JENNINGS RANDOLPH LAKE REALLOCATION STUDY

Demographic Studies:

Task 03-D

Water Supply Needs

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Demographic Studies: Water Supply Needs

1. Introduction

The following discussion of water supply needs is based on data assembled from the most recent existing reports and ongoing studies, supplemented by direct enquiries to water users in the study area. The motivation for the study is derived from the need of several potential users to comply with the Maryland Consumptive Use Regulation, and future demands for municipal residential water supplies by the Washington metropolitan area (WMA) water utilities. The Maryland Consumptive Use Regulation requires all new non-residential demands which have consumptive uses greater than 1.0 million gallons per day (mgd) and subject to surface water withdrawal permits in the Potomac River basin in Maryland up-stream from Little Falls to provide low flow augmentation, cease consumptive water use, or reduce consumptive water use to levels of 1 mgd or less when directed to do so by the State.

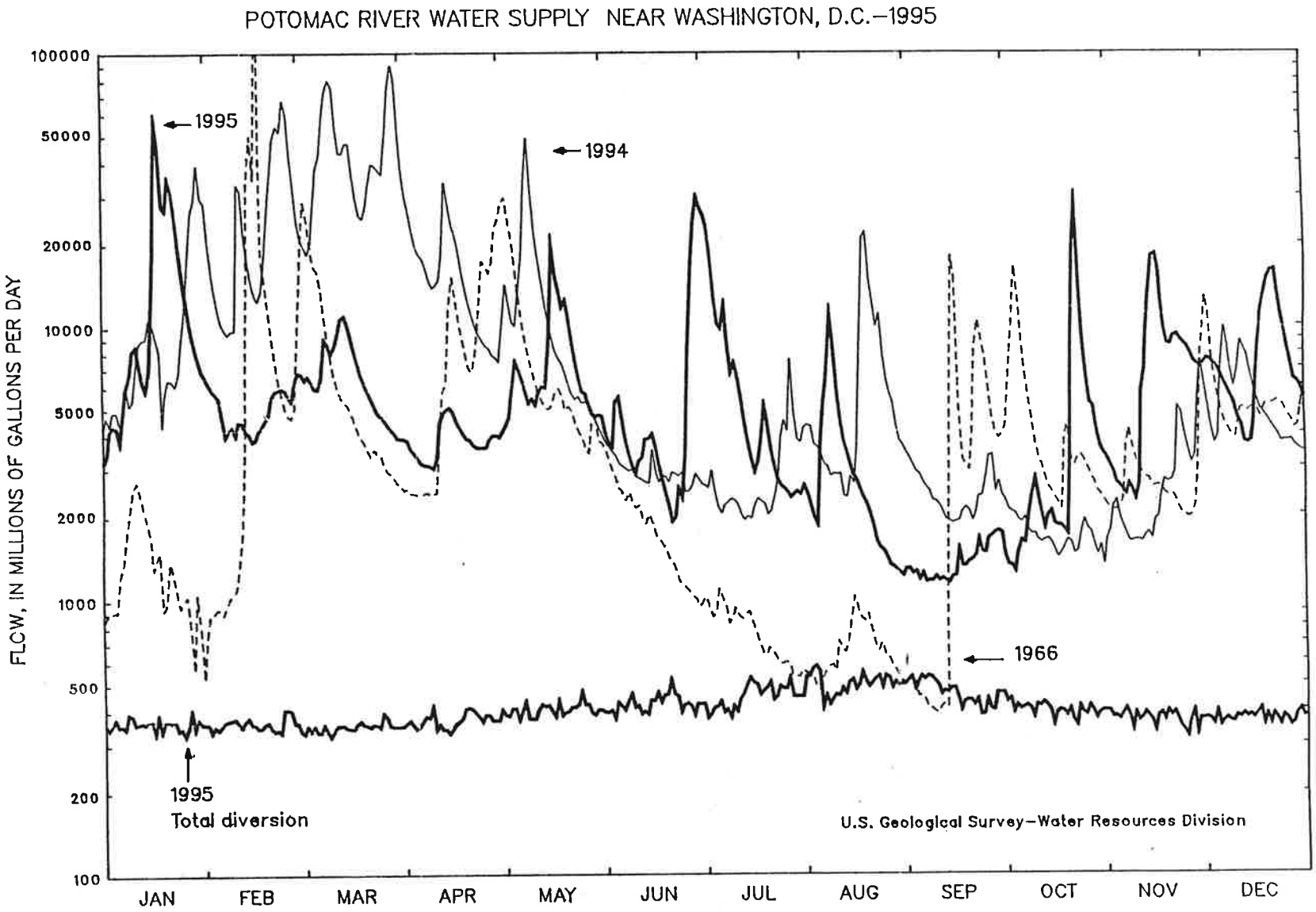
The requirement for low flow augmentation storage to make up for consumptive use is clear from Figure 1 which presents several annual hydrographs contrasted with the total withdrawals for the year 1994 in the WMA. Increased future consumptive use, uncompensated by releases from flow augmentation storage, would exacerbate an already potentially serious situation. It is a situation where the demands on the river in a drought year could exceed its flow.

