

Eastern Shore of Virginia

Water Supply Plan Summary

August 2010

Local and Regional Water Supply Planning

- Regulations: 9 VAC 25-780
- Purpose:
 - Ensure that adequate and safe drinking water is available to all citizens of the commonwealth
 - Encourage, promote, and protect all other beneficial uses
 - Encourage, promote, and develop incentives for alternative water sources, included but not limited to desalinization

Water Supply Plan Components

- **§70 - Existing Water Sources** (Description of water systems)
- **§80 - Existing Water Use** (Description of current and hist. use)
- **§90 - Existing Water Resource Conditions**
(Groundwater Resource, Natural Resources)
- **§100 - Projected Water Demand**
(Future water use)
- **§110 - Water Demand Management**
(Water Conservation and Management)
- **§120 - Drought Response and Contingency Plan**
Previously Presented
- **§130 - Statement of Need and Alternatives**
(Use / Resource Constraints; alternate sources / technologies)

I. Existing Water Sources

(9 VAC 25-780-70)

SECTION PURPOSE AND CONTENTS:

- Summarizes water source information for each county,
- Provides detailed descriptions of water source information within each of the jurisdictions,
- Focuses on groundwater (no significant SW in counties),
- Compiles available information for:
 - Large Community Water Systems,
 - Large self-supplied non-agricultural users,
 - Large agricultural users, and
 - An estimate of the population served by individual wells using less than 300,000 gallons per month.

I. Existing Water Sources

(9 VAC 25-780-70)

- Applies to all surface water and groundwater withdrawals with a combined withdrawal averaging greater than 300,000 gallons per month.
- Differs from the Groundwater Withdrawal Permit – which applies to all groundwater withdrawals that equal to or exceeds 300,000 gallons per month (as opposed to average).

I. Existing Water Sources

(9 VAC 25-780-70)

Information compiled from numerous sources:

- Reports from individual water supply sources
- EPA Envirofacts - Safe Drinking Water Information System
- VDEQ Groundwater Withdrawal Permits
- VDEQ Groundwater Withdrawal Permit Database
- VDH Groundwater Permits
- USGS - Estimated Use of Water in the United States - 2005
- U.S. Census Bureau Data
- County Comprehensive Plans

II. Existing Water Use

(9 VAC 25-780-80)

SECTION PURPOSE AND CONTENTS:

- Summarizes permitted withdrawals and historical usage for each:
 - Large Community Water System,
 - Large self-supplied non-agricultural user
 - Large agricultural user, and
 - An estimate of total usage by self-supplied households and businesses using less than 300,000 gallons per month.

II. Existing Water Use

(9 VAC 25-780-80)

Information compiled from numerous sources:

- VDEQ Groundwater Withdrawal Permits
- VDEQ Reported Water Use Database
- VDH Reported Water Use Database
- USGS - Estimated Use of Water in the United States - 2005
- U.S. Census Bureau Data
- County Comprehensive Plans

III. Existing Water Resource Conditions

(9 VAC 25-780-90)

SECTION PURPOSE AND CONTENTS:

- A description of the physical environment pertaining to the geologic, hydrology, and meteorological conditions on the Eastern Shore and
- A Description of existing environmental conditions that pertain to, or may affect sources that provide the current supply:
 - Threatened and Endangered Species
 - Anadromous, Trout, and other Significant Fisheries
 - Recreational Significance and State Scenic River Status
 - Sites of Historical or Archeological Significance
 - Geology and Soils
 - Wetlands
 - Riparian Buffers
 - Land Use and Land Coverage
 - Impaired Streams and Rivers
 - Point Source Dischargers
- Special attention is given to the potential effects of water usage on current environmental conditions and to mitigating strategies and which reduce or avoid such potential effects.

IV. Projected Water Use

(9 VAC 25-780-100)

SECTION PURPOSE AND CONTENTS:

- Projections to estimate future water demands.
- Estimates of populations in the County and the water needed to serve them are made in ten year increments from 2010 to 2040.
- The projections include considerations of both public and private sources of water.
- Some of the projections are based on values and/or methodologies presented in the respective groundwater withdrawal permit applications, particularly for large industrial self-supplied users.
- Growth projections are assumed zero for agricultural users and communities with recent population declines

IV. Projected Water Use

(9 VAC 25-780-100)

POPULATION PROJECTIONS:

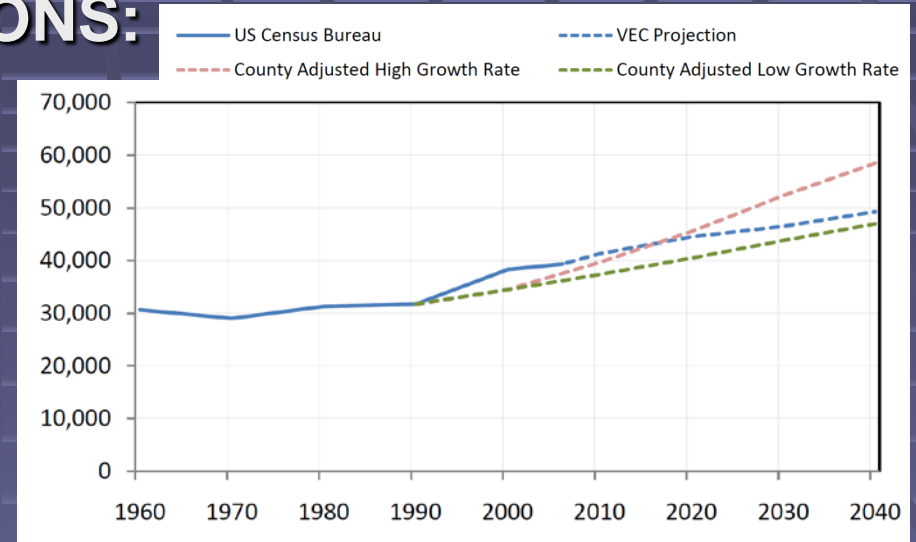
- Population projections for the Counties were estimated by the Virginia Employment Commission (VEC).
- The County Comprehensive Plans also provided estimates of population growth to 2030 based on corrected estimates of the 2000 Census population.
- Projections for 2040 were not available and the growth rates predicted by VEC were nearly linear ($R^2 \geq 0.98$), therefore straight line interpolation was used to extrapolate County population projections to 2040.
- Overall, population in the Accomack and Northampton are projected to grow at average annual rates of approximately 0.65 percent and 0.4 percent, respectively.

Projected Water Use

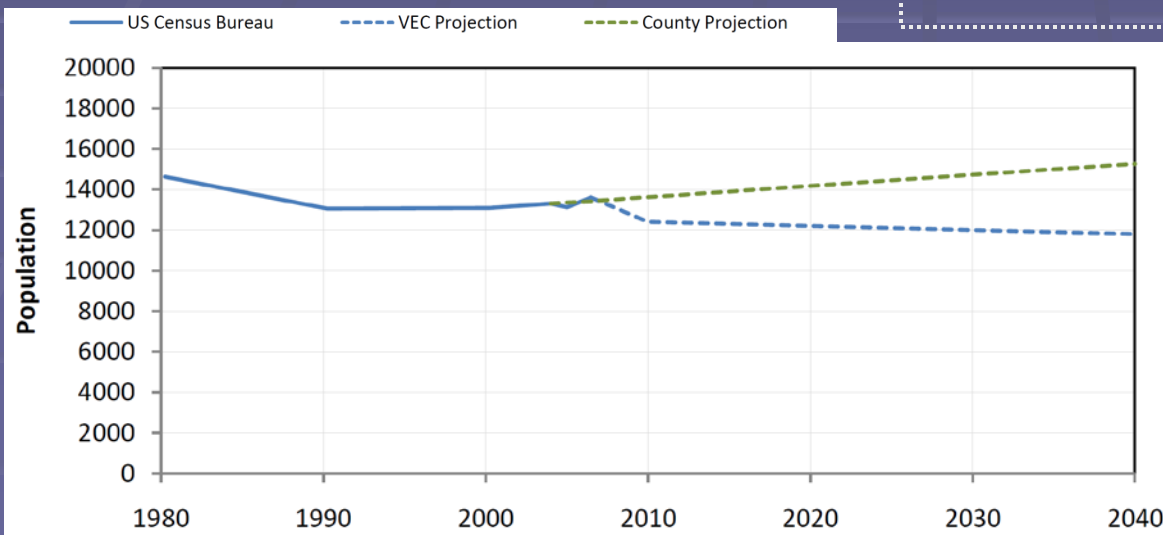
(9 VAC 25-780-100)

POPULATION PROJECTIONS:

Accomack



Northampton



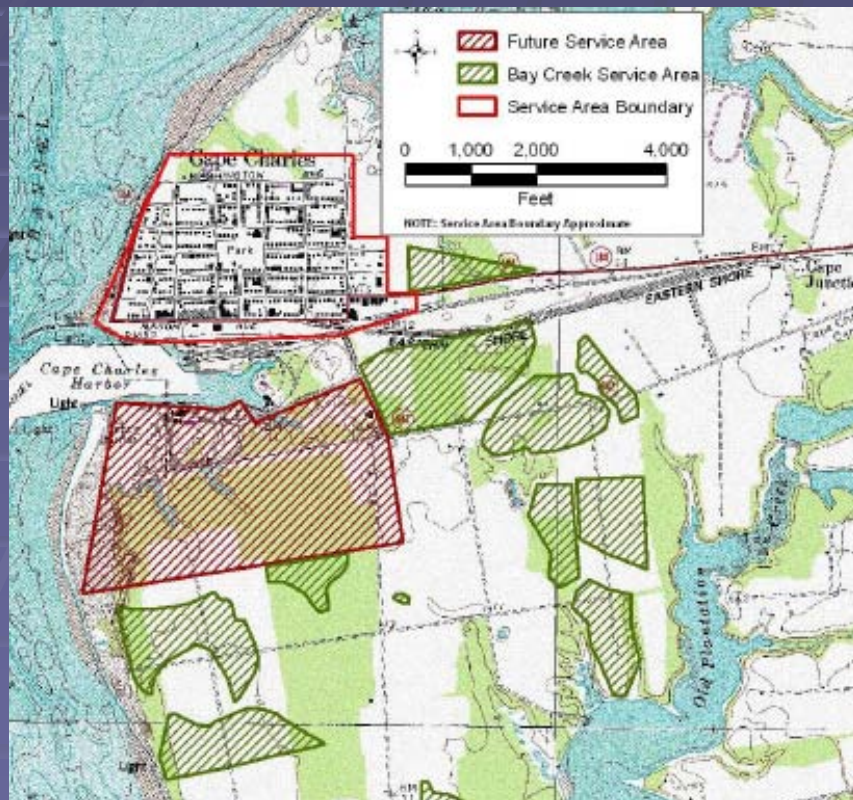
IV. Projected Water Use

(9 VAC 25-780-100)

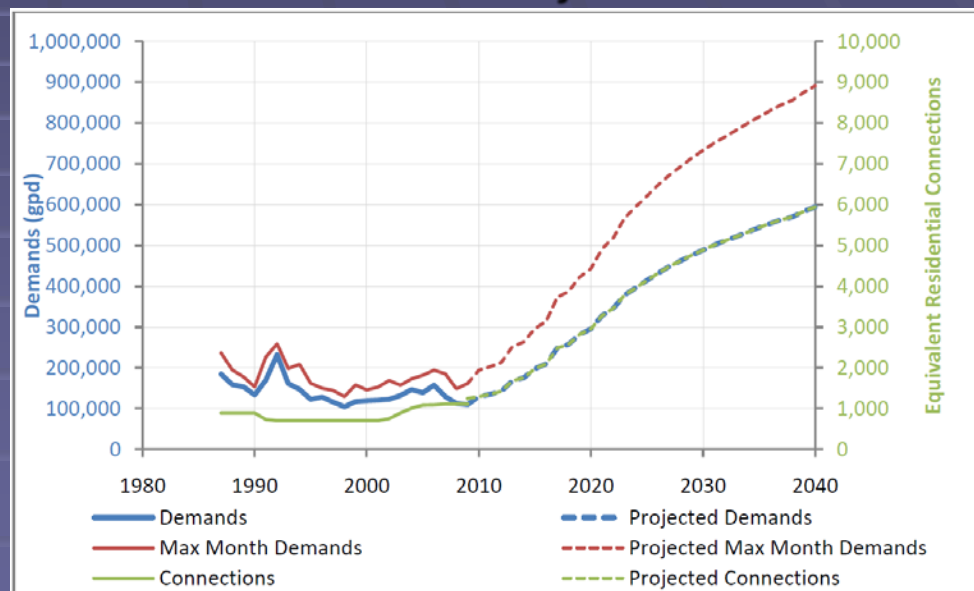
EXAMPLE COMMUNITY SYSTEM SUMMARY:

① Cape Charles

Service Area



Demand Projections



Demand projections based on info in groundwater withdrawal permits
x 100 gpd avg day use rate or
x 150 gpd max day use rate

