



# **SHENANDOAH VALLEY WATER RESOURCES STRATEGIC PLAN**

**Regional Water Resources Policy Committee – Shenandoah Valley**

Prepared with assistance from  
AMEC Earth & Environmental, Inc.

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The Agua Fund, Inc.

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Northern Shenandoah Valley Regional Commission

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## 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 staff support.

The Strategic Plan was designed to further twelve water resources goals that were adopted by the region in 2004. The RWRPC adopted the Strategic Plan on \_\_\_\_\_ 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

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# MEMBERS OF THE REGIONAL WATER RESOURCES POLICY COMMITTEE

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Alternate – Dick Magnifico, Assistant County Administrator

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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 AND BACKGROUND

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 figure to the right) 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.<sup>12</sup> 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 Watersheds Planning Area

The Shenandoah Valley Water Resources Strategic Plan was developed by the Regional Water Resources Policy Committee (Policy Committee). 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 resources and invited the participation of upstream and downstream jurisdictions. This made the RWRPC not only a multi-jurisdictional effort, but a multi-regional and multi-state effort as well. The RWRPC's 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.

The Policy Committee is supported by the Regional Water Resources Technical Committee, which is composed primarily of local government staff and staff from partnering organizations. The Technical Committee performs research and serves as a forum for in-depth discussion of technical issues related to water resources. On occasion, the Technical Committee will form ad-hoc subcommittees to deal with specific issues. The work of the Technical Committee is invaluable to the mission of the Policy Committee.

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

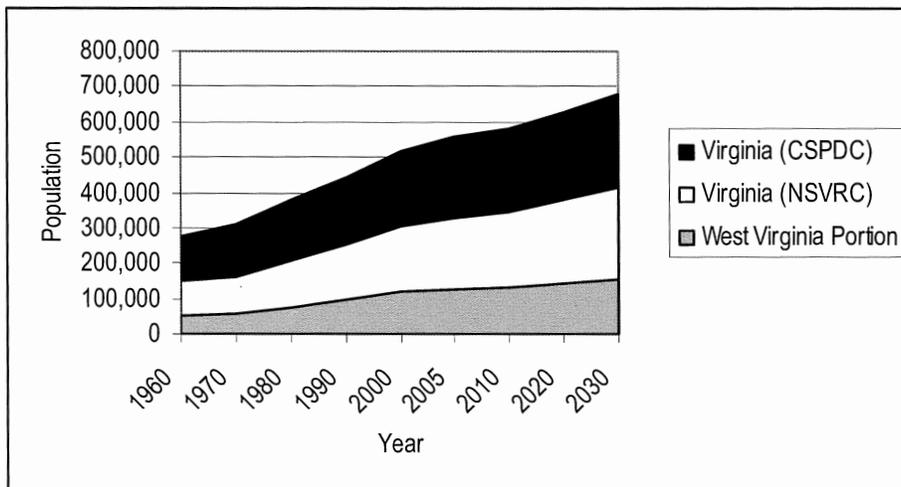
<sup>1</sup> Virginia Employment Commission, State Demographer Projections, 2006.

<sup>2</sup> West Virginia University, Regional Research Institute, West Virginia Population Estimates and Projections, 2006.

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.

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.

**Shenandoah Valley Population – Historic and Projected**



## REGIONAL WATER RESOURCES GOALS

The purpose of creating common regional water resources goals was 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. Identifying long-term goals makes it possible to quickly adjust regional efforts in response to a rapidly changing environment by identifying upfront the ultimate direction that the region wishes to go and then more effectively seek external investment.

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. For instance, good data and information, while it is an important goal in itself, is thematic in that it is needed to support all of the primary goals.

“Take Care of the Water” Goals Matrix

Primary Goals					
<b>WATER SUPPLY SUSTAINABILITY</b> 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).	<b>WATER QUALITY</b> 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.	<b>NATURAL SYSTEMS</b> Protect and enhance the natural systems that are integral to water resources protection, including karst geography, floodplains, vegetative buffers, forest and wetlands.	<b>PLANNING AND REGIONAL COOPERATION</b> 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.	<b>EDUCATION/ STEWARDSHIP</b> Have well informed, conservation-minded citizens, business people, and elected officials that are actively involved in promoting water resources stewardship.	<b>RECREATIONAL ACCESS</b> Ensure reasonable public access to the Valley's water resources while respecting private property rights and the need to protect water quality.
Actionable Supporting Goals					
<b>ECONOMIC ADVANTAGE</b> Enhance the Valley's economic advantage by protecting and wisely using water resources.					
<b>AGRICULTURAL AND OPEN SPACE HERITAGE</b> Enhance the Valley's agricultural and open space heritage through to water resources stewardship.					
<b>BUILD ON EXISTING ABILITIES AND RELATIONSHIPS</b> 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.					
<b>DATA AND INFORMATION</b> Provide Valley leaders and citizens alike with accessible, reliable and objective information and scientific data needed to support informed water resources decisions.					
<b>FINANCIAL RESOURCES</b> 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.					
<b>STANDARDS AND REGULATIONS</b> 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.					

## 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 Current Conditions and Future Trends.

### 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.



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.



