Proposed Regulation
Maximum Contaminant Level (MCL) for 1,2,3-Trichloropropane (1,2,3-TCP)
In Drinking Water

Standardized Regulatory Impact Assessment (SRIA)

I. Summary and Statement of the Need for the Proposed Regulation

The Division of Drinking Water (DDW) of the State Water Resources Control Board (State Water Board) is responsible for adopting primary drinking water standards, which must be set in accordance with the requirements of section 116365 of the California Safe Drinking Water Act (SDWA)(Health & Safety Code (HSC), div. 104, pt. 12, ch. 4, §116270 et seq.). Pursuant to California HSC section 116365, the State Water Board, when it establishes Maximum Contaminant Levels (MCLs), shall set the MCL as close to the Office of Environmental Health Hazard Assessment (OEHHA)-published public health goal (PHG) as is technologically and economically feasible, placing primary emphasis on the protection of public health.

All Public Water Systems (PWS) are subject to regulations adopted by the State Water Board under the California Safe Drinking Water Act. PWS are defined in the SDWA as "systems with more 15 or more service connections or that regularly serve at least 25 individuals daily at least 60 days out of the year." The State Water Board regulates PWS but does not regulate smaller non-public water systems serving fewer than 15 service connections or serving individual homes. Therefore, consistent with previous MCL regulations, the proposed regulations and associated cost estimates developed for this proposed regulation include only costs to treat PWS wells.

The purpose of the proposed regulation addressed in this Standardized Regulatory Impact Assessment (SRIA) is to adopt an MCL for 1,2,3-Trichloropropane (1,2,3-TCP) in drinking water supplied by PWS.

1,2,3-TCP is a man-made chlorinated hydrocarbon. Historically, 1,2,3-TCP has been used as an industrial solvent, cleaning and degreasing agent, and paint and varnish remover. It has also been found as a component in soil fumigants. Since the 1950s, agricultural use of soil fumigants as pesticides and nematocides was prevalent in the United States. Some soil fumigants (known under the trade name of D-D and Telone), contained primarily 1,3-dichloropropene and 1,2-dichloropropane but also contained 1,2,3-TCP as a minor component.[1] . D-D is no longer available in the United States. [2] Telone has since been reformulated and remarketed as Telone II. 1,2,3-TCP may also be generated as a byproduct during the production of other compounds (e.g.,

[1] IARC. 1995. 1,2,3-Trichloropropane. In Dry Cleaning, Some Chlorinated Solvents and Other Industrial Chemicals. IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Humans, vol. 63. Lyon, France: International Agency for Research on Cancer. pp. 223-244.
[2] Sine C, ed. 1991. Farm Chemicals Handbook 1991. Willoughby, OH: Meister Publishing Co.

dichlorohydrin, dichloropropene, epichlorohydrin, glycerol, propylene chlorohydrin, and propylene oxide). 1,2,3-TCP is used as a chemical intermediate in the production of dichloropropene, hexafluoropropylene, and polysulfone liquid polymers, and as a cross-linking agent in the synthesis of polysulfides.

When 1,2,3-TCP is discharged to the ground, there is likely to be some evaporation from the soil surface along with some leaching through the soil and into groundwater. As 1,2,3-TCP in its pure form is more dense than water, it tends to move downward through groundwater. 1,2,3-TCP does not readily degrade and will remain in groundwater for a long period of time; this persistence is due to its low degradation rates. If discharged to surface water, the concentration degrades quickly due to sunlight and evaporation. 1,2,3-TCP has been found by the U.S. Environmental Protection Agency (EPA) to likely be carcinogenic in humans.

DDW maintains a PWS source water quality database containing the results of source water quality monitoring data for 1,2,3-TCP collected from many PWS sources between 2001 and the present. Based on that database, it is known that there are numerous PWS wells in multiple areas of California that contain 1,2,3-TCP above the Detection Level for Reporting (DLR) of 5 parts per trillion (ppt). From this information, it is apparent that in many locations, 1,2,3-TCP has migrated into groundwater, resulting in groundwater contamination.

Based on the data and other reporting by PWS, it is known that there are PWS currently delivering water to their customers containing 1,2,3-TCP above the DLR. In these cases, the PWS are continuing to use these wells to maintain an adequate supply of water for their customers. There are PWS awaiting promulgation of an MCL before taking further action to reduce usage of contaminated wells. In some cases, the use of PWS wells known to be contaminated with 1,2,3,-TCP has been voluntarily reduced or discontinued pending the development of an MCL.

In 1999, the State established a notification level for 1,2,3-TCP as a health-based advisory level for consumers. Since that time, 1,2,3-TCP has been detected in numerous PWS wells throughout California. The counties with the highest number of contaminated wells include Kern, Fresno, Tulare, Merced, and Los Angeles counties. Currently, PWS are not required by regulation to sample for 1,2,3-TCP until an MCL has been established.

In 2009, OEHHA established a PHG for 1,2,3-TCP of 0.7 parts per trillion (ppt); the PHG is based on cancer risk. Currently, there is no federal drinking water standard for 1,2,3-TCP.

In July, 2016, State Water Board staff made a preliminary recommendation for an MCL of 5 ppt. This preliminary staff recommendation was based on consideration and analysis of information developed as of that time. The preliminary staff recommendation was based on consideration of what is technologically achievable, a reasonable level of public health protection, and the cost estimates available at that time.

Through the formal regulation adoption process in accordance with the Administrative Procedure Act (APA), the State Water Board will propose a regulation for 1,2,3-TCP, which will include an MCL. That proposed MCL may be a different value than the preliminary staff recommendation. The development of the proposed MCL will be described in the Initial Statement of Reasons (ISOR) that will be made available as part of the APA process.

Major Regulation Determination

The proposed regulation is determined to be a major regulation requiring a SRIA as the estimated economic impacts of the regulation exceed $50 million in a 12-month period after full implementation. The State Water Board has estimated that the proposed regulation could result in direct costs to regulated parties that increase demand for Granular Activated Carbon (GAC) systems with the economic impacts being highest in the first three years of implementation of the regulation. The results of the analysis are detailed below, respective to the SRIA requirements. The analysis in this document represents a snapshot of the proposed regulation, with the cost and compliance requirements representing the best information available to the State Water Board at the time of the SRIA submittal.

Baseline Information

The State Water Board, as well as the U.S. EPA, establishes drinking water standards to ensure the drinking water provided to the public by each PWS is safe, potable, reliable, and protective of public health. For drinking water supplied by a PWS to the public, the State Water Board establishes maximum allowable levels for various contaminants that may be present in drinking water sources, whether man-made or naturally-occurring. These maximum levels are known as MCLs. There are currently no statewide requirements mandating routine monitoring or treatment of 1,2,3-TCP prior to the adoption of an MCL. A drinking water standard specific for 1,2,3-TCP does not exist at the national level. State Water Board staff has made a preliminary recommendation for a 1,2,3-TCP MCL of 5 ppt. As part of the process, State Water Board staff will issue a proposed regulation and MCL for public review and comment.

Hawaii is the only other state in the nation that has adopted a drinking water standard for 1,2,3-TCP. The standard adopted by Hawaii is 600 ppt.[3] State Water Board staff has reviewed the approach taken by Hawaii for estimating costs to identify implementation issues and better inform cost estimates to be developed for California. State Water Board staff learned that the Hawaii Department of Public Health determined the best available method for removing 1,2,3-TCP to be GAC treatment.

Similar to the process used by the State Water Board, Hawaii also utilized the U.S.EPA Work Breakdown Structure (WBS) model to determine the cost and requirements of GAC treatment. The State Water Board has used the WBS model to estimate costs for potential treatment facilities in California, based on conditions and assumptions appropriate for California.

Hawaii modified the GAC WBS model to account for the space constraints that are common at typical well sites in Hawaii. For their purposes, Hawaii assumed in using the WBS model that

[3] Hawaii Department of Health (HDOH). 2005. Hawaii Department of Health Administrative Rules. Rules Relating to Potable Water Systems. Page 20-14.

water treatment would be optimized to treat multiple sources contaminated with 1,2,3-TCP, allowing for adjustment of engineering variables such as increased flow and decreased GAC contact time based on increased customer demand for drinking water. The State Water Board used appropriate assumptions and variables in the use of GAC WBS model based on conditions typical at well sites in California. The GAC WBS model is discussed in more detail later in this document.

Based on monitoring conducted between 2001 and 2015, the State Water Board has identified 289 PWS wells that exceed the notification level of 5 ppt (which is equal to the preliminary staff recommendation for an MCL of 5 ppt). Twenty-seven of these 289 wells already have GAC treatment facilities permitted by DDW to treat for 1,2,3-TCP; 40 of the 289 wells have treatment for other contaminants using GAC. The monitoring data used in this analysis is based on monitoring of sources that are used by public water systems (i.e., systems with more 15 or more service connections or regularly serve at least 25 individuals daily at least 60 days out of the year.). In areas with known or suspected contamination of groundwater with 1,2,3-TCP, there was a concerted effort to ensure that all PWS wells were sampled at least once to identify as many contaminated sources as possible. This monitoring data does not include sampling of non-public water systems serving fewer than 15 connections or wells serving individual homes. Therefore and consistent with previous MCL regulations in California, the cost estimate the State Water Board has developed for this proposed regulation does not include costs to treat wells serving small non-public water systems or individual homes.

As described previously, releases of 1,2,3-TCP may have occurred as a result of use or disposal of products that contain the chemical or through agricultural land use applications of certain soil fumigants that are known to contain 1,2-dichloropropane, 1,3-dichloropropene, and 1,2,3-TCP. While 1,2,3-TCP has been found in many drinking water wells throughout the state, the bulk of the detections have been concentrated mainly in counties with large agricultural sectors of the economy. Attachment 1 contains maps showing the geographic distribution of those wells impacted by 1,2,3-TCP at the various MCL ranges that are being considered. The counties most impacted by this contaminant include Kern, Fresno, Tulare, Merced, and Los Angeles. Many of the PWS with 1,2,3-TCP contamination serve communities that are economically disadvantaged or severely disadvantaged with median household incomes below 80% or 60% of the statewide median household income, respectively. In some cases, these communities also have other significant drinking water quality or environmental quality issues.

