Water Supply Planning In Virginia and the RRRC Region

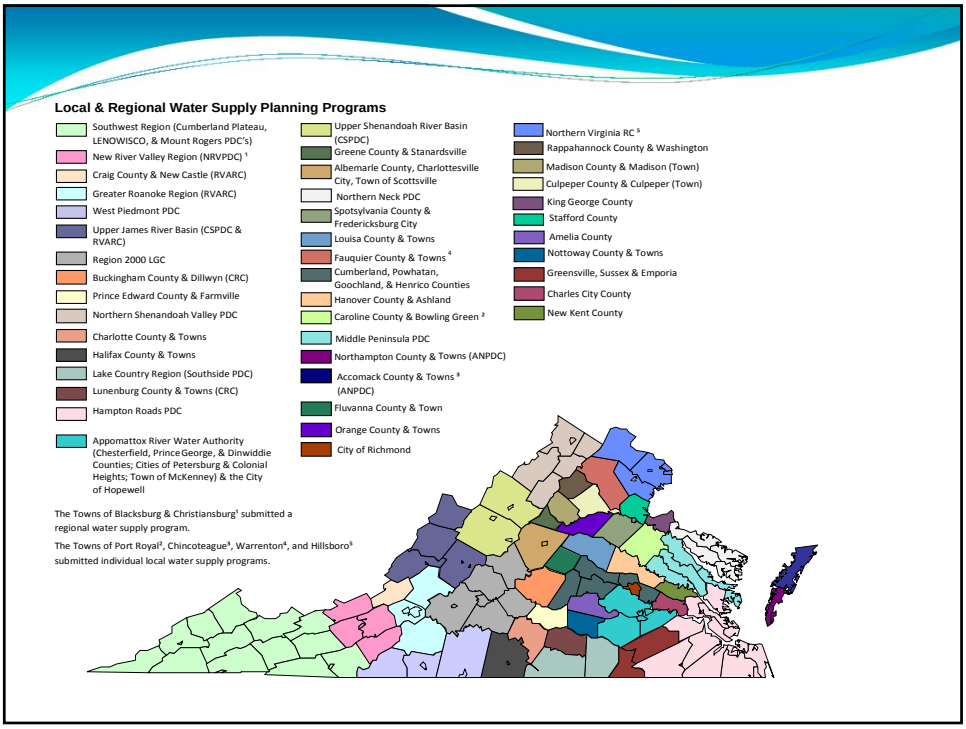
November 18, 2014

Presentation Road Map

- Background of Water Supply Planning
- Local/Regional Water Supply Plan Status
- State Water Resources Plan
- Cumulative Impact Analysis in the RRRC Region
- Summary
- Next Steps

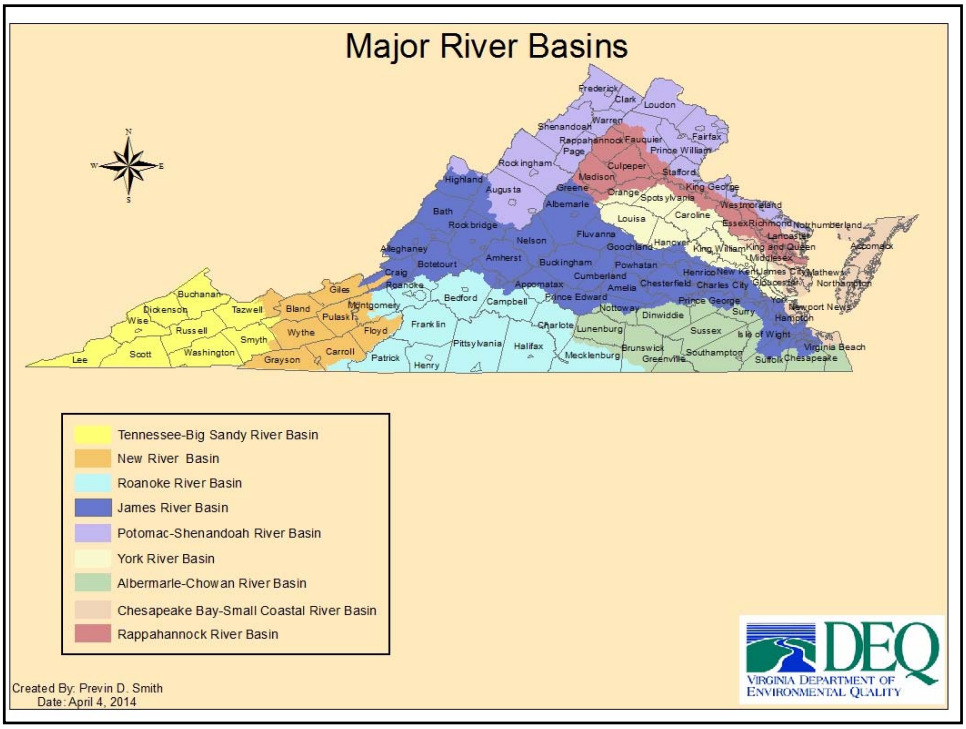
How Did We Get Here?

