



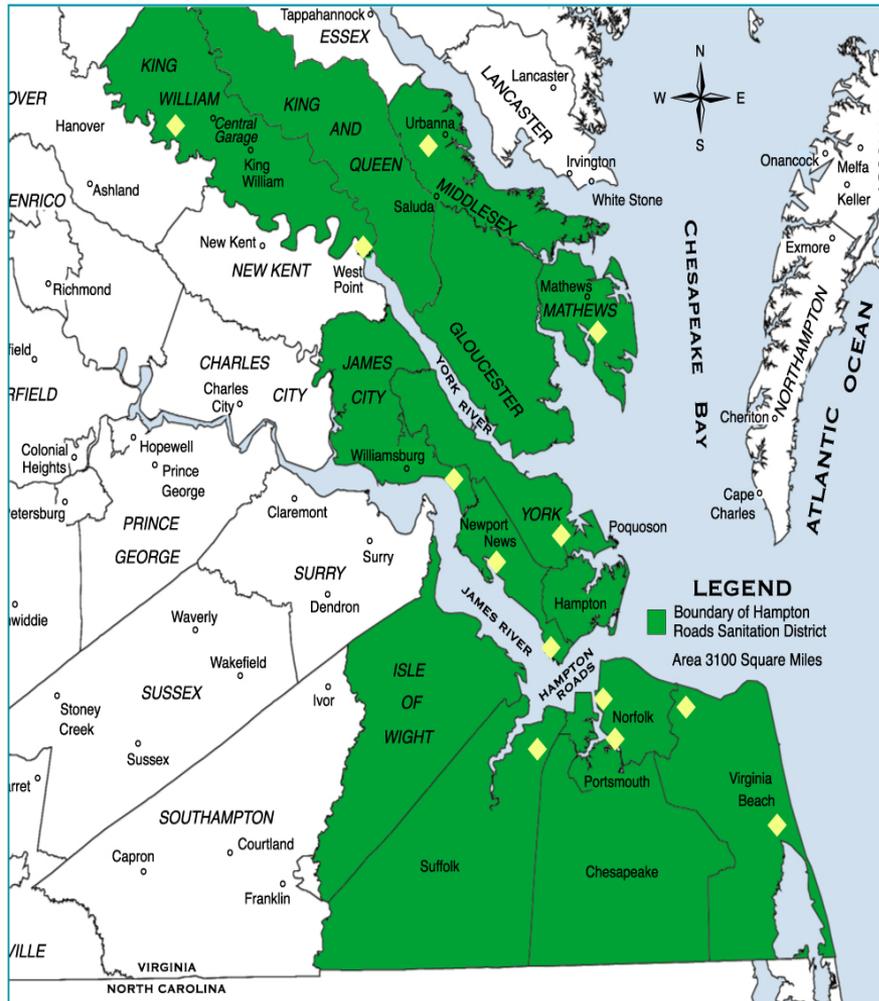
Bayfront Advisory Committee

John J. Dano, PE

HRSD

July 18, 2017

Water is a defining characteristic of Eastern Virginia



- Water Challenges
- HRSD
- SWIFT (A “One Water” Solution)



Water Challenges

- Chesapeake Bay Restoration
- Groundwater Depletion
- Saltwater Intrusion
- Relative Sea Level Rise
- Recurrent Flooding
- Sanitary Sewer Overflows
- Affordability

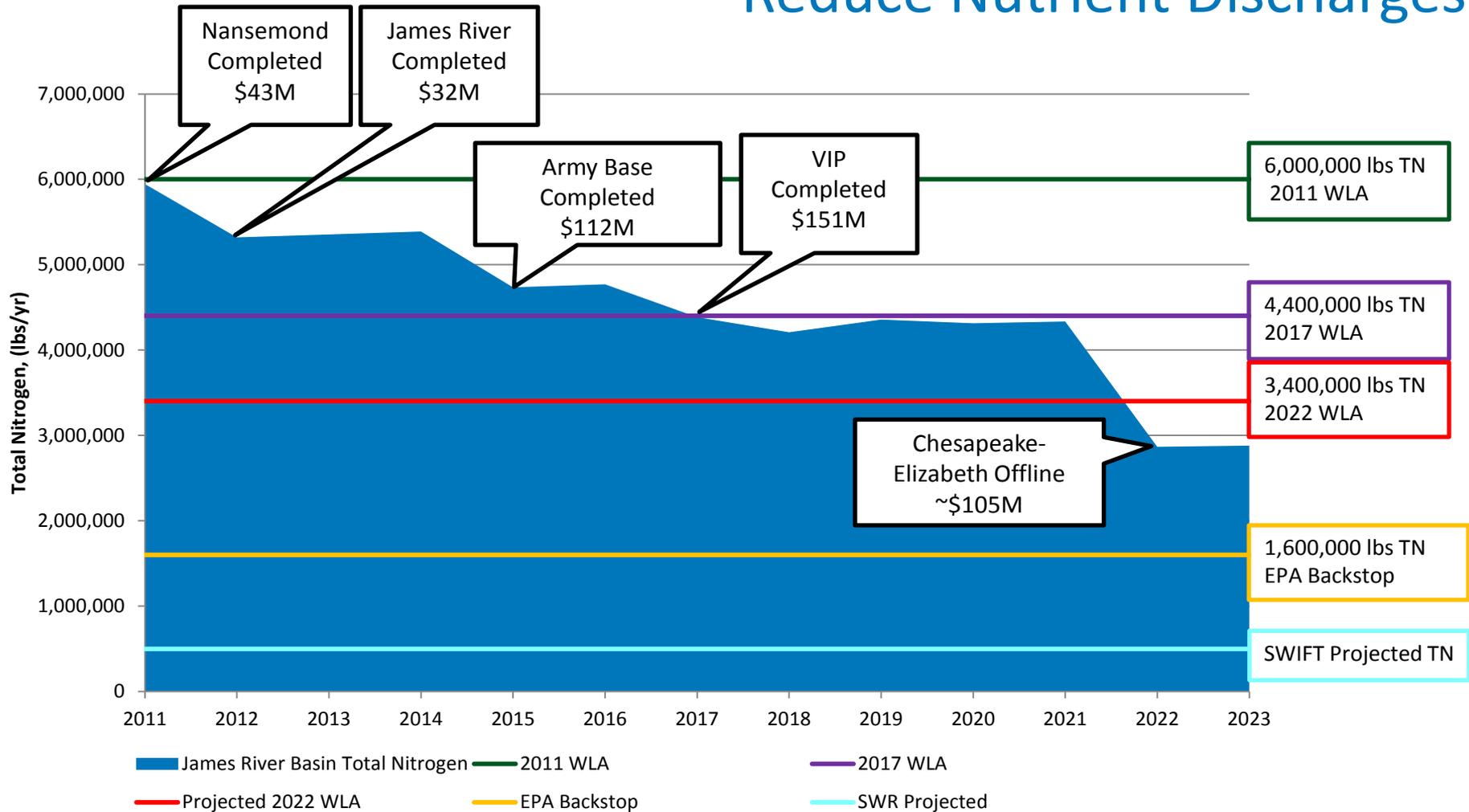
Chesapeake Bay Restoration

- Harmful Algal Blooms
 - wastewater treatment plant upgrades
 - urban storm-water retrofits





Reduce Nutrient Discharges



James River Basin – TN Similar results with TP and TSS and in other river basins.

