





Addressing Gaps in Water Use Data

Virginia's Approach

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Virginia Water Use Reporting: Background

- Annual Withdrawal Reporting since 1982
 - Ag irrigation: users of $\geq 1,000,000$ gal/mo
 - All other uses: users of $\geq 300,000$ gal/mo
 - Monthly withdrawals & max day. Electronic and hardcopy reporting.
 - GW and SW permittees have additional reporting requirements.
- Water use data is used for permit evaluations (water budgets for modeling), water supply availability planning, TMDL development, monitoring/assessment, etc.

Addressing Gaps in Water Use Data

- Data Driven Decision Making
- Regularly Review and Prioritize Data Gaps/Areas of Uncertainty
- Examples:
 - Agricultural Reporting
 - Consumptive Use (Net Withdrawals)

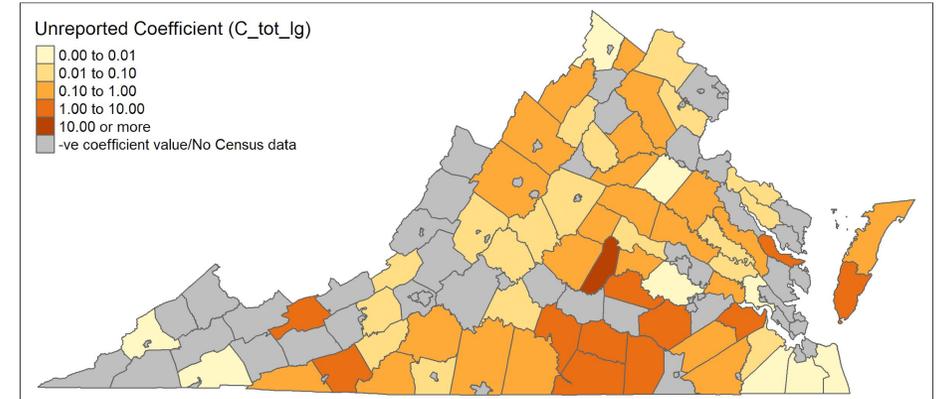
Agricultural Reporting

- Previous analysis indicates potential for substantial unreported water use in some localities.
 - Ongoing staff effort to register farms and improve consistency for existing reporters (limited by staff resources)
 - Increasing trend in smaller farms which fall under the reporting threshold
- We know agricultural water use is a significant proportion of total water use in some basins that increases during dry periods/drought, and is largely consumptive.

2020-2021 WUDR Project - Quantifying Unreported Water Use for Crop Irrigation in Virginia

- Use available data:
 - USDA Agricultural Census (provides irrigated acres per farm)
 - USDA Irrigation and Water Management Survey (crop type, inches irrigated)
- Develop Unreported Withdrawal Estimates
 - Method 1 (Small Farms) - county estimate for farms <10 irrigated acres (presumed to be below reporting threshold)
 - Average 10% increase in ag use per county if accounting for small farms.
 - Method 2 (Large Farms) – county estimate based on irrigated acreage, crop need, and PRISM precip data (deficit method)
 - High variability with some areas suggesting 10x or more increase on reported water use.

2017 Large farm unreported
(as a percentage of VDEQ TOTAL withdrawal)

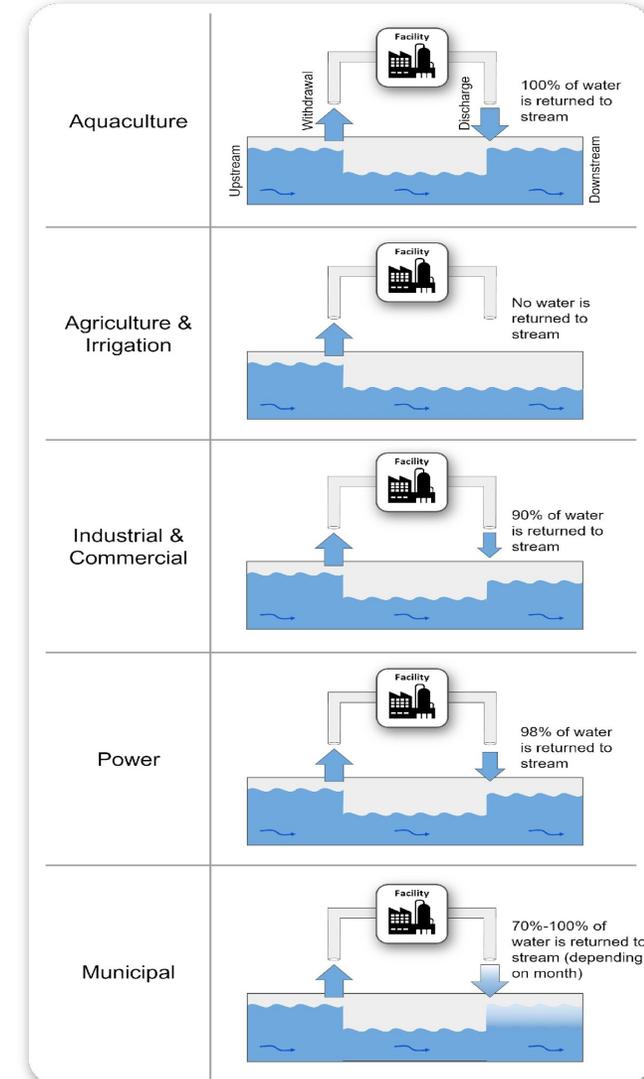


2020-2021 WUDR Project - Quantifying Unreported Water Use for Crop Irrigation in Virginia

