Blue Sky CONSULTING GROUP

Statewide Drinking Water Needs Assessment Modeling Approaches

Prepared for SWRCB Workshop:

Cost Estimating for a Needs Analysis

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Introduction

- The Blue Sky Consulting Group was engaged by the Water Foundation (in 2017) to help stakeholders better understand the amount of funding needed to ensure safe drinking water for communities throughout the state
- The origin of these estimates is important because it encompasses two important aspects of developing a needs assessment:
  - Stakeholders
  - Communities

Defining the Scope

- *Stakeholders* may have specific objectives (e.g. estimate costs due to actions of specific industries or for particular types of consumers) which comprise the frame for analysis
- C*ommunities* may include certain regions or types of consumers (e.g. just the low income, individuals served by small systems) which influence the scope of the analysis
- Other assumptions include
  - Types of contaminants
  - Types of costs (e.g. capital, O&M, administration, emergency water, education and outreach, etc.)
  - Time period covered, treatment costs, interest rates, inflation, etc., etc.
- These threshold assumptions can have a much bigger impact on the results than any more technical issues related to data sources or methodology
  - (Though its worth noting that there were substantial data limitations which limit the accuracy of the estimates we produced)

What's Covered in the Blue Sky Consulting Group Estimate?

- The analysis we performed covered:
  - Nitrate and other contaminants (arsenic, hexavalent chromium, DBPs, radionuclides, fluoride, and DBCP)
  - All communities up to 100,000 people and domestic well users
  - Costs for mitigating nitrate were estimated for all communities
  - Costs for other contaminants estimated for low income communities only

Estimated Cost Categories

- Cost estimates were prepared for
  - Community water systems
  - Domestic wells and very small water systems
- Costs were separately identified for systems and well users subject to
  - Nitrate contamination
  - Other, non-nitrate contaminants (Arsenic, Hexavalent Chromium, DBPs, Radionuclides, DBCP, and Fluoride)
- Capital and ongoing costs (for O&M, admin etc.) were separately identified

Public Water Systems: Methodology, Data Sources, and Assumptions

- Community water systems (CWS) and non-transient non-community (NTNC) systems included in the cost estimate met three criteria.
  - Multiple violations in the SDWIS data and hexavalent chromium data posted on Human Right to Water web portal during the period 2012-2017 (systems subject to nitrate contamination, but not in violation, were not included in the cost estimates)
  - Populations up to 100,000 people
  - A median household income (MHI) less than 80 percent of the statewide MHI (For systems subject to non-nitrate contamination)

Public Water Systems: Methodology, Data Sources, and Assumptions, cont.

- For each included system, treatment cost estimates were developed based on the approach developed by the SWRCB
  - Treatment costs used in state and federal rulemaking documents were applied to water systems with violations for exceeding the maximum contaminant level (MCL)
  - Treatment costs were assigned based on system size and type of contaminant (e.g. ion exchange for nitrate, arsenic, radionuclides, fluoride, and hexavalent chromium)
  - Because most larger systems have multiple water sources, treatment costs were estimated for a portion of the water being delivered to customers (i.e. costs for a single treatment system capable of serving up to 33,000 people were assigned rather than costs to treat the entire system's supply)
- Capital costs were amortized over 30 years at a 4 percent interest rate
- Technical assistance and planning costs were each estimated at 15 percent of capital costs and state administration was estimated to be 5 percent
- Costs were estimated for providing emergency water to communities with less than 1,000 people (using a point of use device)

Domestic Wells and State Smalls: Methodology, Data Sources, & Assumptions

- Separate methods were developed to estimate costs associated with nitrate contamination and "other contaminants" (i.e. Arsenic, Hexavalent Chromium, DBPs, Radionuclides, DBCP, and Fluoride)
- The population affected by nitrate contamination in domestic wells and state smalls was estimated with the 2016 CV-SALTS study for the Central Valley
- The Central Valley estimate was extrapolated to the rest of the state based on the ratio of the CV-Salts estimate to water system violations in the Central Valley

Domestic Wells and State Smalls: Methodology, Data Sources, & Assumptions, cont.

- The statewide domestic well/state small population subject to contamination by other contaminants was estimated using data compiled by OEHHA for CalEnviroScreen
- Californians residing within public water system boundaries were excluded; the remaining 2.1 million residents living outside PWS boundaries were grouped into 6 mile square "townships"
- All known readings of contaminant levels in raw groundwater from the State Water Board's Water Quality monitoring database (2005-2013) were utilized to determine which townships were affected by groundwater contamination
- Results were means-tested by including only populations in communities with a median household income (MHI) less than 80 percent of the statewide MHI

Domestic Wells and State Smalls: Estimating Costs

- Costs were estimated on a per capita basis and applied to all affected populations identified
- Per capita annualized costs were based on similar programs and were categorized by one-time costs (outreach and education, well testing, and program management), ongoing costs (Point-of-Use devices and bottled water for non-POU compatible households), ongoing program administration, and interim emergency water
- Based on current similar programs, the one-time costs of outreach, education, and program management was assumed to be $117 per capita. Well Testing was assumed to be $130 per capita
- For ongoing costs, the annual cost of a POU lease was assumed to be $154 per capita. Five percent of the domestic well/state small population was assumed to use bottled water in lieu of POU at a cost of $206 per capita annually
- The ongoing program administration cost was assumed to be 5 percent of ongoing costs

Estimated Costs

Table 1: Estimated Costs for Addressing Contaminated Drinking Water

Amounts in millions

	Annualized One-Time Costs[1]	Ongoing Annual Costs	Admin, Technical Assistance & Emergency Water	Total Annual Costs
Public Water Systems				
Nitrate	$6.12	$6.82	$1.21	$14.14
Nitrate with co-contaminants	$1.56	$1.44	$.31	$3.31
Other contaminants	$21.8	$20.22	$3.66	$45.68
Sub-total	*$29.48*	*$28.48*	*$5.18*	*$63.13*
Small Water Systems & Domestic Wells				
Nitrate	$1.33	$9.85	$.56	$11.75
Nitrate with co-contaminants	$1.52	$11.2	$.64	$13.35
Other contaminants	$5.83	$43.08	$2.46	$51.37
Sub-total	*$8.68*	*$64.14*	*$3.66*	*$76.48*
Total Costs	**$38.16**	**$92.61**	**$8.84**	**$139.61**

[1]Capital costs were annualized using a 15-year term at 4%. Non-annualized one-time costs total $424 million. (Note: the number $359 million does not include emergency water costs)

Conclusion

- Cost modeling is not simply a technical task
- Input assumptions, model "boundaries" and other factors can have a significant impact on results
- Data limitations can make modeling difficult
- Any questions, please contact

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