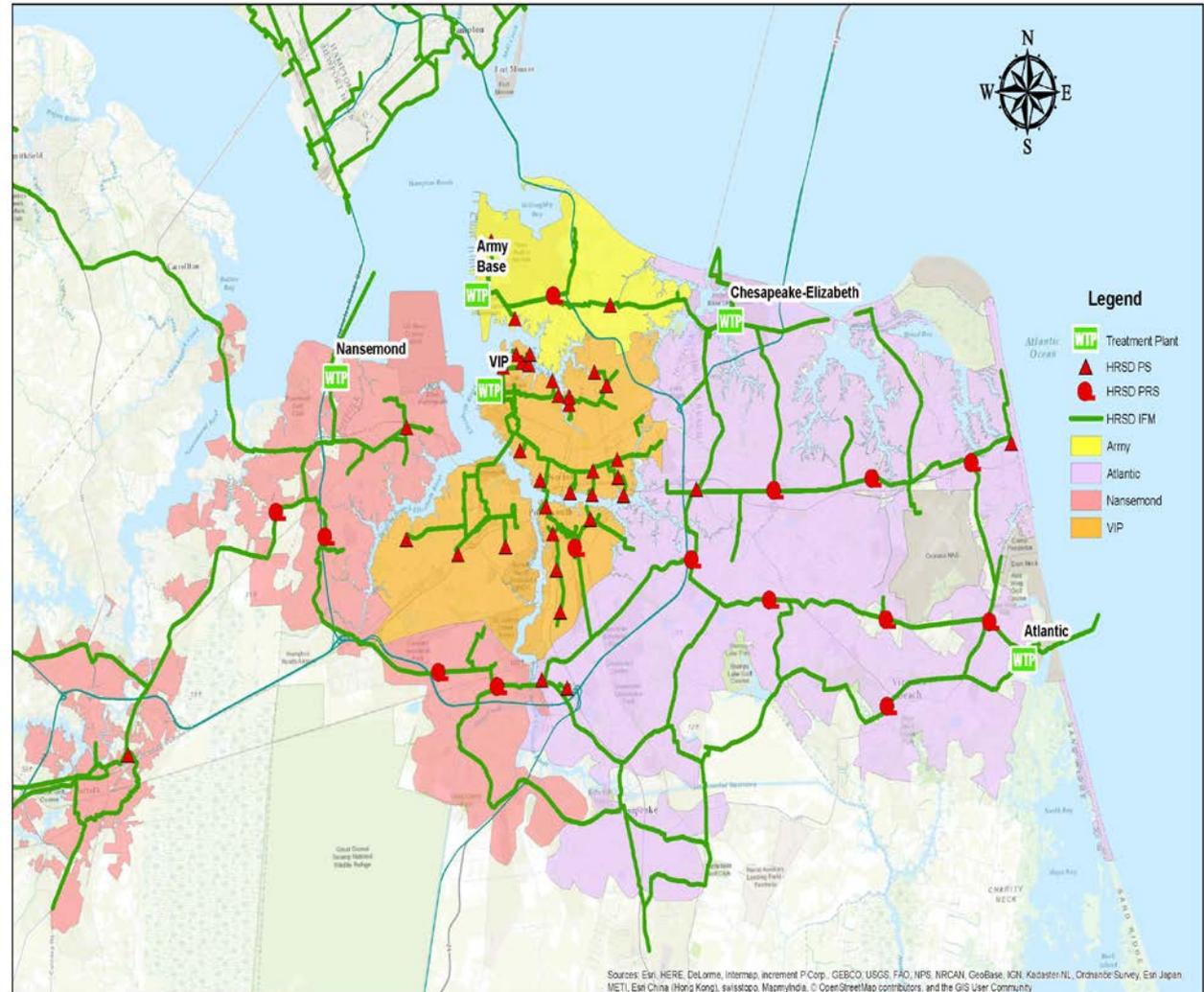
WLA – Nutrient Waste Load Allocation in lbs/yr

Understanding CE Offline



Construct or modify existing infrastructure to divert flow from HRSD's Chesapeake-Elizabeth Treatment Plant to other treatment plants (primarily Atlantic) and

- ▶ Maintain current LOS
- ▶ Complete by June 2021 using a range of delivery methods
- ▶ Be mindful of ease of maintenance for our operations staff, impact to locality staff and citizens, and sequence of infrastructure activation