**Focus Group Process**

To help guide the prioritization process, the RWRPC developed the following criteria:

- 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, but is still something that citizens will accept and elected officials feel comfortable pursuing?
- 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 the process of identifying potential implementation actions. AMEC developed potential "levels of effort" for each strategy to providing a starting point for this discussion. These levels of effort represented potential actions depending on how aggressively the Policy Committee wished to pursue the strategy. The level of effort (base, medium, or low) was not an indication of whether something was a priority, but rather an indication of the RWRPC's capacity to tackle a specific strategy in the short or mid-term.

At its August 16, 2006 meeting, the Policy Committee discussed the levels of effort and indicate 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 took the strategy off of the priority list.



**Action Plan Work Session**

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 at its October 18, 2006 meeting. The final Strategic Plan was approved by the Policy Committee on \_\_\_\_\_ and submitted to local governments for endorsement and participation.

## CURRENT CONDITIONS AND FUTURE TRENDS

The following is a summary of significant current conditions and trends as they relate to each of the six primary water resources goals.

### #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 opts 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 2007.



**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).**

VDEQ is responsible for reviewing all local and regional plans for compliance with the Regulation. 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 (SB 163). 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. 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.

<b>Sub-Basin</b>	<b>2000</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
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

### 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.

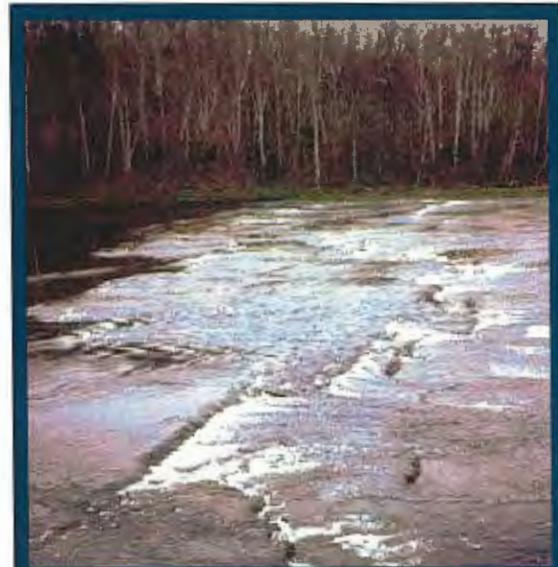
#### ***NPDES Phase II Stormwater Requirements***

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.



**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.**

***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.<sup>3</sup> 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](http://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.<sup>4</sup>

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<sup>3</sup> [www.naturalresources.virginia.gov/Initiatives/TributaryStrategies](http://www.naturalresources.virginia.gov/Initiatives/TributaryStrategies)

<sup>4</sup> 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.<sup>5</sup>

### ***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](http://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](http://www.fosr.org/rivmon.cfm).

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<sup>5</sup> 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: <http://www.svwwtptn.org/svwwtptn/>.

### ***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.<sup>6</sup>

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.<sup>7</sup>

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<sup>6</sup> For more information, please see: <http://www.epa.gov/reg3wapd/tmdl/VA%20TMDLs/Holmans%20Creek/>.

<sup>7</sup> 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 notification will result in civil penalties.<sup>8</sup>

### ***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.<sup>9</sup>

### ***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.<sup>10</sup>

### ***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

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<sup>8</sup> For more information, please see: <http://www.dof.virginia.gov/wq/monitoring.html>.

<sup>9</sup> For more information, please visit: <http://www.deq.state.va.us/gwpsc/homepage.html>.

<sup>10</sup> 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.<sup>11</sup>

### ***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.<sup>12</sup>

### ***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.<sup>13</sup>

## **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

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<sup>11</sup> For additional information visit <http://www.canaanvi.org/>.

<sup>12</sup> For more information see <http://www.vaswcd.org/districts.htm> and <http://www.wvca.us/>.

