A REPORT TO

THE HONORABLE JAMES S. GILMORE III, GOVERNOR,
AND
THE GENERAL ASSEMBLY OF VIRGINIA

STATUS OF VIRGINIA'S WATER RESOURCES

A Report on Virginia's Water Supply Planning Activities

Department of Environmental Quality
COMMONWEALTH OF VIRGINIA
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I. Introduction

The Commonwealth of Virginia is rich in water resources, both in terms of number and in terms of diversity. With nearly 50,000 miles of streams and rivers, approximately 236,900 acres of tidal and coastal wetlands, thousands of publicly and privately owned lakes, more than 800,000 acres of freshwater wetlands, 120 miles of Atlantic Ocean coastline, and more than 2,500 square miles of estuaries, local governments must work together to ensure appropriate management of these diverse water resources.

Despite its abundant water resources, the state is subject to periodic droughts. Localities with inadequate supply sources or storage can experience water shortages. Continued population growth and changing land uses, such as more urban development, will increase demand. In addition, Virginia faces complicated issues stemming from the many water resources that span more than one jurisdiction. With greater emphasis on the protection of the environment, development of new water supply sources has become more challenging. Effective planning is needed to meet future demands, and reliable data on the status of water resources are needed to inform the planning process.

This report, submitted to the Governor and the Virginia General Assembly in accordance with Chapter 3.2 of Title 62.1 of the Code of Virginia, summarizes the State Water Control Board's (SWCB's) activities related to water resources planning and describes the status of the Commonwealth's water sources, both surface and ground water. The report deals solely with water supply planning and does not address activities related to water quality management. The quality of Virginia's rivers and streams is assessed every two years and reported in the 305(b) Water Quality Assessment Report and the 303(d) Total Maximum Daily Load Priority List (prepared every four years), both of which are available from the Department of Environmental Quality.

II. Water Resources Data

A summary of Virginia's water resources is provided in **Table 1**. Virginia has an estimated 49,350 miles of streams and rivers divided into nine major basins (**Figure 1**). Annual statewide rainfall averages almost 43 inches. The total combined flow of all freshwater streams in the state is estimated at about 25 billion gallons per day. The 248 publicly owned lakes in the Commonwealth have a combined area of 162,230 acres. Additionally, many thousands of other small, privately owned lakes and ponds are distributed throughout the state.

Other significant water features of Virginia include approximately 236,900 acres of tidal and coastal wetlands, 808,000 acres of freshwater wetlands, 120 miles of Atlantic Ocean coastline, and more than 2,500 square miles of estuaries.

III. Hydrologic Data Gathering

A. Surface Water

The Department of Environmental Quality (DEQ) and the U.S. Geological Survey (USGS) are the primary agencies responsible for collecting hydrologic data in Virginia. The two agencies have worked cooperatively since 1925, except for a period between 1957 and 1967 when they operated independently. Virginia is one of only four states with a cooperative agreement with the USGS. The other three are California, Colorado and Illinois. Individually, the agencies carry out their own agendas in the collection of hydrologic data. Together, they provide a comprehensive picture of hydrologic affairs in the Commonwealth.

Table 1. Virginia's Water Resources Data

State Population (1994 Census)	-	6,551,500
State Surface Area	-	40,741 square miles
Major River Basins:		
Potomac/Shenandoah		*Tennessee/Big Sandy*
James		*Chesapeake Bay/Small Coastal*
York		*Rappahannock*
Roanoke		*New*
Chowan River/ Albemarle Sound Coastal Basin		
Perennial River Miles (freshwater)	-	49,350

Publicly Owned Lakes and Reservoirs

	Number	Acres
Larger than 5,000 acres	*5*	*109,838*
Smaller than 5,000 acres	*243*	*52,392*
Total	*248*	*162,230*

Acres of Freshwater Wetlands	-	808,000
Acres of Tidal and Coastal Wetlands	-	236,900
Estuary Square Miles	-	2,500
Atlantic Ocean Coastal Miles	-	120
Statewide Average Annual Rainfall	-	42.8 inches

MAJOR DRAINAGE BASINS IN VIRGINIA

ID	BASIN
1.	POTOMAC AND SHENANDOAH RIVER BASIN
2.	JAMES RIVER BASIN
3.	RAPPAHANNOCK RIVER BASIN
4.	ROANOKE RIVER BASIN
5.	CHOWAN RIVER / ALBEMARLE SOUND COASTAL BASIN
6.	TENNESSEE AND BIG SANDY RIVER BASIN
7.	CHESAPEAKE BAY / SMALL COASTAL BASIN
8.	YORK RIVER BASIN
9.	NEW RIVER BASIN

