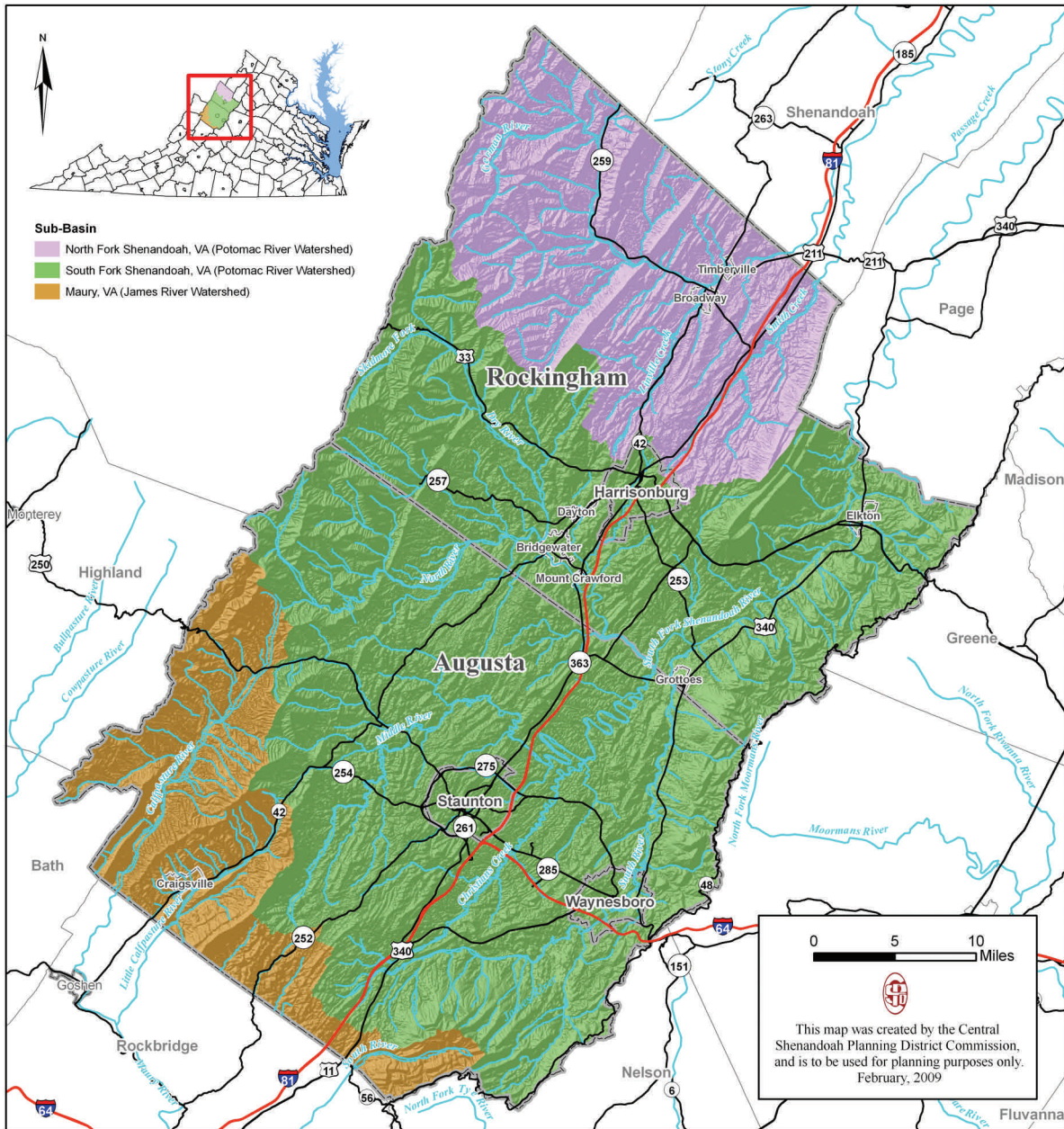


Upper Shenandoah River Basin


Water Supply Plan Executive Summary

August 2011



Prepared and Submitted By:





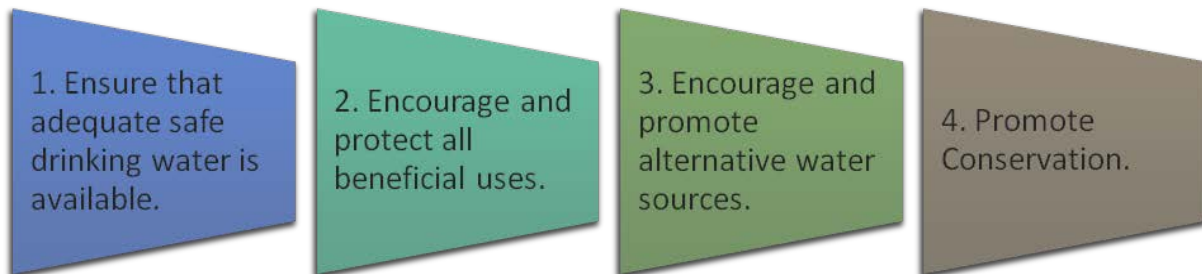
This report was prepared by the Central Shenandoah Planning district Commission (CSPDC). The CSPDC was chartered on September 30, 1969 and is comprised of five counties, five cities and eleven towns. For over forty years, the CSPDC has been providing assistance to local governments and their citizens with issues including land use planning and regulation, transportation, disaster mitigation and preparedness, solid waste management, economic development, water and waste water, emergency management, housing, water resource management and human services. The Central Shenandoah Planning District Commission makes every effort to respond to the changing needs of the citizens of the Central Shenandoah Valley. Should you have any questions, please call or email us.

Executive Summary

Introduction

The Upper Shenandoah River Basin Water Supply Plan was developed in accordance with 9-VAC 25-780, Local and Regional Water Supply Planning. This requirement provides guidance to localities in developing a Water Supply Plan – a regulation that became mandated to all localities by the General Assembly. The final regulations became effective November 2, 2005 and made provisions for all localities electing to participate in a regional water supply planning effort to submit plans to the Virginia Department of Environmental Quality no later than November 2, 2011.

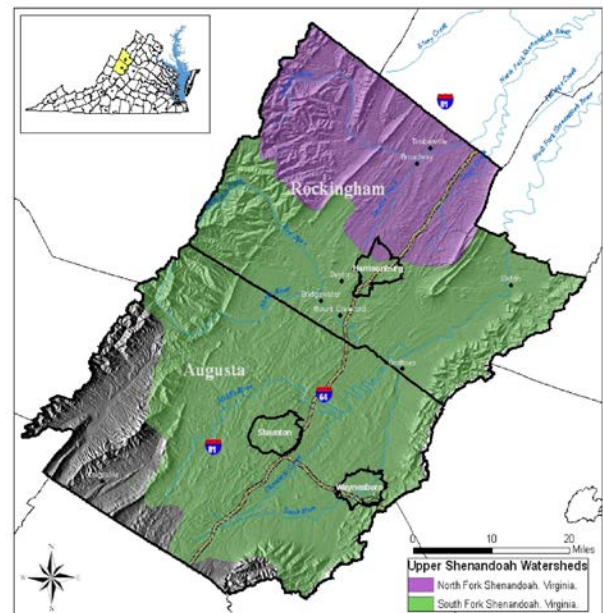
This plan is designed to:



Planning Area

“Planning area” is defined in regulation 9 VAC 25-780-100 B as the geographical area as defined by local government boundaries that is included in the local or regional water supply plan. The Upper Shenandoah River Basin WSP includes 13 localities:

- Augusta County
- Town of Bridgewater
- Town of Broadway
- Town of Craigsville
- Town of Dayton
- Town of Elkton
- Town of Grottoes
- City of Harrisonburg
- Town of Mt. Crawford
- Rockingham County
- City of Staunton
- Town of Timberville
- City of Waynesboro



Planning Process

In early 2006, sub-regional groups began forming in the Upper Shenandoah Basin communities where Augusta-Staunton-Waynesboro formed one regional entity and Rockingham-Harrisonburg formed a separate one. During the summer of 2006, grants were announced to assist localities in develop water supply planning work. The CSPDC was awarded a grant matched by local contributions to develop a water supply plan on behalf of the sub-region.