While no new sources of 1,2,3-TCP discharges are known to exist, existing soil and shallow aquifer contamination and leaching may persist, potentially causing the extent and severity of the groundwater contamination to change over time . Additional wells, not currently contaminated, may become contaminated given that groundwater flow directions change in response to pumping, aquifer recharge and other factors. The concentrations of 1,2,3-TCP in currently-contaminated wells may change depending on a variety of factors that vary from location to location. The factors include groundwater movement, variations in pumping rates in areas, number of wells extracting from that aquifer, and the extent and level of contamination in the adjacent geological formations. All of these factors make it impossible to determine the precise number of impacted water sources or wells that might be found to be contaminated in the future when the regulation is in effect and requires monitoring. This potential for movement of the contamination also creates additional concerns for water systems seeking to develop new wells that do not require significant treatment (i.e., drilling of new wells). The cost estimate used in this analysis is based on the premise that further introduction of 1,2,3-TCP into the environment will not occur, and the design and capacity of treatment to be installed at affected wells will be adequate into the future (i.e., that existing contamination levels do not increase such as to require changes to treatment facilities initially installed).

Disparate Impacts on Affected Populations
As illustrated in the Table 1, the State Water Board identified 289 sources (wells) in 18 counties that have drinking water with 1,2,3-TCP detections above 5 ppt. Of the 289 identified sources, 188 (approximately 65%) are located in counties with a median household income (MHI) of less than 80% of the statewide MHI, designating these counties as 'economically disadvantaged' or at a disadvantaged economic status. That results in approximately 40% of the total population served by water systems requiring treatment for 1,2,3-TCP being located in economically disadvantaged counties.

Table 1. Affected Counties and Distribution of Impacted Drinking Water Sources

County	Impacted Water Sources	Impacted Population	Median Household Income (2014)
SANTA CLARA	1	8,911	$93,854.00
SAN MATEO	5	24,672	$91,421.00
SOLANO	1	1,719	$67,341.00
SANTA CRUZ	1	2,096	$66,923.00
SAN DIEGO	6	51,355	$63,996.00
SAN LUIS OBISPO	2	1,572	$59,454.00
MONTEREY	1	3,242	$58,582.00
RIVERSIDE	15	75,695	$56,592.00
LOS ANGELES	23	187,105	$55,870.00
SACRAMENTO	1	938	$55,615.00
SAN BERNARDINO	20	106,906	$54,100.00
SAN JOAQUIN	12	73,531	$53,253.00
STANISLAUS	13	24,305	$49,573.00
KERN	82	184,212	$48,574.00
MADERA	1	250	$45,490.00
FRESNO	53	86,542	$45,201.00
MERCED	26	51,369	$43,066.00
TULARE	26	44,504	$42,863.00
Subtotals	***289***	***928,924***	
Below 80% of the statewide MHI and considered economically disadvantaged ($49,191) 2010-2014 American Community Survey: Statewide MHI of $61,489			

This county-wide approach provides useful information but is likely an underestimation of the number of severely disadvantaged communities that will be impacted by the proposed regulation. The MHI data obtained through the census is available on a county- and city-wide basis but not at a PWS level. This lack of available MHI data limits a more detailed analysis of the impacted communities. For example, a few of the affected PWS are operated by a city (e.g., City of Delano in Kern County) for which census data exists. The census data shows that the city is considered severely disadvantaged while the corresponding county data shows a disadvantaged status. The large number of affected PWS are not cities but are mutual water companies, community services districts, etc., for which MHI data is not readily available and determining their economic status would require an analysis of the service area, block group, or even a household income survey.

The economic disparity and the cost of treatment are likely to affect the affordability of the proposed regulation for smaller and economically disadvantaged (or severely disadvantaged) communities. In addition, disparate communities may be hindered in their ability to purchase alternative sources of drinking water or relocate their household to an area where drinking water sources are not impacted by 1,2,3-TCP contamination. The cost incurred from the proposed regulation has a greater and disproportional economic impact to the economically disadvantaged communities compared to the other affected communities.

Based on the inability to obtain alternative sources of drinking water, disadvantaged communities would continue to use and consume drinking water containing high levels of 1,2,3-TCP. In disadvantaged or severely disadvantaged communities, the incidence of cancer cases over a lifetime would be greater as compared to other impacted communities. Therefore, the proposed regulation would offer the most health benefit to these types of communities.

Alternative Sources of Drinking Water

In some of these communities, there is assumed to be at least some awareness of the issue of 1,2,3-TCP contamination in groundwater and associated drinking water. It is also assumed that some segment of the population that is aware of the problem has chosen to use alternative sources of drinking water, for example bottled water. The use of alternative sources of drinking water would potentially yield a corresponding cancer risk reduction. However, the exposure associated from inhalation would not be mitigated since it assumed that source water would still be used for other household activities.

Those areas that are more impacted by 1,2,3-TCP contamination (and show the highest concentrations above the PHG), exposure to contaminated drinking water would theoretically result in the highest number of additional cancer cases, where the health risk from exposure to 1,2,3-TCP contamination in drinking water is based on chronic exposure over a lifetime (over 70 years).

For the proposed MCL, the State Water Board is evaluating a range of MCLs ranging from 5 ppt to 150 ppt. The preliminary MCL recommendation of 5 ppt would represent the most health protective level considering technological limitations. The regulation would be expected to decrease expenditures for alternative sources of water by customers using (trusting) tap water delivered by the PWS. Once an MCL has been promulgated, a household would spend less or nothing for bottled water, but would incur an increased cost for water from their PWS utilities for a new treatment system.

A general assumption cannot be made on the percentage of persons that currently use alternative sources of water because that data does not exist. Instead, a range of cost differences can be calculated based on varying percentages of persons that would replace their drinking water with bottled water. Considering the economically disadvantaged populations, it is assumed that only a portion of this affected population will purchase alternative sources of water in order to reduce their exposure to any contaminant. This alternative source estimate also assumes that households will not install home treatment since there are currently no point of entry (POE) devices certified to remove 1,2,3-TCP and data is not currently available on possible reductions of concentrations by these devices. Home treatment devices are also not being used in the baseline scenario.

Based on the assumption that customers with health concerns would replace at least 2 liters/day of their drinking water, we can estimate that each person would purchase 0.5 gallons (~1.9 liters) per day. The average cost of bottled water is $1.20/gallon (http://www.bottledwater.org/economics/real-cost-of-bottled-water); therefore each person will spend average $18.00/month. Based on demographics, an average household size of 4 persons was assumed for these affected communities (http://web.stanford.edu/dept/csre/reports/exec_summary5.pdf); hence, each household will spend approximately $72.00/month.

Table 2: Estimated Bottled Water Usage and Cost Per Person and Household

Total Affected Population	730,902
Water Cost/gallon	$1.20
Gallons/Person/Month	15
Cost/Person/Month	$18.00
Cost/Household/Month	$72.00

Table 3: Population at 5 ppt Replacing Water

Percentage of Population Buying Bottled Water	Population Affected	Monthly Cost/Population Affected
15%	109,635	$1,973,435.40
20%	146,180	$2,631,247.20
30%	219,271	$3,946,870.80

The regulation, once adopted, would decrease overall costs for those households that are currently supplementing and substituting some of their water supply with bottled water but still paying for the monthly water bill. These households would no longer be incurring the costs for the bottled water (e.g., $72/month) but would see an increase to their monthly water bill by approximately $13-$14/ /month (see Macroeconomics Section).

Alternative Methods of Compliance

Some water systems are already voluntarily treating their contaminated wells for 1,2,3-TCP because of earlier detections or long-standing groundwater contamination. For the other impacted groundwater sources, once an MCL has been promulgated and PWS obtain data on current levels of 1,2,3-TCP, it will be possible to more fully evaluate available options to comply with the MCL. Possible options include: treatment of the well water; drilling a well in an area not contaminated with 1,2,3-TCP; removing the contaminated well from use; blending contaminated water with a clean source to reduce overall concentrations; purchasing water from a nearby utility; or consolidating with a nearby larger water system.

Consolidation of PWS consists of the combination of physical facilities and/or managerial control and resources of two or more PWS in relatively close proximity to one another. As an alternative to treatment, consolidation of a PWS with an adjacent larger PWS is evaluated to determine whether such consolidation is both feasible and preferable to providing treatment. In cases where such a consolidation could be accomplished at a comparable or lower cost than treatment, consolidation is the preferred alternative. Such relatively low costs for consolidation are relatively rare occurring primarily in cases where the service areas of the two PWS are in very close proximity such that only a short section of connecting pipeline would be necessary to connect the systems.

In most consolidation projects, the use of the existing contaminated well would cease, in favor of using the water supply from the larger PWS which is part of the consolidation project. This is subject to the larger PWS having adequate infrastructure to provide enough water to meet their existing water system needs and the supply needs of the consolidated system. In addition the water system must be able to provide water that meets all primary drinking water standards. Where consolidation is relatively simple (i.e., short distances between the two water systems), the cost of the connecting pipeline is not typically the only infrastructure cost needed for the consolidation. The consolidating system may need to increase their quantity of water supply, storage and distribution system to serve the combined systems.

As a condition of State funding, each well-contamination mitigation project is evaluated for consolidation potential. In some cases, consolidation projects can provide multiple benefits beyond the mitigation of the contamination problem. For example, the consolidation of the two PWS can provide greater economy of scale and the elimination of duplicative administrative and operation expenses. Some projects provide better overall infrastructure reliability and improvements in such areas as maintaining adequate distribution system pressures and fire flows.

For purposes of this analysis, it is reasonable to assume that:

1. There will be relatively few consolidation projects that will occur primarily as a result of this contamination situation.
2. In cases where the consolidation is the chosen option, there will be substantial benefits to the PWS involved in the consolidation project in addition to the benefit of providing drinking water that meets primary drinking water standards.
3. Because the benefits in each case are project-specific, it is not feasible to perform a detailed economic analysis of these benefits. However, it is recognized that consolidations generally provide the following benefits:
    a. Increased economy of scale in areas of management, operation and maintenance.
    b. Improved levels of service such as emergency response and system repairs.
    c. More reliable infrastructure.

