

Chapter 1 Virginia's Water Resources Planning Process

Planning and Water Resources Management in Virginia

This Chapter discusses the history of water resources planning in Virginia, the interrelationship between this State Water Resources Plan (SWRP) and water use permitting, and current water supply planning efforts in Virginia. It also includes a brief overview of Virginia's population, economy, and anticipated growth as they relate to water resources management and planning.

Water resources management encompasses planning, developing, distributing, and managing water resources for their optimum use. These interrelated tasks can be accomplished by considering all of the competing demands for water, allocating water resources on an equitable basis, and satisfying all uses and demands.

Water supply planning in Virginia is designed, among other goals, to encourage, promote, and protect all beneficial uses of the Commonwealth's water resources. As defined by § 62.1-44.3 of the Code of Virginia:

"Beneficial use" means both in-stream and off-stream uses. In-stream beneficial uses include, but are not limited to, the protection of fish and wildlife resources and habitat, maintenance of waste assimilation, recreation, navigation, and cultural and aesthetic values. The preservation of in-stream flows for purposes of the protection of navigation, maintenance of waste assimilation capacity, the protection of fish and wildlife resources and habitat, recreation, cultural and aesthetic values is an in-stream beneficial use of Virginia's waters. Off-stream beneficial uses include, but are not limited to, domestic (including public water supply), agricultural uses, electric power generation, commercial, and industrial uses.

The Commonwealth of Virginia is rich in volume, type, and diversity of water resources. Precipitation averages almost 43 inches of rain per year, much more than many other states. However, as the impacts of the droughts of the last two decades demonstrated, this resource cannot be taken for granted. The Commonwealth and its localities must work together to manage and protect the water resources to meet long-term human and environmental needs. Improved coordination of drought response and water resources management activities at the local, regional, and state levels are essential to guaranteeing the adequacy of water supplies to meet current and future needs of Virginia's citizens in an environmentally sound manner. The challenge is to ensure sufficient water supplies are available to meet existing and future beneficial uses of water.

Water Resource Planning

Virginia has been involved in water resources management and water supply planning since 1927. Early efforts (between 1927 and 1968) involved the development of various “bulletins” developed periodically for major river basins. These early reports primarily examined surface water, with some effort to describe groundwater resources. The information in these plans was based upon streamflow data and water availability. Planning efforts expanded between 1968 and 1972, following an extended multi-year drought. Reports examining water availability were again developed by major river basin during this time. However, these plans differed from the early plans in that they contained the first inventory of local water use.

The authority⁷ for these early plans and reports outlines the following principles and policies:

- 1) Existing water rights are to be protected and preserved subject to the principle that all of the state waters belong to the public for use by the people for beneficial purposes without waste;
- 2) Adequate and safe supplies should be preserved and protected for human consumption, while conserving maximum supplies for other beneficial uses. When proposed uses of water are in mutually exclusive conflict or when available supplies of water are insufficient for all who desire to use them, preference shall be given to human consumption purposes over all other uses;
- 3) It is in the public interest that integration and coordination of uses of water and augmentation of existing supplies for all beneficial purposes be achieved for maximum economic development thereof for the benefit of the Commonwealth as a whole;
- 4) In considering the benefits to be derived from drainage, consideration shall also be given to possible harmful effects upon groundwater supplies and protection of wildlife;
- 5) The maintenance of streamflows sufficient to support aquatic life and to minimize pollution shall be fostered and encouraged;
- 6) Watershed development policies shall be favored, whenever possible, for the preservation of balanced multiple uses, and project construction and planning with those ends in view shall be encouraged;
- 7) Due regard shall be given in the planning and development of water recreation facilities to safeguard against pollution.

Amended in 1981, Section 62.1-44.38 of the Code of Virginia required preparation and submission of a plan and programs for the management of the Commonwealth’s water resources “to encourage, promote and secure the maximum beneficial use and control thereof.” Plans were required for each major river basin of the Commonwealth, specifically naming the Potomac-Shenandoah, Rappahannock, York, James, Chowan, Roanoke, New, and the Tennessee-Big Sandy River Basins, and for those areas in the

⁷ Code of Virginia §62.1-44.36

Tidewater and elsewhere in the Commonwealth not within these major river basins, and were to include the following information:

- An estimate of current water withdrawals and use for agriculture, industry, domestic use, and other significant categories of water users.
- A projection of water withdrawals and use by agriculture, industry, domestic water use, and other significant categories of water users.
- An estimate, for each major river and stream, of the minimum in-stream flows necessary to maintain water quality and avoid permanent damage to aquatic life in streams, bays, and estuaries during drought conditions.
- An evaluation, to the extent practicable, of the ability of existing subsurface and surface waters to meet current and future water uses, including minimum in-stream flows, during drought conditions.
- An evaluation, in cooperation with the Virginia Department of Health and local water supply managers, of the current and future capability of public water systems to provide adequate quantity and quality of water.
- An identification of water management problems and alternative water management plans to address such problems.
- An evaluation of the hydrologic, environmental, economic, social, legal, jurisdictional, and other aspects of each alternative management strategy identified.