For the Upper Shenandoah Basin communities to develop the best comprehensive planning document and also to make best use of fiscal resources, they joined to form one regional group. This provided a strong regional group that coincided with the political boundaries of the Upper Shenandoah Basin communities that fall within the service area of the Central Shenandoah Planning District Commission. During the late summer/early autumn 2006, localities were invited to the regional table as they fell within the regulation to develop and maintain their individual or regional water supply plans. In 2007, the Upper Shenandoah Basin Water Supply Planning Committee was created. The planning effort was led by the Central Shenandoah Planning District Commission.

Upper Shenandoah Water Supply Technical Advisory Committee

Name	Locality/ Organization
Timothy Fitzgerald	Augusta County
Jennifer Hoover	Augusta County Service Authority
Warren Heidt	Rockingham County
Mike Collins	City of Harrisonburg
Tom Sliwoski	City of Staunton
Nate Litteral	City of Waynesboro
Shane Pyles	Town of Bridgewater
Ross Clem	Town of Broadway
John Temple	Town of Craigsville
Lelan Siler	Town of Dayton
Reid Wodicka	Town of Elkton
Ashley Jacobs	Town of Grottoes
-	Town of Mt. Crawford*
Austin Garber	Town of Timberville
Sara Jordan	Virginia DEQ
Tammy Stephenson	Virginia DEQ

* Town of Mt. Crawford is represented by Rockingham County

Other Water Planning Efforts

At the same time the Upper Shenandoah communities were forming a working committee or Technical Advisory Committee (TAC), there were water supply planning efforts underway on regional, sub-regional and macro-regional levels throughout the Shenandoah River Basin.

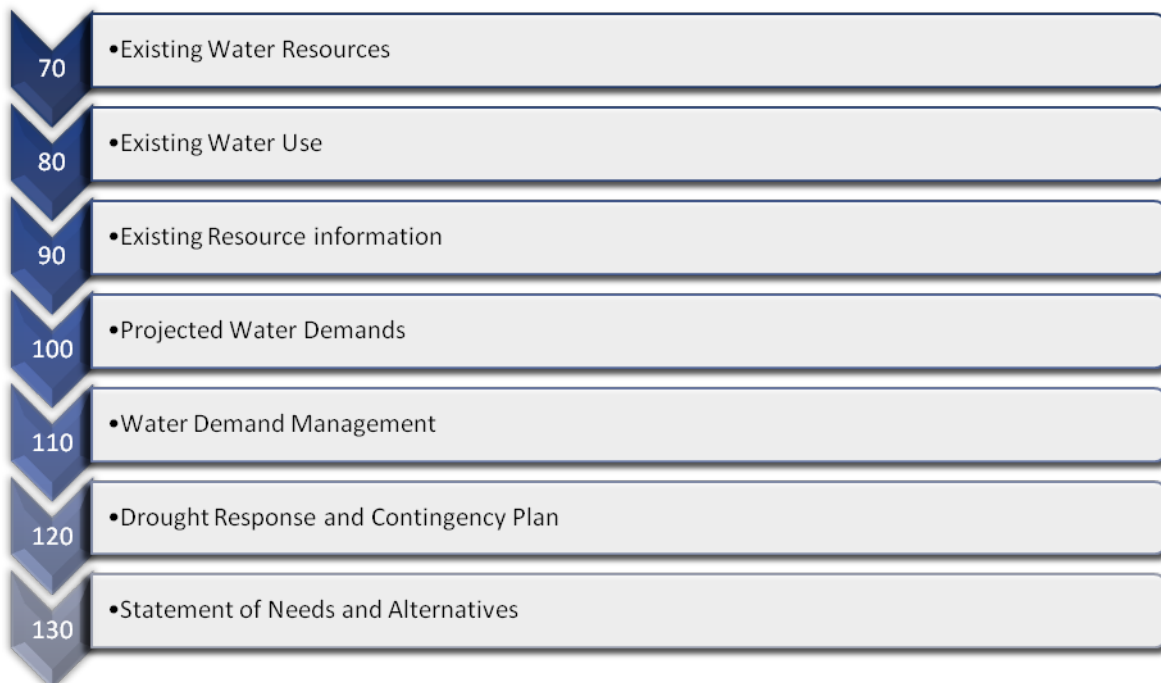
The USGS began working on a 6-year Minimum In-stream Flow (MIF) study of the South Fork of the Shenandoah River. The majority of the planning area for this plan falls within the watershed boundary of the South Fork Shenandoah River. The MIF study was completed in September 2010 and will be helpful in future updates/review of the water supply planning effort.