- Translated estimates into time series for unreported demands based on seasonal patterns for incorporation into modeling.
- Developing series of meteorological scenarios to allow evaluations of how agricultural water use changes in dry versus wet years.
 - Can be applied to reporting facilities and unreported estimates
 - Three withdrawal scenarios: average year, moderate drought, extreme drought.
- Applications: Water supply demand and permit modeling, drought forecasting/climate modeling, and focusing staff outreach to areas with highest potential unreported use.

2020-2021 WUDR Project Refining Virginia's Water Supply Estimates with Discharge and Withdrawal Data

- Water Supply Demand scenarios use local use projections to estimate future impacts to streams.
- Without accounting for consumptive use (CU), we evaluate “gross” withdrawal.
- Project goal: develop facility specific CU values where data exists, and use type specific estimates for use elsewhere.

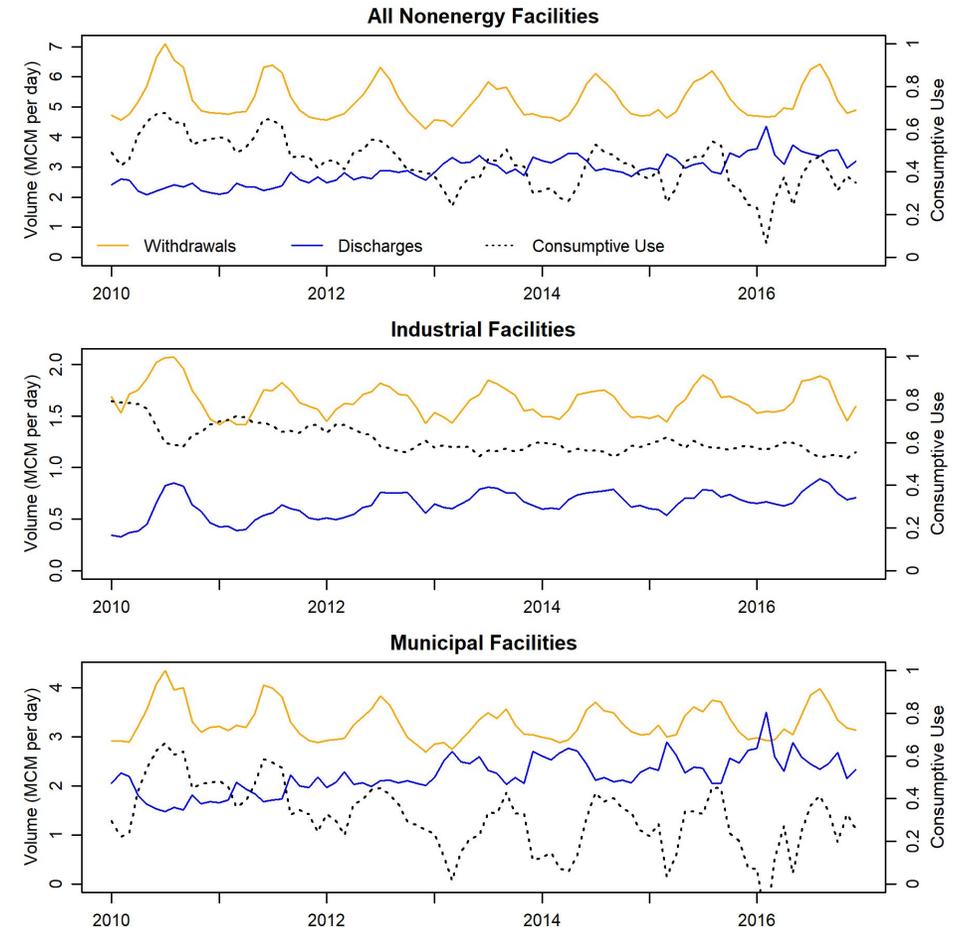


2020-2021 WUDR Project Refining Virginia's Water Supply Estimates with Discharge and Withdrawal Data

- Facility Matching – Script matches withdrawals with DEQ Discharge Data. Several criteria must be met for a match.
 - Of 628 facilities evaluated, 116 were matched and facility CU fraction developed.
- Matched data was sorted by use-type and used to calculate sector wide estimates.
- Literature review used to validate results.

2020-2021 WUDR Project Refining Virginia's Water Supply Estimates with Discharge and Withdrawal Data

- All water non-energy use: consumption increases in summer.
- Industrial: non-seasonal consumption.
- Municipal:
 - consumption increases in summer.
 - Higher variability across facilities (facility specific estimate is preferred)
- Applied in water availability modeling for State Water Resources Plan and ongoing permit evaluations.



Questions?

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