Following the 1981 amendments to § 62.1-44.38, water supply planning efforts were undertaken as major river basin plans were developed between 1985 and 1988. For the first time, safe yield⁸ and analysis of local demand were included in plans in addition to information on water availability and an inventory of local systems and use.

Establishment of a Comprehensive Water Supply Planning Process

Despite Virginia's early efforts to better manage water resources, during the drought of 1999-2002 some localities were unprepared for a dwindling water supply. The intensity of the drought impacts peaked in late August 2002. Wildfire indices were at levels previously unrecorded in Virginia, the vast majority of Virginia agricultural counties had applied for Federal drought disaster designation, streamflows reached a period of record lows, and thousands of individual private wells failed. Several public water supply systems across the Commonwealth were on the brink of failure and a number of large municipal systems had less than 60 days of water supply capacity remaining in reservoirs.

⁸ See "Safe yield" in Glossary.

In response, the Virginia General Assembly amended the Code of Virginia⁹ to require the establishment of a “comprehensive water supply planning process for the development of local, regional, and state water supply plans...designed to (i) ensure that adequate and safe drinking water is available to all citizens of the Commonwealth, (ii) encourage, promote, and protect all other beneficial uses of the Commonwealth's water resources, and (iii) encourage, promote, and develop incentives for alternative water sources, including, but not limited to desalination.”

The distinction between this water supply planning effort and previous efforts is the establishment of a continuous, comprehensive, iterative, long range planning process. This planning process involved the development of local or regional plans by local governments; plans were to describe environmental resources, and existing and anticipated water sources, water use, and water demand. These plans, further described in the following sections, form the foundation of this SWRP. The data from the plans provides information necessary to determine the likely impacts on water resources if future demands are met. The planning process also provides information to be considered in the permitting process for future water supply withdrawals.

Local and Regional Water Supply Plans

At the heart of Virginia’s comprehensive water supply planning process are the local and regional water supply plans, the content of which is defined by regulatory requirements. Virginia’s water supply planning program is designed to be a statewide partnership, enabling local and regional partners, such as planning district commissions, water authorities, and other stakeholders, to take the lead in identifying their future water needs with the technical support and oversight of the State. The Local and Regional Water Supply Planning Regulation¹⁰ (WSP Regulation) requires that all counties, cities, and towns in the Commonwealth of Virginia participate in the development of, and formally adopt, a local or regional water supply plan.

Virginia’s Water Resources:

- are finite;
- have multiple uses, each protected by law; and
- are increasingly in demand.

Water Supply Plan Review Process

Ten “local” (individual locality) and 38 “regional” (two or more localities) water supply plans were developed and submitted to the Virginia Department of Environmental Quality (DEQ) by planning entities between 2008 and 2011. DEQ provided technical and financial assistance to facilitate development of the plans and aided localities and regions in acquiring information on existing resource conditions and existing water use and sources. DEQ also assisted with the

⁹Code of Virginia §62.1-44.38:1, 2003

¹⁰ §9VAC 25-780, 2005

identification of methods for the projection of future water needs. As required by the WSP Regulation, all localities in the Commonwealth held public hearings during the development of the water supply plans and formally adopted the plans, and all plans were submitted to DEQ by the regulatory deadlines. DEQ carefully reviewed each plan for compliance with the WSP Regulation, coordinated with local governments to ensure that plans were as complete and accurate as possible, and entered submitted information into the content management system used for the cumulative impact analysis.

Development of the State Water Resources Plan

Information and data submitted in the local and regional water supply plans are included in this SWRP. In addition to the local data, the SWRP incorporates water withdrawal data submitted by water users¹¹ to DEQ. The SWRP includes a cumulative impact analysis based upon information contained in the local and regional water supply plans and other sources. This analysis is discussed in detail in Chapter 5 Assessing the Long Term Sustainability of Water Resources. In its entirety, this SWRP describes the major water supply issues facing state and local governments through 2040. DEQ anticipates updating the SWRP at five-year intervals, with each update reflecting the most recent local and regional water supply planning information.