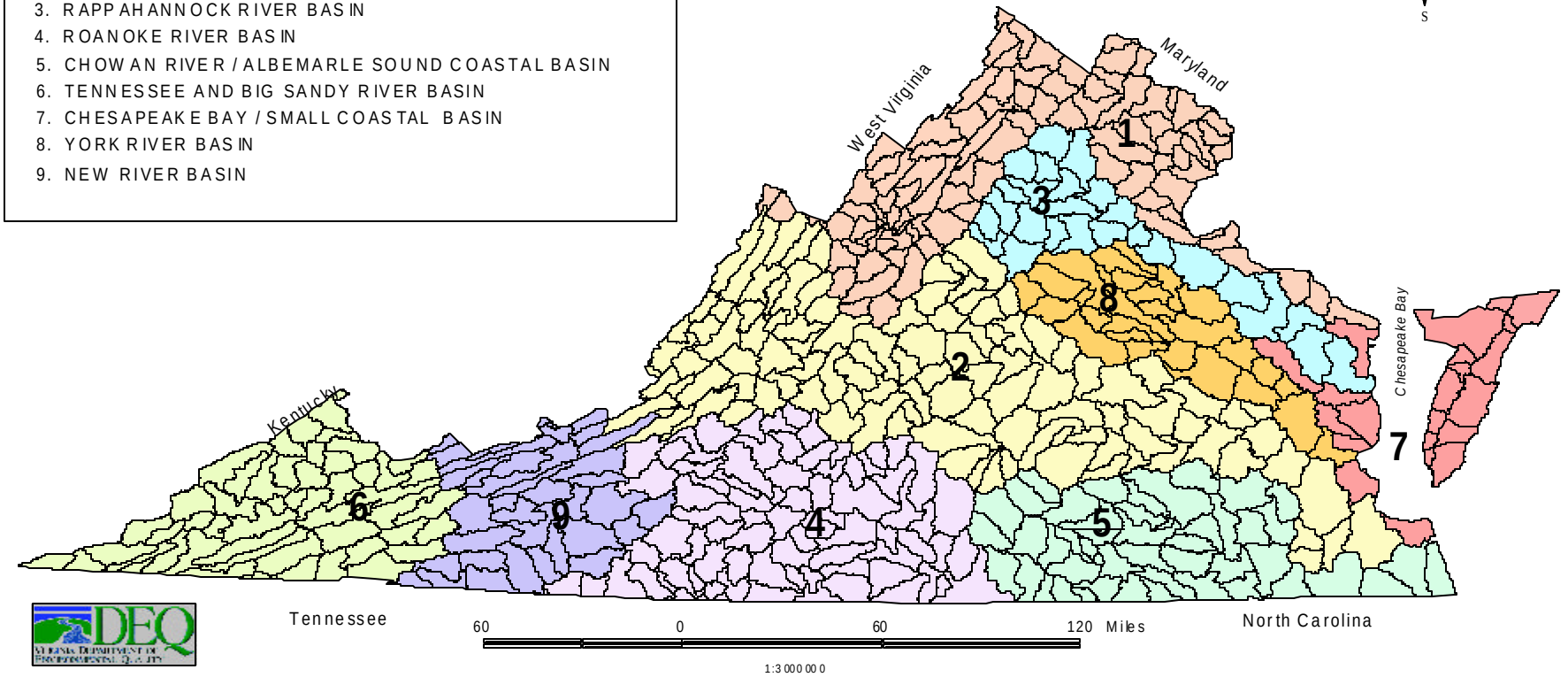

Figure 1. Major River Basins in Virginia

To collect systematic hydrologic data on water surface levels, flow volumes, and other streamflow data, the DEQ operates 67 continuous-record stream-gaging stations and more than 100 miscellaneous measurement sites. The DEQ miscellaneous measurement sites are typically located upstream of the Virginia Pollutant Discharge Elimination System (VPDES) permit discharges, whereas the continuous-record gages are located primarily on larger, free-flowing streams. The USGS operates 90 continuous-record gages and more than 100 miscellaneous measurement sites in Virginia. The USGS collects water quality data at 23 continuous-record gaging stations and at 84 water quality sampling sites. The USGS also operates nine gages that provide stage (surface level height) and contents data on lakes and reservoirs. The flow, lake level, water quality, and miscellaneous measurement data are published in *Volume 1, Water Resources Data – Virginia*, an annual report cooperatively prepared by the DEQ and the USGS. The gages farthest downstream in each major river basin are used to summarize or index the hydrologic condition of the Commonwealth for any given water year; water years run from October 1 through September 30.

These annual hydrologic data indicate that the drought conditions evident throughout much of Virginia during the summer and fall of 1998 carried over into 1999. The spring and summer of 1999 saw streamflows across the Commonwealth decline to levels similar to those of past droughts. Streamflows declined because of the below-normal precipitation rates during the spring and summer of 1999. The result was new annual minimum instantaneous discharges at 21 stream-gaging stations in Virginia.

The 1999 water year ended with virtually all of the index gaging stations showing below-normal flows. Only the Chowan River Basin ended the year in the normal range of flow. The gage farthest downstream in the Blackwater sub-basin of the Chowan River Basin, near Franklin, was the only gage to finish the year above the normal range of flow. The extensive flooding that occurred during the hurricanes of 1999 compensated for the earlier drought in this area.

Streamflows began rebounding statewide in September 1999, primarily because of precipitation from two hurricanes. Hurricane Dennis in early September and Hurricane Floyd in mid-September caused extensive flooding in southeastern Virginia (Chowan Basin) and eastern North Carolina. Five gaging stations documented new annual maximum instantaneous discharges as a result. The distribution of monthly and annual mean discharges for selected index stations is shown in **Figure 2**.

B. Ground Water

The DEQ collects data on ground water level at 181 wells. The USGS collects similar data at 157 wells, with water quality data collected at 86 of those wells. These data are published in Volume 2 of the *Annual Water Resources Data Report*, which is cooperatively prepared by the DEQ and the USGS. The water level data collected by the DEQ contributes to the long-term project with the USGS; this cooperative project is designed to improve ground water modeling abilities in the Virginia Coastal Plain. Three major areas where improved information is needed are saltwater intrusion, ground water interactions with surface water near the fall zone, and the existing hydrogeologic framework and flow model in the Middle Peninsula

and Northern Neck areas. The hydrogeologic framework in the Middle Peninsula and Northern Neck needs to be refined, and field investigation of this matter continued through FY99. This effort is necessary to predict more accurately the impact that withdrawal of ground water has on existing ground water management areas and to evaluate the need to establish additional ground water management areas in the Coastal Plain.

Wells in the counties of Buchanan, Buckingham, Clarke, Fairfax, Loudoun, Louisa, Montgomery, Rockingham, and Westmoreland and in the cities of Colonial Heights and Suffolk were studied as examples of the hydrologic condition of the Commonwealth's unconfined water table aquifers. Wells in James City and Isle of Wight Counties are used to monitor water levels in the deep confined Coastal Plain aquifers. These index wells are considered representative of large areas of the Commonwealth with similar geologic, climatologic, and physiographic characteristics. Data on ground water level were collected by monthly tape measurements to water surfaces or by continuous recording meters attached to a float in the well. The water levels in water table wells were generally at or above average for most of the water year (see **Figure 3**). Water levels in the confined Middle Potomac and Upper Potomac aquifers, however, continued their steady decline (see **Figure 4**). Slight fluctuations to the contrary are due to variations in pumping schedules.