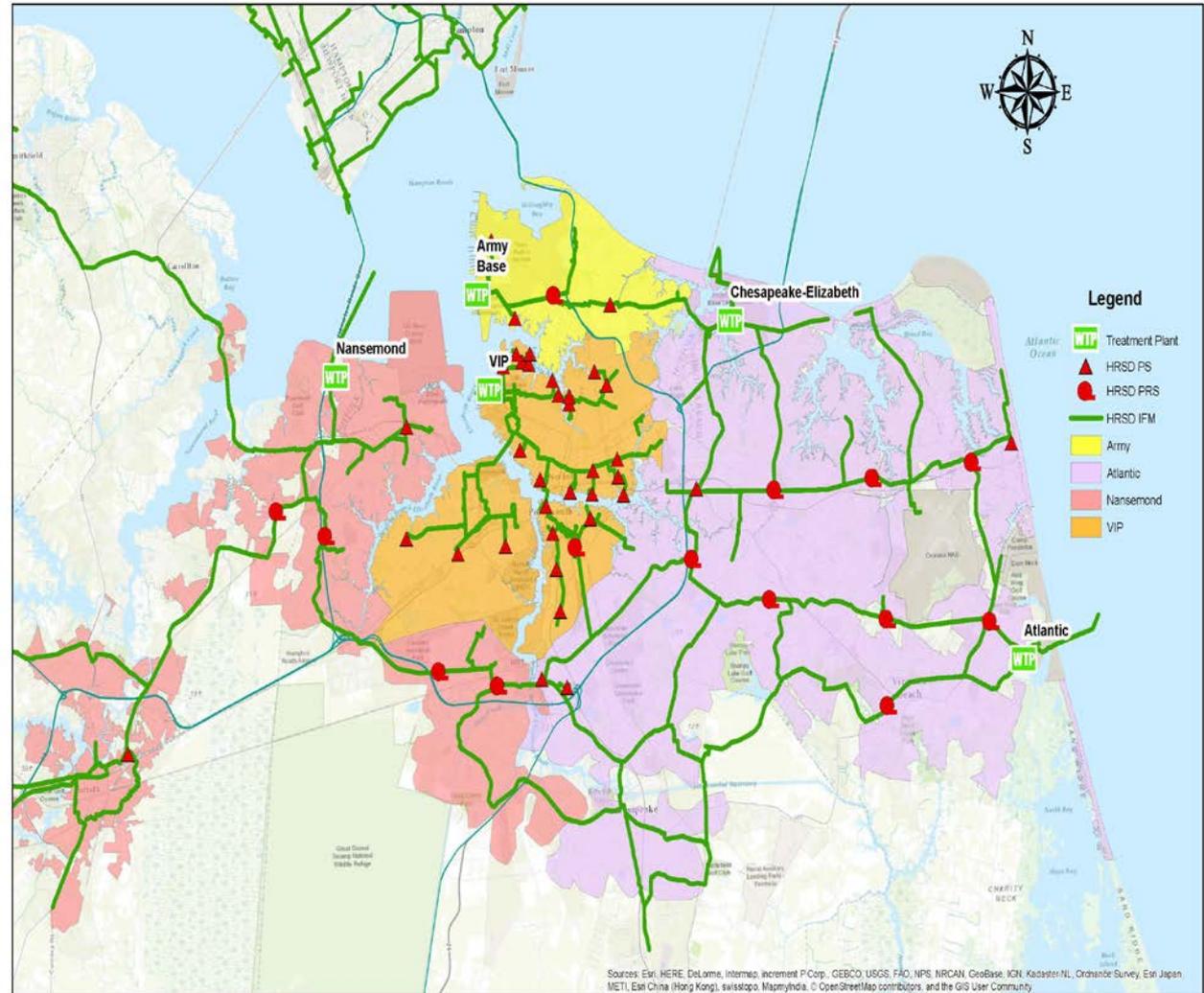


CE Offline Benefits



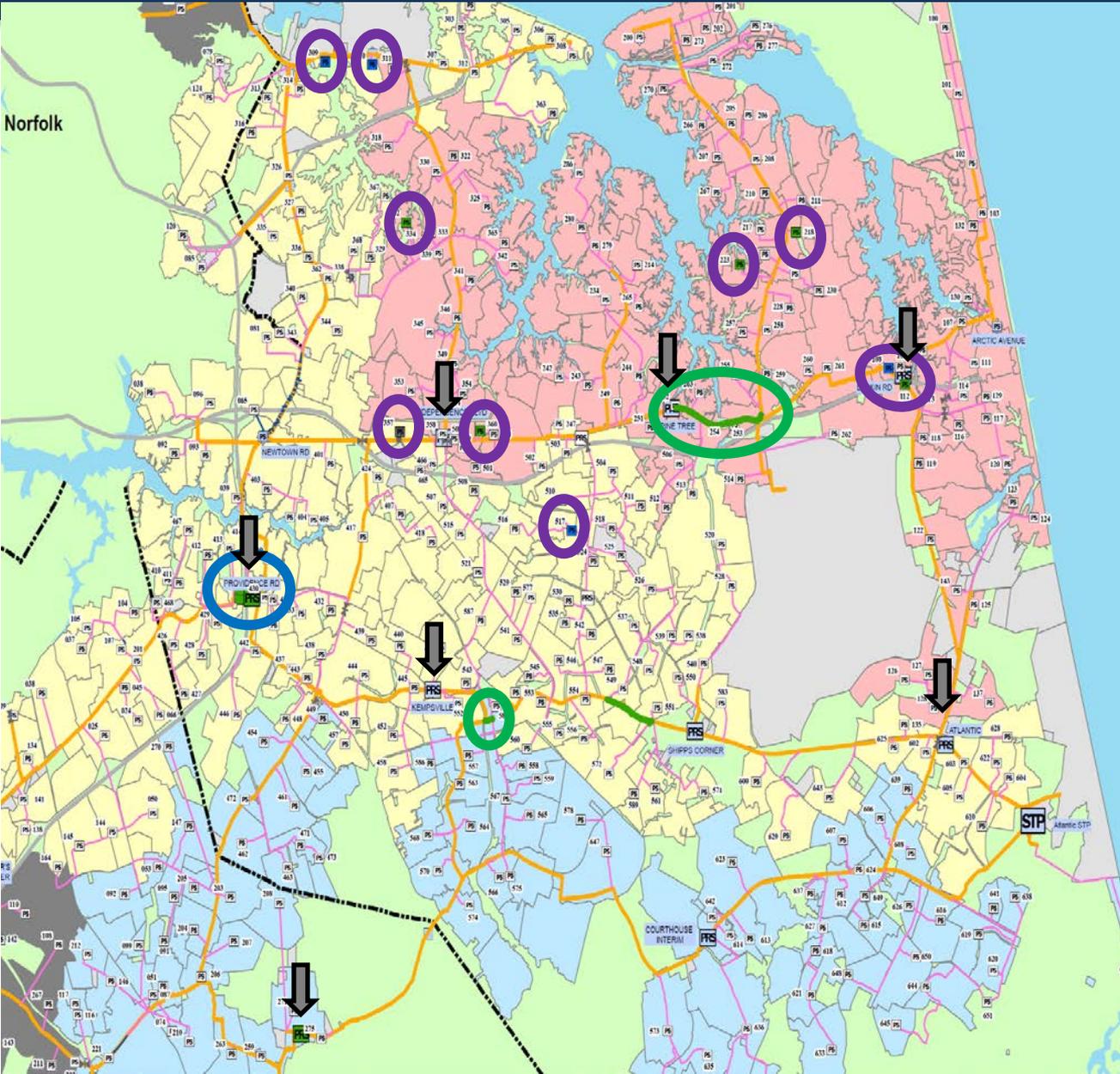
Benefits to rate payers and the Bay

- ▶ Cost Savings
- ▶ Odor Reduction
- ▶ Improved Water Quality
- ▶ Coordinated City Infrastructure Improvement Projects



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBasis, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, Mapbox, © OpenStreetMap contributors, and the GIS User Community

CE Offline Program Components



Pipeline Improvements

1. Force Main Improvements on VB Boulevard from N. Great Neck to N. Lynnhaven
2. 800' 30" FM near Salem Woods Park to connect City

Pump Station Improvements

1. 10 City PS Improvements (one w/ City FM)

Storage Tank (s) 5+ MG Storage

Other Components

1. HRSD PRS Improvements
2. New Elbow Road PRS (in Chesapeake)
3. Little Creek Amphibious Base PS Improvements



CE Decommissioning

Chesapeake-Elizabeth Treatment Plant
Decommissioning

PR_CE011810



PROPOSED SCHEDULE START DATE

PrePlanning	12/01/2018
PER	12/01/2018
Design Delay	05/01/2019
Design	05/02/2019
Bid Delay	02/01/2020
PreConstruction	02/01/2021
Construction	02/01/2021
Closeout	02/01/2028

COST ESTIMATE

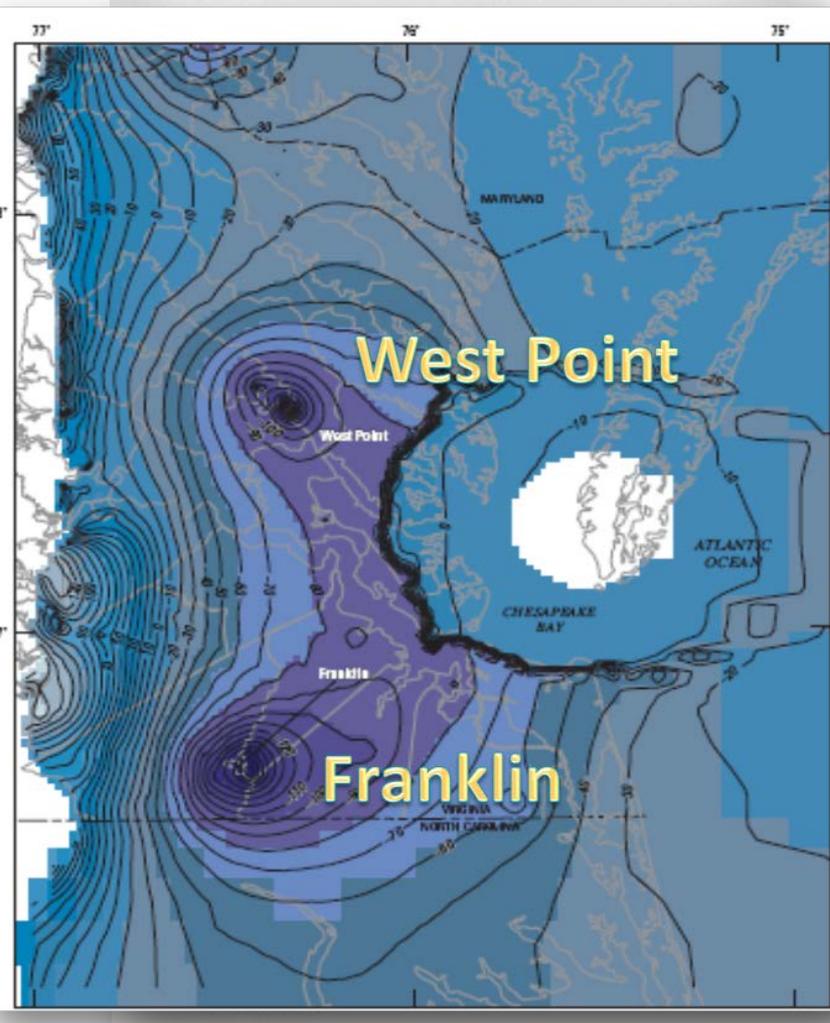
PrePlanning	\$0
PER	\$0
Design	\$2,151,880
PreConstruction	\$0
Construction	\$8,807,520
Closeout	\$0
Est. Program Cost	\$10,759,400
Contingency Budget	\$0
Est. Project Costs	\$10,759,400



Water Challenges

- Chesapeake Bay Restoration
- Groundwater Depletion
- Saltwater Intrusion
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- Affordability

Groundwater Depletion Has Been Rapid



- Water levels falling several feet/yr
- Permitted Withdrawal = 147 MGD
- Actual Withdrawal = 115 MGD
- 200,000 unpermitted “domestic” wells
 - Estimated @ 40 MGD
 - Growing at 1 MGD per year

Unsustainable Aquifer Withdrawals

Code of Virginia

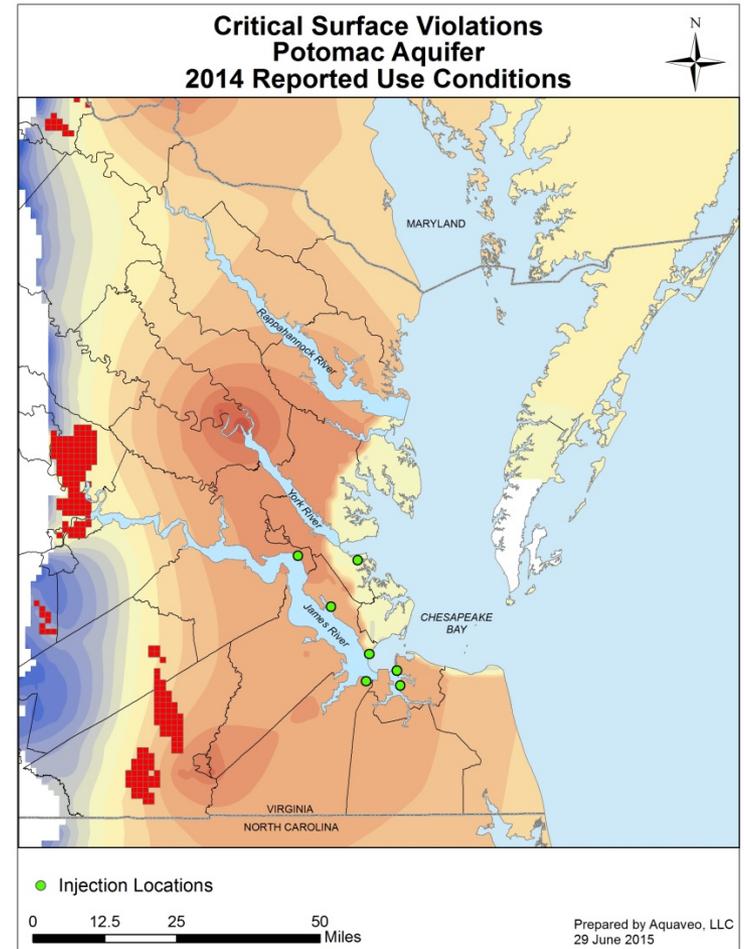
» Title 62.1. Waters of the State, Ports and Harbors