The potential for consolidation will be evaluated both during the preliminary review of each potential project as well as during the permitting process. In some cases, physical consolidation will not be feasible, while managerial consolidation will be feasible.

Public Outreach and Input

Over the last several years, DDW has received input from impacted water systems expressing concern about the lack of a standard for 1,2,3-TCP. Local community groups and environmental justice groups have requested that the State Water Board set the development of an MCL for 1,2,3-TCP as one of its highest priorities. These requests have been made both in writing as well as in person at public State Water Board meetings and other forums.

In May and early June 2016, the State Water Board held three focused stakeholder meetings on the proposed regulation to establish an MCL for 1,2,3-TCP. These focused stakeholder meetings engaged representatives from public water systems most impacted by 1,2,3-TCP contamination in their drinking water supply. The stakeholder meetings were held in Visalia, Bakersfield, and Fresno on May 17, May 19 and June 2, 2016, respectively.

Additionally, publicly noticed workshops were held in Sacramento, Bakersfield, and Fresno on July 20, July 26, and July 28, 2016, respectively when the preliminary staff recommendation for the MCL was released. These forums, held outside of the rulemaking process, provided opportunity for stakeholder comment and for the solicitation of alternatives to the proposed regulation. State Water Board staff noted comments and concerns raised at the workshops. The timeframe of the stakeholder meetings and public workshops allowed the State Water Board to incorporate comments into this analysis. After the regulation is proposed, a public comment period will be held as provided for in the APA.

Announcements and materials related to the workshop were publicly posted on State Water Board websites and distributed at the stakeholder meetings and workshops.

II. Benefits

The proposed regulation is intended to improve the quality of drinking water through the reduction of 1,2,3-TCP in drinking water provided to the public. Establishing an MCL will result in a reduction in public health risk where a lower MCL will result in a greater risk reduction compared to a higher MCL. Compliance with the adopted MCL may result in improved public perception in the safety of their drinking water supply in areas where consumers are aware of this contamination issue. This could result in a reduction in both the use of bottled water and alternatives to drinking water, such as sweetened beverages and soda.

Benefits to Individuals

Exposure to concentrations of 1,2,3-TCP in drinking water that exceed the PHG will result in an increased risk for cancer. The main routes of exposure from this contaminant include oral consumption (drinking) or inhalation (i.e., from showering, household activities, etc.). Dermal exposure (i.e., adsorption through the skin) is not considered a significant exposure route.

Theoretically, reductions of 1,2,3-TCP concentrations in drinking water supplies would lead to a corresponding reduction in the risk of cancer associated with 1,2,3-TCP. The risk reduction calculations at the various MCL alternatives provide an estimate of the number of theoretical cancer cases that would be avoided over a lifetime (70 years). These numbers are based on theoretical calculations of cancer risks using conservative assumptions and data developed from the PHG. As an example, a proposed regulation establishing the MCL at the preliminary staff recommendation of 5 ppt could potentially lead to a reduction of approximately 2.5 cancer cases per year for 70 years. Based on data collected in DDW's database for PWS, there is an estimated population of 930,000 consumers/customers that could receive drinking water from water supplies that contain concentrations of 1,2,3-TCP above 5 ppt. Populations not served by a PWS can be impacted by the contamination but are outside the scope of the MCL development process. That population would include non-public water systems and individuals served by private wells.

The treatment for 1,2,3-TCP may in some cases provide a secondary benefit by removing other contaminants in drinking water. For example, treatment through GAC may remove trace levels of volatile organic compounds or synthetic organic contaminants that may be present in some public water system wells. The health concerns associated with such contaminants would be reduced. The magnitude of this secondary benefit is likely to be relatively low but cannot be estimated based on any currently available data.

Another secondary benefit of adopting an MCL is that this may improve public perception of the safety of the drinking water supply, potentially resulting in a decreased rate of consumption of bottled water. The purchase of bottled water places an extra financial burden on many households, especially those that live within economically disadvantaged or severely disadvantaged communities. In addition, increased confidence in the tap water will generally bolster efforts to reduce childhood consumption of unhealthy substitutes. This would provide a positive public health benefit in areas where children have high rates of consumption of sweetened beverages rather than water.

For every community, having an adequate and safe drinking water supply brings benefits in addition to the obvious benefit to individuals of having a safe water supply. In many of the communities that have wells contaminated with 1,2,3-TCP, the community is typically at least somewhat aware of the problem and the current lack of a drinking water standard for 1,2,3-TCP. In these cases, the adoption of a standard will enable the public to better gauge the relative safety of the water supply, and make informed decisions on whether to choose an alternative water supply if their PWS is delivering water containing 1,2,3-TCP. In the absence of a drinking water standard, the public lacks a basis for making an informed decision.

The PWS source monitoring required by the proposed regulation will serve to more fully define the current extent of the problem. The information from this monitoring will be informative to nearby public and non-public water systems or individuals on private wells who may be unaware of any 1,2,3-TCP contamination in their area. The residents in these areas can use the information to decide whether source monitoring of their own wells is needed.

Lastly, other incidental benefits of the proposed regulation include possible reduction of other constituents that are present in the water supply, for example low-level contaminants that affect taste and odor or other contaminants that would not ordinarily require treatment.

III. Direct Costs

This section outlines the direct costs as estimated by the agency to individuals and businesses, both small and large.

Direct Costs to Individuals

The available data identifies the end-user for drinking water as individual households. Therefore, for the purpose of this analysis, “individuals” are identified as individual households served by a PWS. The proposed regulation does not impose any direct costs on households. Households are not expected to modify their home infrastructure (e.g., plumbing) to comply with the proposed regulation. Water bills to households may increase; these indirect costs are described in the macroeconomic section.

Direct Costs to Public Water Systems (PWS)

There is no direct impact on private businesses because PWS are utilities and are not considered businesses. Therefore this section describes the direct costs to PWS that provide drinking water to the public. As such, the discussion of direct costs will focus on the impact on PWS. The macroeconomic impact section will discuss the indirect and induced costs and benefits to businesses affected by the regulation.

This section begins with a discussion of the impacted sources, followed by a description of the cost estimation method and costs. The associated costs of the regulation vary by flow rate, 1,2,3-TCP concentration, and need for a GAC treatment system; these costs are separated into three categories:

1. Monitoring Costs
2. Full Installation Capital Costs
3. Carbon Change-out Costs for existing systems and other ongoing costs

The proposed regulation identifies "sources" as groundwater wells that may be contaminated by 1,2,3-TCP. The PWS in areas that contain 1,2,3-TCP and are affected by the proposed regulation are using groundwater, solely or in a blend, in order to deliver drinking water to households. The proposed regulation will result in costs to those PWS in the form of capital, monitoring, and other costs.

The number of sources determined by the State Water Board to be subject to the regulation statewide is based on occurrence data obtained from DDW's database and represents those sources that exceed the preliminary staff recommendation for an MCL of 5 ppt, requiring either a GAC treatment system installation or optimization of an existing GAC treatment system. This estimate is based on the current water quality monitoring data available for sources that are used by PWS.

Although the direct costs are expected to be incurred primarily in counties where 1,2,3- TCP was used as an industrial solvent and/or a nematocide, the components of this water treatment technology (tanks, pipes, valves, computer services, carbon, etc.) are frequently used throughout the California economy for many types of industries[4]. In addition, the counties that have been identified as having 1,2,3-TCP in drinking water are scattered throughout the State from the south in San Diego to the north in Butte County. The identified counties that contain three of the State's largest cities are Los Angeles, San Diego, and Sacramento.

To account for the range of well capacities, two flow rates are used to simplify the analysis; these flow rates are identified as "SMALL" and "MEDIUM", expressed in units of million gallons per day (MGD), and represents the rate at which raw (untreated) water will go through the treatment system. In U.S. EPA's Work Breakdown Structure (WBS) model, "SMALL" and "MEDIUM" flow categories represent flow rates *less than or equal to 1 MGD* ("SMALL") and *greater than 1 MGD, but less than 10 MGD* ("MEDIUM"). These flow rate categories are further narrowed in the cost estimate used in this SRIA: based on calculated flow data obtained from DDW's databases, an average flow rate of 0.45 MGD is used to represent "SMALL" sources or treatment systems while

[4] If adopted, the preliminary staff recommendation for a 1,2,3-TCP MCL would require PWS to deliver drinking water with no more than 5 ppt of 1,2,3-TCP. The proposed regulation does not prescribe the method to be used for treatment of 1,2,3-TCP, but identifies a best available technology for treating 1,2,3-TCP which is Granular Activated Carbon or GAC. The cost estimate is based on the assumption that GAC treatment systems would be installed at all impacted public drinking water sources. It is expected that the PWS will incur the installation and operations costs and pass those costs on to its residential customers.

1.9 MGD is used to represent “MEDIUM” sources or treatment systems. In this case, "LARGE" is not a flow scenario because there are no large sources with a flow rate greater than 10 MGD in the existing database. Lastly, the WBS model output simulates the required building materials/components of a GAC treatment facility which represents the requirements for a full treatment system installation (“full installation”).

While all PWS have requirements under the proposed regulation, the resulting costs will vary depending on flow rates and 1,2,3-TCP concentrations. Table 4 presents seven classifications of sources affected by the proposed regulation:

1. Line 1 in Table 4 presents “SMALL” sources. These are sources that have a 1,2,3-TCP concentration exceeding 5 ppt and do not currently have GAC treatment in place, thus requiring a “full installation”. These sources will treat an average of 0.45 MGD “raw” (untreated) water. Full installation produces capital costs and new associated annual costs. Monitoring is also required and those requirements are described later in this section.

2. Line 2 presents “MEDIUM” sources. These are sources that have a 1,2,3-TCP concentration exceeding 5 ppt and do not currently have GAC treatment in place, thus requiring a “full installation”. These sources treat an average of 1.9 MGD raw water. Full installation produces capital costs and new annual costs associated with the capital costs. Monitoring is also required.