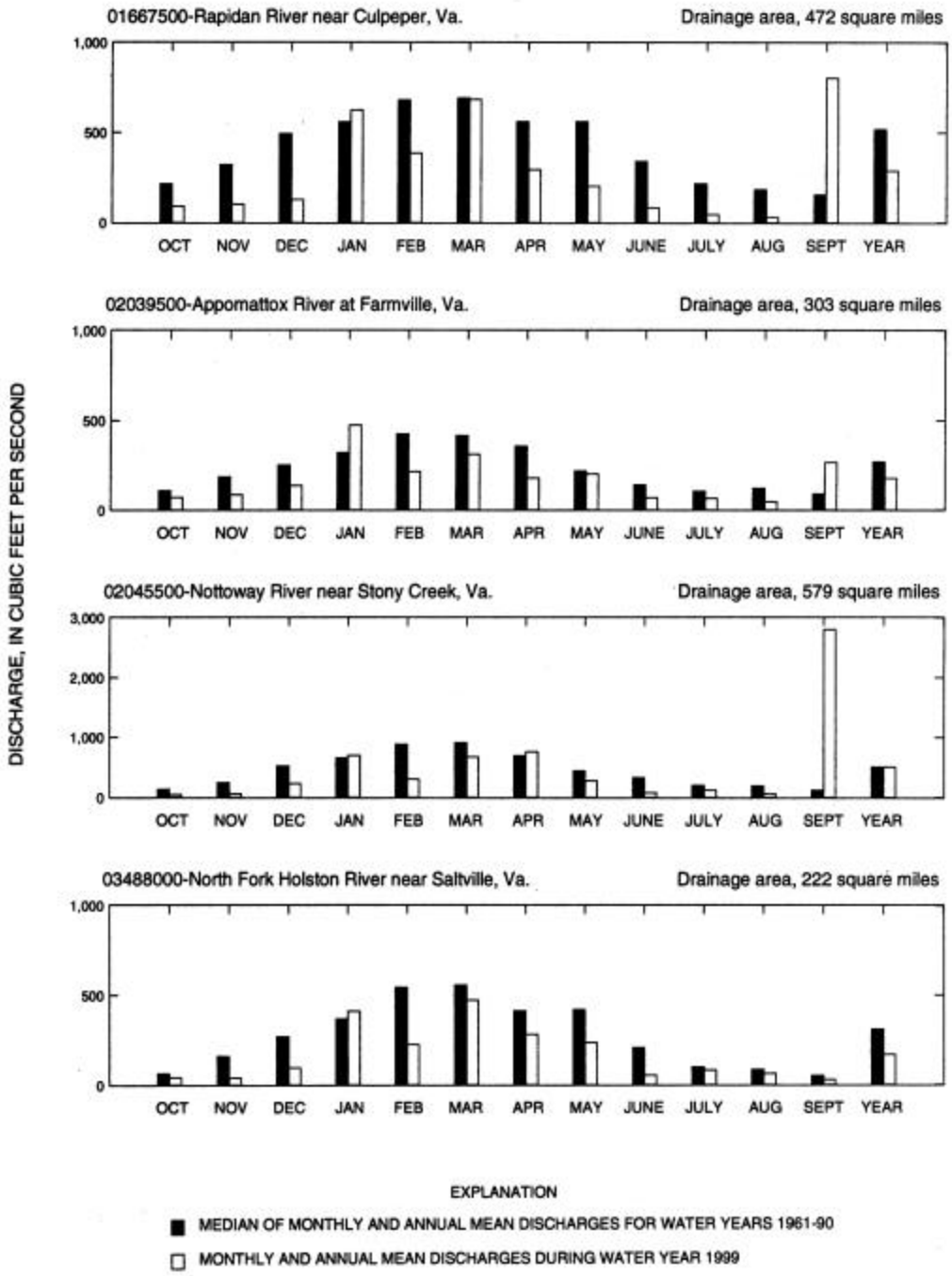

Figure 2. Monthly and Annual Mean Discharge During 1999 Water Year and Median of Monthly and Annual Mean Discharges for 1961–1990 Water Years at Four Representative Gaging Stations