Also on-going at a macro-regional level is the Shenandoah Basin Water Strategic Plan that is managed by the Northern Shenandoah Valley Regional Commission (NSVRC). There is great benefit to regional discussions regarding water resources throughout the basin as both the northern Valley and central Valley will be competing for water resources out of the same river particularly in an era of rapid growth for many localities within the planning area.

The Central Shenandoah Planning District Commission helped in the coordination of these planning efforts by acting as a liaison between localities and regulatory agencies. Additionally, the CSPDC helped to organize educational outreach efforts by hosting workshops and facilitating work group sessions.

WSP Structure

As outlined by regulation 9 VAC 25-780, this plan contains the elements listed below. This information was collected from existing, readily available information and additional detailed studies. Combined, these elements allow for a comprehensive analysis and planning of the water resources in the Upper Shenandoah River Basin.



Section 70 – Existing Water Resources

Section 70 requests localities within the planning area to submit information regarding their existing water sources, including groundwater, surface water reservoirs and stream intakes. For purposes of this plan, a community water system is one that is owned, operated, and/or maintained by a local government.

Municipal Community Water Systems

Owner	Water System	Source
Augusta County	250 West Water	Purchased – City of Staunton (Middle River, Gardner Spring and Elkhorn Lake/ North River Dam Interconnected System)
	Middlebrook	Groundwater – 1 well
	Augusta Springs	Groundwater – 1 well, 1 spring
	Blackburn	Purchased – City of Staunton (Middle River, Gardner Spring and Elkhorn Lake/ North River Dam interconnected System)
	Churchville	Groundwater – 5 wells
	Deerfield	Groundwater – 1 well, 1 spring
	Dooms	Groundwater – Vesper View well; Additional source water available from Waynesboro interconnection
	Estaline Valley	Purchased – Town of Craigsville (4 wells, 2 springs)
	Harriston (Harriston East Subdivision)	Groundwater – 2 wells
	South River	Coles Run Reservoir, 6 groundwater wells
	Verona	Quicks Spring, Purchased – City of Staunton (Middle River, Gardner Spring and Elkhorn Lake/ North River Dam)
	Weyer’s Cave: Dice’s Spring	Dice’s Spring
Town of Bridgewater	Town of Bridgewater – Countryside Estates	North River Groundwater – 1 well
Town of Broadway	Town of Broadway	North Fork Shenandoah River, Linville Creek
Town of Craigsville	Town of Craigsville	Groundwater – 4 wells, 2 springs
Town of Dayton	Town of Dayton	Groundwater – 2 wells, Silver Lake Spring
Town of Elkton	Town of Elkton	Groundwater – 2 wells
Town of Grottoes	Town of Grottoes	Groundwater – 3 wells
City of Harrisonburg	City of Harrisonburg	Switzer Dam/ Dry River and North River (primary sources) Silver Lake and purchase agreement with Rockingham County (contingency sources)
Rockingham County	Rosedale	Purchased – City of Harrisonburg
	Harmany Hills	Purchased – City of Harrisonburg
	Mount Crawford	Owned by Town – water service provided and maintained by Rockingham County
	RR Donnelly/Smith Creek	Purchased – City of Harrisonburg
	Lilly Subdivision	Groundwater – 2 wells
City of Staunton	City of Staunton	Middle River, Gardner Spring and Elkhorn Lake/ North River Dam (
Town of Timberville	Town of Timberville	Groundwater – 2 wells, 1 spring
City of Waynesboro	City of Waynesboro	Groundwater – 2 wells, 1 spring

In addition to the municipal systems listed above the planning area has 20 private community water systems using groundwater. Of these, 11 are located in Rockingham County while the remaining 9 are located in Augusta County. Many of these private systems provide water to subdivisions or mobile home parks. There are no private systems using surface water and only one community water system using a stream intake.

This plan also identifies large self-supplied users, both agriculture and non-agriculture. There are 17 total non-agricultural large self-supplied users. Of the 9 large self-supplied groundwater users 5 are located in Rockingham County, 2 in Waynesboro, 1 in Staunton and 1 in Augusta County. Of the 8 large self-supplied surface water users, 4 are located in Rockingham County, 3 in Augusta County and 1 in Waynesboro. There are 19 agricultural large self-supplied users.