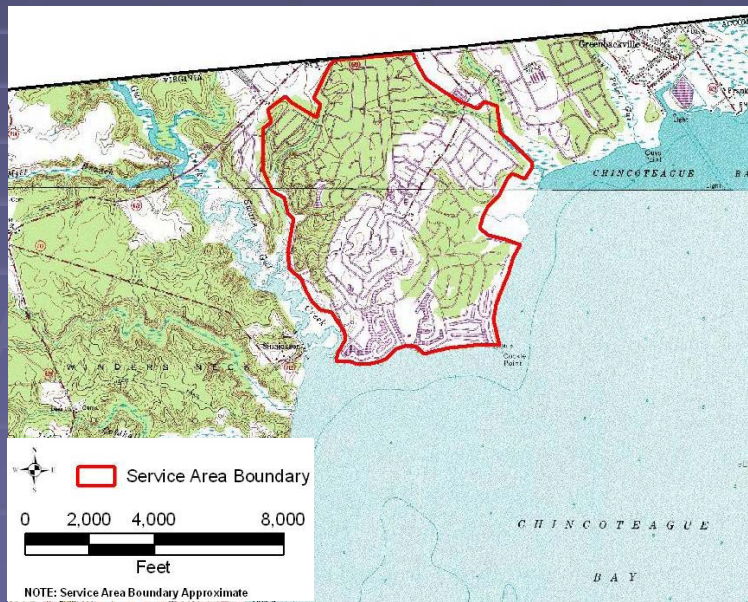
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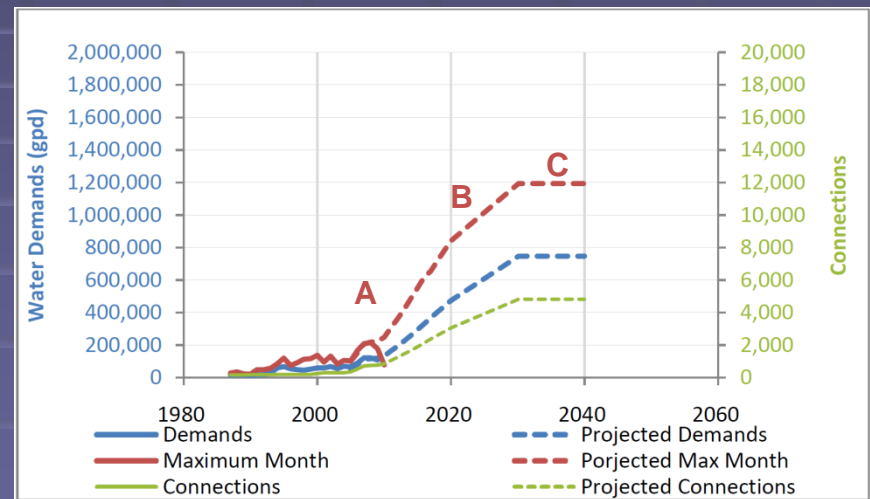
EXAMPLE COMMUNITY SYSTEM SUMMARY:

② Captain's Cove Subdivision

Service Area



Demand Projections



- A Demand projections based on info in groundwater withdrawal permits (100-250 new units/per year)
- B Linear interpolation to 2030 buildout
- C Zero growth after buildout