3. Lines 3 and 4 present “SMALL” and “MEDIUM” sources, respectively, that already have a GAC treatment system installed to remove other contaminants. In order to comply with the proposed regulation, it is assumed they will need an initial change-out to a different GAC medium and may need to increase the replacement frequency to eight months. These sources incur two additional costs, GAC and monitoring.

4. Line 5 presents standby sources: These are sources that are not regularly being used for water supply. Therefore, they do not require full installation unless the sources come online and exceed the MCL (at which point these sources would fall into one of the other categories of sources); as a result, the costs for these sources are solely due to monitoring.

5. Lines 6 and 7 present the remaining sources. Even though these are sources that are assumed not to have a 1,2,3-TCP concentration exceeding the MCL, PWS must conduct monitoring to confirm compliance with the MCL. The monitoring costs depend on the size of the population served.

Table 4: Number of Sources Affected by the Proposed Regulation*

Line	Source Category (Types of Cost)		# of Sources
	Number of Sources Needing Full Installation		
1	"SMALL" Sources, 0.45 MGD (Capital, New Annual O&M, Monitoring)		195
2	"MEDIUM" Sources, 1.9 MGD (Capital, New Annual O&M, Monitoring)		27
		Subtotal:	***222***
	Number of Sources Needing GAC (no installation required)		
3	"SMALL" Sources, 0.45 MGD (GAC Change-Out, Monitoring)		37
4	"MEDIUM" Sources, 1.9 MGD (GAC Change-Out, Monitoring)		3
		Subtotal:	***40***
	Number of Sources Needing only Monitoring		
5	Standby Sources (Monitoring)		395
6	Remaining Sources - Serving ≤ 3,300 people (Monitoring)		6,878
7	Remaining Sources - Serving > 3,300 people (Monitoring)		5,233
		Subtotal:	***12,506***
		Total Number of Sources affected by the Proposed Regulation	**12,768**
* These sources have been identified from the 1,2,3-TCP occurrence data.			

Cost Estimation Method

There were two data sources used in the cost estimating method: 1) the output from U.S. EPA's Work Breakdown Structure (WBS) Model for Granular Activated Carbon (GAC) Treatment, WBS-GAC [5] and 2) DDW staff recommendations based on standard business practices.

The WBS model was designed to assist U.S. EPA in estimating national compliance costs for drinking water regulations. The model is used to determine the required building materials/components and associated costs of a typical GAC treatment facility. The model allows for the adjustment of parametric values to optimize a typical treatment system.[6] The WBS model assumes the source initially has no GAC equipment and no staff dedicated to operating the new infrastructure. Thus, the cost estimate generated by the model is for full installation of the treatment system, including the corresponding operations and maintenance costs necessary for that system. The WBS model does not estimate monitoring costs; instead, these costs were compiled manually as described in the monitoring section below.

---

5 WBS-GAC is available from https://www.epa.gov/dwregdev/drinking-water-treatment-technology-unit-cost-models-and-overview-technologies, scroll down to Granular Activated Carbon (GAC) (XLSM).

6 In addition to the amount of flow, the other specified parametric values are the number of tanks (also known as contactors), the amount of time the untreated water needs to be in contact with the activated carbon, the carbon replacement frequency, the frequency of carbon flushing to remove accumulated materials, the types of pumps needed, whether the system is manually or automatically operated, and the quality of the equipment. Flow and contact time were the only specified parametric values.

The main parametric value that serves as the basic input to the WBS model is the flow rate, the rate at which untreated water will go through the treatment system. As previously noted, two flow rates, 0.45 MGD and 1.9 MGD, were selected for the purpose of estimating the economic impacts of the proposed regulation on the State of California. These are the flow rates seen in Table 4, Lines 1, 2, 3, and 4.

The WBS model estimates four cost categories for a complete treatment system installation:

1. Direct capital costs: tanks, pipes, site development, computers, and initial carbon load;
2. Add-on costs: permits, pilot studies, and land cost[7];
3. Indirect capital costs: mobilization and demobilization, architectural fees, process engineering, financing during construction, and construction management;
4. Annual operating and maintenance costs: labor (manager, clerical, and operator), materials for pumps and contractors, energy (pumps, lighting, ventilation), and carbon regeneration and/or replacement.

The WBS model used 69 capital cost items and 37 annual cost items in the cost estimate for this analysis. Some of the main capital and annual cost items used for the analysis include:

- Tanks: carbon steel with plastic internals, backwash tanks, holding tanks;
- Pipes: process piping, backwash piping, inlet and outlet piping, residuals (waste);
- Motor Valves: cast iron for processing and backwashing;
- Pumps: booster, backwash, residuals;
- Alarms: holding and backwash tanks;
- Other: mobilization/demobilization, lawyers, permits, site work, electrical, financing during construction, management of general contractors and the construction;
- Materials: granular activated carbon;
- Energy: for booster pumps, backwash pumps, lighting, ventilation;
- Personnel: manager, clerical, operator.

Monitoring Costs

Table 5 presents a summary of the monitoring requirements for each type of source described in Table 4.

All sources that exceed the MCL will require the most extensive monitoring. These sources are illustrated in Lines 1 through 4 on Table 5. For these sources, 16 samples will be collected per year starting in 2018 and extending through 2038. Four of the 16 samples are collected quarterly for the untreated water; twelve of the 16 samples are collected monthly for delivered water. The annual monitoring costs for these sources are the same every year.

[7] Although the WBS model allows for land costs, they were not included in these model runs.

Line 5 presents standby sources, sources that are reserved, but not regularly providing water to the public. PWS are required to sample these sources once every three years. Therefore, the annual costs vary from year to year with higher costs occurring every third year. For two out of every three years, the monitoring costs are zero.

Lines 6 and 7 present the remaining sources. These sources are not identified as having a 1,2,3-TCP concentration exceeding the preliminary staff recommendation for an MCL; however, PWS must sample their sources in order to confirm compliance. Upon confirmation, these sources must be sampled every three years; hence the cost pattern shows zero costs in two out of every three years for the whole time period. For purposes of calculating monitoring costs for the remaining sources in Lines 6 and 7, monitoring requirements are based on the population served. Sources that serve *less than or equal to 3,300 people* must be sampled once every third year and sources that serve *more than 3,300 people* must be sampled twice every third year.

Line 8 presents the Regional Economic Models, Inc. (REMI) input values for monitoring. In the first year (2018), monitoring costs are the highest because all sources must be tested. From 2019 and beyond, monitoring costs follow a pattern of two years of relatively low cost followed by one year of a higher cost. This three-year pattern repeats until the end of the analysis period.

For Industry level numbers, the monitoring costs are as follows:

$$(\#Sources) \times (Cost\ Per\ Sample) \times (\#Samples\ per\ Year)$$

Where the cost per sample is assumed to be $132.

Table 5: Monitoring Requirements and Costs in the Proposed Regulation (Thousands of 2015$)

Line	Type of Source	Number of Sources	Monitoring Requirement	2018	2019	2020	2021
1	"SMALL"	195	− 4 treated water samples each year − 12 raw water samples − Begins in 2018 and continues For the sources in (1) and (2) sampling is required even before construction starts	$412	$412	$412	$412
2	"MEDIUM"	27		$57	$57	$57	$57
3	"SMALL" GAC only	37		$78	$78	$78	$78
4	"MEDIUM" GAC only	3		$6	$6	$6	$6
5	Standby Sources	395	− 1 water sample each 3rd year	$52	$0	$0	$52
6	Remaining Sources, *≤ 3,300 Population Served*	6,878	− 4 treated water samples in 2018 − 1 water sample each 3rd year thereafter	$3,632	$0	$0	$908
7	Remaining Sources, *> 3,300 Population Served*	5,233	− 4 treated water samples in 2018 − 2 water samples each 3rd year thereafter	$2,763	$0	$0	$1,382
8	**Total Sources Requiring Monitoring**	**12,768**	**Monitoring REMI Input (North American Industry Classification System (NAICS) Code= 5413) Total Monitoring Cost per Year**	**$7,000**	**$553**	**$553**	**$2,895**

Capital and Ongoing Costs

Table 6 presents the capital and annual costs in the first five years, which are the exogenous demands made to the California economy. Monitoring costs are included in Table 6 as part of the annual costs. Table 6 also presents an overview of the total statewide capital and annual costs (2015$) for the 20-year time horizon, 2018 – 2038, evaluated for this analysis. More detailed accounting of the costs is presented in the Macroeconomic Impacts section.

Capital costs are only incurred for those sources that require GAC installations. The total annual capital cost is spread evenly over the years 2018, 2019, and 2020. Each installation is assumed to take one year. By early 2021, all installations are assumed to be complete. In 2019, the 2018 installations (222 GAC system installations) come online and 40 treatment systems (which already have GAC) require GAC change-out and other operational support for the systems; this is reflected as additional annual costs beginning in that year. In 2020, the 2019 installations come online and the new annual costs are added to the industry total. This continues in 2021 until all installations are online.

Table 6 shows the annual costs to be positive in the first year of the proposed regulation, 2018, before any installation is complete.

Table 6: Direct Costs distributed over time (2015$)

Costs	2018	2019	2020	2021	2022+
Capital Cost ($/Yr)	$33,029,234	$33,029,234	$33,029,234	$0	$0
Annual Cost ($/Yr)	$9,141,521	$8,338,997	$13,983,221	$21,968,993	$21,571,944

In 2018, the annual costs have two main components:

1. Carbon ongoing costs: 37 "SMALL" and 3 "MEDIUM" sources already have operating GAC treatment systems installed. The additional ongoing costs, as a result of the regulation, will be due to carbon change-out.

2. Monitoring costs incurred in the first year: In 2018, all 12,768 sources must be sampled for 1,2,3-TCP.

As identified in the monitoring section, the other variability in the annual costs is the differing monitoring costs which are a function of source type.