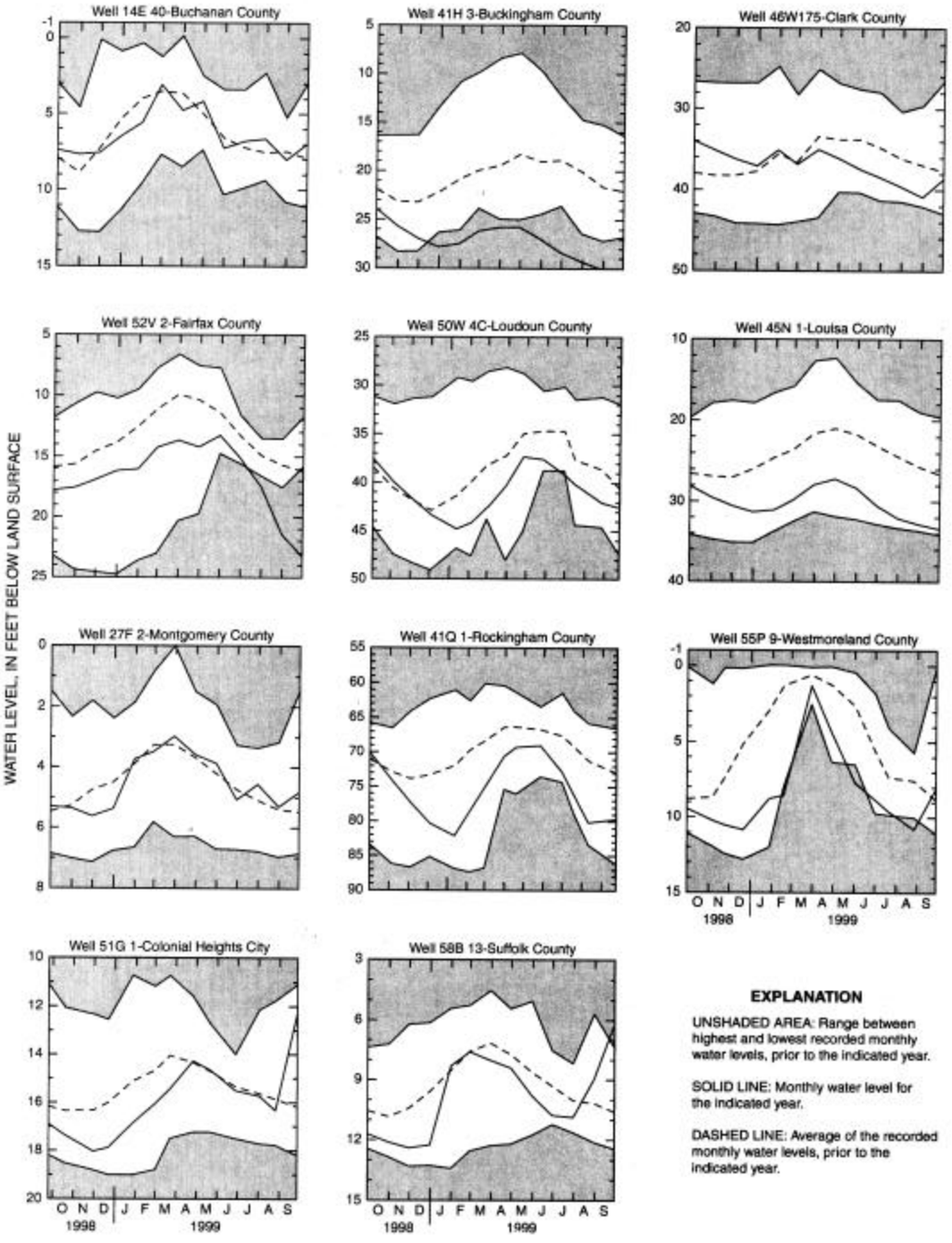

Figure 3. Monthly Ground Water Levels at Index Wells in Water Table Aquifers

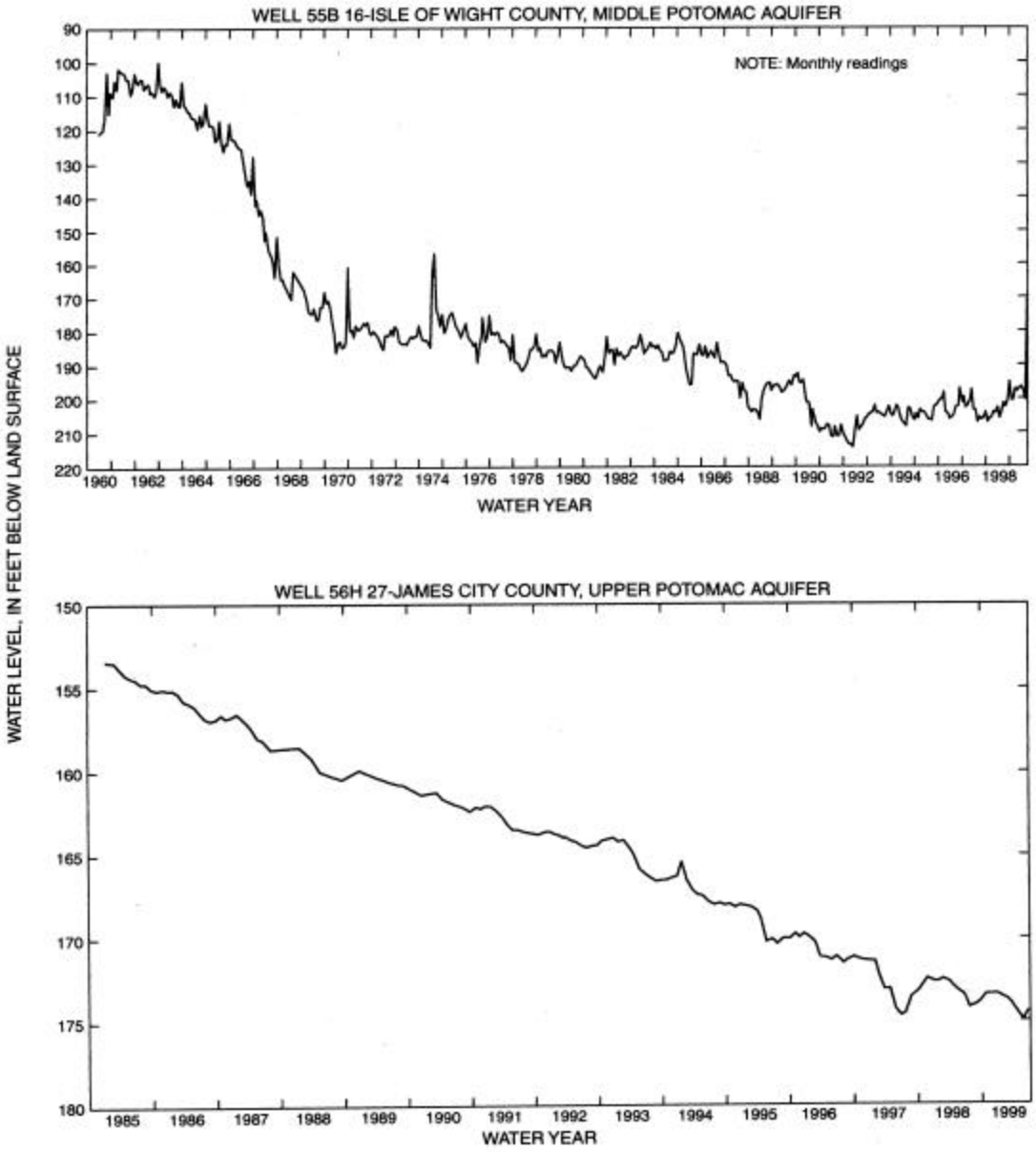

Figure 4. Ground Water Levels in Selected Observation Wells in Confined Coastal Plain Aquifers

IV. Water Withdrawals

The Virginia Water Withdrawal Reporting Regulation (9 VAC 25-200-10 et seq.) requires that individuals or facilities that withdraw water at volumes greater than 10,000 gallons per day (one million gallons per month for crop irrigators) must measure and report annually to the SWCB the monthly volume of water withdrawn. The Virginia Water Use Data System (VWUDS) database contains withdrawal data collected for more than 15 years under this regulation.

A summary of the water withdrawal data for the years 1995 through 1999 is presented in **Table 2A**. **Table 2B** summarizes 1999 withdrawals. The data are aggregated by category of use and by source type. Only public electric utilities that withdraw water for thermoelectric power generation are included in the power use categories (PF and PN). Withdrawals by hydroelectric power generating facilities are not included in this report because they are exempt from the reporting requirement.

During 1999, VWUDS recorded a total average water withdrawal of 8,509 million gallons per day (mgd) for offstream water uses, a decrease of more than 1 percent from the 1998 withdrawals. **Figure 5** shows the distribution of water withdrawals by category of use, excluding electric power generation. The major electric power generating plants in Virginia use once-through cooling water. Currently, approximately 95 percent of the water withdrawn for electric power generation in Virginia is returned to the source. Newer power plants, however, usually use cooling towers that consume more water than the older plants.

The figures in **Tables 2A** and **2B** represent water withdrawals by individuals or facilities covered by the water withdrawal reporting regulation. Approximately 10 percent more water is withdrawn by those not required by regulation to report their withdrawals to the DEQ (not shown in tables).

The relative contribution of surface and ground water sources to non-power generation withdrawals is illustrated in **Figure 6**. The figure shows that large water demands are primarily met by surface water sources. Users of ground water sources outnumber surface water users; however, the amount of water withdrawn from aquifers is less than is withdrawn from streams and reservoirs.

The most recent water use report by the USGS, titled "Estimated Use of Water in the United States in 1995," estimated that 75 percent of Virginia's population is served by public water supply systems and 25 percent is supplied through private wells. Surface water sources supply 88 percent of the public water, and ground water sources supply the remaining 12 percent.

Table 3 lists the top 50 individual water users, ranked by the amount of their 1999 withdrawals. The top seven water users were thermoelectric power generators. Excluding electric power facilities, public water supply systems were the largest consumers of water in the Commonwealth, accounting for 54 percent of the remaining withdrawals. The second largest consumer of water in Virginia is manufacturing, which accounted for 39 percent of withdrawals after electric power facilities are excluded (see **Figure 5**).

Table 2A. Virginia Water Withdrawal Summary (1995 - 1999)

(Million Gallons Per Day)

Type	Category	1995	1996	1997	1998	1999
GW	**AGR**	16.52	16.91	15.16	12.70	13.68
	COM	7.33	6.90	6.79	8.03	6.65
	MAN	105.31	115.44	117.60	102.60	115.96
	MIN	2.62	1.78	1.50	1.10	5.54
	PF	0.08	0.10	0.09	1.10	2.53
	PN	0.30	0.30	0.40	0.02	0.39
	PWS	72.83	67.37	63.92	65.45	67.21
	IRR	4.87	3.92	10.98	9.72	9.75
	Subtotal (GW)	209.86	212.72	216.44	200.72	221.71
SW	**AGR**	2.46	2.87	2.44	4.95	2.90
	COM	10.86	9.81	9.87	9.95	10.88
	MAN	470.99	465.43	482.86	477.89	441.38
	MIN	35.61	45.23	37.47	35.58	38.80
	PF*	2694.38	2905.06	2832.90	3071.00	3004.52
	PN*	3831.53	3993.02	3847.87	4105.00	4074.84
	PWS	699.72	699.42	717.00	707.57	701.81
	IRR	16.31	4.59	12.69	16.96	12.23
	Subtotal (SW)	7761.86	8125.43	7943.10	8428.90	8287.36
Total (excludes power use)		1446	1440	1478	1452	1427
Grand Total (rounded)		**7972**	**8338**	**8160**	**8630**	**8509**

Legend

GW	Ground Water	MIN	Mining
SW	Surface Water	PF	Power, Fossil Fuel
AGR	Agriculture, Non-Crop	PN	Power, Nuclear
COM	Commercial	PWS	Public Water Supply
MAN	Manufacturing	IRR	Irrigation, Crop

*****Approximately 95% of withdrawn water is returned to the source.

Table 2B. Virginia Water Withdrawal Summary – 1999
(Million Gallons Per Day)

Category	Surface Water	Ground Water	Total
AGR	2.90	13.68	16.58
COM	10.88	6.65	17.53
MAN	441.38	115.96	557.34
MIN	38.80	5.54	44.35
PF*	3004.52	2.53	3007.05
PN*	4074.84	0.39	4075.23
PWS	701.81	67.21	769.02
IRR	12.23	9.75	21.98
Subtotal (excludes power use)	1208.00	218.79	1426.79
Total (rounded)	8287	222	8509

Legend

GW	Ground Water	MIN	Mining
SW	Surface Water	PF	Power, Fossil Fuel
AGR	Agriculture, Non-Crop	PN	Power, Nuclear
COM	Commercial	PWS	Public Water Supply
MAN	Manufacturing	IRR	Irrigation, Crop

*Approximately 95% of withdrawn water is returned to the source.