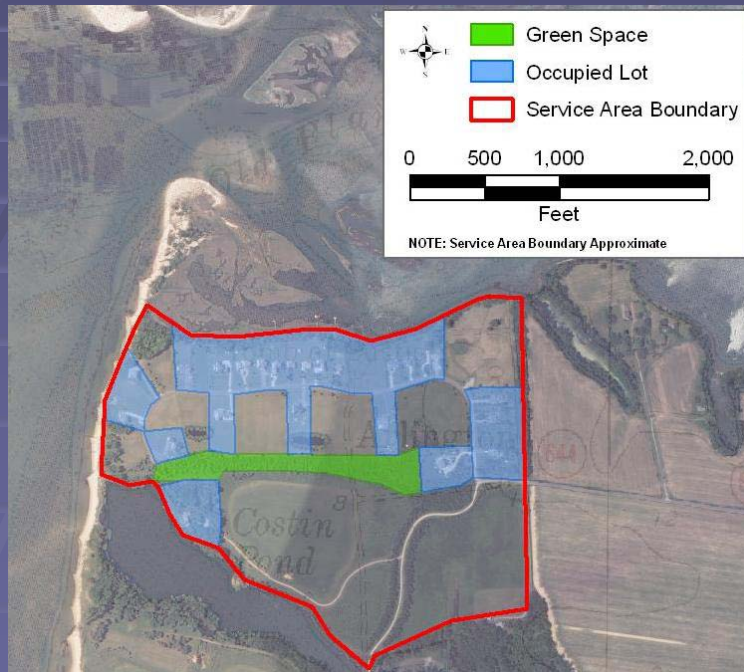
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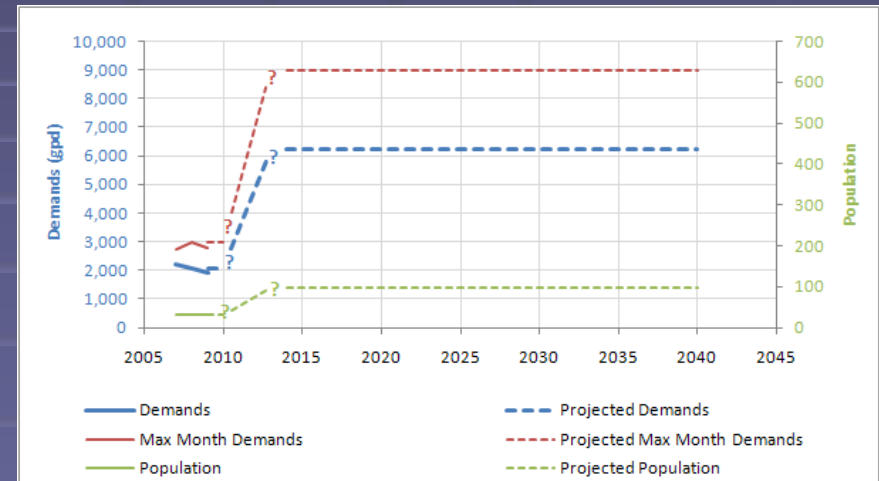
EXAMPLE COMMUNITY SYSTEM SUMMARY:

③ Arlington Plantation

Service Area



Demand Projections



Based on an analysis of available 2010 aerial photography. Assuming a similar lot size in future development, 32 new lots could be developed for a total of 48. Assuming the current occupancy of 2 people per home will be accurate at buildout, the total population of Arlington Plantation is projected to be 96 people. The buildout date is uncertain as it is assumed that new homes will be constructed on an as needed/demanded basis. Assumed zero demand growth following buildout.

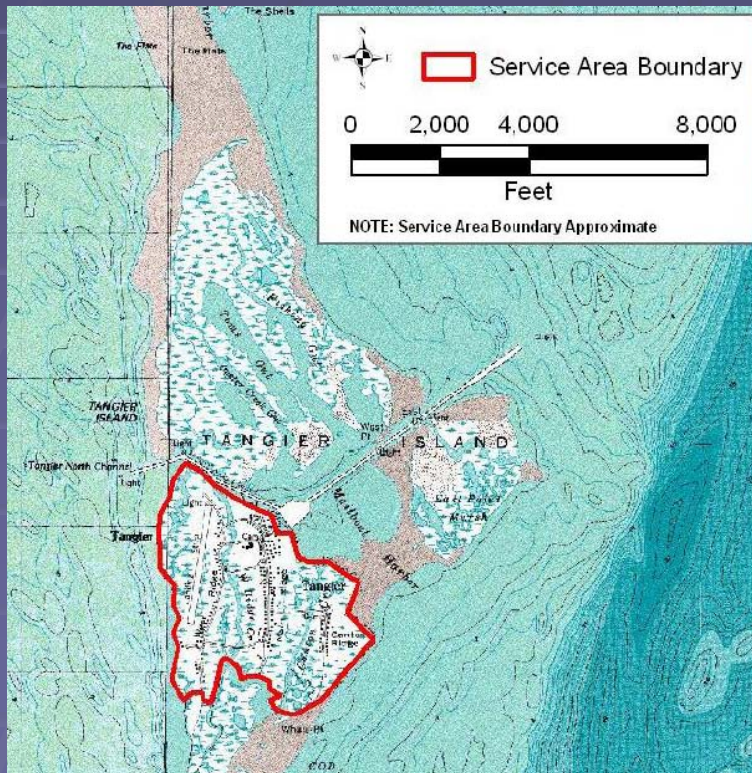
IV. Projected Water Use

(9 VAC 25-780-100)