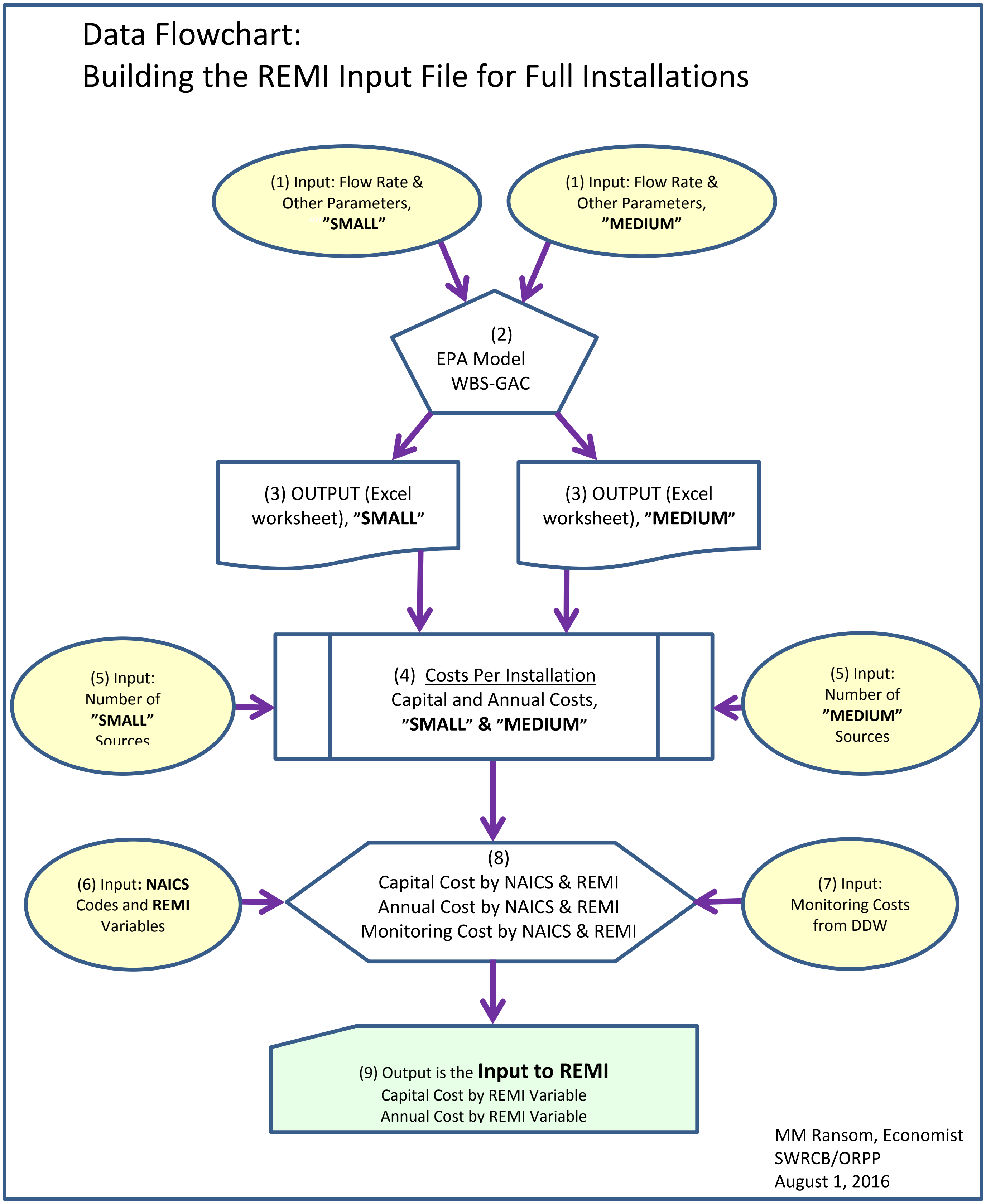
IV. Macroeconomic Impacts

This section begins with a description of how the direct costs are translated into inputs for the macroeconomic analysis. It then discusses the limitations of the analysis, including the limitations of the direct cost inputs to REMI. It is followed by an analysis of the potential economic impacts on the California economy, given the scenario and simulation described in this document, which are insignificant relative to the size of the California economy with the gross domestic product (GDP) totaling $2.31 trillion. [8]

The data flowchart on the following page shows how the REMI input file for full installations was built. The numbers in the flow chart correspond to the origination of the data identified in the flowchart box. The origination categories are:

1. Input from the DDW engineer
2. U.S. EPA's WBS-GAC Model
3. Output from the WBS-GAC Model
4. Processing Work, transforming U.S. EPA's WBS Model outputs to simple tables
5. Inputs from Table 4, Lines 1 and 2
6. NAICS code assignments to the 69 + 37 cost items, then REMI variables assigned
7. Monitoring Cost inputs from Table 5, Line 8
8. Cost items sorted by NAICS, aggregated by NAICS
9. Input to REMI, capital and annual costs by REMI variable

[8] Source: http://www.lao.ca.gov/LAOEconTax/Article/Detail/90. This is a 2014 estimate.


Data Flowchart:
Building the REMI Input File for Full Installations
(1) Input: Flow Rate & Other Parameters, "SMALL"
(1) Input: Flow Rate & Other Parameters, "MEDIUM"
(2) EPA Model WBS-GAC
(3) OUTPUT (Excel worksheet), "SMALL"
(3) OUTPUT (Excel worksheet), "MEDIUM"
(5) Input: Number of "SMALL" Sources
(4) Costs Per Installation Capital and Annual Costs, "SMALL" & "MEDIUM"
(5) Input: Number of "MEDIUM" Sources
(6) Input: NAICS Codes and REMI Variables
(8) Capital Cost by NAICS & REMI Annual Cost by NAICS & REMI Monitoring Cost by NAICS & REMI
(7) Input: Monitoring Costs from DDW
(9) Output is the Input to REMI Capital Cost by REMI Variable Annual Cost by REMI Variable
MM Ransom, Economist
SWRCB/ORPP
August 1, 2016

Taking the direct costs and translating them into REMI input values begins with identifying the industries that manufacture the required materials for the removal of 1,2,3-TCP as identified in the WBS model. Table 7 identifies the industries that make up the capital costs presented in Table 6 where Line 16 equals the Capital Cost per Year.

Table 7: Exogenous Demand due to Capital Costs (2015$)[9]

Line	NAICS	REMI	NAICS Name	Exogenous Demand
	Capital Costs in each year 2018, 2019, and 2020 (2)			
1	2213	6411	Water Supply, Sewage Treatment	$293,662
2	2362	6412	Industrial Building & Utility System Construction	$3,503,420
3	2389	6412	Site Preparation Contractors	$5,976,068
4	3259	6436	Carbon Activated, Manufacturing	$3,536,757
5	3261	6440	Tanks, Plumbing, Rigid Plastics, Steel Manufacturing	$6,961,906
6	3329	6445	Industrial Valve, Fabricated Pipe and Pipe Fitting Manufacturing	$2,005,490
7	3333	6485	Other Commercial and Service Industry Machinery Manufacturing	$20,546
8	3339	6485	Pump and Pumping Equipment Manufacturing	$693,145
9	3345	6486	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	$2,878,314
10	5221	6505	Commercial Banking	$688,153
11	5411	6515	Offices of Lawyers	$221,164
12	5413	6517	Engineering and Landscape Architectural Services	$3,499,374
13	5414	6518	Industrial Design Services	$1,732,039
14	5415	6519	Computer Systems Design, Programming	$116,506
15	5419	6523	All Other Professional, Scientific, and Technical Services	$902,690
16			**Total Statewide for Each Installation Year, 2018, 2019, 2020**	**$33,029,234**

Table 8 presents the exogenous final demand for the ongoing costs and with the corresponding industry. These costs are input values to the REMI model to represent the increases in demand in response to the capital purchases made by PWS for the GAC systems. The monitoring costs on Line 4 highlight the varying monitoring costs described in more detail in the previous sections.

[9] The WBS output was in 2013 dollars that were converted to 2015 dollars using the California Construction Cost Index from the California Department of General Services, Publications, CCCImasterListing_5-2016.pdf.

Table 8: REMI Annual Exogenous Demand sorted by REMI Variable

Line	NAICS Name	REMI Variable	2018	2019	2020	2021
1	Electric Power Generation [(1)]	6409	$0	$567,084	$1,134,168	$1,701,251
2	Carbon Activated, Manufacturing [(1), (2)]	6485	$2,141,429	$6,395,459	$10,649,489	$14,903,518
3	Other Construction Material Merchant Wholesalers [(1)]	6488	$0	$275,088	$550,175	$825,263
4	Monitoring Costs - 'Testing Laboratories, Not Medical, Not Veterinarian' [(3)]	6517	$7,000,092	$553,344	$553,344	$2,894,892
5	All Other Professional, Scientific, and Technical Services [(1)]	6523	$0	$41,594	$83,189	$124,783
6	Facilities Support Services [(1)]	6525	$0	$421,269	$842,537	$1,263,806
7	Waste Collection [(1)]	6530	$0	$85,160	$170,319	$255,479
8	**Total Each Year:**		**$9,141,521**	**$8,338,998**	**$13,983,221**	**$21,968,993**

(1) The 2021 cost remains constant until end of analysis period.
(2) Carbon annual costs start in 2018 because there are sources that already have a GAC treatment system but need to use specific GAC and need to change the carbon out more frequently.
(3) Table 5 presents the monitoring requirements.

Method for Determining Economic Impacts

REMI is the computational general equilibrium model that was used to estimate the macroeconomic impacts of the proposed regulation on the California economy. The capital and annual costs outlined in the previous section represent the direct costs to the economy. REMI traces the direct costs through the relevant industries and consumers and estimates the indirect and induced economic impacts of the proposed regulation. REMI Policy Insights Plus (PI+) provides year-by-year estimates of the total impacts as required by SB 617 and the California Department of Finance (DOF).[10] The Air Resources Board (ARB) provided the REMI support for this study. ARB uses the REMI PI+ one-region, 160-sector model that has been customized by the DOF to include California-specific data about population, demographics, and employment.