Having foreseen the potential for serious water supply shortages, the jurisdictions and local water supply utilities developed forward looking agreements which cooperatively guide the management of water resources in times of shortage. The Water Supply Coordination Agreement provides for the efficient operation of the water resources to meet demands when shortages are anticipated or experienced. The operations under this agreement are administered by the CO-OP Section of the Interstate Commission on the Potomac River Basin. If resources are insufficient to meet demands, the Potomac River Low Flow Allocation Agreement (LFAA) provides for the division of available river flow among the water utilities, based upon accepted principles. The State of Maryland incorporates a requirement to comply with the terms of the LFAA in all appropriation permits issued to water users in the State's portion of the Potomac River basin. A Metropolitan Washington Water Supply Emergency Plan exists to guide the response to abrupt water quality and quantity problems in the WMA.

The geographic scope of the study includes areas served by, or potentially served by, water withdrawn from the North Branch and main stem Potomac River, along the river from Jennings Randolph Lake downstream to Little Falls. Relevant information is generally available on a county by county basis; therefore, the results of this study are generally presented in county format for the counties in Maryland, West Virginia , and Virginia which border the river (see Map, Figure 2).

The study presents a profile of water use along the Potomac River, including base (1988) year and projections into the next century (2010, 2020, 2030, and to 2050 where analyses exit).

Figure 1



The above graph shows the total streamflow of the non—tidal portion of the Potomac River and the total of diversions for water supply in the Washington metropolitan area. Total river flows for 1994 and for 1966 are included for comparison with current conditions. The difference between river flow and total diversions represents the inflow to the head of the Potomac Estuary. This report is issued monthly except during low—flow periods when more frequent release of information is justified for appraisal of water—supply conditions.

12/31/95

POTOMAC RIVER BASIN
COUNTIES

2. Water Needs in Maryland (planning level analysis)

An investigation of the existing and future water supply needs was performed recently by the U.S. Army Corps of Engineers (Department of the Army, 1990) for the Maryland Department of Natural Resources. It provides a consistent basis for general planning purposes for all counties in the State. For the present study, that information is condensed and presented for the counties of Maryland in the area of the study; that is the counties adjacent to the North Branch and main stem Potomac River from western Maryland downstream through the Washington metropolitan area (WMA). The study area in Maryland includes: Allegany, Frederick, Garrett, Montgomery, Prince George's, and Washington counties (see Map, Figure 2). A detailed study of the water supply needs in the WMA is currently in progress by the CO-OP Section of the Interstate Commission on the Potomac River Basin. It is expected to be a refinement of the existing and future conditions in Montgomery and Prince George's counties presented below.

The Maryland data are presented in five tables. Variations of existing conditions are presented in Tables 1 - 3. Projections of future water needs and differences from existing conditions are presented in Table 4 and Table 5, respectively.