» Chapter 25. Ground Water Management Act of 1992

» § 62.1-256.1. (Expires January 1, 2018)

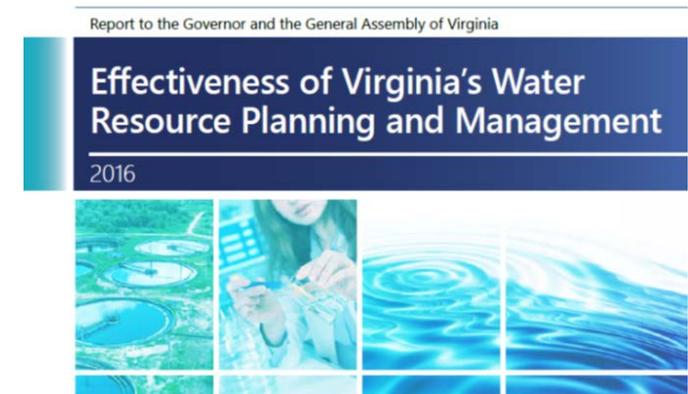
Eastern Virginia Groundwater Management Advisory Committee established

“The Eastern Virginia Groundwater Management Advisory Committee (the Committee) is hereby established as an advisory committee to assist the State Water Commission and the Department of Environmental Quality in developing, revising, and implementing a management strategy for ground water in the Eastern Virginia Groundwater Management Area.”



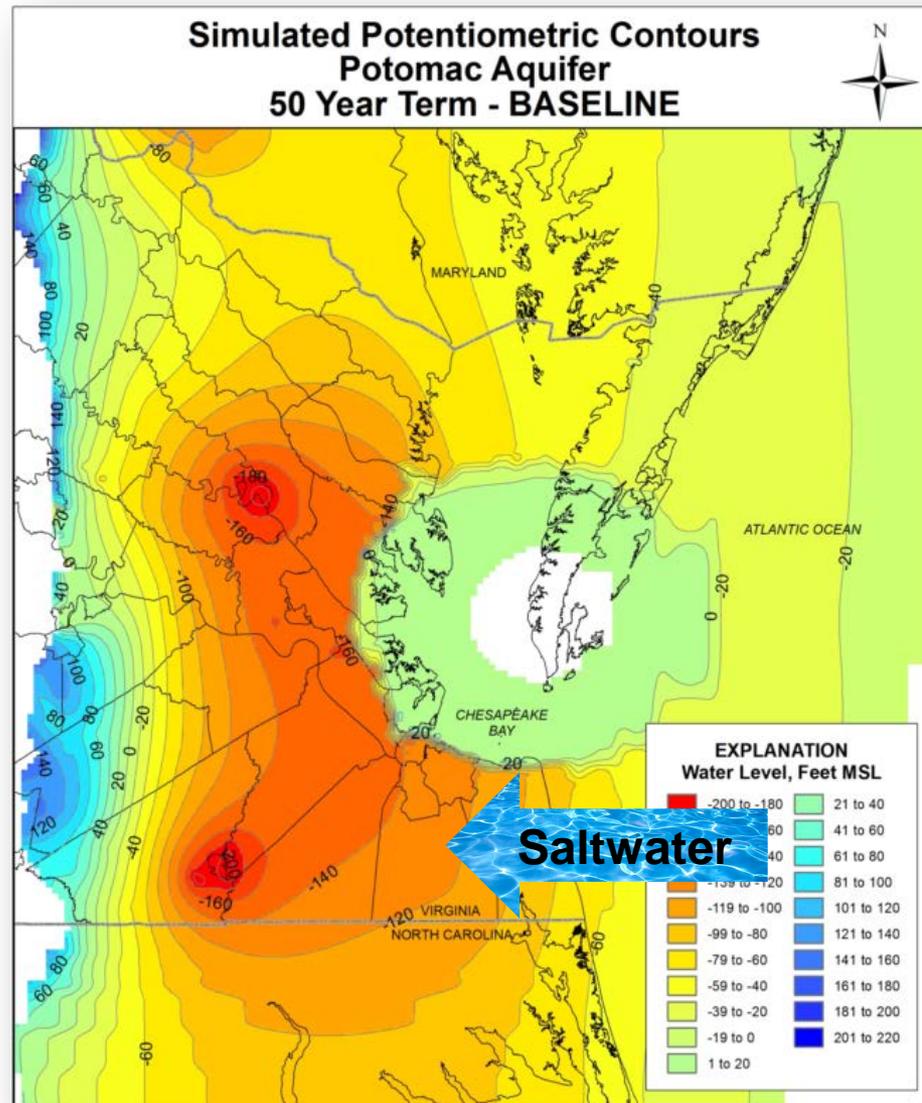
WHY WE DID THIS STUDY

“In 2015, the General Assembly directed the Joint Legislative Audit and Review Commission (JLARC) to review Virginia’s water resource management and planning. **Interest in this topic was prompted by concerns about the sustainability of water supply and demand, especially in eastern Virginia.**”



COMMISSION DRAFT

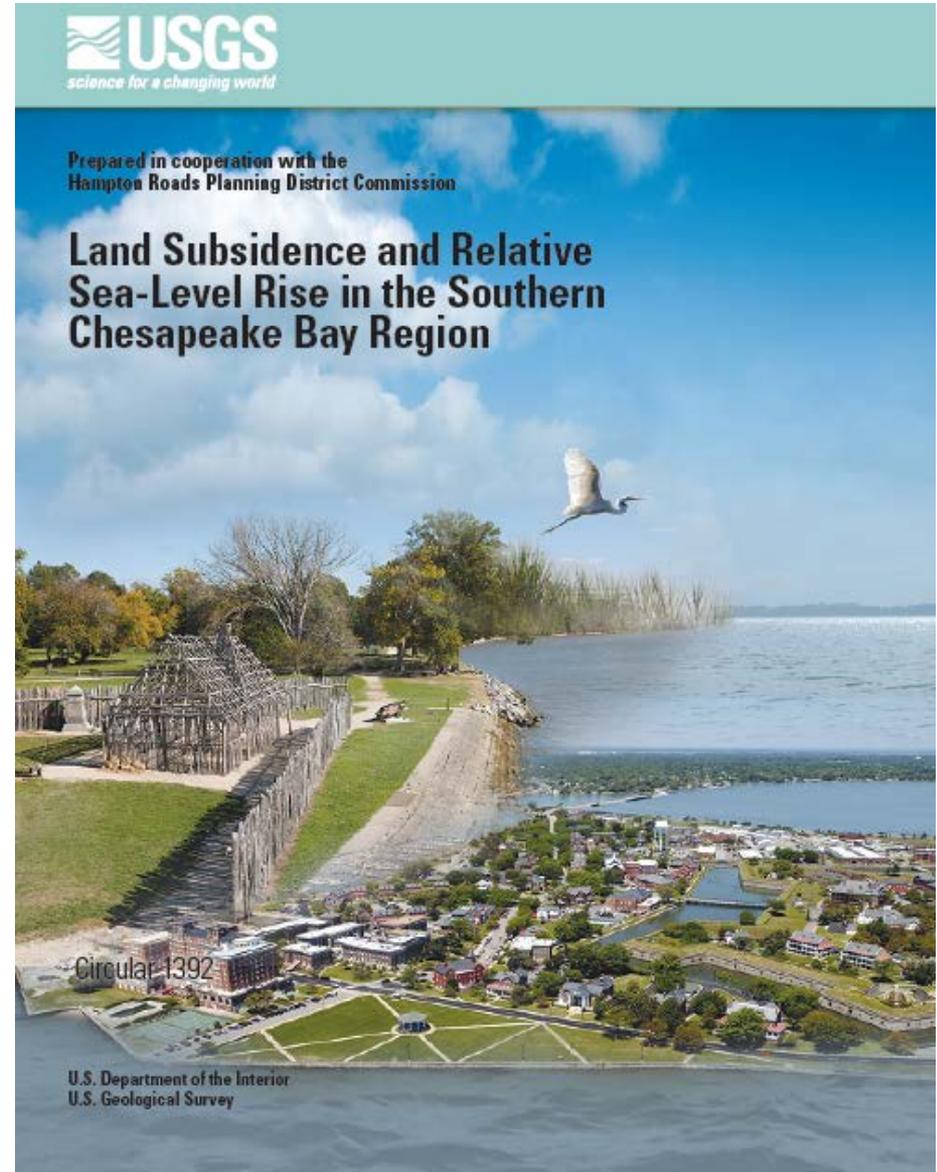
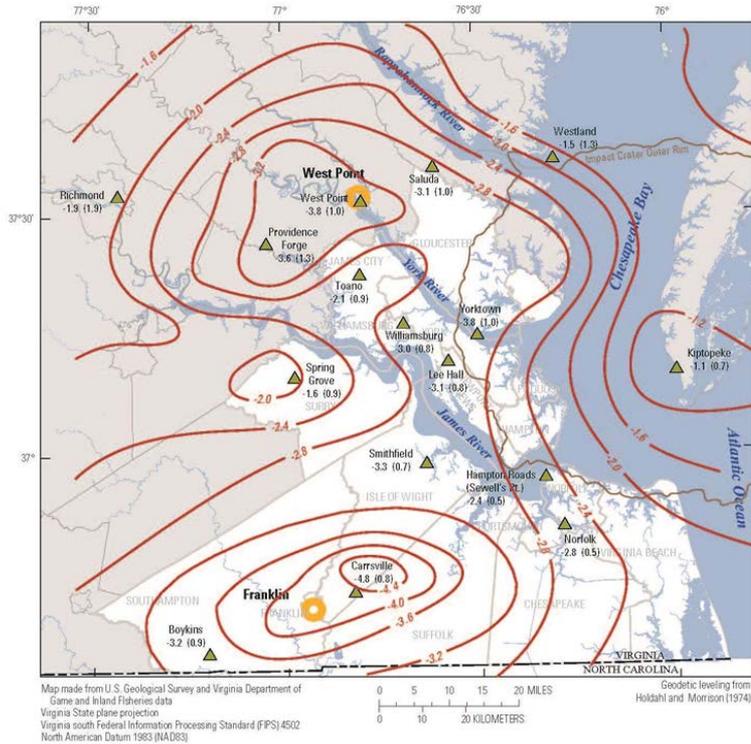
“According to analysis conducted for this study, new permit requests (for example, requests by industries seeking to locate in the region) for even a moderate amount of groundwater cannot be accommodated.”