- 1999-2002 Drought
- Water Supply Plan Development; Compliance
- Collaborative effort – locality, region, state
- Continuous Comprehensive Planning Process
- Informs the permitting process



Compliance Conditions; Data Needs

- Design capacity
- Improved information for private water systems
- Improved agricultural use data
- Improved water conservation efforts as part of water demand management
- Well construction information



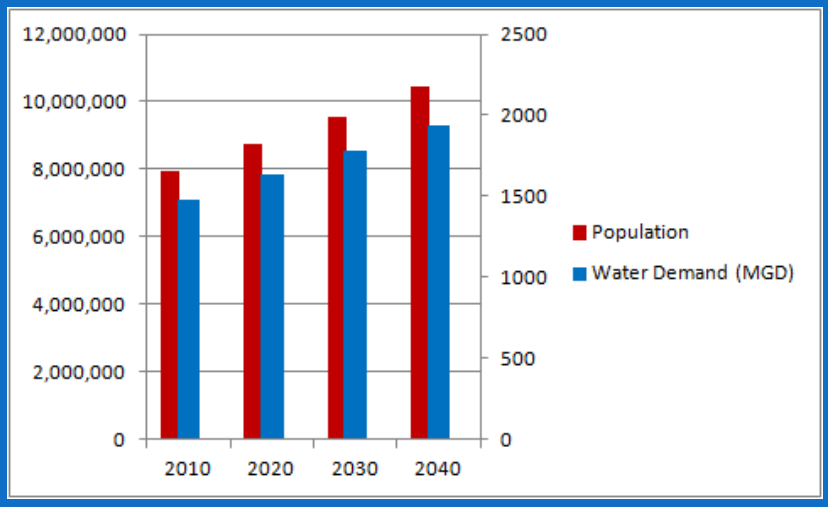
State Water Resources Plan

- SWRP includes information from all water supply plans, as well as information from other sources
- 250,000 records entered in content management system

State Water Resources Plan

- For the first time, we can analyze the expected cumulative impacts of future water demands on water resources
- We can target areas where water demand meets or exceeds projections
- DEQ will provide feedback on SWRP findings to regions and localities

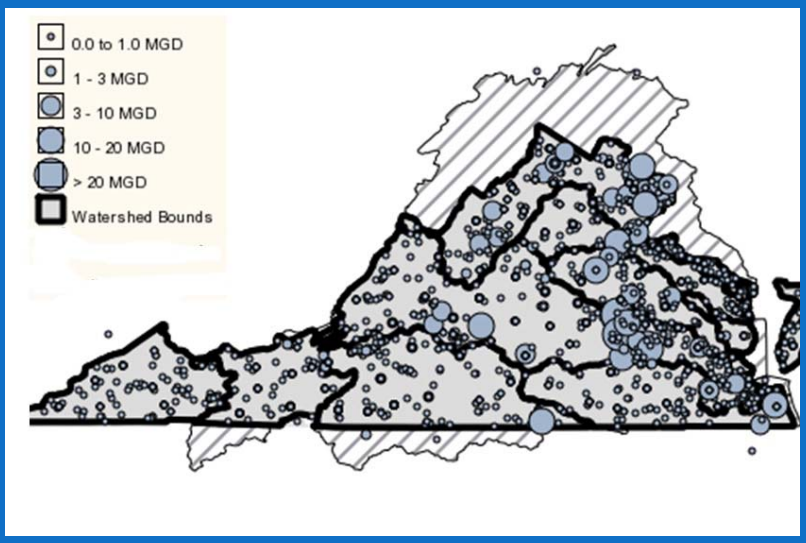
Virginia Population and Water Demand Trends