<sup>13</sup> 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**

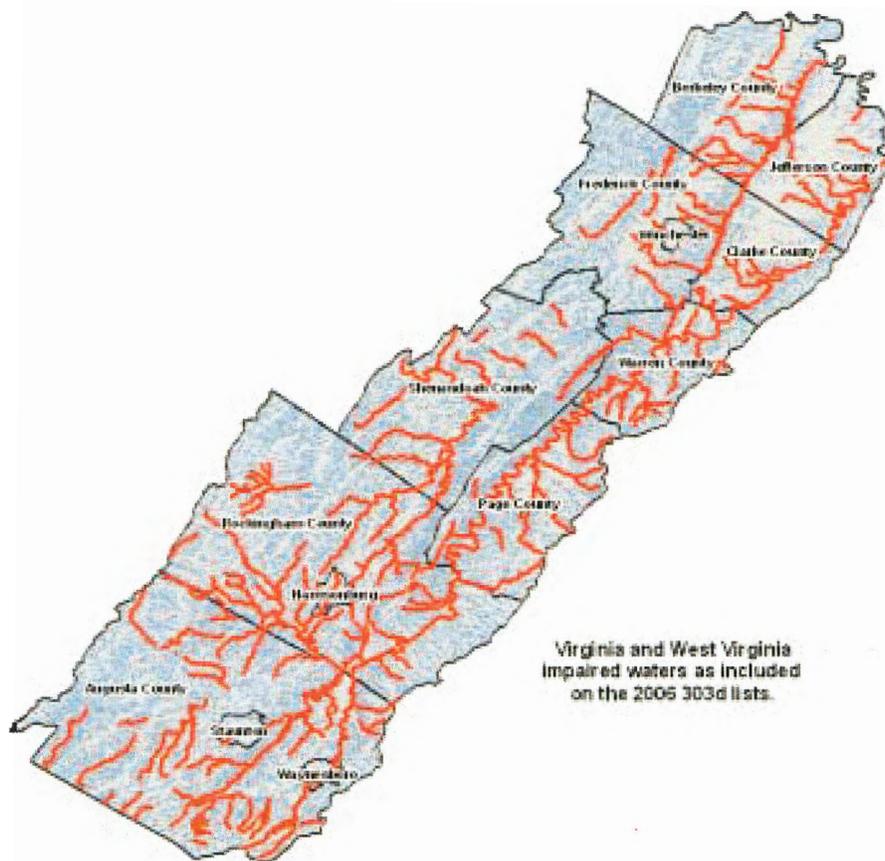
There are a total of 146 impaired waters listed on the Virginia DEQ 2006 Impaired Waters Fact Sheet and the 2006 listing featured on the West Virginia DEP website. The following table depicts the number of impaired waters and approximate mileage and acreage impaired in each county.

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
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\*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**

<b>Water Body ID</b>	<b>Stream</b>	<b>County/City</b>	<b>Length</b>	<b>Cause</b>
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<sup>14</sup> 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.

<sup>14</sup> 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

### 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.*



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

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 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***

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. It helps private landowners implement voluntary measures such as conservation easements and agricultural/forestral districts. The VCC promotes public policies that maintain rural land uses and protect Valley character. Finally, it works cooperatively with citizens, landowners, government officials, and other organizations to achieve local land conservation goals.

### ***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.

## **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.

## #4 Planning and Regional Cooperation

### 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***

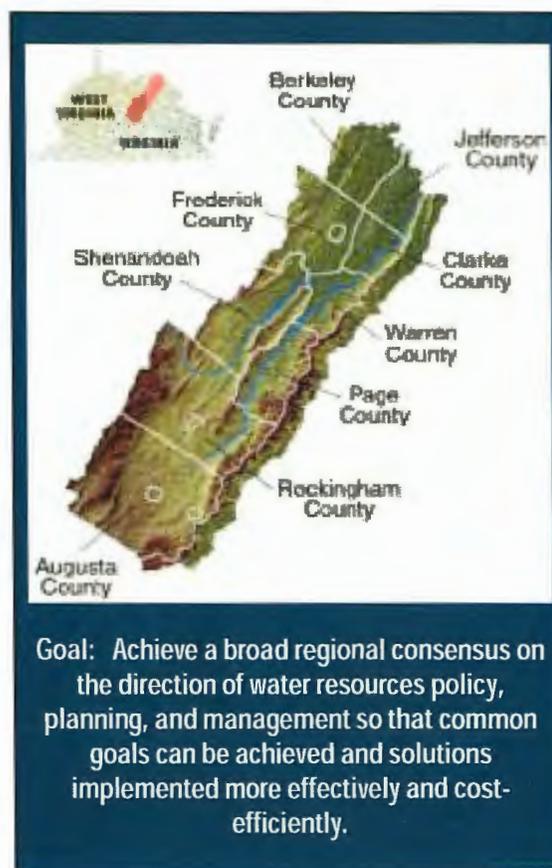
The Central Shenandoah Planning District Commission (CSPDC) is composed of five counties (Augusta, Bath, Highland, Rockbridge and Rockingham); five cities (Buena Vista, Harrisonburg, Lexington, Staunton, and Waynesboro); and eleven incorporated towns (Timberville, Broadway, Elkton, Dayton, Bridgewater, 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

### 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**

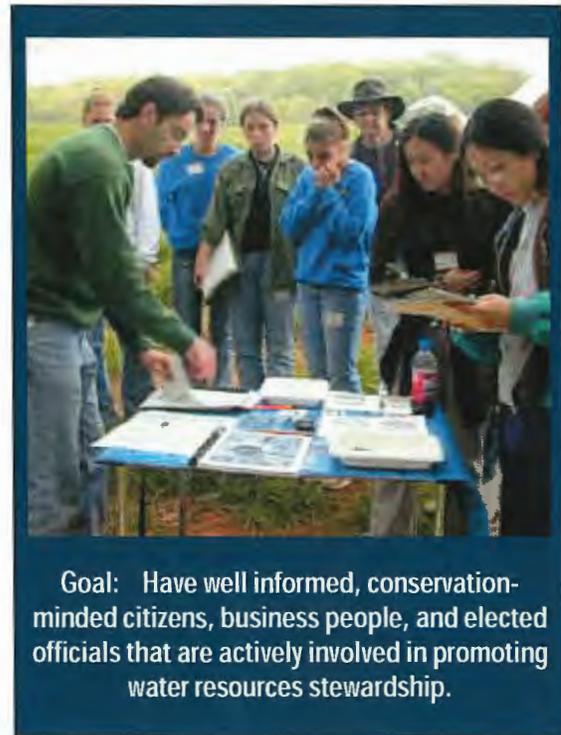
All localities subject to NPDES Phase II regulations must address six minimum control measures, including public education and outreach and public participation and involvement