Relative Sea Level Rise

- USGS Circular 1392

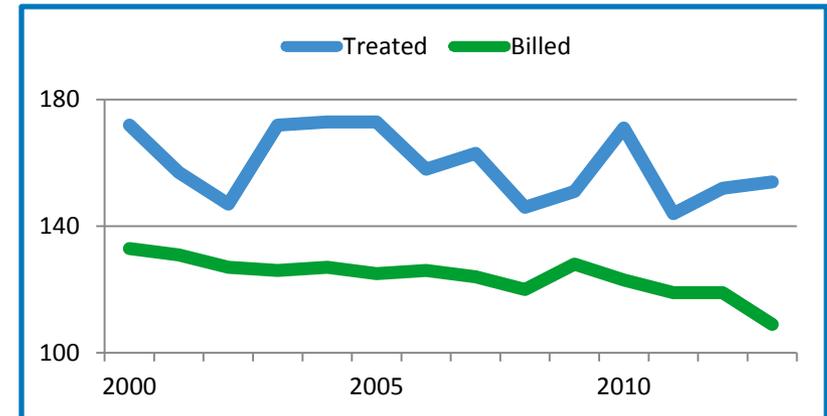
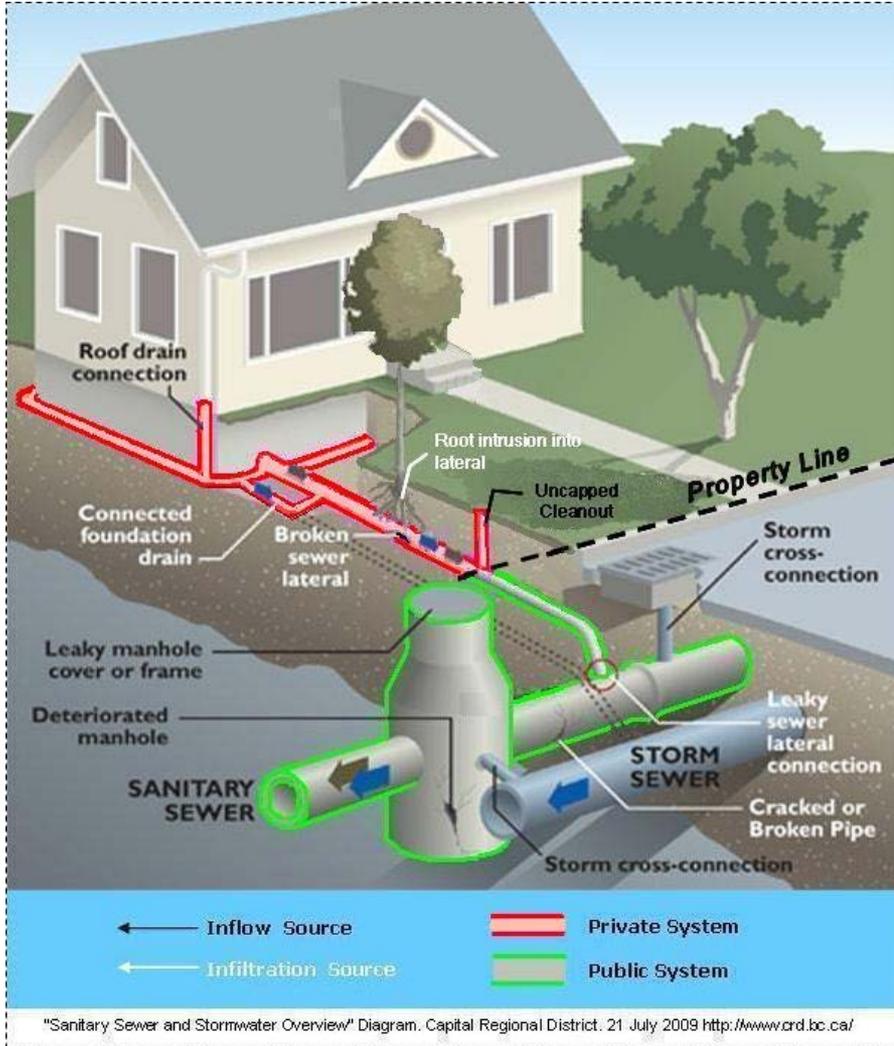
- Jack Eggleston
- Jason Pope
- <https://pubs.usgs.gov/circ/1392/pdf/circ1392.pdf>



Recurrent Flooding



Sanitary Sewer Overflows



- **HRSD responsible for regional wet weather flows**
- **Region loses less than 0.015% in a bad year**

"Sanitary Sewer and Stormwater Overview" Diagram. Capital Regional District. 21 July 2009 <http://www.crd.bc.ca/>



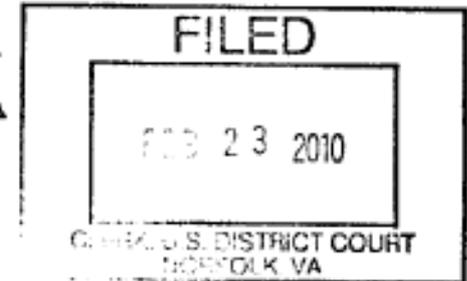
Compliance with Federal Enforcement Action

- Projected \$2 Billion

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Norfolk Division

UNITED STATES OF AMERICA and)
COMMONWEALTH OF VIRGINIA,)
Plaintiffs,)
v.)
HAMPTON ROADS SANITATION)
DISTRICT,)
Defendant.)

Civil Action No. 2:09-cv-481
AMENDED CONSENT DECREE





Cost Estimates for the Chesapeake Bay TMDL

Table 1: Estimated Costs to Implement Backstops and Final Virginia Phase I WIP Requirements

Locality	Draft TMDL: October 2010	Final TMDL / Virginia's Phase I WIP: December 2011	
	Cost to meet EPA backstops	Cost based on WIP Table 2.2 (no nutrient management)	Cost based on WIP Table 6-4.1 (includes nutrient management)
	(millions)	(millions)	(millions)
Chesapeake	\$1,367	\$255	\$255
Hampton	\$1,053	\$198	\$198
Newport News	\$1,166	\$224	\$224
Norfolk	\$1,384	\$318	\$280
Portsmouth	\$866	\$125	\$125
Virginia Beach	\$1,737	\$429	\$323
Isle of Wight County	\$231	\$79	\$40
James City County	\$501	\$149	\$87
Poquoson	\$90	\$14	\$14
Suffolk	\$628	\$211	\$109
Williamsburg	\$94	\$21	\$18
York County	\$594	\$94	\$94
Gloucester County	\$242	\$33	\$33
Surry County	\$40	\$13	\$7
Hampton Roads	\$9,793	\$2,163	\$1,806