Maryland State water appropriation permits were used in the development of the data presented in Table 1. Permits typically are valid for twelve years and are issued for an average daily withdrawal on a yearly basis and a daily average withdrawal for the month of maximum use. Although the Maryland Consumptive Use Regulation went into effect in January 1985, Maryland water appropriation permits do not distinguish consumptive from non-consumptive use. The data for permits in effect in 1988 with average withdrawal appropriations greater than 2,000 gallons per day and withdrawal locations in each of the counties of interest are summarized in Table 1.

Table 1: Maryland Counties Appropriated Average Value (mgd) in 1988

	Potable	Irrigation	Comm/Ind	Test & Fire	Sub-Total	Elec. Gen.	Total
Allegany	22.02	0.33	61.95	ins	84.30	0.00	84.30
Frederick	25.87	1.08	20.36	ins	47.31	0.00	47.31
Garrett	4.54	0.57	6.73	ins	11.84	200.00	211.84
Montgomery	553.39	1.22	0.25	0.20	555.06	400.00	955.06
Prince George's	60.13	0.46	5.03	ins	65.62	721.66	787.28
Washington	18.45	0.60	11.05	ins	30.10	992.00	1022.10
Total	684.40	4.26	105.37	0.20	794.23	2313.66	3107.89

ins = insignificant value, Source: Department of the Army, 1990

Actual pumpage data for the year 1987 are summarized for the Maryland counties of interest in Table 2. These data generally include non-agricultural users with an annual average appropriation of more than 10,000 gallons per day. Users with an annual average appropriation of less than 10,000 gallons per day and agricultural users were not required to report pumpage in 1987. Pumpage amounts may differ significantly from, and are usually less than, appropriated values specified in the associated permits.

Table 2: Maryland Counties Reported Pumpage Value (mgd) in 1988							
	Potable	Irrigation	Comm/Ind	Test & Fire	Sub-Total	Elec. Gen.	Total
Allegany	7.61	0.04	46.01	0.00	53.66	0.00	53.66
Frederick	11.04	0.05	5.45	0.00	16.54	0.00	16.54
Garrett	2.74	0.29	2.50	0.00	5.53	0.00	5.53
Montgomery	280.46	0.65	0.13	0.00	281.24	189.52	470.76
Prince George's	39.68	0.23	0.82	0.00	40.73	232.51	273.24
Washington	11.42	ins	4.86	0.00	16.28	373.15	389.43
Total	352.95	1.26	59.77	0.00	413.98	795.18	1209.16

ins = insignificant value, Source: Department of the Army, 1990

In order to make an estimate of future water supply needs to the year 2010, the county appropriations for potable supplies presented in Table 1 were reconfigured from county of appropriation to county of use based on population and per-capita income and presented in Table 3. Water used for irrigation and for commercial and industrial purposes was not reconfigured because it is assumed that water for those purposes is withdrawn near its point of use. Forecasts of water use for electrical power generation were not made; therefore, there was no consideration of reconfiguration for that use sector presented in Table 3.

Table 3: Estimated Appropriated Average Value (mgd) in 1988 (in-County Use)							
	Potable	Irrigation	Comm/Ind	Test & Fire	Sub-Total	Elec. Gen.	Total
Allegany	17.99	0.33	61.95	nc	80.27	nc	80.27
Frederick	32.54	1.08	20.36	nc	53.98	nc	53.98
Garrett	6.29	0.57	6.72	nc	13.58	nc	13.58
Montgomery	191.39	1.22	0.25	nc	192.86	nc	192.86
Prince George's	180.41	0.46	5.03	nc	185.90	nc	185.90
Washington	27.22	0.60	11.05	nc	38.87	nc	38.87
Total	455.84	4.26	105.36	nc	565.46	nc	565.46

nc = not calculated, Source: Department of the Army, 1990

Forecasts of future potable, irrigation, and commercial/industrial water use were available for several planning horizons. The forecasts are summarized as appropriated average daily withdrawals and presented in Table 4 for the year 2010, which was the longest planning horizon available. Forecasts of potable water use were based on population and per-capita income projections, those for irrigation use were based on acreage of land in agricultural use and amounts of water applied per acre. Commercial and industrial water use forecasts were based on projections of the labor force in each county.