### 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



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

### ***Shenandoah Basin Project***

The Shenandoah Basin Project (SBP) is a multiyear effort designed to help community watershed organizations increase their capacity and improve their watersheds. The SBP is a collaborative partnership of four non-profit organizations (River Network, Virginia Izaak Walton League Save Our Streams, Canaan Valley Institute, and Shenandoah Valley Pure Water 2000 Forum) offering technical assistance and grants up to \$3,500 per project category. Project grant categories include (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 been recipients of funding for specific education and outreach program elements.

### ***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**

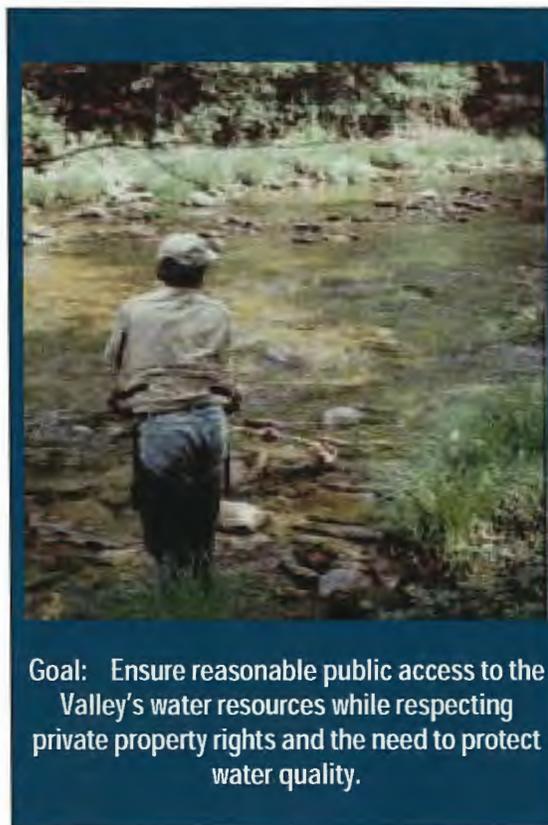
#### ***Chesapeake Bay Public Opinion Poll***

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

### 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.



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

### Status of Existing Efforts

#### ***Virginia Outdoors Plan 2002***

The *Virginia Outdoors Plan (VOP)* is the state's official conservation, outdoor recreation and open space plan. It 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 Calpasture 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 Department of Game and Inland Fisheries 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 that are needed 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<sup>15</sup>. 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 to 20,158 water acres, resulting in a deficit of 15,405 water acres.

There are 581 stream miles available for Stream Use<sup>16</sup> 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 to 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.

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<sup>15</sup> Includes power boating, sailing, lake fishing, saltwater fishing, jetski/personal watercraft, and water skiing.

<sup>16</sup> Includes stream fishing, human powered boating, rafting, and tubing.

## STRATEGIES AND ACTIONS

The following represents consensus strategies for implementing the water resources goals of the Policy Committee. For each strategy, the Policy Committee has identified levels of effort, actions, responsible parties, preliminary costs, and time-frames for completion. See the end of this document for a list of acronyms.

**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. Strategic plan work included an initial water supply planning database reflecting the VDEQ listed requirements, the subsequent conversion to input spreadsheets, and continued coordination with VDEQ as it further defines state-wide data requirements. The Strategic Plan funds from local governments and The Agua Fund, Inc. were supplemented by VDEQ grants.
- 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 DEQ by November 2008.**
- The strategy should maximize the use of available DEQ and related grants. For FY 2007, DEQ grants ranged from \$20,000 for a single water utility to \$50,000 for a regional data collection effort.
- The strategy should utilize local staff to the extent possible through the Technical Committee and provide staff support services through the PDCs.

Level of Effort	Actions	Details
Maintain the existing cooperative water supply planning effort for the Shenandoah Valley region with completion before 2011.	<b>1:</b> Conduct a regional <b>water supply planning workshop</b> after the Strategic Plan is presented to the RWRPC to help the region move forward on coordinated plan. VDEQ has offered to provide the technical presentations.	<b>Responsible Party:</b> NSVRC and CSPDC (invitations and meeting logistics) with support from VDEQ (presentations and materials). <b>Cost:</b> NSVRC and CSPDC staff time. <b>Time-Line:</b> First half of 2007.
	<b>2:</b> Finalize a <b>regional water supply work plan</b> that builds on existing regional data collection efforts. The three remaining phases of implementation include:	<b>Responsible Party:</b> NSVRC and CSPDC.