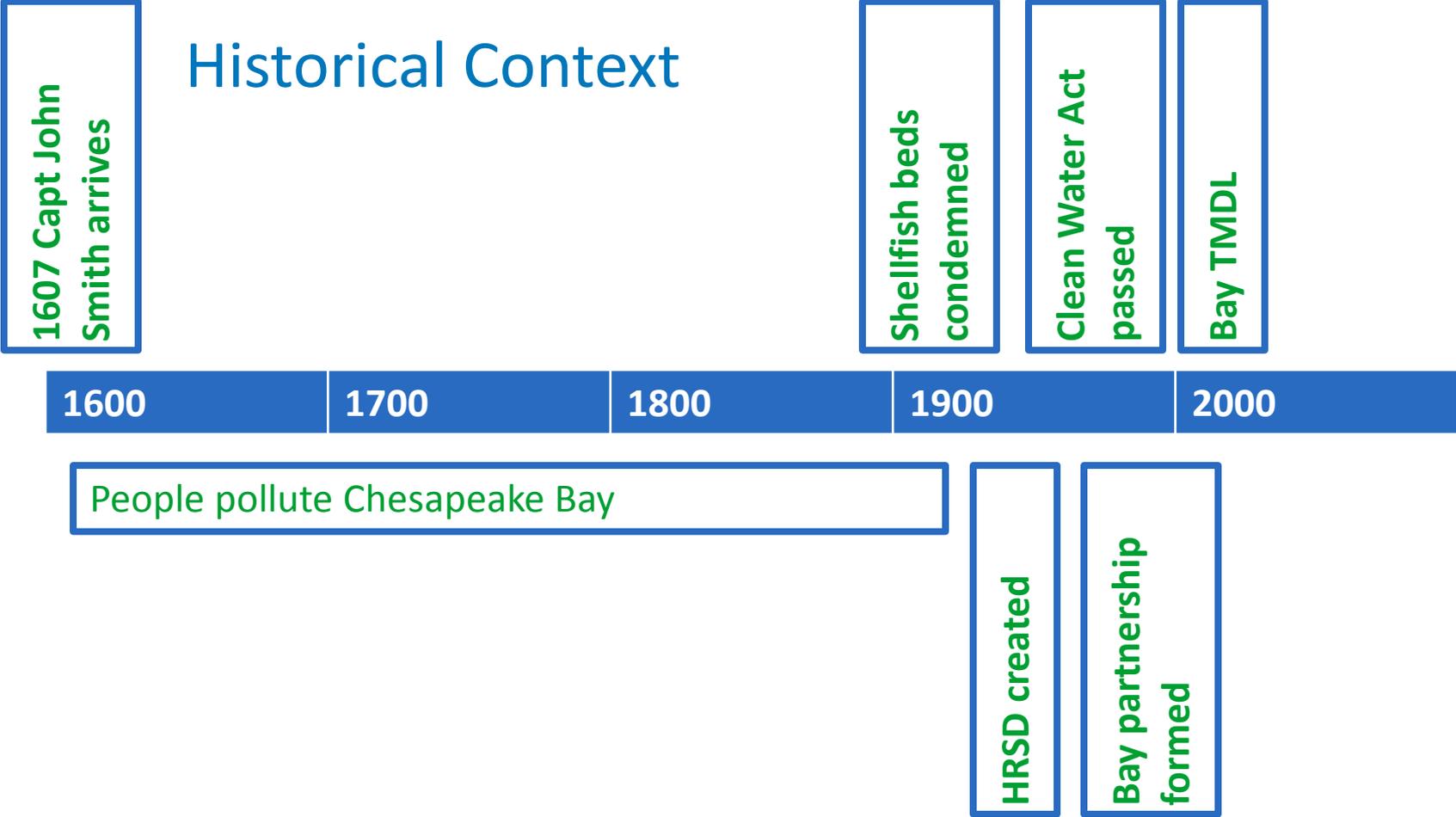
Prepared by the staff of the

HAMPTON ROADS PLANNING DISTRICT COMMISSION

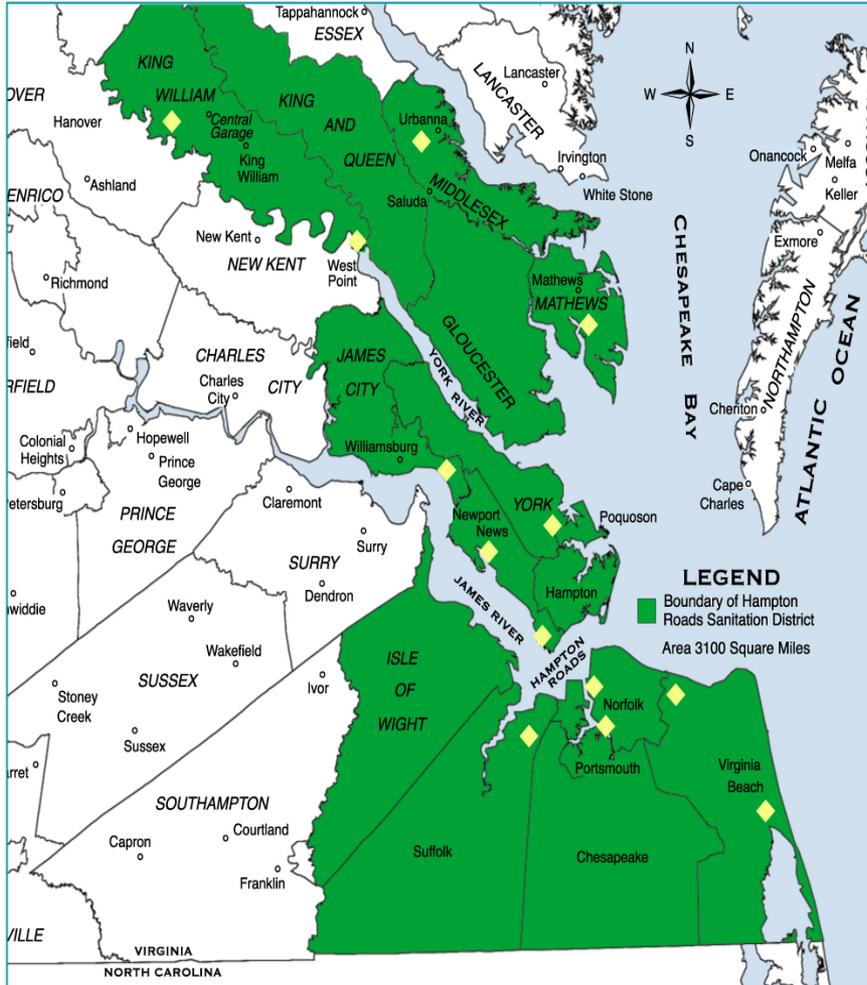


AUGUST 2011

Historical Context



HRSD Service Area Map



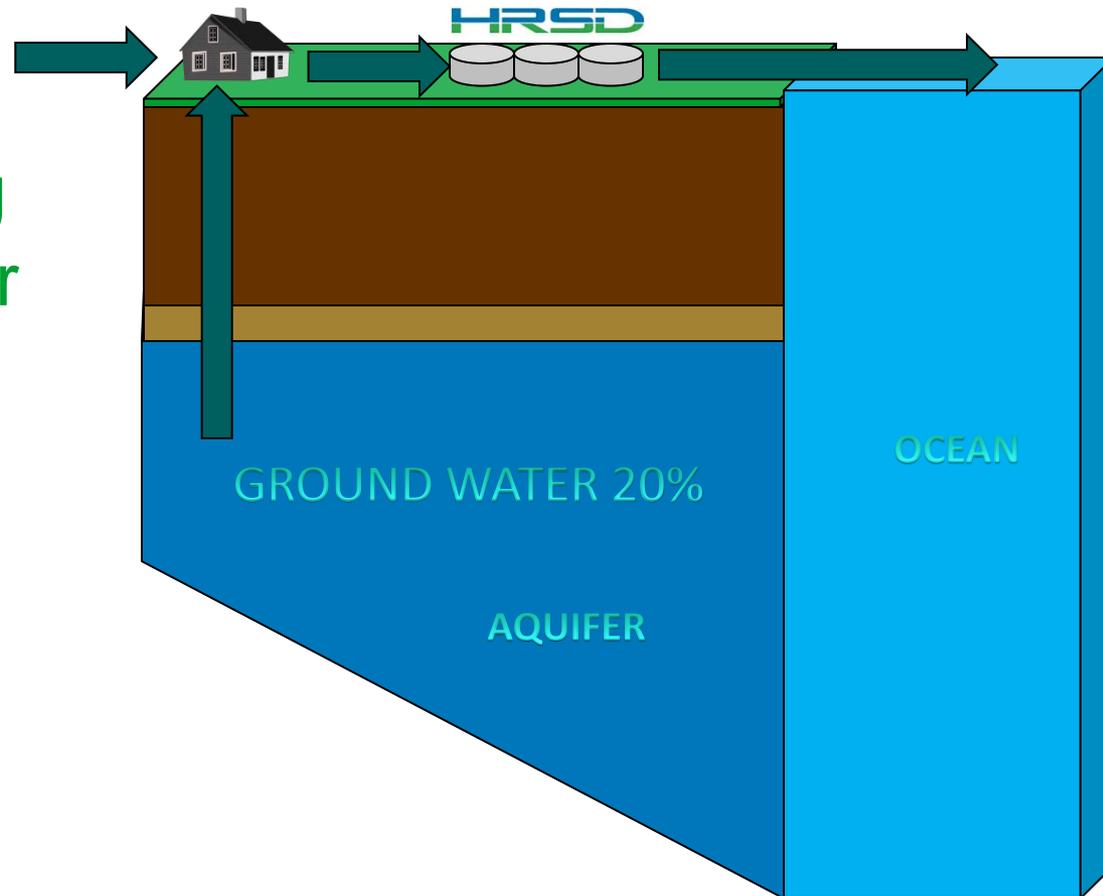
◆ = treatment plant locations

- Independent political subdivision
- Serve 1.7 million people (18 localities)
- 3,000 square miles
- Mission & Vision