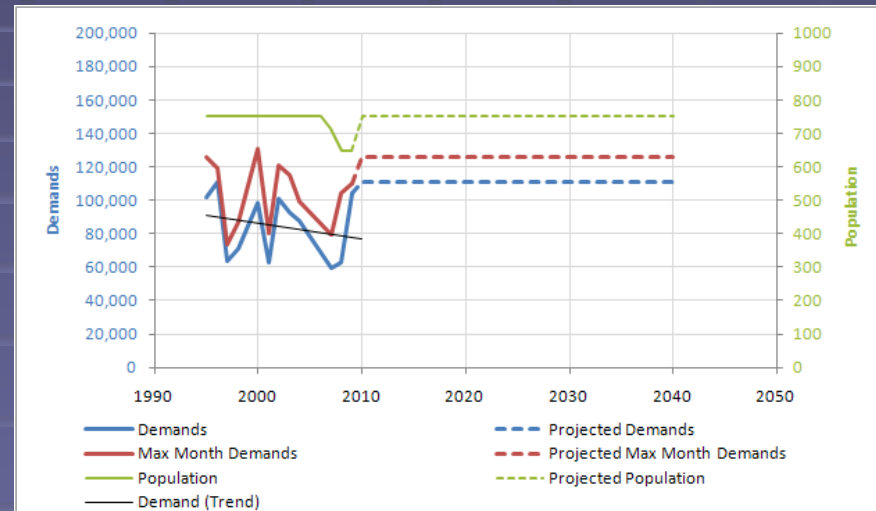
EXAMPLE COMMUNITY SYSTEM SUMMARY:

④ Tangier Island

Service Area



Demand Projections



Assumed zero demand growth from maximum reported demands based on recent negative growth trend

V. Water Demand Management

(9 VAC 25-780-110)

SECTION PURPOSE AND CONTENTS:

- Water demand management involves both an increase in efficiency of water use and a reduction of water losses.
- Implemented through WCMP, which must include:
 - Use of water-saving plumbing and processes including, where appropriate, the use of water-saving fixtures in new and renovated plumbing as provided under the Uniform Statewide Building Code (USBC).
 - A water use education program.
 - An evaluation of potential water reuse options.
 - Requirements for mandatory use reductions during water shortage emergencies, including, where appropriate, ordinances prohibiting the waste of water generally.
- This section summarizes typical components/elements of a WCMP

VI. Drought Contingency Plan

(9 VAC 25-780-120)

SECTION PURPOSE AND CONTENTS:

Outline a regional approach to respond to drought, while recognizing that drought conditions will vary across region, and specific response and contingency actions will be made based on local conditions. The plan recognizes the unique characteristics of water sources within the region, as well as the beneficial uses of the water.

The DRCP includes four graduated stages of responses to the onset of drought conditions within the Planning Area:

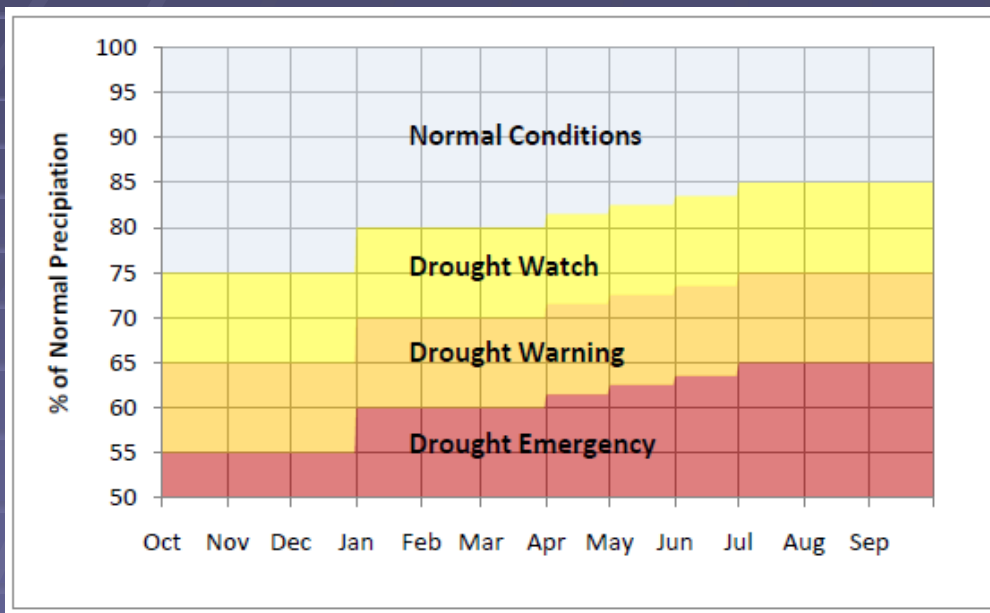
DRCP STAGE	VDEQ DROUGHT		MAJOR RESPONSE
	MONITOR CONDITIONS	CONDITIONS	
■ Normal Conditions	--	Normal Conditions	--
	D0	Abnormally dry (short-term)	
■ Drought Watch	D1	Moderate Drought	Public awareness campaign
■ Drought Warning	D2	Severe Drought	Voluntary restrictions
■ Drought Emergency	D3	Extreme Drought	Mandatory restrictions
	D4	Exceptional Drought	