FIGURE 5. 1999 WATER WITHDRAWALS BY CATEGORY/AMOUNT (1427 mgd)
(Excluding Power Generation)

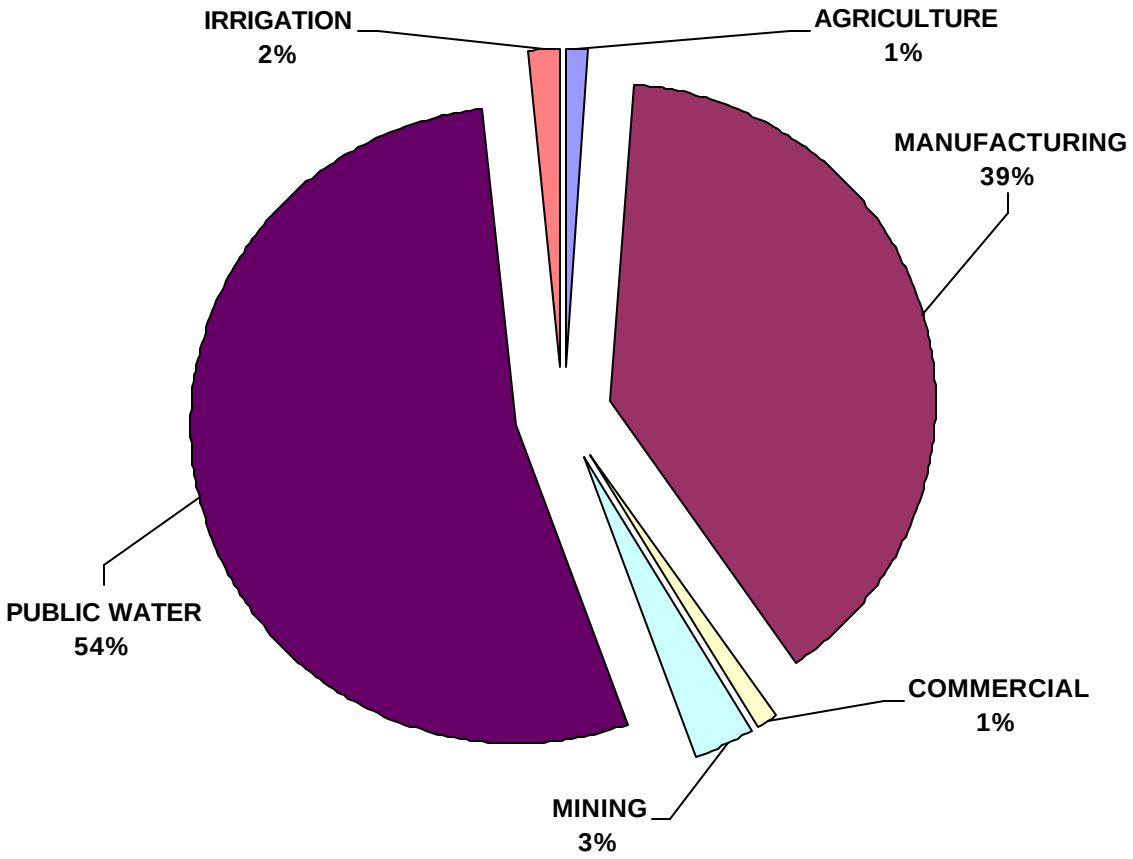

FIGURE 6. 1999 WATER WITHDRAWAL BY SOURCE TYPE
(1427 mgd)
(Excluding Power Generation)