Current State Of Wastewater In Hampton Roads

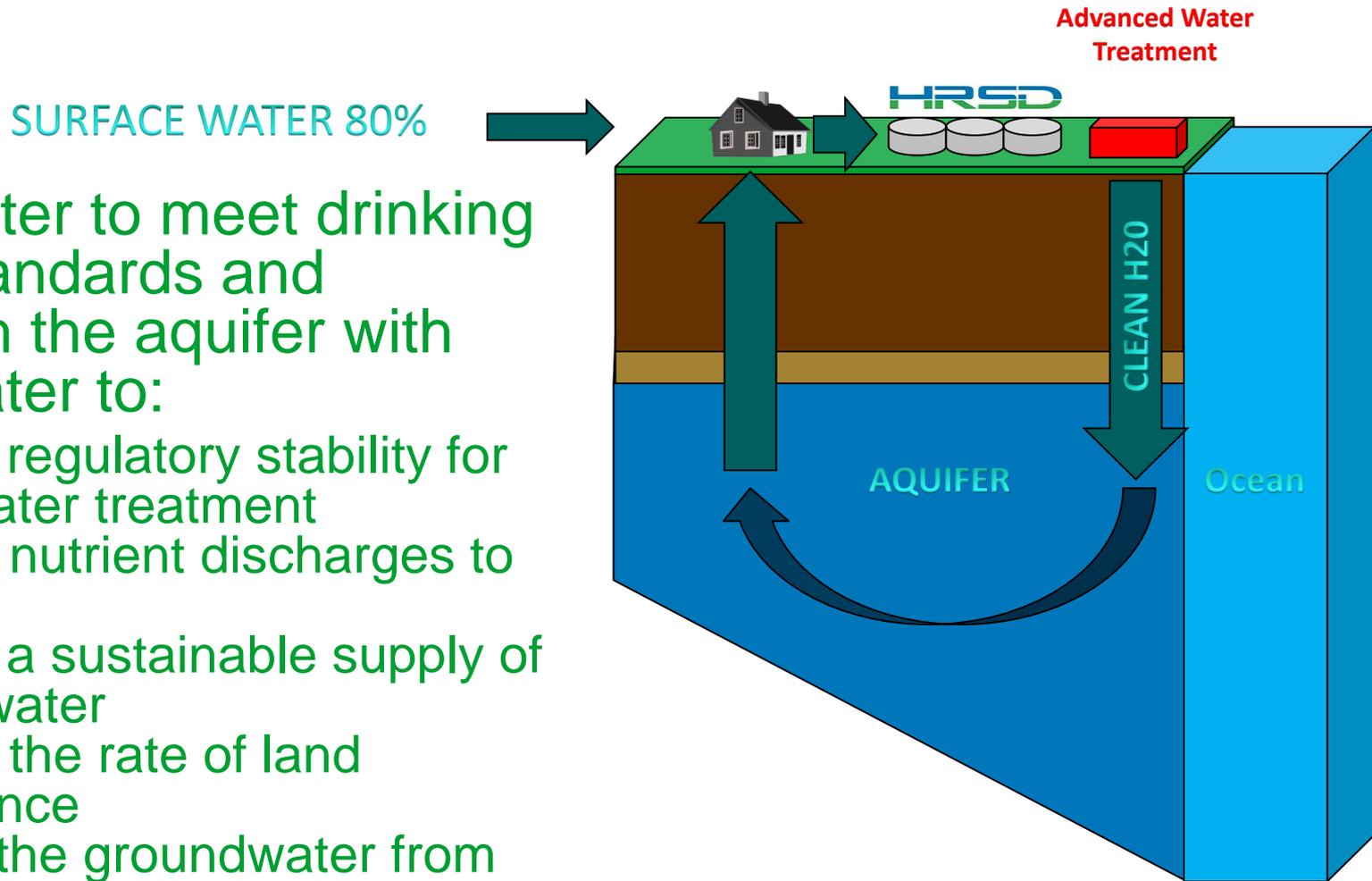
SURFACE WATER 80%

HRSD costs are rising to treat water to higher standards. Treated water currently discharged to area waterways – no beneficial use.

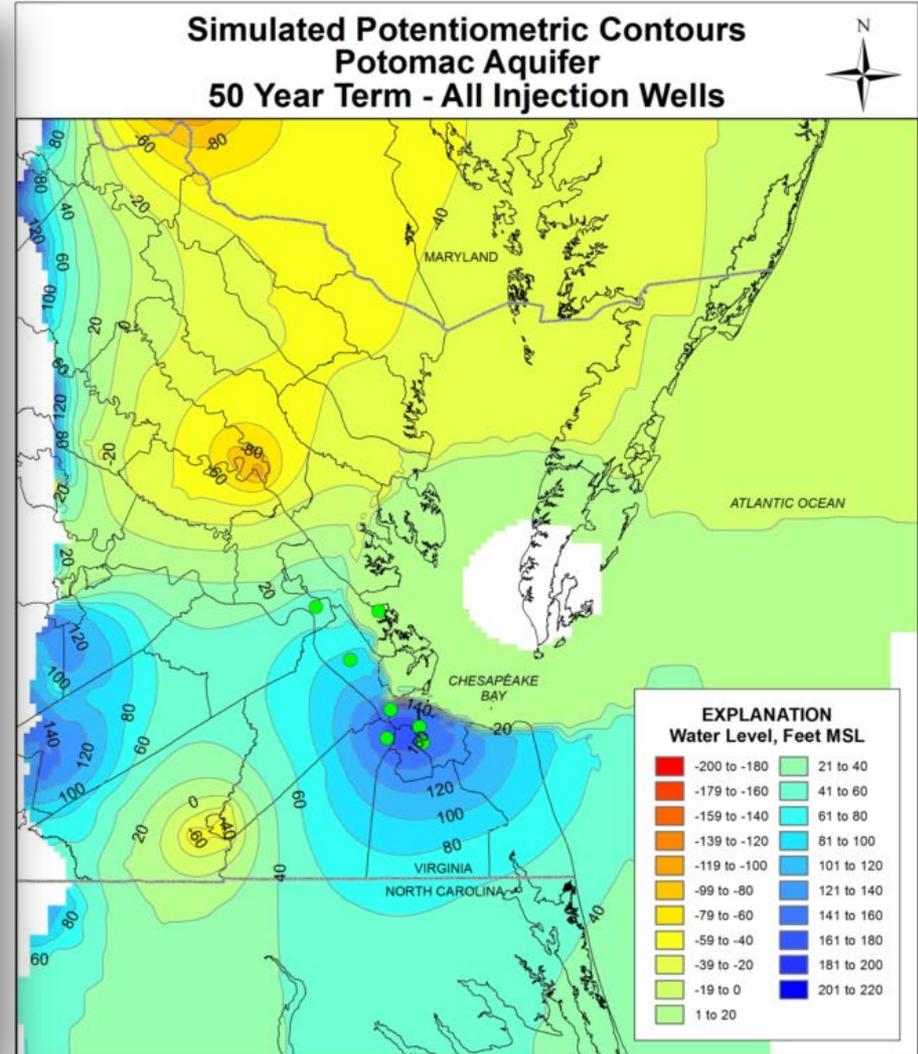
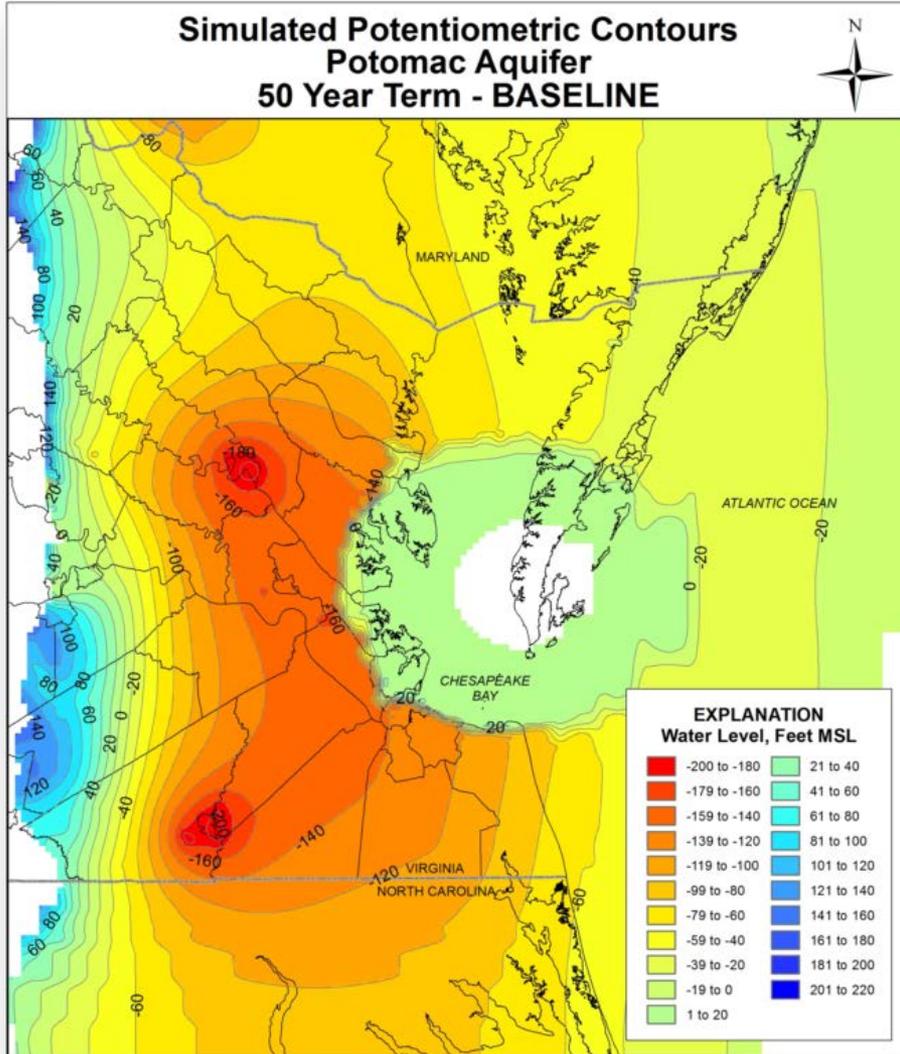