Table 4: Maryland Counties Forecast Appropriated Average Value (mgd) in 2010							
	Potable	Irrigation	Comm/Ind	Test & Fire	Sub-Total	Elec. Gen.	Total
Allegany	17.05	0.49	61.95	nc	79.49	nc	79.49
Frederick	43.15	1.58	27.31	nc	72.04	nc	72.04
Garrett	7.22	0.82	7.98	nc	16.02	nc	16.02
Montgomery	227.12	1.50	0.29	nc	228.91	nc	228.91
Prince George's	211.73	0.48	5.84	nc	218.05	nc	218.05
Washington	28.87	0.89	11.94	nc	41.70	nc	41.70
Total	535.14	5.76	115.31	nc	656.21	nc	656.21

nc = not calculated, Source: Department of the Army, 1990

The information available which describes the difference between existing and future water needs in Maryland is presented in Table 5 as the difference between reconfigured permit average appropriations by county for the years 1988 and 2010. It is clear that the overwhelming proportion of increased water need (87%) is anticipated to be in the potable sector. Generally, municipal residential water supplies (included as potable in this study) are exempt from the Maryland Consumptive Use Regulation. Irrigation use is expected to increase by only 1.5 mgd in the six Maryland counties. Commercial and industrial use is expected to increase by nearly 10 mgd, with the bulk (6.95 mgd) anticipated in Frederick County. By direct contact with the Westvaco Corporation in Garrett County it is determined that additional future, but as yet unspecified amount of, water may be used consumptively.

Table 5: Maryland Counties Increase in Appropriated Average Value (mgd) 1988 - 2010							
	Potable	Irrigation	Comm/Ind	Test & Fire	Sub-Total	Elec. Gen.	Total
Allegany	-0.94	0.16	0.00	nc	-0.78	nc	-0.78
Frederick	10.61	0.50	6.95	nc	18.06	nc	18.06
Garrett	0.93	0.25	1.26	nc	2.44	nc	2.44
Montgomery	35.73	0.28	0.04	nc	36.05	nc	36.05
Prince George's	31.32	0.02	0.81	nc	32.15	nc	32.15
Washington	1.65	0.29	0.89	nc	2.83	nc	2.83
Total	79.30	1.50	9.95	nc	90.75	nc	90.75

nc = not calculated, Source: Department of the Army, 1990

3. Water Needs in West Virginia (planning level analysis)

The study area in the State of West Virginia includes the counties adjacent to the North Branch and main stem Potomac River from Jennings Randolph Lake in Mineral County down stream through Hampshire, Morgan, Berkeley, and Jefferson counties (see Map, Figure 2). Enquiries to the relevant planning and development councils revealed no significant published water use or forecast studies in those areas. However, population figures were provided on a county basis for both the 1990 census and forecasts for future years through 2020.

The forecasts of population and changes from the 1990 census are presented in Table 6. The Regional Research Institute of the West Virginia University conducts two series of population forecasts: (1) forecasts based on most recent information and trends: 1990 birth and death rates and 1985 to 1990 migration rates, and (2) forecasts based on longer term average trends: 1990 birth and death rates and average 1975 to 1990 migration rates. These two series provide a range of projections. Without compelling information as to which end, if either, of the range would be more accurate as a forecast, the figures presented in Table 6 represent the mid points of the ranges forecast for each of the counties.