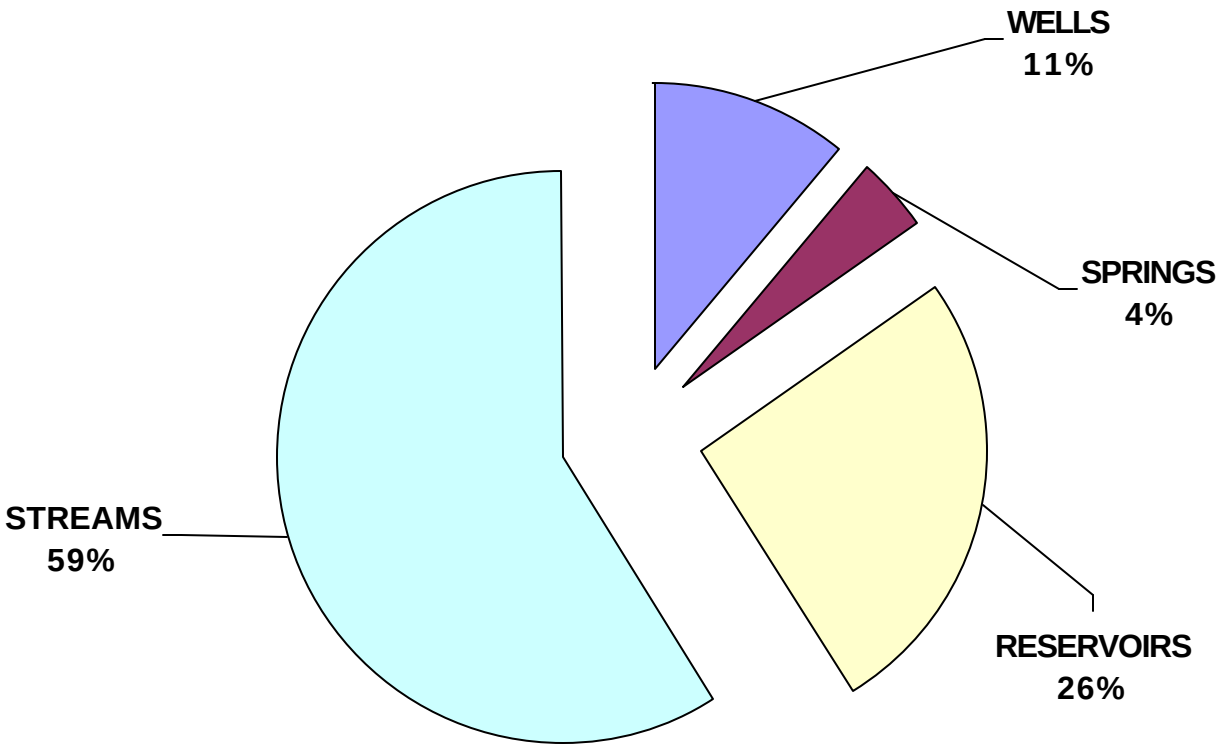

Table 3. Top 50 Water Withdrawers During 1999

	OWNER NAME	SYSTEM	CATEGORY	TOTAL WITHDRAWN (MGD)
1	VIRGINIA POWER	N. ANNA NUCLEAR POWER PLT	NUCLEAR POWER	2048.2
2	VIRGINIA POWER	SURRY NUCLEAR POWER PLANT	NUCLEAR POWER	2026.65
3	VIRGINIA POWER	YORKTOWN FOSSIL POWER PLT	FOSSIL POWER	894.42
4	VIRGINIA POWER	CHESTERFIELD POWER STATION	FOSSIL POWER	841.93
5	VIRGINIA POWER	CHESAPEAKE ENERGY CENTER	FOSSIL POWER	457.81
6	POTOMAC ELECTRIC POWER	POTOMAC RIVER GEN STATION	FOSSIL POWER	384.24
7	APPALACHIAN POWER CO.	GLEN LYN POWER PLANT	FOSSIL POWER	279.05
8	HONEYWELL INTERNATIONAL	HOPEWELL PLANT	MANUFACTURING	125.54
9	VIRGINIA POWER	BREMO BLUFF POWER PLANT	FOSSIL POWER	114.73
10	RICHMOND, CITY OF	RICHMOND, CITY OF	PUBLIC WTR SUPPLY	88.16
11	NEWPORT NEWS, CITY OF	NEWPORT NEWS, CITY OF	PUBLIC WTR SUPPLY	76.33
12	FAIRFAX CO. WATER AUTH.	POTOMAC RIVER	PUBLIC WTR SUPPLY	75.65
13	NORFOLK, CITY OF	NORFOLK, CITY OF	PUBLIC WTR SUPPLY	70.47
14	HOECHST CELANESE	CELCO PLANT	MANUFACTURING	61.88
15	FAIRFAX CO. WATER AUTH.	OCCOQUAN	PUBLIC WTR SUPPLY	58.69
16	AMOCO PETROLEUM	YORKTOWN REFINERY	MANUFACTURING	56.7
17	WESTVACO CORPORATION	COVINGTON PLANT	MANUFACTURING	54.08
18	UNITED STATES	WASHINGTON AQUEDUCT DIV	PUBLIC WTR SUPPLY	27.18
19	INTERNATIONAL PAPER	FRANKLIN	MANUFACTURING	26.69
20	DUPONT E I DE NEMOURS	SPRUANCE PLANT	MANUFACTURING	25.71
21	HONEYWELL INTERNATIONAL	CHESTERFIELD PLANT	MANUFACTURING	25.22
22	APPOMATTOX R. WTR AUTH.	LAKE CHESDIN	PUBLIC WTR SUPPLY	21.96
23	DUPONT E I DE NEMOURS	WAYNESBORO PLANT	MANUFACTURING	21.04
24	ST. LAURENT PAPER	WEST POINT	MANUFACTURING	20.56
25	VIRGINIA AMERICAN WATER	HOPEWELL DISTRICT	PUBLIC WTR SUPPLY	19.56
26	SMURFIT-STONE CONTAINER	HOPEWELL PLANT	MANUFACTURING	18.09
27	VIRGINIA BEACH, CITY OF	VIRGINIA BEACH, CITY OF	PUBLIC WTR SUPPLY	16.99
28	ROANOKE, CITY OF	ROANOKE, CITY OF	PUBLIC WTR SUPPLY	16.65
29	AMERICAN ELECTRIC POWER	CLINCH RIVER PLANT	FOSSIL POWER	16.56
30	U.S. SILICA	MONTPELIER PLANT	MINING	14.4
31	UNITED STATES	RADFORD AMMO. PLANT	MANUFACTURING	11.83
32	LYNCHBURG, CITY OF	LYNCHBURG, CITY OF	PUBLIC WTR SUPPLY	10.63
33	VA POWER/OLD DOMINION EL	CLOVER POWER STATION	FOSSIL POWER	10.32
34	FAIRFAX, CITY OF	FAIRFAX, CITY OF	PUBLIC WTR SUPPLY	9.87
35	GEORGIA-PACIFIC CORP.	BIG ISLAND PLANT	MANUFACTURING	9.37
36	ROANOKE COUNTY	SPRING HOLLOW RESERVOIR	PUBLIC WTR SUPPLY	9.1
37	VIRGINIA, COMM. OF	COURSEY SPRING FISH STA	AGRICULTURE	8.72
38	MANASSAS, CITY OF	MANASSAS, CITY OF	PUBLIC WTR SUPPLY	8.36
39	DUPONT E I DE NEMOURS	MARTINSVILLE PLANT	MANUFACTURING	8.17
40	CHESTERFIELD COUNTY	CHESTERFIELD COUNTY	PUBLIC WTR SUPPLY	8.16
41	RIVANNA WTR & SEWER AUTH.	ALCSA & CHARLOTTESVILLE	PUBLIC WTR SUPPLY	7.91
42	DANVILLE, CITY OF	DANVILLE-MUNICIPAL	PUBLIC WTR SUPPLY	7.78
43	WINCHESTER, CITY OF	WINCHESTER, CITY OF	PUBLIC WTR SUPPLY	7.65
44	CHESAPEAKE, CITY OF	CHESAPEAKE, CITY OF	PUBLIC WTR SUPPLY	7.22
45	BLCKSBRG-C'BURG-VPI WTR	BLCKSBRG-C'SBURG-VPI	PUBLIC WTR SUPPLY	7.16
46	DAN RIVER INC.	DAN RIVER TEXTILE PLANT	MANUFACTURING	6.73
47	PORTSMOUTH, CITY OF	PORTSMOUTH	PUBLIC WTR SUPPLY	6.69
48	VIRGINIA FIBRE CORP	RIVERVILLE PLANT	MANUFACTURING	5.84
49	FREDERICKSBURG, CITY OF	FREDERICKSBURG, CITY OF	PUBLIC WTR SUPPLY	5.07
50	APG LIME CORPORATION	KIMBALLTON PLANT 1	MINING	4.86

V. Ground Water Management Act (GWMA)

The SWCB was originally authorized by the Ground Water Act of 1973 to declare ground water management areas in places where there was reason to believe that (1) ground water levels were declining, (2) there was substantial well interference, (3) the aquifer might be depleted, or (4) the ground water might be polluted. To date, the SWCB has declared two ground water management areas: the Eastern Virginia Ground Water Management Area and the Eastern Shore Ground Water Management Area (see **Figure 7**).

Almost 20 years later, the General Assembly repealed the Ground Water Act of 1973 and enacted the Ground Water Management Act (GWMA) of 1992. The new Act establishes permitted amounts of ground water withdrawal based on need; in contrast, the repealed legislation had established ground water withdrawal rights based on maximum daily withdrawals. The GWMA of 1992 limits the term of ground water withdrawal permits to 10 years. Under this Act, all withdrawers, including agricultural facilities, of more than 300,000 gallons per month within designated ground water management areas are required to obtain ground water withdrawal permits.

To implement the GWMA of 1992, the Ground Water Withdrawal Regulation (9 VAC 25-610-10 et seq.) was adopted by the SWCB effective September 22, 1993. This regulation was significantly amended in 1998 to (1) establish ground water withdrawal requirements for agricultural ground water users, (2) incorporate legislative amendments to the GWMA of 1992 adopted by the 1994 session of the Virginia General Assembly, and (3) require that the DEQ perform technical evaluations of the impact of proposed withdrawals; previously, the applicant was required to perform the evaluation. This amended regulation became effective January 1, 1999.

In accordance with the regulatory amendment, the DEQ has developed the capability to perform technical evaluations of proposed withdrawals, which has significantly reduced the burden on the regulated users. In addition, a new position has been established that concentrates on the issuance of ground water withdrawal permits to agricultural users.

The regional ground water flow model that is used as the basis for examining ground water conditions in the Virginia Coastal Plain was originally developed in the mid-1980s. Scientists from the USGS and DEQ staff met in the spring of 1999 to evaluate the existing regional model and develop a plan of action to address any problems identified. This group included scientists who developed the original model, the authors of the model code used in the regional model, and developers of other regional models in coastal plain settings. The group identified several areas of concern in the existing model. The major concerns included the following: (1) The model is based on scientific knowledge of the Virginia Coastal Plain that is 20 years old and does not include significant new discoveries such as the existence of the Chesapeake Bay Impact Crater; (2) the level of detail in the hydrogeologic framework that forms the basis of the model varies significantly across the Coastal Plain, with a significant lack of ground water data for the Northern Neck and Middle Peninsula; and (3) the computer model relies on data management techniques

from the mid-1980s that are more cumbersome than current techniques.

DEQ staff, in collaboration with staff from the Virginia District USGS Water Resources Division, developed a detailed plan of study to address the areas of concern in the existing regional Coastal Plain model. The plan includes the following three long-term projects to address data collection and revisions to the existing model:

- The Chesapeake Bay Impact Crater Study, a cooperative five-year study by the USGS Geologic Division, the DEQ, and the Hampton Roads Planning District Commission (HRPDC), will collect geologic cores to define the location and development of the Chesapeake Bay Impact Crater. This study was proposed to be jointly funded by the USGS, DEQ, and HRPDC.