SWIFT – Sustainable Water Initiative for Tomorrow

- Treat water to meet drinking water standards and replenish the aquifer with clean water to:
 - Provide regulatory stability for wastewater treatment
 - Reduce nutrient discharges to the Bay
 - Provide a sustainable supply of groundwater
 - Reduce the rate of land subsidence
 - Protect the groundwater from saltwater contamination



Modeled Potomac Aquifer Water Levels With And Without SWIFT



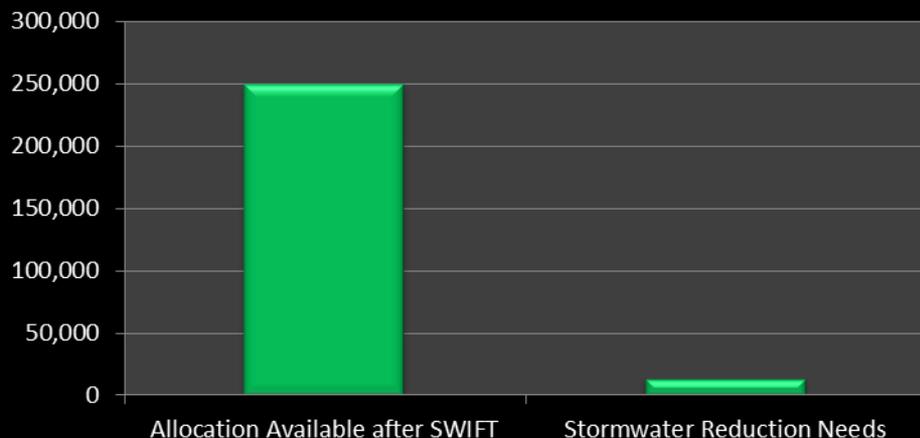


SWIFT's Potential To Offset Stormwater TMDL Reductions – James River Basin Example

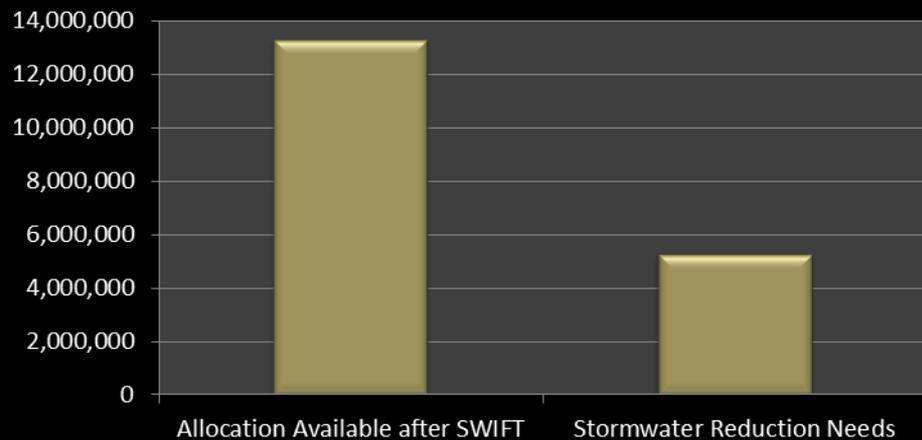
Nitrogen



Phosphorus



Sediment

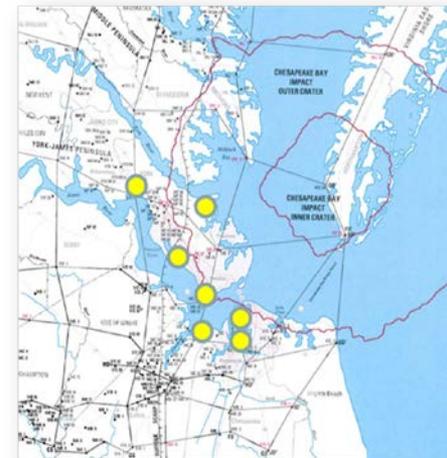


Why Now?

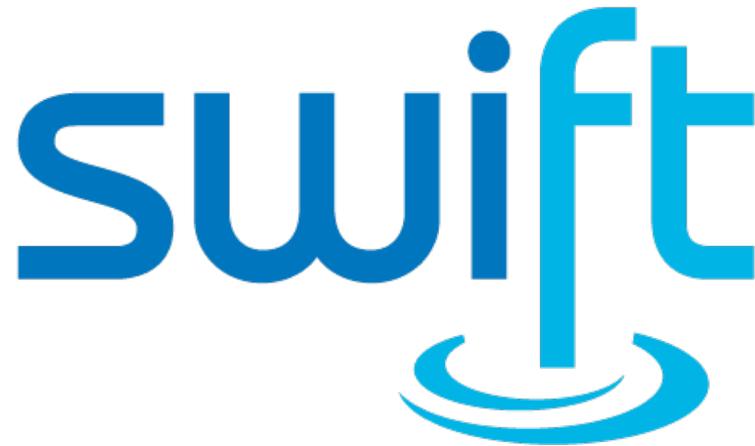
- Consent Decree requires plan submittal with schedule to EPA October 2017
 - Lose financial ability to pursue SWIFT until 2037 at earliest
- Bay TMDL deadline is 2025
 - Will require more significant investments in nutrient and sediment removal without SWIFT
 - HRSD is backstop if Agriculture and Stormwater come up short
- Groundwater scarcity will continue to get worse
 - Will force development of additional water supplies by local governments
 - Chills development in eastern Virginia
 - Potential loss of water dependent industries
- Next regulation (viruses, emerging contaminants, ???) will require plant upgrades

Timeline

- 2015 - Feasibility Study
- 2016 - Concept Development
 - Pilot systems
 - Test wells
 - NWRI
 - Extensometer
- 2017 – Construct 1 MGD Demonstration Facility
 - Integrate SWIFT into CIP
 - Facility Layouts (costs & schedules)
 - Develop Long Term Oversight Framework
 - SAT
 - MS4 Nutrient Trading Agreements
- 2018 - Program Management
 - Demonstration Facility Data Collection
 - Land Acquisition
- 2020 – EPA/DEQ/VDH formal approval
- 2020 to 2030 – Construction through phased implementation
- 2030 - Fully operational ~ 100 MGD of purified water put into the aquifer



COST ~ \$1B



Sustainable
Water Initiative
for Tomorrow

*Future generations will inherit clean waterways and
be able to keep them clean.*

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SWIFTVA.COM