Table 6: West Virginia Potomac River Counties Population

	Population		
	1990 Census	2020 Forecast	Change: Pop'n
Berkeley	59,253	92,945	33,692
Hampshire	16,498	21,774	5,276
Jefferson	35,926	49,920	13,994
Mineral	26,697	26,246	(451)
Morgan	12,128	15,117	2,989
Total	150,502	206,002	55,500

Source: Regional Research Institute, West Virginia University, 1992

In order to develop a quantitative estimate of increased water demand for the West Virginia portion of the study area, more complete information from a similar area in the Commonwealth of Virginia is used. The sector and per capita water use data for the Shenandoah region of Virginia are presented in Table 7 and Table 8, respectively. The Domestic/Commercial/ Institutional sector is forecast to grow at approximately the same rate as population which would result in a nearly constant per capita use rate. However, combining all sectors, an analysis of change in water use presented in Table 8 indicates that per capita demand, totaled for all sectors, might decline from 331.45 gpcd in 1980 to 278.90 gpcd in 2030 which would be equivalent to a decline of 10.51 gpcd per decade.

Table 7: Virginia Shenandoah Water Demand (mgd)				
	1980*	2030	Change	% Change
Dom/Com/Inst	22.94	32.89	9.95	43.4
Ind/Man/Min	49.29	55.03	5.74	11.6
Unaccounted	6.94	10.50	3.56	51.3
Irrigation	13.44	13.44	0.00	0.0
Non-Irr Agri	5.75	8.95	3.20	55.7
Total	98.36	120.81	22.45	22.8

*Figures may be from any of the years 1980-1986

Source: Virginia State Water Control Board, 1988

Table 8: Virginia Shenandoah Region						
	1980			2030		
	Population	Demand (mgd)	Per Capita (gpcd)	Population	Demand (mgd)	Per Capita (gpcd)
Shenandoah	296,761	98.36	331.45	433,165	120.81	278.90

Source: Virginia State Water Control Board, 1988

Even if a similar rate of decline in per capita water use takes place in the counties of West Virginia, the expected growth in population would result in an increase in water demand of approximately 11.3 mgd, as shown from Table 9. However, it is probable that future demand growth among the sectors of use would be different from that projected for the Shenandoah. Without such detailed forecast information for the counties of West Virginia in the study area, it is impossible to identify specifically consumptive water demand from these general population-based estimates.

Table 9: Potential Change in West Virginia Water Demand						
	1990			2020		
	Population	Demand (mgd)	Per Capita (gpcd)	Population	Demand (mgd)	Per Capita (gpcd)
WV Co's	150,502	48.30	320.94	206,002	59.62	289.41

4. Water Needs in Virginia (planning level analysis)

The study area in the Commonwealth of Virginia includes the counties adjacent to the main stem Potomac River from Loudoun County down stream through Fairfax, Arlington, and Prince William counties (see Map, Figure 2). The Virginia Department of Environmental Quality (formerly the State Water Control Board) conducted a study of the existing and future water needs and resources to meet those needs (Virginia State Water Control Board, 1988 (2)).

As in West Virginia, the Maryland Consumptive Use Regulation has a potential impact in areas of Virginia adjacent to the Potomac River because withdrawals are regulated by Maryland. This is due to the state boundary being at the Virginia shore of the river, and withdrawals from the river deemed to be from under the jurisdiction of Maryland. Many small demand centers in Virginia are located some distance from the Potomac River, making them unlikely users of water released from Jennings Randolph Lake and conveyed by the river. In the areas with access to, or served by, water withdrawn from the Potomac River, the dominant water use is for municipal residential purposes, and is therefore, exempt from the conditions of the Maryland Consumptive Use Regulation.

Consistent population and water use information is available for the Virginia portion of the study area based on demand centers (multiple consumers on a water supply system) and areas of counties outside of the designated demand centers. Base year and future population information is presented in Table 10. It must be borne in mind that forecasts of population are usually influenced by conditions which are recent and current at the time of forecast preparation. Other factors which may influence the demand for water and which are presently under consideration in Virginia include: implementation of Surface Water Management Areas, and the effects of any new minimum instream flow policies.

The Northern Virginia Metropolitan Demand Center, for which planning level data are presented in the tables below, encompasses Arlington and Fairfax counties, the eastern portion of Prince William County, the cities of Falls Church and Alexandria, and the towns of Herndon and Vienna. This area is essentially the same as that area of northern Virginia which is the subject of a current demand forecast study being conducted for the WMA by the CO-OP Section of the Interstate

Commission on the Potomac River Basin. Updated demand forecasts for the area will be available upon the completion of that study.