There is no groundwater or surface water purchased from outside the geographic boundaries of the planning area. There are no existing contracts or known current planning efforts to purchase water from outside the geographic boundaries of the planning area.

Section 80 – Existing Water Use

Section 80 of the regulation requires a description of existing water use. These data are compiled from several sources: VDH permit compliance reports, VDEQ water withdrawal reports, and the individual localities and water purveyors. Years 2002 and 2003 were chosen to indicate differences in usage and source water availability during a drought year followed directly by a wet water year. The Year 2006 was chosen to represent the most current data for all systems. The TAC also determined that the community systems would provide historic disaggregated water consumption by use for year 2006.

**2006 Average Daily Withdrawal (MGD)
Municipal Community Water Systems**

Locality	Average
ACSA	4.009
Bridgewater	0.83
Broadway	0.433
Craigsville	0.355
Dayton	1.635
Elkton	0.353
Grottoes	0.245
Harrisonburg	6.479
Rockingham*	2.007
Staunton	3.91
Timberville	0.221
Waynesboro	3.256
*Includes Mount Crawford	

Large Self Supplied Users (Non-Ag) - Surface Water 2006 Average Daily Withdrawal (MGD)

Locality	User	MGD
Rockingham	Brett Aggregates, Inc.	.0449
	Lakeview Development Corporation Golf Course	.0249
	Spotswood Country Club	.0289
Staunton	Staunton Country Club	.0360
Waynesboro	Augusta Lumber	.0120
	Waynesboro Country Club	.0669
	Invista, Inc.	.1960

Large Self Supplied Users (Non-Ag) - Groundwater 2006 Average Daily Withdrawal (MGD)

Locality	User	MGD
Augusta County	Alcoa Flexible Packaging	1.312
	Ingleside Hotel	0.031
	Skyline Swannanoa, Inc.	0.018
Rockingham	Adolph Coors	1.173
	Lakeview Development Corporation Golf Course	.0642
	Merck & Co.	6.615
	Spotswood Country Club	0.031
	Valley Proteins, Inc.	0.049
Waynesboro	Invista, Inc.	3.934

Large Self Supplied Users (Ag) – Surface & Groundwater 2006 Average Daily Withdrawal (MGD)

Locality	Surface Water	Groundwater
Augusta County	.599	.0265
Rockingham County	.0126	.1008

Section 90 – Existing Resource Information

Section 90 of the regulation requests a description of existing resource conditions to include geologic, hydrologic, and meteorological conditions in the planning area. In addition, a description of existing environmental conditions must be included that pertains to, or may possibly affect in-stream uses, and water supply sources currently serving the area.

Geology

The study area is part of the Valley and Ridge Physiographic Province, which is characterized by gently rolling and hilly valleys, as well as gradual mountain slopes. Elevations range from a high of 4,463 feet above sea level at Elliott's Knob to a low of 900 feet above sea level near the Rockingham and Page County border.

Hydrology

The study area has a high quality of hydrological resources. A narrow belt along the western toe of the Blue Ridge Mountains has a particularly high potential for groundwater because of favorable geologic and recharge conditions. High capacity wells have been developed successfully throughout the planning area. Surface springs in the area result from significant sources of groundwater.

The entire study area is situated in the Shenandoah River drainage basin. The major waterways are the North and South Forks of the Shenandoah River in Rockingham County. These two rivers are part of the Potomac River Basin which flows to the Chesapeake Bay. The North and South Rivers pass through portions of Rockingham and Augusta County and the Middle River flows through the north central portion of Augusta County.

Meteorology and Climate

The climate of the study area is classified as modified continental with mild winters and warm summers. The mountains and elevation are major factors controlling the climate. Annual normal temperatures average 53 degrees and annual precipitation averages 35 inches.

Scenic Rivers and Recreational Destinations

The Scenic Rivers Act of 1970 was passed to protect and preserve specific rivers or river segments of significant natural beauty. There is one river within the planning area that is legislatively designated as a scenic river; the St. Marys River from its headwater's in Augusta County to the boundary with the George Washington National Forest. Two additional rivers within the planning area are designated as having potential for scenic rivers listing. These include the Calfpasture River in Augusta County, from Route 250 to Marble Valley, and the South Fork Shenandoah River in Rockingham County from Port Republic to Goods Mill.