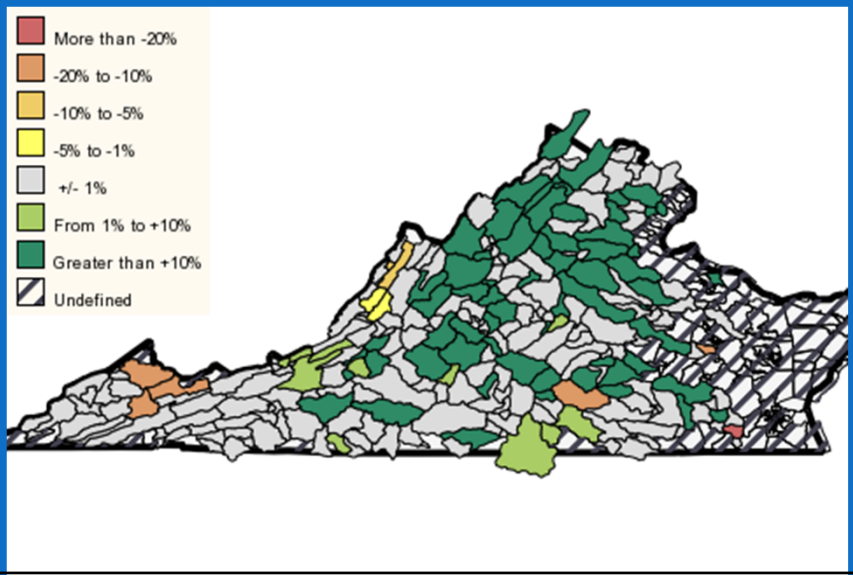
What the SWRP Tells Us

- Approximately 450 MGD needed by 2040
- 32% increase in demand consistent with anticipated increase in population
- Plans predict that approximately 77% of total water demand will be from surface water
- Concentration of Demands: 97% of surface water withdrawals are predicted to occur in 25% of stream reaches