VI. Drought Contingency Plan

(9 VAC 25-780-120)

STANDARD VDEQ DROUGHT TRIGGERS:

Precipitation:



Groundwater:

ACCOMACK

Withmans Observation Well
USGS local number 19 SOW 110S)

NORTHAMPTON

P.C. Kellam Observation Well
(USGS local number 63H 6 SOW 103A)

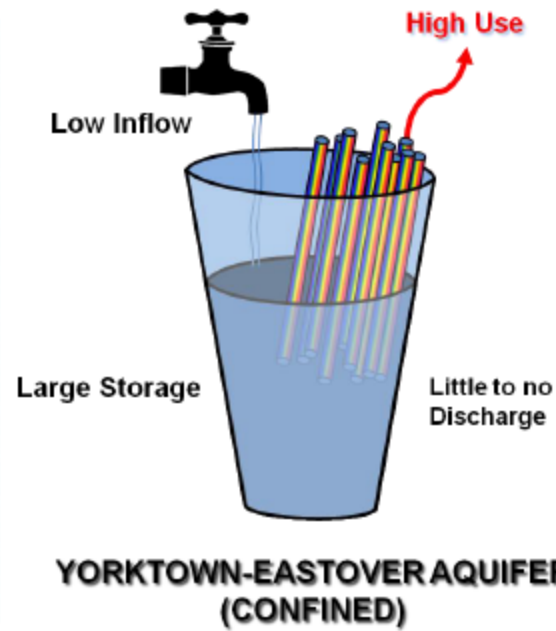
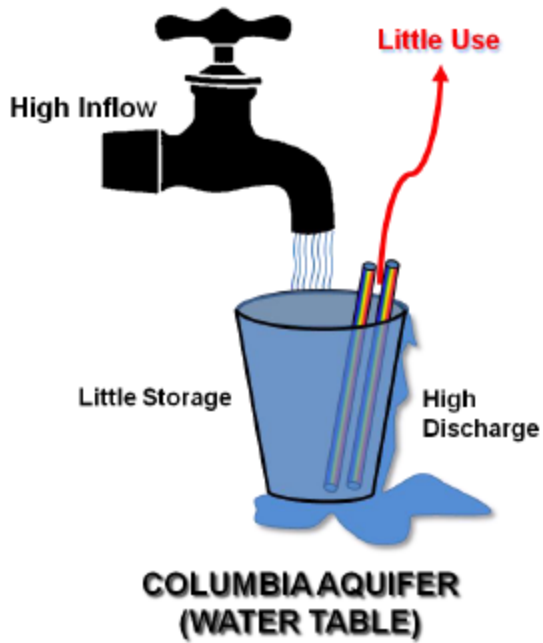
	DROUGHT STAGE			
	Normal Conditions	Drought Watch	Drought Warning	Drought Emergency
<i>(% occurrence relative to all historical measured groundwater levels)</i>				
Measured Groundwater Level	>25 %	10-25 %	5-10 %	<5 %

VI. Drought Contingency Plan

(9 VAC 25-780-120)

LIMITED DIRECT AQUIFER RESPONSE TO DROUGHT:

Conceptual differences in water budgets between the water table and confined aquifers on the Eastern Shore of Virginia



VI. Drought Contingency Plan

(9 VAC 25-780-120)

- *Indirect* impacts to groundwater availability during drought events on the Eastern Shore are typically associated with local water level declines due to **increased use**.
- For a given drought to be based on groundwater indicators alone, it is preferable to provide flexibility to water systems (community, agricultural and other self-supplied systems) such that local groundwater water levels may be used as indicators of local drought conditions and severity for each system or portions of the County – rather than using regional indicators.
- The recommended indicator of a drought emergency for a (community or individual) water supply system is either a water level less than 5 ft above the intake or 80 percent of available drawdown in a production well. For systems where production well water level measurements are impracticable, a nearby observation well may also be used.