Additional information can be found regarding the following topics in Section 90:

- Anadromous, Trout & Other Significant Hatcheries
- Historic and Archaeological Resources
- Geologic Formations
- Riparian Buffers & Conservation Easements
- Land Use and Land Cover
- Impaired Streams
- Point Source Discharges
- Potential Threats

Section 100 – Projected Water Demands

Section 100 of the regulation requests a description of projected water demands to include population estimates and projections, estimated water demand within the planning are for 30 to 50 years, and estimated future water use.

Population Projections

Locality	2010	2020	2030	2040
Augusta County*	74,000	82,900	91,700	
Bridgewater	5,644	6,600	7,600	8,600
Broadway	3,691	4,960	6,666	8,959
Craigsville	1,099	1,218	1,338	1,458
Dayton	1530	1755	2013	2308
Elkton	2726	3790	5269	7326
Grottoes	2668	3455	4475	5796
City of Harrisonburg	48,914	60,154	73,977	90,977
Mt. Crawford**				
Rockingham County	76,314	86,579	98,225	111,437
City of Staunton	23,746	25,295	26,945	28,703
Timberville	2,044	2,486	3,023	3,676
City of Waynesboro	21,006	22,658	24,440	26,363

*Projections only available for 2017, 2027, 2037

** Included in Rockingham County Projections

Projected Water Demand (MGD) Municipal Community Water Systems

Locality	2010	2020	2030	2040
Augusta County*	4.78	5.95	7.20	9.46
Bridgewater	0.79	1.29	1.55	1.72
Broadway	0.37	0.50	0.67	0.90
Craigsville	0.377	0.399	0.421	0.442
Dayton	0.1125	0.1277	0.1449	0.1644
Elkton	0.2004	0.2757	0.3794	0.5220
Grottoes	0.1961	0.2514	0.3222	0.4130
City of Harrisonburg	6.29	7.93	9.57	11.04
Mt. Crawford**				
Rockingham County	2.98	4.97	6.80	9.53
City of Staunton	4.01	4.71	5.42	6.64
Timberville	0.24	0.36	0.36	0.43
City of Waynesboro	1.5439	1.6484	1.7597	1.8784

*Projections only available for 2017, 2027, 2047

**Included in Rockingham County Projections

2040 Projected Water Demand (MGD) Large Self-Supplied Users (Non-Ag)

Locality	2040 (MGD)
Augusta County	1.36
Staunton	.04
Rockingham County	8.61
Waynesboro	4.20
Planning Region	14.21

2040 Projected Water Demand (MGD) Large Self-Supplied Users (Ag)

Locality	2040 (MGD)
Augusta County	.63
Rockingham County	.2
Planning Region	.83

Section 110 – Water Demand Management

Section 110 of the regulation requests a description of water demand management to include information describing efficient water use practices, water conservation measures and practices to address water loss. Data was collected from Demand Management Forms submitted by the localities.

Additional information can be found regarding the following topics in Section 110:

- Adoption of Virginia Uniform Building Code
- Local Water Use Ordinances or Plans
- Homeowners' Association
- Wasteful Water Use
- Irrigation Efficiency
- Municipal/ Private Water Suppliers
- Efficient Water Use Practices
- Water Conservation
- Water Loss Reduction
- Capital Improvement Plans
- Public Education

Section 120 – Drought Response and Preparedness Plan

In accordance with the Water Supply Planning regulations (9 VAC 25-780-120), a Regional Drought Plan has been developed for the Upper Shenandoah Basin to guide communities in the planning area through instances when water shortages lead to drought conditions.



The Plan includes three drought response levels ranging from drought watch to drought emergency. These drought stage triggers are among the primary “hard line” or mandatory triggers in the Plan. Once a drought watch level has been declared, progression through drought warning and emergency stages will be declared based on threats to the localities’ supplies and/or local system indicators that indicate negative impacts to the utility’s groundwater supplies or stream intakes.

These region-wide conservation measures in the Plan may be implemented on an individual locality basis when an Upper Shenandoah River Basin local government declares a drought stage. It is possible that the increased public awareness of water conservation activities during a drought stage may reduce water use up to 5% to 15%.