Level of Effort	Actions	Details
	<ul style="list-style-type: none"> <li>▪ 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).</li> <li>▪ Phase II: Adopt a drought response and contingency plan (9VAC25-780-120). See Strategy #2.</li> <li>▪ Phase III: Develop a statement of need and analysis of alternatives (9VAC25-780-130).</li> </ul> <p>3: Secure <b>letters of intent</b> to participate in the regional planning process from all localities involved.</p>	<p><b>Cost:</b> Cost is variable, especially for Phase III, which depends on whether or not the Statement of Need suggests the need for more in depth analysis. NSVRC and CSPDC staff time will be required to coordinate any consultant contracts. The cost of work plan development/finalization is expected to be borne by the consultant.</p> <p>As a benchmark, 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 in the Shenandoah Valley through the Technical Committee).</p> <p>Based on a preliminary work plan, the following are estimated planning process costs:</p> <ul style="list-style-type: none"> <li>▪ Phase I approximately \$108,000</li> <li>▪ Phase II see Strategy #2</li> <li>▪ Phase III approximately \$96,000</li> </ul> <p><b>Time-Line:</b> Complete the work plan by January 2007.</p> <p>Estimated plan completion is as follows:</p> <ul style="list-style-type: none"> <li>▪ Phase I: Complete by end of 2008.</li> <li>▪ Phase II: Complete by end of 2009 (see Strategy #2)</li> <li>▪ Phase III: Complete by end of 2010.</li> </ul> <p><b>Responsible Party:</b> NSVRC and CSPDC, working with individual local governments.</p> <p><b>Cost:</b> NSVRC and CSPDC staff time.</p> <p><b>Time-Line:</b> First half of 2007.</p>

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

**Notes:**

- This is a short-term priority that builds on the work of the Regional Water Resources Technical Committee (RWRTC). It is also part of the longer-term effort to comply with water supply planning regulations (by 2011 in Virginia if done regionally).
- A 2006 report by Virginia Tech entitled “Special Report on the Effectiveness of Drought Management Programs in Reducing Residential Water-Use in Virginia” is useful in helping to understand the limitations of voluntary and mandatory water restrictions in reducing demand.

Level of Effort	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: Continue process of reviewing and moving towards adoption of the Technical Committee <b>Drought Response Plan</b> .	<b>Responsible Party:</b> RWRTC.
		<b>Cost:</b> Technical Committee member staff time.
		<b>Time-Line:</b> Complete by end of 2009.
Work with local media and stakeholder organizations for the timely delivery of water and climate metrics related to drought conditions.	2: Identify local media outlets and develop agreements to publicize drought response under different circumstances. Develop a <b>regional press release protocol</b> to define when regional release is appropriate versus local releases.	<b>Responsible Party:</b> NSVRC and CSPDC.
		<b>Cost:</b> NSVRC and CSPDC staff time.
		<b>Time-Line:</b> Complete by end of 2009.
Cooperatively develop water conservation education materials.	3: Work with VDEQ and WVDEP to <b>identify education materials for replication</b> and choose materials accordingly. Potentially use water bills to disseminate information.	<b>Responsible Party:</b> RWRTC and Pure Water Forum.
		<b>Cost:</b> Staff time.
	4: Develop a <b>scope of work for customizing education/outreach materials</b> for the region or by locality. Apply for appropriate state, federal, or private grants.	<b>Responsible Party:</b> RWRTC and Pure Water Forum.
		<b>Cost:</b> Staff time.
Develop a regional drought awareness/information web portal to provide information to both	5: Form an ad-hoc subcommittee to pursue the development of a <b>water supply/drought information web portal</b>	<b>Time-Line:</b> Complete by end of 2008.
		<b>Responsible Party:</b> RWRTC and Pure Water Forum.

Level of Effort	Actions	Details
localities and citizens.	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.	<p><b>Cost:</b> Approximately \$70,000 for initial development plus yearly maintenance fees and staff time.</p> <p><b>Time-Line:</b> Form ad-hoc subcommittee in first half of 2007. Complete work by end of 2008.</p>
If required, work with stakeholders to develop and mobilize a year around Shenandoah Valley water stewardship/conservation ethic program for citizens and visitors.	<p><b>6:</b> The scope and necessity of this approach is contingent on the Statement of Needs produced from Phase I of the Water Supply Plan. 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 2008 (after forecasting) and before 2010 (alternatives analysis).</p> <p>Based on this information, a <b>scope of work for a regional water conservation plan</b> could be developed. Example components from the Metropolitan Washington Council of Government's "Water Wise Use Campaign" are:</p> <ul style="list-style-type: none"> <li>▪ Broadcast Media (Radio)</li> <li>▪ School-Based Education and Outreach</li> <li>▪ Transit Ads</li> <li>▪ Partnership Development (Food Chains, Builders, Building Suppliers)</li> <li>▪ Theater Slides</li> <li>▪ Campaign Implementation (Staff)</li> <li>▪ Product Purchases</li> </ul>	<p><b>Responsible Party:</b> RWRPC to coordinate with Pure Water Forum and ICPRB. Determine the role of Soil and Water Conservation Districts.</p> <p><b>Cost:</b> An example program is the Metropolitan Washington Council of Government's "Water Wise Use Campaign." Annual work plan costs are around \$123,000, including media buys, staff time, and material purchases. \$25,000 of that amount is from a DEQ grant. Media costs in the Washington region are considerably higher than in the Valley.</p> <p><b>Time-Line:</b> Consider in 2009.</p>