The first document of its kind in Virginia, the SWRP is the primary mechanism available for achieving wise, long-term water use. Sustainability means maintaining the "beneficial uses" that are considered to be essential to the wellbeing of the Commonwealth's human and natural resources.

Pursuant to Virginia Code § 62.1-44.38, the purpose of the SWRP includes the following:

- Estimate current water withdrawals and use for agriculture, industry, domestic use, and other significant categories of water users;
- Project water withdrawals and use by agriculture, industry, domestic water use, and other significant categories of water users;
- Estimate, for each major river and stream, the minimum in-stream flows necessary during drought conditions to maintain water quality and avoid permanent damage to aquatic life in streams, bays, and estuaries;
- Evaluate, to the extent practicable, the ability of existing subsurface and surface waters to meet current and future water uses, including minimum in-stream flows, during drought conditions;
- Evaluate, in cooperation with the Virginia Department of Health and local water supply managers, the current and future capability of public water systems to provide adequate quantity and quality of water;

¹¹ §9VAC25-200

- Identify water management problems and alternative water management plans to address such problems; and
- Evaluate hydrologic, environmental, economic, social, legal, jurisdictional, and other aspects of each alternative management strategy identified.

Among other uses, the SWRP can be used to:

- Identify and prioritize water resource and water supply development projects.
- Provide information to public and private decision makers regarding water availability to help guide efficient investment and economic development.
- Identify opportunities for improving operation of existing water resources infrastructure.
- Guide the development and implementation of policies and programs to reduce the risk of water shortages from drought and conflicts between water users or uses.
- Guide policies on activities that directly and significantly affect the quantity and quality of water available with the objective of balancing and encouraging multiple uses of water resources.
- Educate the public about the sources and uses of water in the Commonwealth.

Interrelationship between Water Supply Planning and Water Use Permitting

Water supply plans are an important component of the evaluation process for both the Virginia Water Protection (VWP) and Groundwater Withdrawal (GW) permitting programs. Permitting staff in the DEQ VWP and GW permitting programs coordinate with water supply planning staff when evaluating permitting actions. Prior to the issuance of a VWP or GW permit, relevant information contained in water supply plans are given consideration for Virginia Water Protection Permitting¹² and for Groundwater Withdrawal Regulations¹³.

Population, Economy, and Growth Depend upon Water

As Virginia's population and economy continue to grow, so does the need for good quality, reliable water supplies. The future of the economy depends upon having enough water for future needs.

Population

According to the most recent data from the U. S. Census Bureau, the population of the Commonwealth of Virginia is estimated to be 8,185,867, 2.6% of the total United States population. Virginia's population is estimated to have grown 2.5% since the 2010 Census estimate of 8,001,024 persons (Table 1-1).

¹² 9VAC25-210-80 B 2 g, and 9VAC25-210-115 B 2 and C 2

¹³ 9VAC25-610-102

Approximately 86% of all Virginians live in 11 metropolitan areas: Washington-Arlington-Alexandria, Virginia Beach-Norfolk-Newport News, Richmond, Roanoke, Lynchburg, Charlottesville, Blacksburg, Bristol, Winchester, Harrisonburg, and Danville. Approximately 3% of the population lives in seven smaller urban areas (micropolitan areas) and 11% live in rural areas. The percentage of estimated population increase from 2010 to 2040 is 32%. As described later in this SWRP, this is consistent with the projected water use for the same time period.

Region	2010	2020	2030	2040
United States	308,745,538	335,605,444	360,978,449	382,152,235
Virginia	8,001,024	8,871,484	9,701,508	10,415,575

Table 1-1 Population Estimates for U.S. and Virginia: 2010–2040¹⁴

Economy and Growth

Water contributes to economic growth when used for hydroelectric power generation, navigation, and industrial, agricultural, and commercial purposes. Water also provides the streamflows, lakes, and reservoirs necessary to support fish and wildlife, boating, scenic attractions, and related recreation and tourism industries.

In seeking lasting solutions to the growing and competing demands for Virginia’s water resources, the ultimate goal must be to create balance and sustainability. In this respect, a healthy natural environment as well as strong local economies will demonstrate the achievement of balance. Industries and communities must be sustainable and profitable in both the short and long term. Likewise, resource management programs must contribute positively to watershed health. Key to achieving these outcomes is finding practical, common sense ways to balance the economic and cultural needs of communities with the biological needs of natural resources.

¹⁴ Figures updated August 2013 by Weldon Cooper Center for Public Service, Demographics & Workforce Group, www.coopercenter.org