Section 130 – Statement of Needs and Alternatives

Section 130 of the regulation requests a description of adequacy of existing supplies to meet current and projected demands. If deficits are expected a general discussion of potential alternatives is to be included.

Projected Year 2040 water demands and current permitted capacities of each municipal system were compared to determine adequacy of existing supplies. Based solely on that analysis, the region as a whole, will meet its projected 2040 water demand with the existing regional supply. However, that would assume that the necessary infrastructure was in place to move water around the region as necessary to meet individual community deficits. Realistically, that is not the case. The following localities show future deficit with their municipal water systems.

- Augusta County
- Town of Bridgewater
- Town of Broadway
- Town of Grottoes
- City of Harrisonburg
- Rockingham County
- Town of Timberville

Additional information is included on private water system and self-supplied users.

Additional Documentation

Each locality is responsible for adopting a Resolution in support of the Upper Shenandoah River Basin Water Supply Plan. A Model resolution is presented below.

RESOLUTION

Adoption of the Upper Shenandoah River Basin Water Supply Plan

WHEREAS, the Virginia General Assembly has mandated the development of local and regional water supply programs throughout the Commonwealth and the State Water Control Board has developed regulations 9 VAC 25-780, Local and Regional Water Supply Planning, to implement this planning process; and

WHEREAS, based upon these regulations, county, cities, and towns are required to complete a water supply program that fulfills the regulations by deadlines based on population.

WHEREAS, local governments may elect to join one or more other local governments to develop a regional water supply program for which a deadline of November 2, 2011 has been established.


WHEREAS, the following elements must be included in all local or regional water supply programs:

- A description of existing water sources;
- A description of existing water use;
- A description of existing water resource conditions;
- An assessment of projected water demand;
- A description of water management actions;
- A statement of need;
- An alternatives analysis that identifies potential alternatives to address projected deficits in water supplies;
- A map or maps identifying important elements of the program that may include existing environmental resources, existing water sources, significant existing water uses, and proposed new sources;
- A copy of the adopted program documents including any local plans or ordinances or amendments that incorporate the local program elements required by this chapter;
- A resolution approving the plan from each local government that is party to the plan; and
- A record of the local public hearing, a copy of all written comments and the submitter's response to all written comments received, and

WHEREAS, it is reasonable and prudent for the following local governments to coordinate and collaborate in the development of a regional water supply program:

Augusta County
Rockingham County
City of Harrisonburg
City of Staunton
City of Waynesboro
Town of Bridgewater
Town of Broadway

Town of Craigsville
Town of Dayton
Town of Elkton
Town of Grottoes
Town of Mt. Crawford
Town of Timberville



WHEREAS, [JURISDICTION] is part of the Upper Shenandoah River Basin Regional Water Supply Plan which includes the 13 localities listed above;

WHEREAS, the Upper Shenandoah River Basin Regional Water Supply Plan was developed in accordance with Virginia Regulation 9 VAC 25-780-70 through 9 VAC 25-780-130; and

WHEREAS, on [DATE], [JURISDICTION] held a public hearing to accept public comment on the Upper Shenandoah River Basin Regional Water Supply Plan and all written comments submitted have received a written response as required; and

NOW, THEREFORE BE IT RESOLVED that the [GOVERNING BODY] of the [JURISDICTION] hereby adopts the Upper Shenandoah River Basin Regional Water Supply Plan as it pertains to [JURISDICTION]. Approval and adoption of this regional plan indicates support for and general agreement with the regional planning approach, but does not indicate approval or disapproval of conclusions and recommendations presented in the plan as they pertain to other localities. [JURISDICTION] reserves the right to comment on specific water supply alternatives in the future even though such alternatives may be recommended in this adopted plan. [JURISDICTION] will not be limited to specific water supply alternatives in this adopted plan and reserves the right to recommend additional alternatives for consideration in the future.

BE IT FURTHER RESOLVED that the [GOVERNING BODY] of the [JURISDICTION] intends that the Upper Shenandoah River Basin Regional Water Supply Plan shall be revised to reflect changes in relevant data at least once every five years and shall be revised and resubmitted to the Virginia Department of Environmental Quality every ten years in accordance with the regulation and sound planning practice.

PASSED, APPROVED AND ADOPTED by the [GOVERNING BODY] of the [JURISDICTION] at a meeting held on [DATE].