

## MEMORANDUM

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**To:** The Water Foundation  
**From:** Matthew Newman and Katrina Connolly  
**Date:** July 27, 2017  
**Re:** 2017 Safe Drinking Water Needs Assessment

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### **The Problem**

Across the state, hundreds of thousands of people are exposed to unsafe drinking water each year. In 2017, the California State Water Resources Control Board (State Water Board) identified roughly 300 California public water systems serving communities and schools that are out of compliance with federal drinking water standards.<sup>i</sup> The State Water Board's analysis does not consider roughly 2 million Californians served by domestic wells and very small water systems that are not regulated by the state and ineligible to receive state assistance. To address this statewide challenge, stakeholders and advocates have called for the creation of a new sustainable funding source that can meet ongoing drinking water treatment needs that are not being met with existing funding sources such as bonds or federal programs. A proposed law, Senate Bill 623 (Monning) Water quality: Safe and Affordable Drinking Water Fund, would create such a program.

### **Statewide Drinking Water Needs Assessment**

Blue Sky Consulting Group was hired by the Water Foundation, a strategic philanthropy working to transform how water is managed across the west, to help stakeholders better understand the amount of funding needed to ensure safe drinking water for affected communities throughout the state.

The cost of providing safe drinking water depends on the specific populations to be covered and the contaminants to be addressed. For purposes of this analysis, costs were estimated to provide safe drinking water to communities up to 100,000 people affected by contamination from nitrate as well as from arsenic, DBPs, radionuclides, DBCP, fluoride, and hexavalent chromium. Since no previous statewide study or comprehensive data source exists to quantify these costs, cost figures established through this analysis are estimated based on available data and information. The amount of funding needed to implement SB 623 is ultimately dependent on the specific needs assessment completed during implementation of the bill. If that needs assessment differs from the methodology used to estimate costs in this memo, the bill's implementation costs will differ from estimates provided here. Finally, the estimates presented are based on current conditions, and do not account for changes over time (research by UC Davis demonstrates the problem of nitrate contamination is expected to worsen over time).<sup>ii</sup>

### ***Methodology and Data Sources***

Drinking water cost estimates were prepared based on the approaches developed by the State Water Board, CV Salts, and CalEnviroScreen.<sup>iii</sup> The cost estimates include: 1) public residential water systems serving up to

100,000 people and non-residential water systems serving at least 25 people (schools, nursing homes, small businesses); and 2) very small systems serving less than 15 people and those using domestic wells. In total, the cost estimates presented here cover an estimated 732,000 Californians: 140,000 people affected by nitrate contamination and 592,000 people living in low-income communities affected by non-nitrate contamination.

### ***Methodologies to Calculate Cost Estimates – Public Water Systems***

Costs were estimated for public water systems that met the following criteria:

- Served communities of less than 100,000 people
- Had multiple violations reported in the Safe Drinking Water Information System database during the period 2012-2017
- Served communities with a median household income (MHI) less than 80% of the statewide MHI (for systems subject to non-nitrate contamination)

For each system that met the criteria, costs for implementing an Ion Exchange treatment system were estimated using the approach identified by the State Water Board (for nitrates and some non-nitrate contaminants), and granulated activated carbon for some non-nitrate contaminants.

### ***Methodologies to Calculate Cost Estimates – State Smalls and Domestic Well Owners***

Affected populations and costs were estimated for very small systems and domestic well users as follows:

- The population affected by nitrate contamination was estimated based on the 2016 CV SALTS study for the Central Valley; this estimate was extrapolated to the rest of the state based on the extent of nitrate contamination violations in these areas.
- The population affected by non-nitrate contamination (Arsenic, Hexavalent Chromium, DBPs, Radionuclides, DBCP, and Fluoride) was estimated using CalEnviroScreen data. Under this approach, populations residing in areas outside of public water system boundaries were grouped into “townships.” Well testing data from within the township boundaries was used to identify those townships that exceeded the state maximum contaminant level. Only those townships with an average income less than 80 percent of the statewide MHI were included for cost estimate purposes for non-nitrate contaminants.

For each household identified using these approaches, costs for providing a reverse osmosis point-of-use system were calculated.

### **Estimated Costs**

Three types of costs were estimated: 1) ongoing operations and maintenance costs for drinking water treatment; 2) annualized one-time capital costs; and 3) administrative, emergency and technical assistance costs.<sup>iv</sup> These three types of costs were estimated for both public water systems and state smalls/domestic wells. Because some water systems and domestic well owners are impacted by more than one drinking water contaminant, the costs estimates are further broken out by 1) those impacted by nitrate *only*; 2) those impacted by both nitrate *and* non-nitrate contaminants (e.g., arsenic, DBCP, etc.); and 3) those impacted by non-nitrate contaminants *only*.