VA Spatial Trends in 2040 Demand



Surface Water Withdrawals

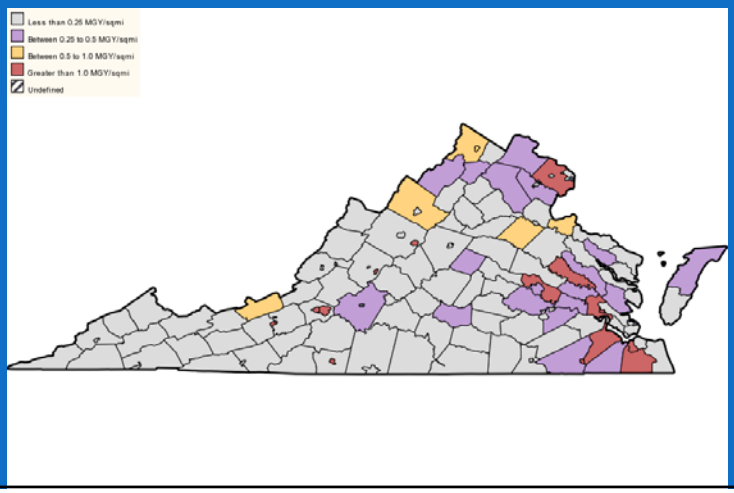


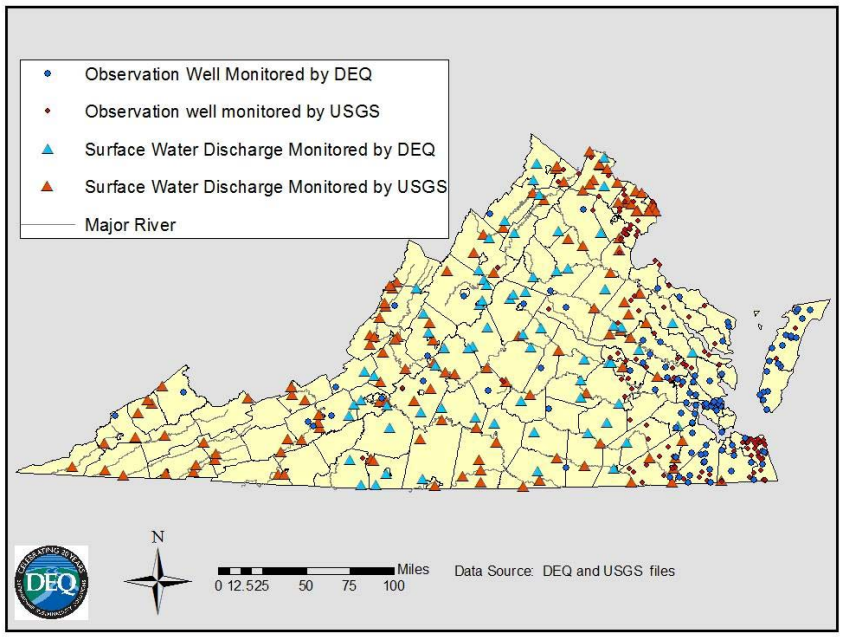
Impacts of Projected Demands

- Higher demands = lower drought flows
- Unregulated withdrawals have potential impacts
  - Demands are concentrated
  - 90% of surface water withdrawals unregulated
- Water is available, but not without accepting risks
  - Negative impacts on in-stream beneficial uses, particularly during low flows

Groundwater Withdrawals

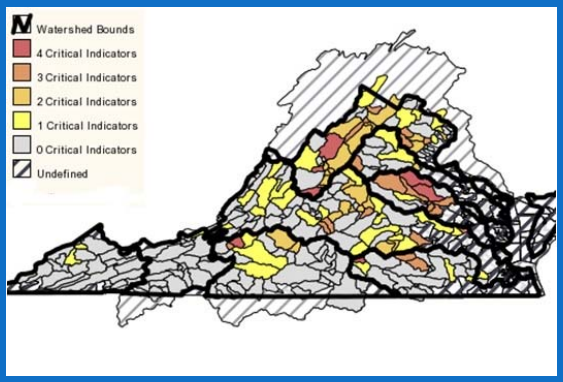
- 23% of total water demand is expected to come from GW
- 75% of GW demand outside established GWMA





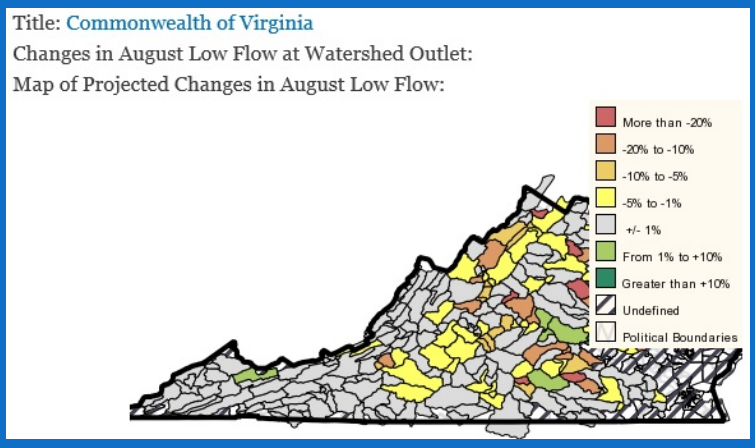
Quantifying Potential Impacts

- Four Metrics:
  - August Low Flow – Biodiversity
  - 7Q10 – Water Quality Impacts/Waste Assimilative Capacity
  - Change in Drought of Record Flow – Safe Yield
  - Withdrawal as Percentage of September Drought Warning – Overall System Stress



