations, and economic and environmental lessons.

River Use Plan

The Northern Shenandoah Valley Regional Commission has completed a plan for "recreational access to and stewardship of water resources." It is built around five main goals, each of which contains several specific actions to undertake:

- *Public Access*: Inform recreational users of the need and methods for responsible access to public recreation waters in the Shenandoah Valley, as well as the penalties for trespass.
- *Public Safety - Law Enforcement:* To encourage a coordinated law enforcement presence for river recreation that ensures safety and enhances the quality.
- *Public Health:* Protect the Shenandoah Valley surface water quality from impacts of recreation use on the river, its forks and tributaries, at boat landings and on the adjoining banks; making all aware of the stewardship need and responsibilities to achieve this goal.
- *Public Stewardship:* To minimize the impacts on the river resource by all user groups.
- *Coordinated Planning*: The recommendations of this plan should be coordinated with and included in the Walking and Wheeling Plan of the NSVRC as the concepts Floating and Fishing.

Blueway Map

Through cooperative efforts between the Department of Conservation and Recreation, the Pure Water Forum, and the Town of Shenandoah, the Shenandoah River has been designated a "Blueway" from Port Republic to the Town of Shenandoah. The focus of this project is to provide public access to the navigable portion of the River. The result is an elegant navigation map and regular maintenance and improvements on riverbanks and at boat ramps. Other activities included providing portapotties, cleaning and adopting the sites at least monthly through DCR, retrofitting the kiosks with riparian buffer signs, and placing "wood duck boxes" with trash bags for the public to use instead of leaving their trash behind.

Relevant Regional Trends

The VOP 2002 study found that the water-related resources in the CSPDC are currently not meeting recreational activity needs. There are 4,753 water acres currently available for Lake, River, and Bay Use[29]. This falls short of the 18,989 water acres demanded in 2000, resulting in a 14,236 water acre deficit. By 2010, Lake, River, and Bay Use recreational needs are projected to increase it 20,158 water acres, resulting in a deficit of 15,405 water acres.

There are 581 stream miles available for Stream Use[30] recreation in the CSPDC. This meets the need for 572 stream miles demanded in 2000, resulting in a 9 stream mile surplus. However, by 2010, Stream Use recreation needs are projected to increase to 608 stream miles, resulting in a deficit of 27 stream miles.

The VOP 2002 study found that the water-related resources in the NSVRC are currently not meeting recreational activity needs. There are 576 water acres currently available for Lake, River, and Bay Use. This falls short of the 13,596 water acres demanded in 2000, resulting in a 13,020 water acre deficit. By 2010, Lake, River, and Bay Use recreational needs are projected to increase it 15,702 water acres, resulting in a deficit of 15,126 water acres.

There are 348 stream miles available for Stream Use recreation in the NSVRC. This falls short of the 410 stream miles demanded in 2000, resulting in a 62 stream mile deficit. By 2010, Stream Use recreation needs are projected to increase to 473 stream miles, resulting in a deficit of 125 stream miles.

[29] Includes power boating, sailing, lake fishing, saltwater fishing, jetski/personal watercraft, and water skiing.
[30] Includes stream fishing, human powered boating, rafting, and tubing.

APPENDIX E – ACRONYMS

ASA ..... Agricultural Stewardship Act

CERCLA ..... Comprehensive Environmental Response, Compensation, and Liability Act

CREP ..... Conservation Reserve Enhancement Program

CSPDC ..... Central Shenandoah Planning District Commission

CWA ..... Clean Water Act

ICPRB ..... Interstate Commission on the Potomac River Basin

MGD ..... Million Gallons Per Day

MIF ..... Minimum Instream Flow

NPDES ..... National Pollutant Discharge Elimination System

NSVRC ..... Northern Shenandoah Valley Regional Commission

PDR ..... Purchase of Development Rights

RWRPC ..... Regional Water Resources Policy Committee

RWRTC ..... Regional Water Resources Technical Committee

SWCD ..... Soil and Water Conservation District

TDR ..... Transfer of Development Rights

TMDL ..... Total Maximum Daily Load

VDEQ ..... Virginia Department of Environmental Quality

VDACS ..... Virginia Department of Agriculture and Consumer Services

VDOF ..... Virginia Department of Forestry

VDCR ..... Virginia Department of Conservation and Recreation

VWPPP ..... Virginia Water Protection Permit Program

WVDEP ..... West Virginia Department of Environmental Protection

WVU ..... West Virginia University