**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 applies to a number of levels of effort and actions.

Level of Effort	Actions	Details
<p>Develop tools on an as needed basis. Potential examples include:</p> <ul style="list-style-type: none"> <li>▪ A model ordinance for local governments to adopt for the mandatory restriction phase of the drought management agreement.</li> <li>▪ A model ordinance to meet pending stormwater management regulatory requirements.</li> <li>▪ Water conservation public education and outreach materials.</li> </ul>	<p><b>1:</b> Assess the need for <b>cooperative local government tools</b> on a case-by-case basis.</p>	<p><b>Responsible Party:</b> RWRPC and RWRTC.</p> <hr/> <p><b>Cost:</b> Variable depending on effort. Some efforts may require hiring a consultant, while others may involve researching and highlighting existing efforts.</p> <hr/> <p><b>Time-Line:</b> Ongoing.</p>
<p>Create a subcommittee to study water-related ordinances around the region or nationally and identify/recommend best practices.</p>	<p><b>2:</b> Create a <b>subcommittee to study water-related ordinances</b>. A place of the subcommittee to start would be the EPA's Smart Growth web site. In particular, the Protecting Water Resources with Smart Growth Manual addresses the following issues:</p> <ul style="list-style-type: none"> <li>➤ Innovative Ordinances</li> <li>➤ Creating Partnerships for Water Quality Improvements</li> <li>➤ Open Space</li> <li>➤ Funding and Fee Structures</li> <li>➤ Implementation Examples</li> </ul>	<p><b>Responsible Party:</b> RWRPC and RWRTC.</p> <hr/> <p><b>Cost:</b> Staff time.</p> <hr/> <p><b>Time-Line:</b> Establish in second half of 2007.</p>

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

**Notes:**

- A list of science questions was developed by the Policy Committee in 2005. The USGS has responded with a plan to address some of these questions.
- Local funds (Frederick, Clarke, Warren, Jefferson, and Berkeley) have been leveraged in the past.
- The Technical Committee is taking advantage as opportunities arise and plays a lead role in coordinating with the USGS, state and federal agencies, and other potential stakeholders.

Level of Effort	Actions	Details
Cooperatively develop a regional Water Resources Science Plan.	<p>1: Collaborate with state and federal regional partners to develop the synergy needed to pursue a <b>Water Resources Science Plan</b>. 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.</p> <p>An example is the Foundation for Earth Science Water Cluster's interest in developing a proposal for answering science questions submitted by the Policy Committee in September 2005.</p> <p>Using the partnering among existing research projects to build a Valley Science network that can produce an integrated Valley Science Plan for water and related natural resources programs like SHENAIR as science grants are sought.</p>	<b>Responsible Party:</b> RWRPC and RWRTC.
		<b>Cost:</b> Focus is 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.
		<b>Time-Line:</b> Ongoing. Science Plan target date of July 2008.

**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.**

Level of Effort	Actions	Details
<p>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.</p>	<p><b>1:</b> Annually present RWRPC legislative priorities to the NSVRC and the CSPDC.</p> <p><b>2:</b> Determine budget related requests early and <b>send an annual letter to the Governor</b> requesting that items be placed in the introduced budget. Include the Shenandoah Valley delegation on the distribution list.</p>	<p><b>Responsible Party:</b> NSVRC and CSPDC.</p>
		<p><b>Cost:</b> NSVRC and CSPDC staff time.</p>
		<p><b>Time-Line:</b> September annually.</p>
<p>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.</p>	<p><b>3.</b> Request to meet with Northern Virginia Regional Commission to discuss opportunities for <b>joint legislative/budget efforts</b>. If successful, continue this dialogue on an ongoing basis.</p>	<p><b>Responsible Party:</b> NSVRC and CSPDC.</p>
		<p><b>Cost:</b> NSVRC and CSPDC staff time.</p>
		<p><b>Time-Line:</b> September 2007. Potentially ongoing.</p>

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

Level of Effort	Actions	Details
Support recognition programs for groups/individuals who have "cleaned-up after other people's messes.	1: Encourage the Pure Water Forum to take the lead in developing a <b>recognition program</b> , including mission, goals, guidelines, nomination process, etc. Provide support as needed.	<p><b>Responsible Party:</b> Pure Water Forum.</p> <p><b>Cost:</b> Staff time.</p> <p><b>Time-Line:</b> Consider in 2007.</p>
Consider a regional media strategy for highlighting environmental enforcement actions.	2. Encourage the Pure Water Forum to develop a <b>regional media strategy</b> and to engage in message development.	<p><b>Responsible Party:</b> Pure Water Forum.</p> <p><b>Cost:</b> Unknown.</p> <p><b>Time-Line:</b> Consider in 2008.</p>
Provide better education and outreach on existing ways to report illicit/illegal discharges.	<p>3. Develop an <b>ad-hoc subcommittee</b> 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.</p> <p>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.</p>	<p><b>Responsible Party:</b> RWRPC and RWRPC Technical Committee.</p> <p><b>Cost:</b> Unknown.</p> <p><b>Time-Line:</b> Report findings in 2009.</p>