VI. Drought Contingency Plan

(9 VAC 25-780-120)

RECOMMENDED DROUGHT TRIGGERS:

NORMAL CONDITIONS

- Precipitation exceeds the percent of normal precipitation threshold specified for normal conditions and the relevant time period **OR**
- Groundwater levels above 25th percentile for historic levels

DROUGHT WATCH

- Precipitation at or below the percent of normal precipitation threshold specified for drought watch conditions and the relevant time period **OR**
- Groundwater levels between 25th and 10th percentile for historic levels

VI. Drought Contingency Plan

(9 VAC 25-780-120)

RECOMMENDED DROUGHT TRIGGERS: (con't)

DROUGHT WARNING

- Precipitation at or below the percent of normal precipitation threshold specified for drought warning conditions and the relevant time period **OR**
- Groundwater levels between 25th and 10th percentile for historic levels

DROUGHT EMERGENCY

- Precipitation at or below the percent of normal precipitation threshold specified for drought emergency conditions and the relevant time period,
- Groundwater levels measured in production wells levels are less than 5 ft above the pump intake, **OR**
- Groundwater level measured in production or nearby observation wells show drawdown greater than 80 percent relative to non-pumping water levels.

VI. Drought and Contingency Plan

(9 VAC 25-780-120)

RECOMMENDED ACTIONS:

NORMAL OPERATION

- Monitor groundwater, precipitation, and other indicators

DROUGHT WATCH

- Review existing drought water conservation and contingency plans,
- Make reasonable efforts to pursue leak detection and repair programs,
- Inform the VDH of a self-declared drought watch, and
- Issue a press release indicating the reasons for the declaration

VI. Drought Contingency Plan

(9 VAC 25-780-120)

RECOMMENDED ACTIONS: (con't)

DROUGHT WARNING

- Issue public announcements encouraging the voluntary reduction or elimination of non-essential water uses including car washing, lawn watering, garden watering, and water usage by swimming pools and other recreational facilities after consultations with the mayor and public works committee chair **and**
- Voluntarily reduce or eliminate non-essential flushing of water lines and other operational water uses. Monitor groundwater, precipitation, and other indicators
- The goal of the voluntary water use restrictions shall be to reduce total water consumption by **5 to 10** percent

VI. Drought Contingency Plan

(9 VAC 25-780-120)

RECOMMENDED ACTIONS: (con't)

DROUGHT EMERGENCY

- Issue public announcements declaring the mandatory reduction or elimination of non-essential water uses including car washing, lawn and garden watering, and water usage by swimming pools and other recreational facilities.
- The goal of the water use restrictions is to reduce total water consumption between 10 and 15 percent, or higher. All residential, business and industrial water users; who do not normally utilize water for any of the listed prohibited uses are requested to voluntarily reduce water consumption by at least 10%.

VII. Statement of Need & Alternatives

(9 VAC 25-780-130)

SECTION PURPOSE AND CONTENTS:

- Determine the adequacy of existing water sources and whether they meet the current and projected demands.
- Discuss potential alternatives to increase current supplies or develop new water supplies

Statement of Need & Alternatives

(9 VAC 25-780-130)

ADEQUACY:

- The Columbia and Yorktown-Eastover multi-aquifer system within the Eastern Shore of Virginia has been designated a Sole Source Aquifer by the USEPA. As such, availability of fresh water supply on the Eastern Shore is limited. However, given the current and projected demands, there is sufficient water supply to meet the overall needs of the Eastern Shore. The challenge is to manage the resource in a manner that will avoid local degradation of the water supply that can occur even under the current demands. The greatest risk is from local saltwater intrusion in the confined Yorktown-Eastover aquifer due to over pumping and contamination of the Columbia aquifer from various land use activities.

Statement of Need & Alternatives

(9 VAC 25-780-130)

ALTERNATIVES:

- Water Table Withdrawals
 - Water is replenished in the Water Table aquifer at far greater rates than the confined Yorktown-Eastover aquifer.
- Dug Ponds
 - Replenished by precipitation, the water table aquifer, and potentially other sources (tail-water recovery).
- Aquifer Storage and Recovery
 - Can be used to store water or reduce potential for saltwater intrusion
- Desalinization
 - Cost of desalinization has decreased significantly over the past 20-years and continues to decrease, making use of desalinization a viable technology to desalt slightly brackish groundwater.