Table 10: Virginia Population in the Study Area						
	1980*	1990	2000	2010	2020	2030
Demand Centers						
Leesburg	9,040	12,590	15,420	17,650	19,570	21,490
W. Loudoun	3,690	5,140	6,290	7,200	7,980	8,770
Lovettsville	520	720	880	1,010	1,120	1,230
Middleburg	660	910	1,120	1,280	1,420	1,560
Hillsboro	80	100	130	150	170	190
Manassas	17,400	20,830	24,870	27,900	30,530	33,150
Manassas Pk	6,524	7,010	7,220	7,436	7,659	7,888
W. Pr. Wm. Co	23,315	31,148	40,950	44,189	48,608	52,983
City of Fairfax	36,600	39,160	41,544	43,122	44,328	45,594
E. Loudoun Co	26,733	45,000	65,000	74,695	82,510	90,244
N. Va. Metro**	956,000	1,177,000	1,293,000	1,363,000	1,428,000	1,495,000
County Areas Outside Demand Centers						
Loudoun (West)	16,790	23,390	28,650	32,790	36,370	39,940
Loudoun (East)	2,375	2,987	3,631	4,139	4,553	4,963
Pr. William	29,800	34,700	40,100	46,200	53,300	60,300
Total	1,129,527	1,400,685	1,568,805	1,670,761	1,766,118	1,863,302

* Some figures in this column are for the year 1983

** The Northern Virginia Metro Area is presently (1995) the subject of a detailed demand study by the CO-OP Section of the Interstate Commission on the Potomac River Basin. These values are expected to be revised as a consequence of that study.

Source: Virginia State Water Control Board, 1988 (2).

Base year and projected water use information is available for scenarios both without and with future conservation. These data are presented in Table 11 and Table 12, respectively.

Table 11: Virginia Water Use (mgd) without Conservation						
	1980*	1990	2000	2010	2020	2030
Demand Centers						
Leesburg	1.06	1.47	1.80	2.06	2.29	2.51
W. Loudoun	1.19	1.30	1.39	1.45	1.51	1.57
Lovettsville	0.03	0.04	0.05	0.06	0.06	0.07
Middleburg	0.09	0.12	0.15	0.17	0.19	0.21
Hillsboro	0.01	0.01	0.01	0.01	0.01	0.01
Manassas	2.27	5.05	6.61	7.28	7.77	8.27
Manassas Pk	0.45	0.86	0.92	0.95	0.98	1.01
W. Pr. Wm. Co	3.10	3.86	5.68	6.90	8.22	9.53
City of Fairfax	3.61	4.90	5.19	5.39	5.54	5.70
E. Loudoun Co	3.00	6.03	8.71	10.01	11.06	12.09
N. Va. Metro**	99.00	122.00	135.00	142.00	147.00	154.00
County Areas Outside Demand Centers						
Loudoun (West)	1.33	1.82	2.22	2.53	2.80	3.07
Loudoun (E)***	0.62	0.83	1.01	1.16	1.21	1.26
Pr. William***	7.83	9.63	11.21	12.97	14.11	15.27
Total	123.59	157.92	179.95	192.94	202.75	214.57

* Some figures in this column are for the year 1983.

** The Northern Virginia Metro Area is presently (1995) the subject of a detailed demand study by the CO-OP Section of the Interstate Commission on the Potomac River Basin. These values are expected to be revised as a consequence of that study.

*** Pro rota proportion by population of larger counties area demand outside Demand Centers.

Source: Virginia State Water Control Board, 1988 (2).

Assumed conservation reflected in Table 12 increases linearly to the year 2030 by 20% for industrial demand, 25% for domestic/commercial demand, and on a case by case basis for unaccounted-for water.