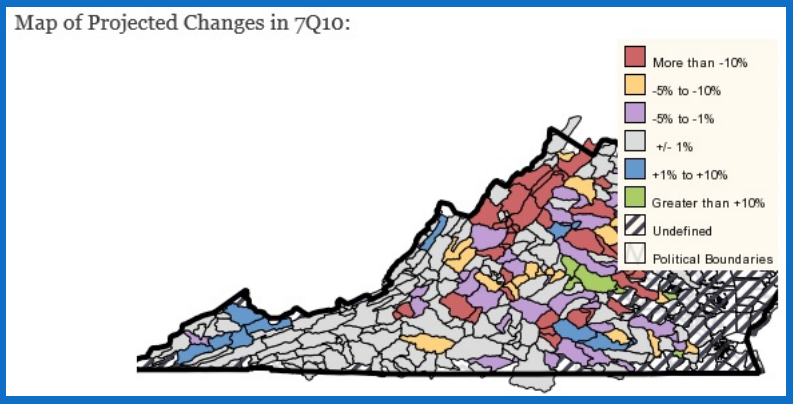
Stream reach considered at risk based on exceedance of screening thresholds

August Low Flow



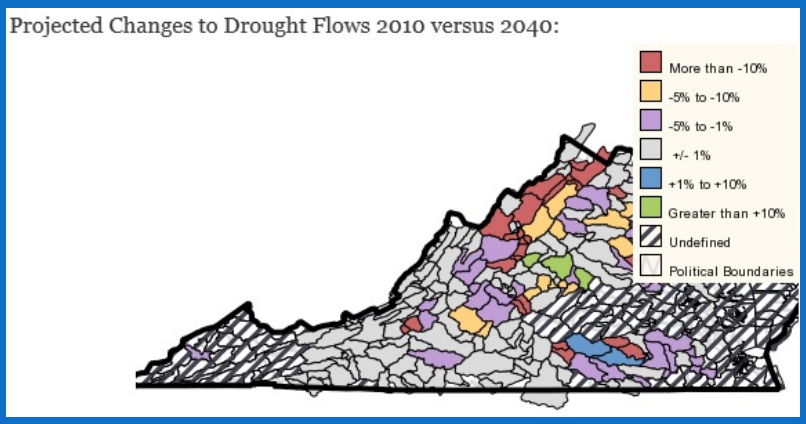
Watersheds that see substantial changes to ALF will face an increased probability of aquatic life impacts.

Changes in 7Q10



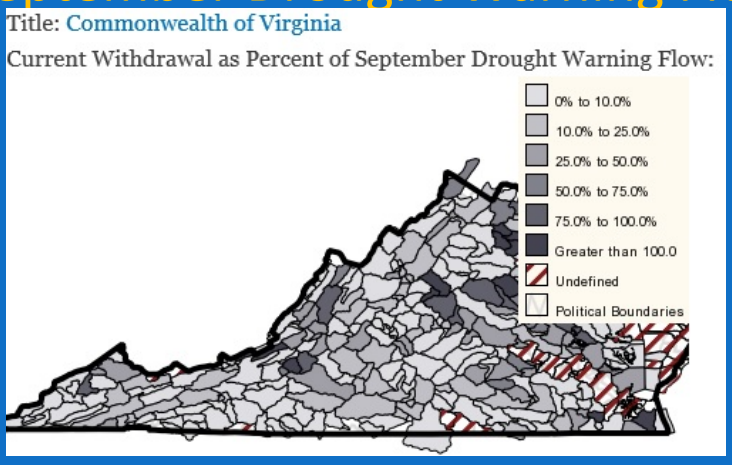
Areas that suffer decreases in 7Q10 flows will face choices that involve reducing consumptive demands, increasing reliance on stored water during dry periods, or reducing the amount of waste discharged from point sources.

Drought of Record



DoR flows are the ultimate limiting factor in safe yield.