The annual costs in Table 1 total \$140 million, \$63 million for the public water systems and \$76 million for the small water systems and domestic wells. Annual costs for both public water systems and state smalls/domestic

wells for addressing nitrate only contamination are estimated to be \$26 million; costs for addressing contamination of nitrate with co-contaminants were estimated at \$17 million; and costs for addressing other contaminants were estimated at \$97 million. By apportioning part of the costs associated with treating nitrate with co-contaminants to the category of nitrate and part of those costs to the category of other contaminants, the categories can be combined into two categories: \$30 million for nitrate and \$110 million for other contaminants.

**Table 1: Estimated Costs for Addressing Contaminated Drinking Water**  
(Amounts in millions)

	Annualized One-Time Costs <sup>1</sup>	Ongoing Annual Costs	Admin, Technical Assistance & Emergency Water	Total Annual Costs
<b>Public Water Systems</b>				
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
<i>Sub-total</i>	<i>\$29.48</i>	<i>\$28.48</i>	<i>\$5.18</i>	<i>\$63.13</i>
<b>Small Water Systems &amp; Domestic Wells</b>				
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
<i>Sub-total</i>	<i>\$8.68</i>	<i>\$64.14</i>	<i>\$3.66</i>	<i>\$76.48</i>
<b>Total Costs</b>	<b>\$38.16</b>	<b>\$92.61</b>	<b>\$8.84</b>	<b>\$139.61</b>

<sup>1</sup>Capital costs were annualized using a 15-year term at 4%. Non-annualized one-time costs total \$359 million.

## Endnotes

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<sup>i</sup> State Water Resources Control Board. 2017. "Safe Drinking Water O&M Needs Estimate," Human Right to Water Portal. [http://waterboards.ca.gov/water\\_issues/programs/hr2w/index.shtml](http://waterboards.ca.gov/water_issues/programs/hr2w/index.shtml).

<sup>ii</sup> Harter, T., J. R. Lund, J. Darby, G. E. Fogg, R. Howitt, K. K. Jessoe, G. S. Pettygrove, J. F. Quinn, J. H. Viers, D. B. Boyle, H. E. Canada, N. DeLaMora, K. N. Dzurella, A. Fryjoff-Hung, A. D. Hollander, K. L. Honeycutt, M. W. Jenkins, V. B. Jensen, A. M. King, G. Kourakos, D. Liptzin, E. M. Lopez, M. M. Mayzelle, A. McNally, J. Medellin Azuara, and T. S. Rosenstock. 2012. "Addressing Nitrate in California's Drinking Water with a Focus on Tulare Lake Basin and Salinas Valley Groundwater." Report for the State Water Resources Control Board Report to the Legislature. Center for Watershed Sciences, University of California, Davis. <http://groundwaternitrate.ucdavis.edu>.

<sup>iii</sup> For a description of the State Water Resources Control Board's approach, see "Explanation of Safe Drinking Water O&M Needs Estimate Spreadsheet," on the Human Right to Water Portal website at [http://waterboards.ca.gov/water\\_issues/programs/hr2w/index.shtml](http://waterboards.ca.gov/water_issues/programs/hr2w/index.shtml). For a description of the CV SALTS approach, see Larry Walker Associates. 2016. "Central Valley Salt and Nitrate Management Plan Economic Analysis," Prepared for the Central Valley Regional Water Quality Control Board. <https://www.cvsalinity.org/docs/ceqa/ceqa-documents/3529-snmp-econ-analysis-draft-20160923/file.html>. For a description of CalEnviroScreen's approach see Office of Environmental Health Hazard Assessment. 2017. "Methodology for a Statewide Drinking Water Contaminant Indicator: CalEnviroScreen 3.0." <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30>. CalEnviroScreen is a tool developed by the Office of Environmental Health Hazard Assessment (part of CalEPA) that helps identify California communities that are most affected by sources of pollution, and where people are especially vulnerable to pollution's effects. It has a drinking water indicator to estimate drinking water quality for the populations outside of public water system boundaries based on the groundwater quality monitoring data available in state databases for the most common primary drinking water contaminants.

<sup>iv</sup> Ongoing costs for domestic wells and state smalls include the annual lease cost for POU devices and bottled water costs for households that are unable to utilize POU for various reasons (plumbing, contaminant levels or combinations, etc.). We estimated that 5 percent of households would be non-POU compatible and need bottled water on an ongoing basis. One-time capital costs for domestic wells and state smalls include annualized costs of outreach and education, well testing, and program management. Administrative costs for public water systems are estimated to be 5 percent of capital costs. Administrative costs for domestic wells and state smalls are estimated to be 5 percent of the POU lease cost. Emergency water costs for public water systems were estimated for providing emergency water to communities with less than 1,000 people. For domestic wells and state smalls, emergency water costs are estimated for the provision of interim bottled water for the time between the result of the well test and installation of the POU device for POU-compatible households. Technical assistance for public water systems (estimated at 15 percent of capital costs) covers technical, managerial, and financial capacity building assistance in addition to assistance with capital projects for utilities serving small or disadvantaged communities. For domestic wells and state smalls, technical assistance for the POU device is included in ongoing costs as part of the lease estimate.