[10] More information is available on the California Department of Finance website at: http://www.dof.ca.gov/research/economic_research_unit/SB617_regulation/view.php.

Impacts to the State of California
Treatment system installations are assumed to be complete by the beginning of the year 2021. And, beginning in year 2021, every PWS is making bond payments and incurring their new annual O&M costs. In addition, monitoring costs vary from year to year. Although the input to REMI varies from year to year, the impact of the proposed regulation on the California economy is so small that the annual variations do not appear in the REMI percentage outputs.

Table 9 presents the direct costs as a percentage of total cost. The capital costs are represented as annual spending occurring in the first three years of the regulation and represent the construction of treatment facilities. The largest proportion, 21 percent, goes to NAICS 3261 "Tanks, Plumbing, Rigid Plastics, Steel Manufacturing."

The economic impact to California and to a particular industry depends on the amount of that spending that stays in California. Thus, the benefit to the California economy as a result of the increase in demand for GAC capital in early years and GAC in each year will vary depending upon the amount of demand met by California companies. Industries with a large presence in California will likely serve much of the new demand (and consequently economic impact) and have resulting positive economic indicators.

Table 9: Direct Costs as Percent of Total Costs (2015$)
Industries listed by Percentages, highest to lowest

NAICS Code	NAICS Name	Annual Direct Cost	Percent of Total
Capital Costs in each year 2018, 2019, and 2020			
3261	Tanks, Plumbing, Rigid Plastics, Steel Manufacturing	$6,961,906	21.04%
2389	Site Preparation Contractors	$5,976,068	17.51%
2362	Industrial Building & Utility System Construction	$3,503,420	14.56%
5413	Engineering and Landscape Architectural Services	$3,499,374	12.81%
3259	Carbon activated, Manufacturing	$3,536,757	9.33%
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	$2,878,314	5.69%
3329	Industrial Valve, Fabricated Pipe and Pipe Fitting Manufacturing	$2,005,490	4.79%
5414	Industrial Design Services	$1,732,039	3.63%
5419	All Other Professional, Scientific, and Technical Services	$902,690	2.99%
3339	Pump and Pumping Equipment Manufacturing	$693,145	2.93%
5221	Commercial Banking	$688,153	2.56%
2213	Water Supply, Sewage Treatment	$293,662	1.34%
5411	Offices of Lawyers	$221,164	0.52%
5415	Computer Systems Design, Programming	$116,506	0.26%
3333	Other Commercial and Service Industry Machinery Manufacturing	$20,546	0.04%
	Total Statewide for Each Installation Year, 2018, 2019, 2020	**$33,029,234**	**100%**
NAICS	**NAICS Name**	**Annual Cost**	**Percent of Total**
Average Annual Costs, 2019 - 2038 (1)			
3259	GAC Granular Activated Carbon, manufacturing (2)	$14,903,518	73.07%
2211	Electric Power Generation	$1,701,251	8.34%
5612	Facilities Support Services	$1,263,806	6.20%
5413	Monitor: Testing Laboratories, not medical, not veterinary (3)	$1,321,903	6.48%
4233	Other Construction Material Merchant Wholesalers	$825,263	4.05%
5621	Waste Collection	$255,479	1.25%
5419	All Other Professional, Scientific, and Technical Services	$124,783	0.61%
	Total Average Annual, 2019 - 2038	**$20,396,003**	**100%**

(1) These are the industry-wide ongoing annual costs that start in year 2021, the first year after all installations are assumed to be complete. The major economic shock, construction, has ended and the routine is assumed to begin in 2021.
(2) These are the ongoing carbon costs after all installations are complete. They include the carbon costs to the 2018 - 2020 installations plus the pre-existing GAC treatment systems that need specific GAC and more frequent change-outs.
(3) These are the average annual monitoring costs, averaging over the years 2019 to 2038. Note: The monitoring cost estimates have a 3-year pattern. This number is the average of that 3-year pattern. The 2018 monitoring costs are not typical of the time horizon and were not used in this average annual calculation.

Impacts to Households

The proposed drinking water regulation is expected to increase the costs to PWS which will likely be passed through to consumers and result in an increase in water rates to households. There are no expected financial impacts to irrigated agriculture or industries that do not require drinking water quality water in their processes or operations.

The sources identified in Table 4 serve various populations and utilize different flow rates, depending on demand. The existing DDW database does not contain the number of households associated with these sources. The U.S. EPA WBS model output provides the number of households associated with sources for which a treatment system is being installed; however, the model does not provide this information for those sources that already have GAC treatment or that only require monitoring. Thus, it is not possible to estimate the household's water bill increase due to the proposed regulation when a full treatment system installation is not needed.

According to the U.S. EPA WBS model, a "SMALL" source (0.45 MGD) serves 430 households, and a "MEDIUM" source (1.9 MGD) serves 1,950 households.[11] Households served by a "SMALL" source can expect a water charge increase of approximately $14 per month, whereas households served by a "MEDIUM" source can expect an increase of approximately $13 per month. Table 10 presents these calculations.

Table 10: Example Cost Increases to Households Served by a PWS with Sources Requiring Full Treatment System Installation

Cost Category	"SMALL" (0.45 MGD)	"MEDIUM" (1.9 MGD)
Capital Cost / Source (2015 $[12])	$264,571	$1,759,126
Capital Cost Annualized / Source: 1.6%[13], 20 years	$15,562	$103,474
Annual O&M / Source (2015 $)	$58,062	$207,801
Total Annual Cost / Source	$73,624	$311,275
Number of Households Served	430	1950
Cost for the Source/Household/Month	**$14.28**	**$13.30**

The estimated impact to the median disposable income of a household is presented in Table 11 which uses the estimated water bill increase from Table 10. According to the 2014 Census, the California median household income is $61,938 (2015$). [14] Assuming a 32% total tax rate (federal + state + local income taxes, property taxes, and sales taxes), the median estimated water bill

[11] Source: EPA model run for SMALL ("wbs-gac-SMALL-StandardDesign-2016-05.03.xls"), OUTPUT tab, Row 393. EPA model run for MEDIUM ("wbs-gac-MEDIUM-StandardDesign-2016-05.03.xls"), OUTPUT tab, Row 393.

[12] The WBS output was in 2013 dollars that were converted to 2015 dollars using the California Construction Cost Index from the California Department of General Services, Publications, CCCImasterListing_5-2016.pdf.

[13] 1.6% interest rate is from the SWRCB Drinking Water State Revolving Fund for 2016 median values. Downloaded 6/2/2016 from: http://www.waterboards.ca.gov/drinking_water/services/funding/documents/srf/dwsrf_interest_rate_and_mhi_v2.pdf

[14] Source: United States Census, Quick Facts, California, downloaded 6/8/2016 from https://www.census.gov/quickfacts/table/INC110214/06,00

increase would require less than 0.5 of a percentage point of increased spending from disposable income; a 0.40% increase for customers served by a “SMALL” source and a 0.37% increase for customers served by a “MEDIUM” source. This small change in spending from the disposable household income, as a result of an increase to the households water bills’ due to a GAC treatment system installation, produces insignificant economic induced impacts on the California state economy and is likely to be within normal fluctuations in spending by a given household.

Table 11: Increased Water Bill & Median Disposable Income

Median household income, 2015$ (1)	$61,937.57	
Total Median Tax Rate: (fed + state + local) income tax + property tax + sales taxes (2)	32%	
Disposable median household income	$42,117.55	
	“SMALL” (0.45 MGD)	**“MEDIUM” (1.9 MGD)**
Increase in Water Bill, $/month	$14	$13
Percent decrease in disposable income due to increased water bill	**0.40%**	**0.37%**

(1) Source: United States Census, Quick Facts, California, 2014$ inflated to 2015$ using BLS, Table 24 CPI for All Urban Consumers.
(2) Source: NerdWallet.com. Provides a list of 14 California cities with overall tax rates ranging from 26% (Fresno) to 46% (San Francisco). Rounded to 2-digits, the median overall tax rate is 32%. https://www.nerdwallet.com/blog/taxes/how-much-do-americans-really-pay-taxes-2015/. Discussion with Dr. Joe Fitz, Chief Economist, State of California Board of Equalization, indicates that 32% is a good figure for a median total tax burden.

While these are not direct economic impacts to individuals, this example identifies one potential simulation of an indirect increase in the water bill to individuals. Contrary to the previous example outlined in Table 11, which is based upon the direct cost inputs, the REMI output for consumption commodity prices for the Household Utility category shows a 0% change in 2018, increasing to a .03% change by 2022. Thus, if a household’s water bill was $50/month, the change in the price, absent any change in consumption, would yield a $.02 increase per month. These prices start to increase in 2019 when 1/3 of the installations are complete and households are starting to receive higher water bills.

Employment

REMI defines employment to be an estimate of the number of jobs, full-time plus part-time, by place of work. Full-time and part-time jobs are counted at equal weight. Employees, sole proprietors, and active partners are included, but unpaid family workers and volunteers are not included.

Table 12 highlights the three largest employment impacts estimated by REMI in each of the first five years. Line 1 presents the total employment impacts due to the proposed regulation. Six industries are listed in the table on Lines 2 – 7. In each year, the actual values are given for the top three industries. If an industry is not in the top three that year, the table entry is "N/A". Line 8 presents the percentage of the total employment change due to the top three industries.

In 2018, for example, the top three industries account for 60% of the total change in employment. In years 2018 through 2022, the top three industries account for at least 50 % of the employment changes. In 2021, negative employment changes begin to occur because construction jobs have ended and the induced effects of reduced household income and increased water bills begin to dominate the economic impact. When disposable income is reduced, the household must decrease consumption of other goods; for example Health Care and Arts. In 2021 and 2022, two other industries join the top three: in 2021, Arts shows a top-3 decline and in 2022, Health Care shows a top-3 decline. The negative impact of lost construction jobs and higher water bills does, according to REMI, impact such seemingly unrelated industries as Arts and Health Care. Slightly negative or zero impacts persist throughout the analysis period for all industries, though all impacts are less than one tenth of a percent.