- The DEQ Ground Water Research Drilling Project will install ground water research stations at several locations within the Coastal Plain. This project will address the lack of data on the Northern Neck and Middle Peninsula.

- The USGS/DEQ Cooperative Ground Water Modeling Project is a five- to six-year effort to incorporate data collected in the previous two projects into a revised hydrogeologic framework of the Virginia Coastal Plain and then incorporate that framework, along with modern data management techniques, into a revised regional ground water flow model. The total cost of this project is estimated to be $2.4 million over five to six years. The DEQ's portion of this cooperative effort would be one-half of the total cost.

The 2000 session of the Virginia General Assembly appropriated $850,000 to the DEQ to develop a statewide water supply planning initiative and to sponsor water research. The DEQ will use a portion of this appropriation to support the Chesapeake Bay Impact Crater Study and to install one ground water research station.

The 1999 General Assembly appropriated $20,000 for the DEQ to study water resources issues in the Northern Neck area. The $20,000 in state funding was matched by federal funding from the USGS. DEQ staff developed a cooperative agreement with the USGS to evaluate existing wells on the Northern Neck to obtain additional ground water data in this area. The results of this reconnaissance effort indicate that existing wells are not a suitable source of ground water data in the Northern Neck and highlight the need to establish a ground water research drilling project to collect such information.

Virginia Ground Water Management Areas

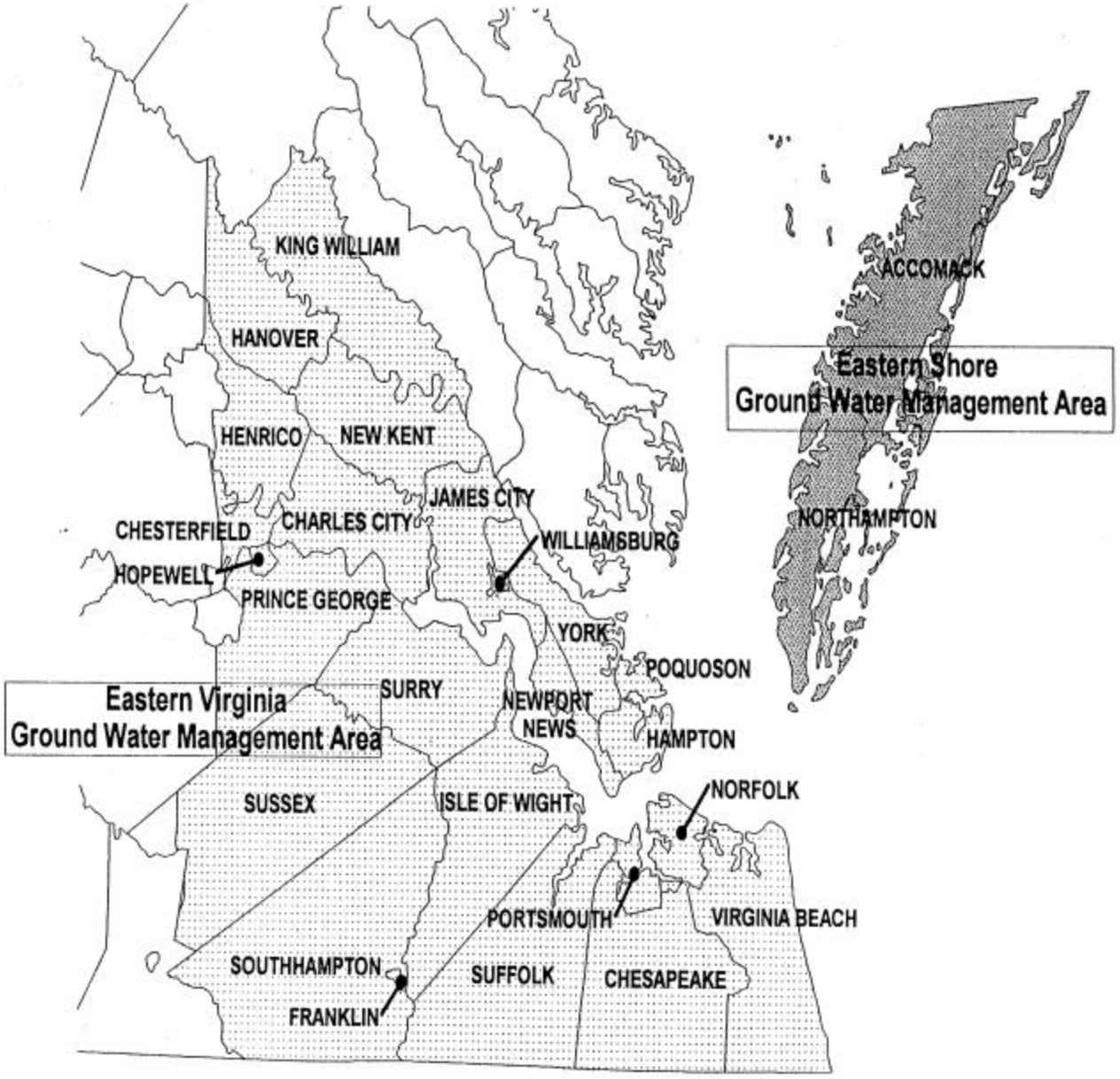

Figure 7. Ground Water Management Areas in Virginia

VI. Virginia Water Protection (VWP) Permit

In 1999, the DEQ issued VWP permits to South Boston, VA, for its withdrawal from the Dan River, to Nelson County Service Authority for its withdrawal from Black Creek, and to Harrisonburg for its withdrawal from the South Fork of the Shenandoah River. Thus far in 2000, the DEQ has issued a permit to the City of Salem for its withdrawal from the Roanoke River.

The drought of 1998 caused Smith Mountain Lake to drop by more than 4 feet by November of that year. American Electric Power Company asked for and received a variance from its Federal Energy Regulatory Commission (FERC) license that allowed the company to reduce releases to the Staunton River. The SWCB then had to take action so that other electrical power companies downstream could continue to operate during this variance.

The drought continued into 1999, and the DEQ reissued three power plant permits with modifications for drought contingency conditions. One permittee, LG&E Westmoreland-Altavista, objected to the proposed permit modification, which allowed for tiered water withdrawals during FERC variances. The company felt that because its withdrawal was so small, it would not affect instream beneficial uses, such as recreational boating. Other river users, however, argued that state law gave priority to existing users and instream uses and that the SWCB should protect river flow against cumulative withdrawals. The SWCB voted to support the permit modification as drafted by the DEQ. The fact that LG&E Westmoreland-Altavista had built water storage facilities capable of holding only a five-day reserve supply of water for use during drought and the fact that the Staunton River is heavily used for recreation influenced the SWCB's decision.

In addition to its other VWP permit activities, the DEQ is currently meeting with the Rivanna Water and Sewer Authority to discuss plans for a major new water supply. Various alternatives are being considered. Also pending is an application from Stafford County for an intake on the Rappahannock River that will be used to fill a reservoir on Rocky Pen Run.

VII. Surface Water Management Area (SWMA) Act

In 1989, the General Assembly enacted the Surface Water Management Area (SWMA) Act for the purpose of protecting instream uses from excessive surface water withdrawals. The legislation authorizes the SWCB to establish surface water management areas in places where a low level of surface water could be potentially adverse to the public welfare, health, and safety. In 1999 the General Assembly amended the SWMA Act to facilitate approval of voluntary agreements among water withdrawers in the same SWMA.