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

Level of Effort	Actions	Details
Secure funds to continue existing continuous monitoring being performed by the USGS as a result of the fish kill.	1. Develop a strategy for <b>securing continuous monitoring</b> funding, including official communications from the RWRPC.	<p><b>Responsible Party:</b> RWRPC.</p> <p><b>Cost:</b> Minimal staff time.</p> <p><b>Time-Line:</b> January 2007.</p>
Enhance the ability of Virginia and West Virginia to fully utilize volunteer water quality monitoring data.	2. Develop and <b>ad-hoc subcommittee</b> to assess the status of existing efforts and what actions and resources are needed to enhance monitoring.	<p><b>Responsible Party:</b> RWRTC.</p> <p><b>Cost:</b> Staff time.</p> <p><b>Time-Line:</b> Provide report and findings in 2008.</p>

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

**Notes:**

- It is recognized that the Policy Committee 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>.

Level of Effort	Actions	Details
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.	1: Establish a ad-hoc committee to work with the Pure Water Forum to develop an education and outreach strategy.	<b>Responsible Party:</b> RWRPC with the Pure Water Forum.
		<b>Cost:</b>
		<b>Time-Line:</b> Provide report and findings in 2008.
Create and deliver a simple media strategy using existing outlets, including the use of press releases, etc.	Same as above.	<b>Responsible Party:</b>
		<b>Cost:</b>
		<b>Time-Line:</b>
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.	Same as above.	<b>Responsible Party:</b>
		<b>Cost:</b>
		<b>Time-Line:</b>
Utilize the education pamphlets and brochures of Page County and Shenandoah County as models for other Shenandoah Valley communities.	Same as above.	<b>Responsible Party:</b>
		<b>Cost:</b>
		<b>Time-Line:</b>
Develop a goal statement, scope	Same as above.	<b>Responsible Party:</b>

Level of Effort	Actions	Details
<p>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.</p>		<p>Cost:</p>
		<p>Time-Line:</p>
<p>In partnership with local and regional faith community, develop a "Faith Based Stewardship" program that outlines how to integrate stewardship into faith-based teachings.</p>	<p>Same as above.</p>	<p>Responsible Party:</p>
		<p>Cost:</p>
		<p>Time-Line:</p>
<p>Develop a "teach the teachers" program that provides hands-on experience for teaching the natural resources SOLs in a Valley-specific manner.</p>	<p>Same as above.</p>	<p>Responsible Party:</p>
		<p>Cost:</p>
		<p>Time-Line:</p>

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

Level of Effort	Actions	Details
Localities approve the Strategic Plan as the regional framework for long-term water resources planning.	1: Develop a plan for presenting draft Strategic Plan results to localities after presentation to the RWRPC. Pursue <b>adopting resolutions by the NSVRC and the CSPDC.</b>	<p><b>Responsible Party:</b> RWRPC, NSVRC, and CSPDC.</p> <p><b>Cost:</b> Staff time.</p> <p><b>Time-Line:</b> First quarter of 2007.</p>
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. Establish a subcommittee to <b>better assess the “cumulative” impacts</b> of staff demands on the NSVRC and the CSPDC. Focus on work-displacement caused by new RWRPC initiatives.	<p><b>Responsible Party:</b> RWRPC.</p> <p><b>Cost:</b> Staff time.</p> <p><b>Time-Line:</b> End of 2007.</p>
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. Communicate from the RWRPC to localities what Page and Shenandoah counties have done and encourage replication of <b>water resources committees</b> by other localities.	<p><b>Responsible Party:</b> RWRPC.</p> <p><b>Cost:</b> Staff time.</p> <p><b>Time-Line:</b> Second half of 2007.</p>

**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.**

Level of Effort	Actions	Details
<p>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.</p>	<p>1: Provide ongoing support and encouragement for <b>regional greenway/green space</b> efforts.</p>	<p><b>Responsible Party:</b> RWRPC.</p>
		<p><b>Cost:</b> None.</p>
		<p><b>Time-Line:</b> Ongoing.</p>
<p>Propose consideration of a “<b>Shenandoah Valley Green Space Vision</b>” <b>planning process</b> to consider linkages between economic vitality and quality of life.</p>	<p>2. Work with the Valley Conservation Council and/or other organizations to express interest in pursuing a <b>regional green space vision</b>. Establish the feasibility of such an effort.</p>	<p><b>Responsible Party:</b> RWRPC and VCC.</p>
		<p><b>Cost:</b> Staff time.</p>
		<p><b>Time-Line:</b> Second half of 2007.</p>