Table 12: Employment Changes, Top Three Industries in the First Five Years

Line	Industry (2-digit NAICS)	2018	2019	2020	2021	2022
1	Total Employment Change due to the Proposed Regulation	382	264	213	-95	-178
2	Construction (23)	87	80	66	-29	-51
3	Professional, Scientific, and Technical Services (54)	97	58	55	N/A	N/A
4	Manufacturing (31-33)	32	29	27	N/A	N/A
5	Utilities (22)	N/A	N/A	N/A	-15	-20
6	Arts (71)	N/A	N/A	N/A	-12	N/A
7	Health Care (62)	N/A	N/A	N/A	N/A	-14
8	**Percent Total of the Top Three**	**60%**	**60%**	**70%**	**60%**	**50%**

N/A indicates an industry that is not in the top three industries for employment change.

Table 13 presents REMI results for the maximum job growth reductions both in terms of number of jobs and percent losses. For Construction, the maximum job growth reduction in terms of number is 78 occurring in the year 2026; while the maximum job growth reduction in terms of percentage is 0.010 occurring in years 2033 to 2038. It should be noted that the maximum losses for Construction occur in different years depending on the unit used (number or percentage). For Utilities, the maximum job growth reduction in terms of number is 38 in years 2036 to 2038; while the maximum job growth reduction in terms of percentage is 0.090 for years 2024 to 2028. Thus, identifying the biggest job growth reductions depends on the data used.

Table 13: Maximum Job Growth Reduction, Number and Percentages

	Number of Jobs	Year(s)	Percent Loss	Year(s)
Construction	-78	2026	-0.010%	2033-2038
Utilities	-38	2036-2038	-0.090%	2024-2028

Output
REMI defines output as the amount of production, including all intermediate goods, purchases, as well as value added. Output can also be thought of as sales or supply.

Table 14 gives a glimpse of the top five changes in output for the years 2018 (first year of construction) and 2022 (the second year after full implementation). The table has two parts: Part 1 lists the five industries that gained the most during the first year of construction; Part 2 lists the five industries that lost the most after construction ended. The highlighted industries appear in both lists. Thus, four of the top five experienced relatively significant gains and losses.

Table 14: Significant Changes in Output (2015$)

Part 1: Five Most Significant Increases in First Year of Implementation, 2018		
Professional, Scientific, and Technical Services (54)	$15,000,000	
Manufacturing (31-33)	$12,000,000	
Construction (23)	$10,000,000	
Finance and Insurance (52)	$4,000,000	
Real Estate and Rental and Leasing (53)	$4,000,000	
Part 2: Five Most Significant Decreases in the Second Year after Full Implementation, 2022		
Construction (23)		-$6,000,000
Real Estate and Rental and Leasing (53)		-$3,000,000
Utilities (22)		-$3,000,000
Finance and Insurance (52)		-$2,000,000
Professional, Scientific, and Technical Services (54)		-$1,000,000

Based on REMI output, in percentage terms, the only non-zero impacts were for Construction and Utilities. Construction's output increased 0.01% during the installation years of 2018 through 2020 and then declined to zero with some years being negative for the rest of the period. Utilities initially had a 0% change (positive, but less than one percent) in output and then became negative in 2022 and remained negative for the rest of the analysis period, though in percentage terms the impact was diminutive.

Impacts to Businesses
Two types of businesses, analytical (testing) laboratories and GAC suppliers, will experience an increased demand from PWS. Laboratories will likely experience an increased demand as a result of the additional monitoring required for 1,2,3-TCP. [15] The cost estimate assumes GAC for all new treatment system installations and a different type of GAC medium for those sources that already have an existing carbon-based treatment but that will be required to treat 1,2,3-TCP. Thus, the businesses that process, retail, and service GAC will experience an increased demand. GAC will need to be reactivated and/or replaced when water quality results indicate

[15] For a list of labs certified for 1,2,3-TCP testing go to http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/123-tcp/123tcp_lablist.pdf

the need. Both the laboratories and the GAC suppliers will experience an increased demand into the foreseeable future because 1,2,3-TCP will likely be in the groundwater for at least 40 years. [16]

PWS are not businesses and their costs are paid for by household water bills and, in some cases, through grants, bonds or loans. As such, it is not expected that any PWS would shut down as a result of the regulation. While the cost will likely be passed on to consumers, the potential increase in the household water bills is not significant enough to exact a drastic change in purchasing behavior. Potentially, the increase in water costs faced by consumers may decrease their spending on retail and other disposable income categories, but the decrease in spending on these goods would likely be spread throughout multiple industries and is potentially offset in early years by the increases in income provided by the gains in employment and output in GAC system industries. Thus, these small impacts are not likely to create or eliminate any businesses.

In the near future, businesses providing GAC and laboratory/monitoring services are likely to expand in size and/or number. There are also opportunities for companies to be created in California in response to the increased demand for GAC systems. However, given that this is an existing technology, it is possible but cannot be predicted.

Impacts on Competitive Advantage to California Businesses

PWS are not market-based organizations, but instead are utilities that are able to pass costs onto their consumers. Because both public drinking water originating in California and water originating from outside of California is subject to the requirements in the proposed regulation, there is no likelihood of non-California businesses taking over public drinking water from California-based PWS. As a result, there is no competitive advantage to neither California nor non-California businesses as a result of the proposed regulation.

Impacts on Investments

Because 1,2,3-TCP will remain in groundwater for such a long time and the population of people continues to grow, resulting in an increased demand for and consumption of drinking water, there are likely to be two types of investments. First, there is likely to be an expansion in services for both GAC (supply, operations, and disposal) and laboratory/monitoring. Second, there is likely to be an investment in the research for analytical methods that will detect lower concentrations of 1,2,3-TCP and also in the research to increase efficiency of treatment technologies and decrease of associated costs.

Incentives for Innovation

The incentives for innovation would come from the role that the GAC costs play in the annual costs. GAC represents approximately 70% of the annual costs. Because GAC will be needed for the foreseeable future, there is an incentive to research alternatives that can lower the annual costs. The alternatives may include a less expensive GAC medium or substitute for GAC, a

---

[16] Cohen, Harding, Barnes, Pohll, Wheatcraft, Bahme, "DBCP and TCP in Ground Water in California and Hawaii: Comparison of the Vadose Zone and Saturated Zone Modeling with Monitoring Results (ENVR #13180)", a PowerPoint presentation before the Division of Environmental Chemistry, 242nd ACS national Meeting, Slide 20, August 29, 2011.

regeneration method that allows the existing GAC to treat significantly more raw water, or an entirely new technology for removing 1,2,3-TCP from the raw water.

Limitations of the Economic Impact Assessment

Limitations of REMI:

REMI aggregates NAICS codes and that aggregation blends the economic impacts of the proposed regulation. For example, this analysis had individual cost items that were in eight NAICS codes starting with "33". The industries in the "33" category were: iron and steel mills, plastics machinery manufacturing, pump and pumping equipment manufacturing, semiconductor and other electronic component manufacturing, navigational, electromedical and control instruments. With such broad categories, it is difficult to see how the initial spending, the direct costs, impact the various industries.

Limitations of NAICS:

One NAICS code can contain a wide variety of industries. GAC is included in NAICS code 3259 [17], "All Other Chemical Product and Preparation Manufacturing". Because the proposed regulation requires GAC, one would expect employment and output to increase in NAICS code 3259. However, this NAICS classification also contains antifreeze preparations, sugar substitutes, pyrotechnics manufacturing, and other chemical products. Thus, when the proposed regulation requires the use of GAC for the entire analysis period, producing a constant increase in demand, the induced impacts on other industries within the NAICS class can be sufficiently negative so as to produce a negative impact in the industry producing GAC.

Limitations of WBS model:

The per-unit costs in the WBS model are national with an index value = 1. [18] The model allows entering another cost index value. If California prices are 20% higher than the national average, then 1.2 would be the appropriate cost index. However, because this one index number applies to every cost item and it is unlikely that all cost items have the same relationship to the national average cost, the default national cost index was used.

Summary and Interpretation of the Results of the Economic Impact Assessment

Overall, the proposed regulation is estimated to have an insignificant impact on the California economy. Even those median-income households receiving drinking water from a PWS with a source requiring a full treatment system installation will experience very small increases in their water bills. These households will not have to significantly change their spending patterns, thus the induced impacts on their spending will be very small. All other households receiving water from a PWS with a source requiring either a GAC change-out or simple monitoring will see a smaller impact on their spending decisions because their water bill increases will be lower (no installation costs). The percent changes for all REMI outputs are effectively zero.

Although the economic impact on the California economy is insignificant, the direction of change is consistent with the assumption that households will shift their spending away from other

[17] Source: OMB, North American Industry Classification System, United States, 2012, p. 324.

[18] Source: WBS-GAC output, Row 333.

goods and services (such as Arts and Health Care) in order to pay the increased water bill. That shift away from the non-water expenditures ripples through the California economy causing losses in many industries. However, the losses are insignificant to the whole California economy.

V. Alternatives

The State Water Board has evaluated alternatives or modifications to the proposed regulation as mandated by Health & Safety Code (HSC), div. 104, pt. 12, ch. 4, §116270 et seq. To solicit alternatives from stakeholders, the State Water Board conducted three focused stakeholder meetings in May/June 2016 and three public workshops in July 2016. No alternative regulatory proposals were received during those meetings and workshops. Therefore, the State Water Board has evaluated two alternatives to the proposed regulation for this analysis.

The regulation analyzed in this report is based on cost information available to the State Water Board at this time. The ISOR will include an economic analysis of the proposed regulation and may rely on additional information and analysis. As the ISOR is developed, interactions with the regulated communities, stakeholders, Environmental Justice groups, and the public continue, and the Board provides direction to staff; as a result, the State Water Board may choose to evaluate other alternatives to the proposed regulation. Over the course of the next 9-12 months, as the regulation is finalized, additional supporting documents for the economic analysis may be added.