The SWCB has not designated any SWMA as of yet; however, the James River in the Richmond metropolitan area (Richmond Regional [West] SWMA) is under consideration for such a designation by the DEQ. As part of the designation process, the DEQ has formed a Technical Advisory Committee. The

Committee last met in June 1999 to address issues associated with drafting a designation regulation. The DEQ is also currently developing SWMA implementation guidance.

The DEQ has received two other nominations for SWMA designation. One is the North River in Rockingham County and the other is the Shenandoah River in Clark and Warren Counties. The designation processes for these two areas are on hold pending resolution of problems associated with nonsupport by one significant withdrawer in the North River and pending the results of minimum instream flow studies in the Shenandoah River, which will be used in assessing whether or not the area meets the criteria for SWMA designation.

VIII. Water Supply Plans

In 1988, the State Water Control Board developed and published 11 River Basin Water Supply Plans and one Statewide Summary. The plans were a valuable inventory of Virginia water resources and water needs, and they served as part of a sound foundation on which to develop solutions to Virginia's growing water supply problems.

Many of the outstanding issues that have been identified by the 1988 plans remain unresolved. Among these issues are the following:

- Provision of water to areas with water shortages.
- Financing of water supply projects for small disadvantaged communities.
- Protection of water resource development areas from encroachment by commercial, industrial, and residential development.
- Provision of safe drinking water from small public water supply systems.
- Regionalization of water supply functions.
- Continuation and improvement of water resources data gathering.

Although the DEQ issues various permits and works with local planners on water resource management planning issues, no formal statewide activities have been undertaken to update the 1988 River Basin Water Supply Plans. As mentioned in Section V of this report, the 2000 session of the Virginia General Assembly appropriated $850,000 to the DEQ to develop a statewide water supply planning initiative and to sponsor water research. In addition to using this appropriation for the Chesapeake Bay Impact Crater Study and to establish a ground water research station, the funds will be used to secure the services of the Virginia Water Resources Research Center in preparing a framework for a comprehensive water supply planning effort for the Commonwealth. This effort will

include reviewing water supply planning activities across the nation, developing appropriate water demand forecasting techniques, developing appropriate methods for determining safe yield of water sources, and evaluating the role of water conservation in water supply planning initiatives. The study will also evaluate potential or existing water problems and conflicts among water users.

IX. Cooperative Programs and Technical Assistance

The DEQ maintains mutually beneficial working arrangements with several state and federal agencies concerned with studying and planning solutions to water resources problems in Virginia. Among the state agencies are the Virginia Department of Health (VDH), Department of Conservation and Recreation (DCR), Department of Game and Inland Fisheries, Virginia Marine Resources Commission, Virginia Department of Agriculture and Consumer Services (VDACS), Virginia Department of Emergency Management (VDEM), the state climatology office, and others. Additional efforts to improve regional cooperation in resource management are under way, such as the following:

- Regional cooperation got a boost at the recent Virginia General Assembly session. The legislators repealed the sunset clause that would have terminated the Rappahannock River Basin Commission on July 1, 2000. Established in 1996, the Commission is developing a regional decision-making process that will address a range of use- and growth-related issues that affect the Rappahannock River Basin. The 2000 General Assembly also passed a joint resolution asking the State Water Commission to study the desirability and feasibility of establishing an intergovernmental agency that would work to facilitate the planning and coordination of water resources in the Roanoke River Basin.

- One example of an excellent cooperative arrangement is the interagency Virginia Drought Monitoring Task Force (VDMTF), which is made up of 11 state and federal agencies coordinated by the DEQ and has been in place since 1985. The Task Force monitors developing drought conditions and issues drought status reports, as needed, to inform state and local officials and the general public about drought-related problems and available state assistance. During 1999, the VDMTF issued five drought status reports and reviewed and commented on the National Drought Policy Commission Report on preparing for drought in the new millennium. The Task Force also briefed the Governor's cabinet secretaries on the drought and on ways that the state can assist local governments and private facilities in coping with the drought.

- In August 1999, representatives of Westvaco Corporation in Covington approached the DEQ with their concern that the ongoing drought was threatening to deplete all of the water stored at upstream Lake Moomaw that was allocated for release during conditions of low flow. Once this stored water was depleted, the standard procedure of the Army Corps of Engineers would be to release from the reservoir the exact amount of water flowing into the reservoir. Flows were so low at the time that such a scenario would have threatened the ongoing operations of

the Westvaco paper mill and also impair water quality. In response to the impending crisis, the DEQ asked the Corps of Engineers to halt normal releases in order to conserve what little water remained stored in Lake Moomaw and to instead have a smaller release that would last longer and still protect water quality and keep the paper mill operating. Two adjustments were made over the fall and winter of 1999. The adjustments allowed most but not all of the stored water to be used, protected water quality, and kept the mill in operation. The water level in Lake Moomaw was back to normal by the middle of March 2000.

- In May 2000, the DEQ collaborated with the VDH, VDACS, and other state agencies to assemble a guidance document for conducting a comprehensive needs assessment of the public drinking water supply. The guide primarily addresses drinking water and other domestic water uses, rather than other general water uses.

- State-federal partnerships provide a forum for coordinating and cooperating in mutual water supply planning activities. Among these partnerships are the Interstate Commission on the Potomac River Basin, the Ohio River Basin Commission, the Tennessee Valley Authority, and the Washington Metropolitan Council of Governments. The DEQ maintains cooperative arrangements with the U.S. Geological Survey, the Norfolk District and the North Atlantic Division of the U.S. Army Corps of Engineers, and the National Weather Service.

- Virginia is a signatory to the Potomac River Low Flow Allocation Agreement, which allocated low flows in the Potomac River. The Agreement has not had to be implemented for more than 17 years; however, in preparation for that possibility, the signatory parties have met in April each year since its ratification to review the data upon which its implementation would be based. In 2001, the Virginia DEQ will host this annual meeting.

X. Conclusions

Virginia is a water-rich state with average annual statewide precipitation of approximately 43 inches. For the most part, Virginians enjoy adequate water supplies; however, continued population growth and changing land uses, such as more urban development, will increase water demand. In addition, the state is subject to periodic droughts, and localities with inadequate supply sources or storage can experience water shortages. Because of the current greater emphasis on the protection of the environment, development of new water supply sources has become more challenging. Recent experiences, most notably the Virginia Beach/Lake Gaston and the Newport News/King William reservoir projects, have highlighted the long lead time required to implement solutions to water supply problems.

The year 1999 started with statewide average precipitation close to the normal range, but dry conditions recurred in the spring and summer of 1999. Governor Gilmore extended the drought emergency that he originally declared in 1998. Agriculture was again severely affected. Many localities asked for voluntary water conservation, and some imposed mandatory water restrictions.

Adequate and safe water supplies are essential to the public welfare and to continued economic development. Historically, localities have retained control over utilization of resources within their borders, including water resources. But water resources issues are very complicated and span more than one jurisdiction, often requiring cooperative efforts among multiple localities. Fortunately, there are increased efforts in Virginia to establish forums for regional cooperation.

With the availability of more and better information on water resources and water use, the Commonwealth and its local governments are now better able to effectively plan for future water supply needs. Water is a public resource, and the policies that govern its use should continue to provide management of water resources from a broad perspective rather than relying solely on riparian localities. The state must provide strong leadership in water resources management because local governments have no mandated requirement to consider the implications of water management decisions beyond their political boundaries.