Table 12: Virginia Water Use (mgd) with Conservation						
	1980*	1990	2000	2010	2020	2030
Demand Centers						
Leesburg	1.06	1.38	1.64	1.82	1.95	2.07
W. Loudoun	1.19	1.27	1.34	1.36	1.39	1.42
Lovettsville	0.03	0.04	0.04	0.05	0.05	0.05
Middleburg	0.09	0.11	0.13	0.14	0.15	0.16
Hillsboro	0.01	0.01	0.01	0.01	0.01	0.01
Manassas	2.27	4.81	6.19	6.66	6.94	7.19
Manassas Pk	0.45	0.79	0.81	0.81	0.79	0.78
W. Pr. Wm. Co	3.11	3.60	5.19	6.21	7.30	8.34
City of Fairfax	3.61	4.45	4.52	4.47	4.38	4.27
E. Loudoun Co	2.73	5.49	7.59	8.32	8.76	9.10
N. Va. Metro**	99.00	112.00	119.00	120.00	119.00	119.00
County Areas Outside Demand Centers						
Loudoun (West)	1.33	1.66	1.93	2.10	2.22	2.31
Loudoun (E)***	0.62	0.83	1.01	1.16	1.21	1.26
Pr. William***	7.83	9.63	11.21	12.97	14.11	15.27
Total	123.33	146.07	160.61	166.08	168.26	171.23

* Some figures in this column are for the year 1983.

** The Northern Virginia Metro Area is presently (1995) the subject of a detailed demand study by the CO-OP Section of the Interstate Commission on the Potomac River Basin. These values are expected to be revised as a consequence of that study.

*** Assumed the same values as without conservation.

Source: Virginia State Water Control Board, 1988 (2).

5. Specific Water Needs of Feasibility Study Participants

In addition to the general planning level information for base year and future projections of population and water use, specific information is available on future water demands for the non-federal participants in the study. The general planning level information for base year and future projections of water use that might be required from the Potomac River indicates that most growth in demand for water use is expected to occur in the municipal residential water use sector; and is therefore, not subject to the terms of the Maryland Consumptive Use Regulation. However, there is smaller but significant growth in demand expected to occur in non municipal sectors which will be subject to the Consumptive Use Regulation.

That Regulation: Maryland Code of Regulations 08.05.09.03, requires that storage be calculated on the basis of total consumptive use travel time from the location of the storage (Jennings Randolph Lake) to Great Falls, which is 5 days in this case.

The total amount of low flow augmentation storage, in billions of gallons, required of a permittee by the Department shall be interpolated from the following table:

Consumptive use of permittee in mgd	Time of travel in days from the storage facility to the Washington Metropolitan Area at Great Falls					
	0	1	2	3	4	5
1	0.089	0.124	0.124	0.124	0.124	0.124
10	0.9	1.2	1.3	1.3	1.3	1.3
20	1.8	2.4	2.7	2.7	2.7	2.7
30	2.8	3.6	4.0	4.0	4.1	4.1
40	3.8	4.7	5.3	5.3	5.4	5.4
50	4.9	6.1	6.7	6.7	6.7	6.7
60	6.0	7.2	8.1	8.1	8.1	8.1
70	7.0	8.6	9.5	9.5	9.5	9.5
80	8.3	9.8	10.9	10.9	10.9	12.0
90	9.4	11.3	12.4	12.4	12.6	12.6

As Maryland regulation mandates that consumptive users must replace lost flow from production processes during extreme droughts or alternatively, cease or reduce consumptive use; surface water appropriation and use permittees for any water use up-stream from the WMA must reduce withdrawals from the Potomac River and its tributaries when the restriction stage is declared in the WMA to a proportion of the Potomac River allocatable flow corresponding to the ratio of the permittee's average daily withdrawal during the 5 most recent winter periods (December, January, and February) to the average daily total withdrawal of all users during those periods.

The non-federal participants in the study anticipate future consumptive water use, as follows:

A. Potomac Electric Power Company (PEPCO) plans to expand the electricity generating capacity at its Dickerson, Maryland location. PEPCO currently holds water appropriation and use permit number MO66S017 (04) for surface water withdrawal from the Potomac River of an annual average of 400 mgd and a single day maximum of 550 mgd. The amount of water withdrawn under this permit is not expected to increase; however, there will be an increase in the consumptive use which is subject to the Maryland consumptive use regulations.