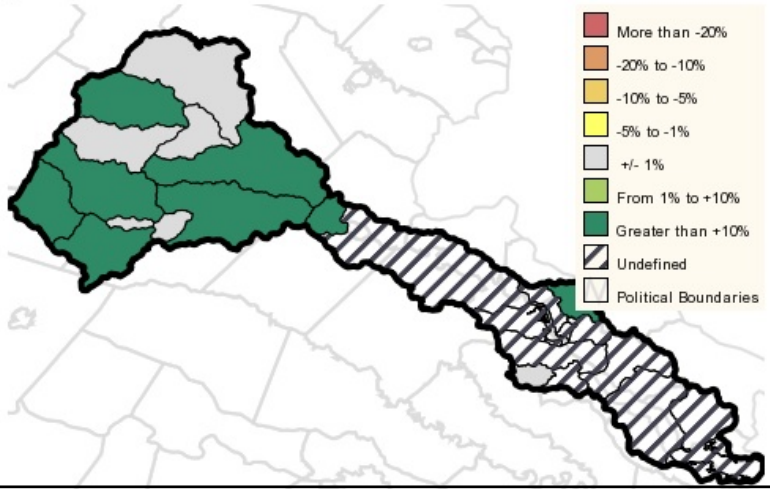
Withdrawals as Percentage of September Drought Warning Flows



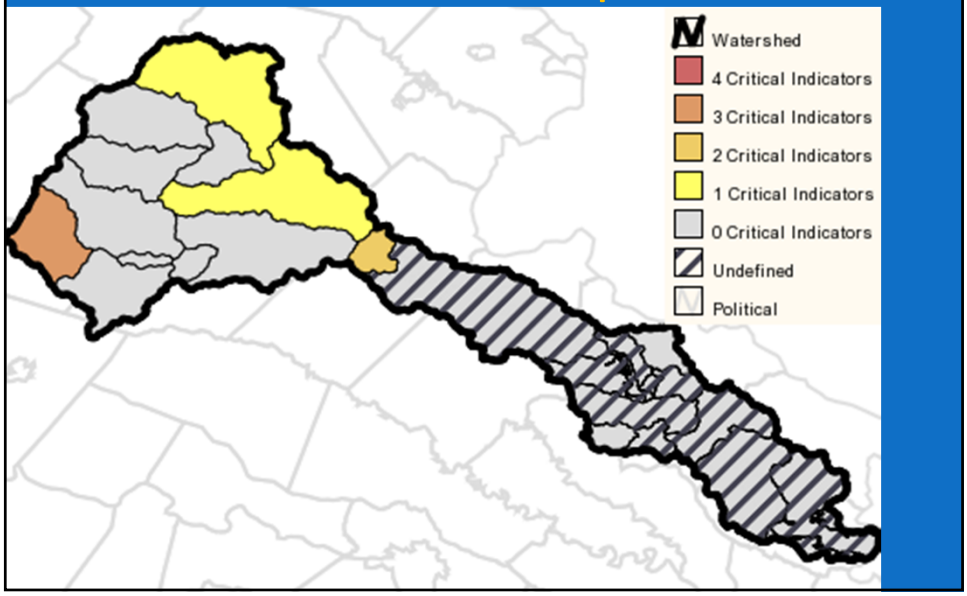
This measurement is an indicator of cumulative water supply system stress.

Rappahannock Basin

Map of Changes in Local Withdrawal:

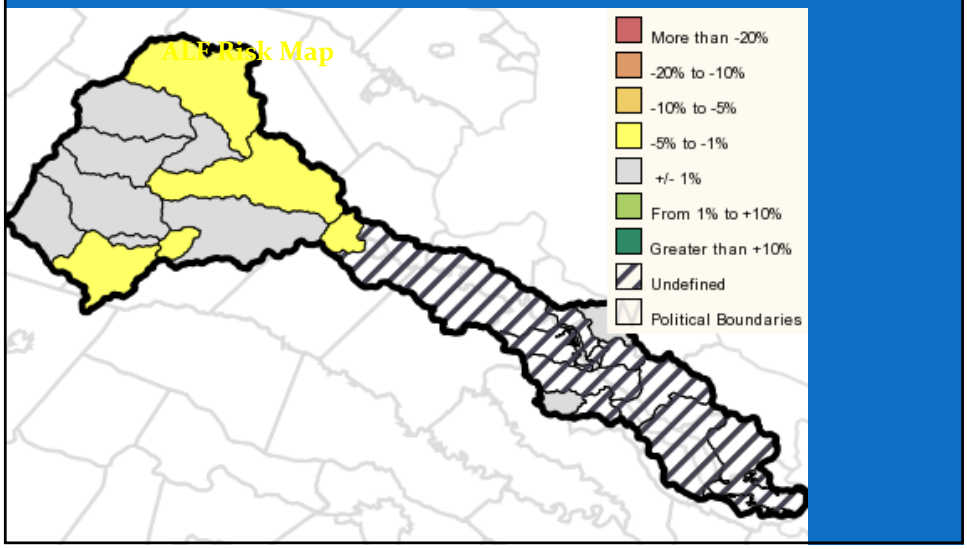


Rappahannock River Basin Cumulative Impacts



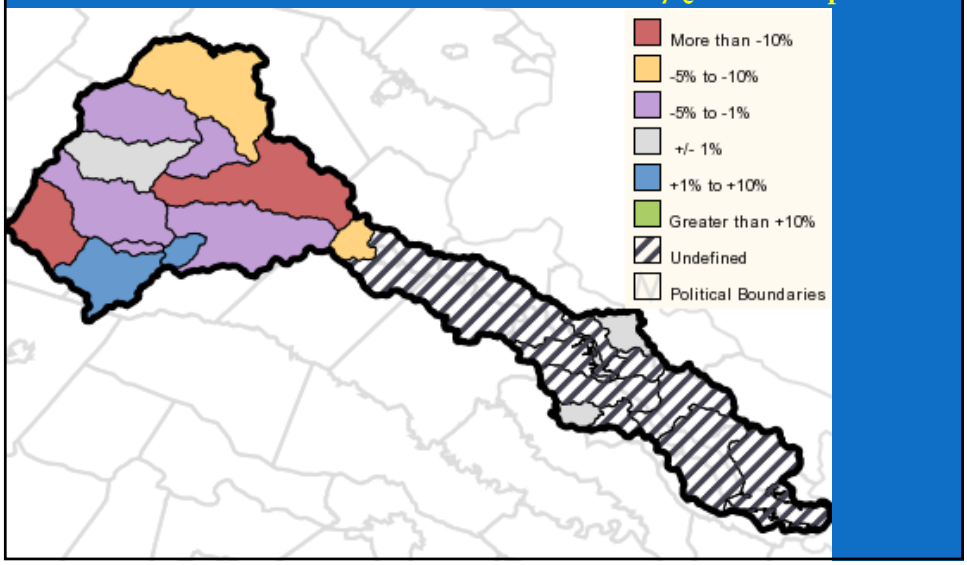
Rappahannock Impact Risks

August Low Flow



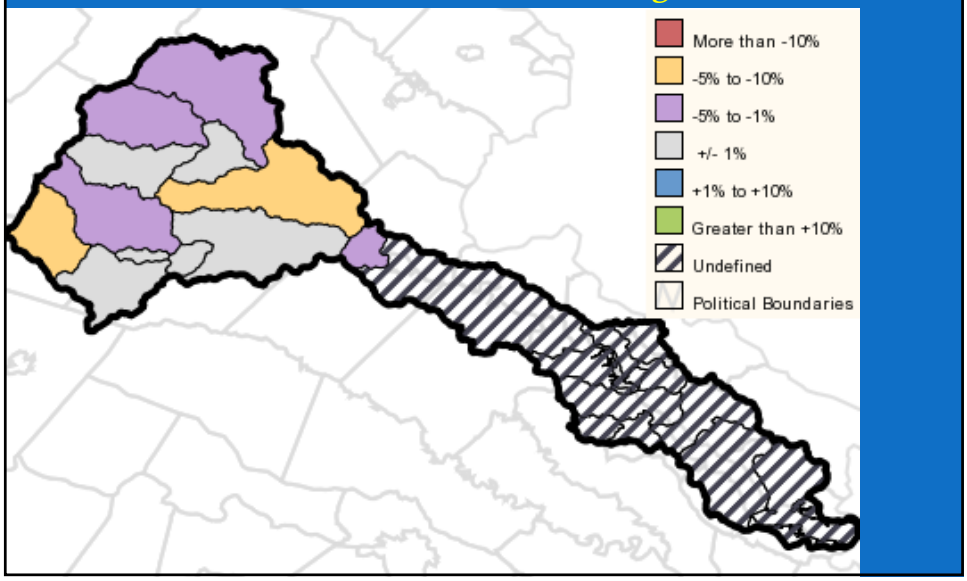
Rappahannock Impact Risks

7Q10 Risk Map

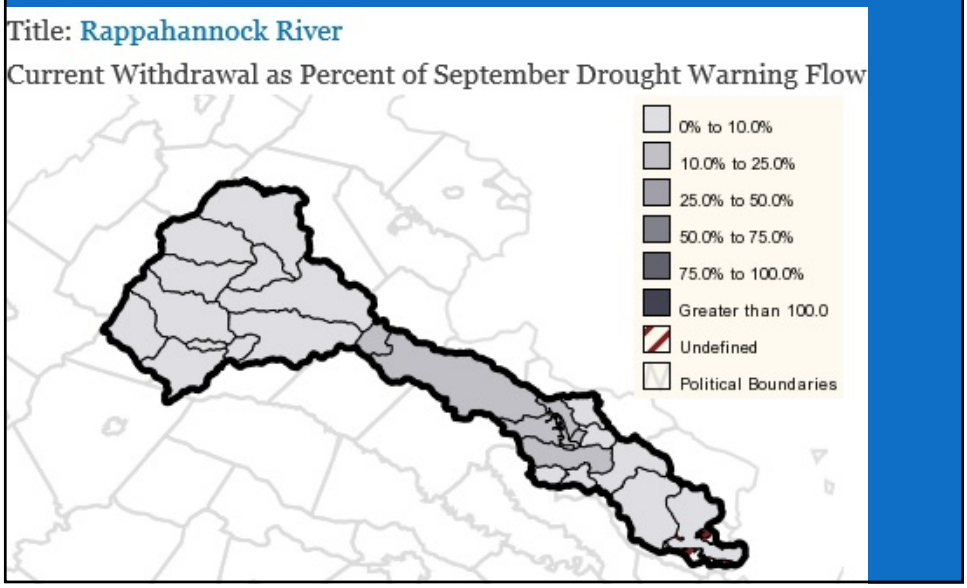


Rappahannock Impact Risks

Drought of Record



Rappahannock Impact Risks



Summary

- Additional 450 MGD needed to meet 2040 demand
- 77% anticipated total demand expected to come from surface water; 23% from groundwater
- 97% of projected surface water demand anticipated to come from 25% of the stream reaches
- 75% of projected groundwater outside GWMA

- Demands can be met in 2040 (except coastal GW) – challenges AND opportunities
- Impacts to off-stream, water-quality & aquatic life uses in high use watersheds w/o management
- Unpermitted Withdrawals/Impoundments & Direct Withdrawals have impacts on Low Flows
- Follow-Up Needed to 1) Targeted Monitoring; 2) Operational Optimization; 3) Review Safe Yields

Next Steps

- Collaborate with localities and planning regions to develop a strategy to obtain additional data
- Provide analyses of data to localities so informed decisions can be made about water resources

Next Steps

- Capitalize on relationships developed through water supply plan effort
- Initially focus on outreach efforts to localities and withdrawers in high risk watersheds
- Explain status of local water resources and trade-offs from additional withdrawals
- Work with localities/water withdrawers to improve Cumulative Impact Analysis and coordination during critical periods

Questions?

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