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

Level of Effort	Actions	Details
<p>Encourage DCR, DEQ and related State economic development agencies to develop a strategy for <b>more effectively promoting</b> businesses and farms that are certified under existing water quality programs such as environmentally friendly lawn care and the Clean Farm Awards.</p>	<p>1: 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.</p>	<p><b>Responsible Party:</b> RWRTC.</p>
		<p><b>Cost:</b> Staff time.</p>
		<p><b>Time-Line:</b> First half of 2008.</p>
<p>Assess areas where <b>additional certifications are needed</b> and work with DCR and DEQ to establish new certification programs. Develop a state/regional strategy for promoting these businesses or farms.</p>	<p>2. Form ad-hoc committee of RWRPC Technical Committee members and stakeholders to work with DEQ and DCR.</p>	<p><b>Responsible Party:</b> RWRTC.</p>
		<p><b>Cost:</b> Staff time.</p>
		<p><b>Time-Line:</b> First half of 2008.</p>
<p>Create a <b>larger market branding strategy</b> for Valley products, similar to the Made in Virginia branding strategy. Only products that engage in water-wise practices can participate.</p>	<p>3. Consider this a long-term strategy for consideration by the RWRPC.</p>	<p><b>Responsible Party:</b> RWRPC.</p>
		<p><b>Cost:</b> To be determined.</p>
		<p><b>Time-Line:</b> Consider in 2011.</p>

## TIME LINE

Strategy/Action	2007	2008	2009	2010	2011
<b>Strategy #1</b>					
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	■				
<b>Strategy #2</b>					
1: Adopt Drought Response Plan			■		
2: Regional Press Release Protocol			■		
3: Identify Education Materials		■			
4: Scope for Customizing Education Materials			■		
5: Water Supply Web Portal	■	■			
6: Consider Regional Conservation Plan				■	
<b>Strategy #3</b>					
1: Assess Need for Cooperative Tools	■	■	■	■	■
2: Subcommittee to Examine Model Ordinances		■			
<b>Strategy #4</b>					
1: Pursue Water Resources Science Plan	■	■			
<b>Strategy #5</b>					
1: Legislative Priority Development		■	■	■	■
2: Budget Request to Governor		■	■	■	■
3: Meet with Northern Virginia RC	■				
<b>Strategy #6</b>					
1: Consider Recognition Program	■				
2: Consider Regional Media Strategy		■			
3: Subcommittee on Reporting Hot-Lines			■		

Strategy/Action	2007	2008	2009	2010	2011
<b>Strategy #7</b>					
1: USGS Continuous Monitoring Funding	■				
2: Subcommittee on Monitoring Needs		■			
<b>Strategy #8</b>					
1: Subcommittee on Education and Outreach		■			
<b>Strategy #9</b>					
1: Plan Adoption by NSVRC and CSPDC	■				
2: Budget Plan Development		■			
3: Support Local Water Resources Committees		■			
<b>Strategy #10</b>					
1: Support Greenway Efforts	■	■	■	■	■
2: Valley Greenway Plan		■			
<b>Strategy #11</b>					
1&2: Subcommittee on Certification Programs		■			
3: Market Branding Strategy					■

## 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

# REGIONAL RELATIONSHIPS MATRIX

Federal	Regional Water Resources Policy Committee									
Interstate	EPA - Region II Great Valley Water Resources Service Forum - JUNE 2000									
State	Virginia Chesapeake Bay Program Virginia Department of Health - VDH - Legislation Office Department of Environmental Quality - DEQ - Water Office Department of Transportation & Infrastructure - Shenandoah Valley Department of Forestry									
Region	Shenandoah Valley - R04									
County/Independent City/Municipality	Augusta Co. (Augusta)	Shenandoah Co. (Fryingpan)	Rockingham Co. (Rockingham)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)
Policy Committee Area	Augusta Co. (Augusta)	Shenandoah Co. (Fryingpan)	Rockingham Co. (Rockingham)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)
Policy Committee Area	Augusta Co. (Augusta)	Shenandoah Co. (Fryingpan)	Rockingham Co. (Rockingham)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)
Region	Shenandoah Valley - R07									
County/Independent City/Municipality	Jefferson Co. (Jefferson)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Jefferson Co. (Jefferson)
Policy Committee Area	Jefferson Co. (Jefferson)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Jefferson Co. (Jefferson)
Policy Committee Area	Jefferson Co. (Jefferson)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Jefferson Co. (Jefferson)
Region	Shenandoah Valley - R08									
County/Independent City/Municipality	Jefferson Co. (Jefferson)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Jefferson Co. (Jefferson)
Policy Committee Area	Jefferson Co. (Jefferson)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Jefferson Co. (Jefferson)
Policy Committee Area	Jefferson Co. (Jefferson)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Jefferson Co. (Jefferson)
Region	Shenandoah Valley - R09									
County/Independent City/Municipality	Jefferson Co. (Jefferson)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Jefferson Co. (Jefferson)
Policy Committee Area	Jefferson Co. (Jefferson)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Jefferson Co. (Jefferson)
Policy Committee Area	Jefferson Co. (Jefferson)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Jefferson Co. (Jefferson)
Region	Shenandoah Valley - R10									
County/Independent City/Municipality	Jefferson Co. (Jefferson)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Jefferson Co. (Jefferson)
Policy Committee Area	Jefferson Co. (Jefferson)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Jefferson Co. (Jefferson)
Policy Committee Area	Jefferson Co. (Jefferson)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Warren Co. (Warren)	Page Co. (Page)	Waynesboro (Waynesboro)	Stafford Co. (Stafford)	Shenandoah Co. (Shenandoah)	Frederick Co. (Frederick)	Jefferson Co. (Jefferson)

# TECHNICAL COMMITTEE MEMBERSHIP AND STAKEHOLDER PARTICIPATION LIST