There have been a number of changes to PEPCO's capacity requirements since the feasibility study was begun. Initially, the design requirement offered two options for calculating storage. One is the use of wet mechanical draft cooling towers for combined cycle units which translates to a rate of 12 cfs (7.8 mgd) (12 cfs x 0.65 mgd/cfs = 7.8 mgd). The storage requirement under this scenario is estimated to be 1.013 bg (3,109 af). The other alternative is the installation of a coal gasifier combined cycle (GCC) unit which would consumptively use water at a rate of 11.6 mgd. At that rate the storage requirement would be 1.524 bg (4,677 af) of storage in Jennings Randolph Lake.

According to the Preferred Integrated Resource Plan, 1994 through 2008, a single steam cycle addition in 2004 is the last stage of Station H, and the only new PEPCO owned generation anticipated during the period. The addition of the second combined cycle unit and coal gasifier at Station H are no longer part of the plan, as all other new supply side resource additions may be purchased from contract suppliers. Therefore, the generation facilities may not even be located in the Potomac River basin. Without specific information concerning location and generating technology no quantitative need for consumptive water use can be determined now.

B. The Co-Op Montgomery County Government/Northeast Maryland Waste Disposal Authority has completed construction of a municipal solid waste resource-recovery facility near the Dickerson PEPCO plant. The surface water withdrawal granted by a water appropriation and use permit number MO90S011 (01) is limited to an annual withdrawal of 1.342 mgd and a single day maximum withdrawal of 2.516 mgd from the Potomac River. The consumptive use portion (2 mgd) of their withdrawal translates to 0.248 bg (761 af) of storage in Jennings Randolph Lake. However, the facility has since been built to a smaller scale, and there is not a projected need to purchase augmentation storage capacity from a reallocation of the Jennings Randolph Lake.

C. AES WR Limited Partnership (AES Warrior Run) is constructing an electrical cogeneration facility in Allegany County, Maryland near the City of Cumberland. AES was issued water appropriation and use permit number AL69S036 (05) for an average annual withdrawal of 2.93 mgd and a single day maximum withdrawal of 3.2 mgd from the Potomac River. The consumptive use portion (2.6 mgd) of their withdrawal translates to 0.200 bg (614 af) of storage in Jennings Randolph Lake. AES has since signed a 30 year agreement with the City of Cumberland. Under this agreement, the City will supply water needs from the City's reservoirs on Evitts Creek in Pennsylvania. Maryland consumptive use regulations only apply to water appropriation permits issued by the State of Maryland. AES, with its out of State source, does not project a need to purchase augmentation storage capacity from a reallocation of the Jennings Randolph Lake.

D. The Washington, D.C. metropolitan area water utilities, represented by ICPRB/CO-OP, have anticipated future demands for water. A demand forecast study that helps define future storage needs was recently completed. Using the river/reservoir daily system simulation model with current design criteria, the drought of record (1930-1931) hydrology, and current operating policies, approximately 10.7 bg (32,839 af) of additional storage will be required to meet new demand by the year 2050. As facilities are up-graded over the years, and operating policies are continually improved, the storage required to meet the current estimate of future demands may decline slightly.

In addition to the study participants, Westvaco has expressed an interest in consumptive use make-up storage resulting from reallocation at Jennings Randolph, but their needs have not been quantified.

The motivation for a study of water needs, especially future growth in consumptive water needs, is for compliance with the Maryland Consumptive Use Regulation; and for future needs of the water utilities in the Washington Metropolitan Area. Most of the areas with access to water stored in, and released from, Jennings Randolph Lake are expected to experience growth in demand which is mostly for municipal residential water use purposes. Water used for municipal residential purposes is not subject to the Maryland Consumptive Use Regulation. The WMA water utilities will experience future growth in demand which will exceed the capabilities of existing resources. Access to reallocated storage in Jennings Randolph Lake may be a favorable candidate among the alternatives for new supplies.

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