1.) No Action - No regulation
2.) Less Stringent MCL - Modification of the recommended MCL (5 ppt) to 15 ppt

Alternative 1 assumes that there are no changes to drinking water standards, which results in no additional costs to PWS or consumers/customers. Alternative 2 explores a scenario of a less stringent MCL with a reduced cost for implementation and a reduction in annual costs and benefits.

Alternative 1

In this alternative, drinking water delivered to customers/consumers will not be treated to remove any concentrations of 1,2,3,-TCP. Theoretically, the cancer health risk can be reduced with alternative sources of drinking water (e.g., bottled water) on a voluntary basis, and when consumers are made aware of the TCP contamination in the water (which is the case with some PWS). This cancer risk reduction cannot be estimated as it would be speculative to assume the amount of alternative drinking water replacement occurring per person per day or the percentage of the impacted population choosing to purchase bottled water. Additionally, some of the most disadvantaged communities would likely be disproportionately affected by not taking action; some consumers may not be able to afford bottled water, or have the capacity or time to keep informed on the contamination status of their PWS. For these reasons, Alternative 1 will not consistently provide cancer health risk reductions as compared to the proposed regulation.

a. Cost and Benefits
   Alternative 1 would not impose any new cost on PWS or consumers/customers. This scenario would not result in a change to: 1) existing drinking water standards (SDWA), 2) 1,2,3-TCP-contaminated drinking water being delivered to customers and consumers, or 3) incurred cost from purchasing alternative sources of water. Assuming that alternative drinking water sources are not available, theoretically, there would be at least 2.5 cancer cases per year, or more than 175 cancer cases in a lifetime. With this alternative, no cancer cases are being reduced and therefore, there is no health benefit.

b. Economic Impacts
   Since this alternative represents the baseline scenario, there would be no economic impacts – Alternative 1 does not impose any additional costs on PWS or consumers/customers. As a result, there would be no changes in the gross state product, personal income, private investment, or other economic indicators.

c. Cost-Effectiveness
   Overall, Alternative 1 may be a more costly alternative as compared to the proposed regulation, since the average cost for alternative sources of water (e.g., bottled water) tends to be greater than the increased cost from implementing centralized treatment from a PWS. Fiscal or regulatory costs associated with the implementation and enforcement of the proposed regulation will not be imposed with Alternative 1.

d. Reason for Rejection
   Alternative 1 does not sufficiently address the requirement in the HSC of setting the MCL as close to the PHG as is technologically and economically feasible, placing primary emphasis on the protection of public health. The health benefit cannot be estimated, and is expected to be small and unpredictable due to voluntary water replacement. Therefore, Alternative 1 is not a viable alternative to the proposed regulation.

Alternative 2

Alternative 2 represents a less stringent MCL (15 ppt) as compared to the proposed regulation. This alternative results in a reduced cost based on: 1) a reduced number of impacted drinking water sources requiring treatment, thus reducing the total number of treatment facilities constructed; 2) a reduction of operation and maintenance costs associated with drinking water treatment; and 3) a reduction in the cost of monitoring and laboratory analyses. Alternative 2 would offer a cancer risk reduction for approximately 57% of the total population that benefit from the proposed regulation.

a. Cost and Benefits
   Alternative 2 would result in a reduced cost for PWS and consumers/customers compared with the proposed regulation, but the reduction of the number of sources being treated would increase the public health risk for cancer attributed to 1,2,3-TCP. An

MCL set at 15 ppt would be health protective to a population of 414,954 people as compared to a population 730,902 people. In part, the difference in cost is due to the construction of fewer treatment facilities which is most evident in the first three years of implementation of the regulation during which time all treatment construction is expected to be completed (Table 15). In addition, the monitoring requirements for Alternative 2 would be reduced as noted in Table 16.

Table 15: Direct Costs distributed over time (2015$)

Costs	2018	2019	2020	2021	2022+
Capital Cost ($/Yr)	$17,090,194	$17,090,194	$17,090,194	$0	$0
Annual Cost ($/Yr)	$8,173,255	$5,073,789	$8,479,679	$14,243,882	$12,671,674

Table 16: Monitoring Requirements and Costs for Alternative 2 (Thousands of 2015$)

Line	Type of Source	Number of Sources	Monitoring Requirement	2018	2019	2020	2021
1	"SMALL"	114	4 treated water samples each year 12 raw water samples Begins in 2018 and continues For the sources in (1) and (2) sampling is required even before construction starts	$241	$241	$241	$241
2	"MEDIUM"	12		$25	$25	$25	$25
3	"SMALL" GAC only	23	1 water sample each 3rd year	$49	$49	$49	$49
4	"MEDIUM" GAC only	2		$4	$4	$4	$4
5	Standby Sources	395		$52	$0	$0	$52
6	Remaining Sources, *≤ 3,300 Population Served*	6,973	4 treated water samples in 2018 1 water sample each 3rd year thereafter	$3,682	$0	$0	$920
7	Remaining Sources, *> 3,300 Population Served*	5,249	4 treated water samples in 2018 2 water samples each 3rd year thereafter	$2,771	$0	$0	$1,386
8	**Total Sources Requiring Monitoring**	**12,768**	**Monitoring REMI Input (NAICS Code = 5413) Total Monitoring Cost per Year**	**$6,824**	**$319**	**$319**	**$2,677**
	Represents Initial Monitoring Cost for first year of implementation of Alternative 2 Represents ongoing 3 year cost pattern for Alternative 2						

Once an MCL has been established, it is assumed that the populations receiving treated water will consume tap water and will not purchase bottled water. As compared to the proposed regulation, there will be a population of 315,948 people that will receive drinking water from sources with 1,2,3-TCP concentrations between 5 and 15 ppt ,and therefore, could purchase bottled water. The replacement of drinking water with alternative sources could represent an additional public health benefit, specifically a reduction in the number of cancer cases in a lifetime, but the additional health benefit cannot be estimated.

A general assumption cannot be made on the percentage of persons that currently use alternative sources of water. A range of cost differences can be demonstrated based on percentages of persons that could replace their drinking water with bottled water, as demonstrated in the Tables 17 and 18.

Table 17: Estimated Bottled Water Usage and Cost Per Person and Household

Total Affected Population	315,948
Water Cost/gallon	$1.20
Gallons/Person/Month	15
Cost/Person/Month	$18.00
Cost/Household/Month	$72.00

Table 18: Population at 15 ppt Replacing Water

Percentage of Population Buying Bottled Water	Population Affected	Monthly Cost/Population Affected
15%	47,392	$853,059.60
20%	63,190	$1,137,412.80
30%	94,784	$1,706,119.20

b. Economic Impacts
REMI was used to estimate the macroeconomic impacts of Alternative 2.

Similar to the proposed regulation, the REMI employment output showed that in the first three years of implementation of Alternative 2, the only positive growth period of employment occurred during years 2018-2038. The top three industries (Construction, Manufacturing, and Professional, Scientific, and Technical Services) accounted for the greatest job increases in the first three years. In comparison to the job growth reduction in Table 13, Alternative 2 shows 48 jobs lost in the construction industry for year 2026 as compared to 78 jobs lost due to the proposed regulation. In addition, the utility industry for years 2036-2038 showed an average of 21 jobs lost compared to 38 lost due to the proposed regulation. In 2021, negative employment changes begin to occur because construction of treatment facilities is expected to be completed and the induced effects of reduced household income and increased water bills begin to dominate the economic impact. When disposable income is reduced, the household must decrease consumption of other goods. Starting with the implementation of the Alternative 2 in 2018, two industries (Arts and Utilities) start and continue with an employment deficit that continues through 2038. Slightly negative or zero percent impacts persist after 2021 throughout the analysis period for all industries.

REMI defines output as the amount of production, including all intermediate goods, purchases, as well as value added. Output can also be thought of as sales or supply.

The greatest gains were seen in the first three years of the implementation of Alternative 2, specifically in the industries of Construction, Manufacturing, and Professional, Scientific, and Technical Services with gains (2015$, million) of 36.8, 25.5, and 22.6 in the first 3 years. Year 2021 represents the completion of all construction of water treatment facilities, and the REMI output shows loss of revenue with the exception of the continued gain from the manufacturing industry. The recognized gain in manufacturing is likely due to the demand for GAC, which stabilizes near the end of 2026 and starts a trend of loss to Year 2038. Based on REMI output, in percentage terms, all impacts were zero with some years being negative for the rest of the period. The impact in terms of percentage on each industry was diminutive.

c. Cost-Effectiveness
As compared to the proposed regulation, Alternative 2 is less costly, but would result in proportional reduction in health benefits. This alternative also would impose increased fiscal and regulatory costs, but would be lower in cost compared to the proposed regulation based on the number of required treatment facilities and less stringent drinking water standard.

d. Reason for Rejection
The MCL is subject to HSC section 116365, which requires the State Water Board to set the MCL as close to the PHG as is technologically and economically feasible, while placing primary emphasis on the protection of public health. While Alternative 2 is more affordable, the MCL of 15 ppt can be set at a lower level to further reduce exposure and the theoretical cancer cases in a lifetime. Therefore, the proposed regulation is preferred to achieve the maximum protection of public health given the current technology.

VI. Fiscal Impacts

Local Government

There are 58 PWS that have sources contaminated with 1,2,3-TCP above 5 ppt that are operated by local government (city, or county). Additional costs (beyond those addressed in the SRIA) may include planning, design, permitting and other administrative functions related to the installation of the treatment facilities. This workload is expected to be absorbed by existing local government personnel and resources. Hence, the proposed regulation does not significantly impact local government costs or tax revenue.

State Government – State Water Board

The State Water Board's DDW oversees approximately 12,768 water sources impacted by the proposed regulation. The initial impact of the proposed regulation would have a relatively small impact on staffing resources, which could be accommodated through redistribution of existing staff at the District office level. Additional personnel may be needed for effective implementation and enforcement of the adopted MCL.

The establishment of an MCL will enable the Regional Water Quality Control Boards (RWQCBs) to more fully consider impacts on beneficial uses in areas with 1,2,3-TCP groundwater contamination. This could serve as a catalyst to protecting and restoring groundwater resources for present and future generations.

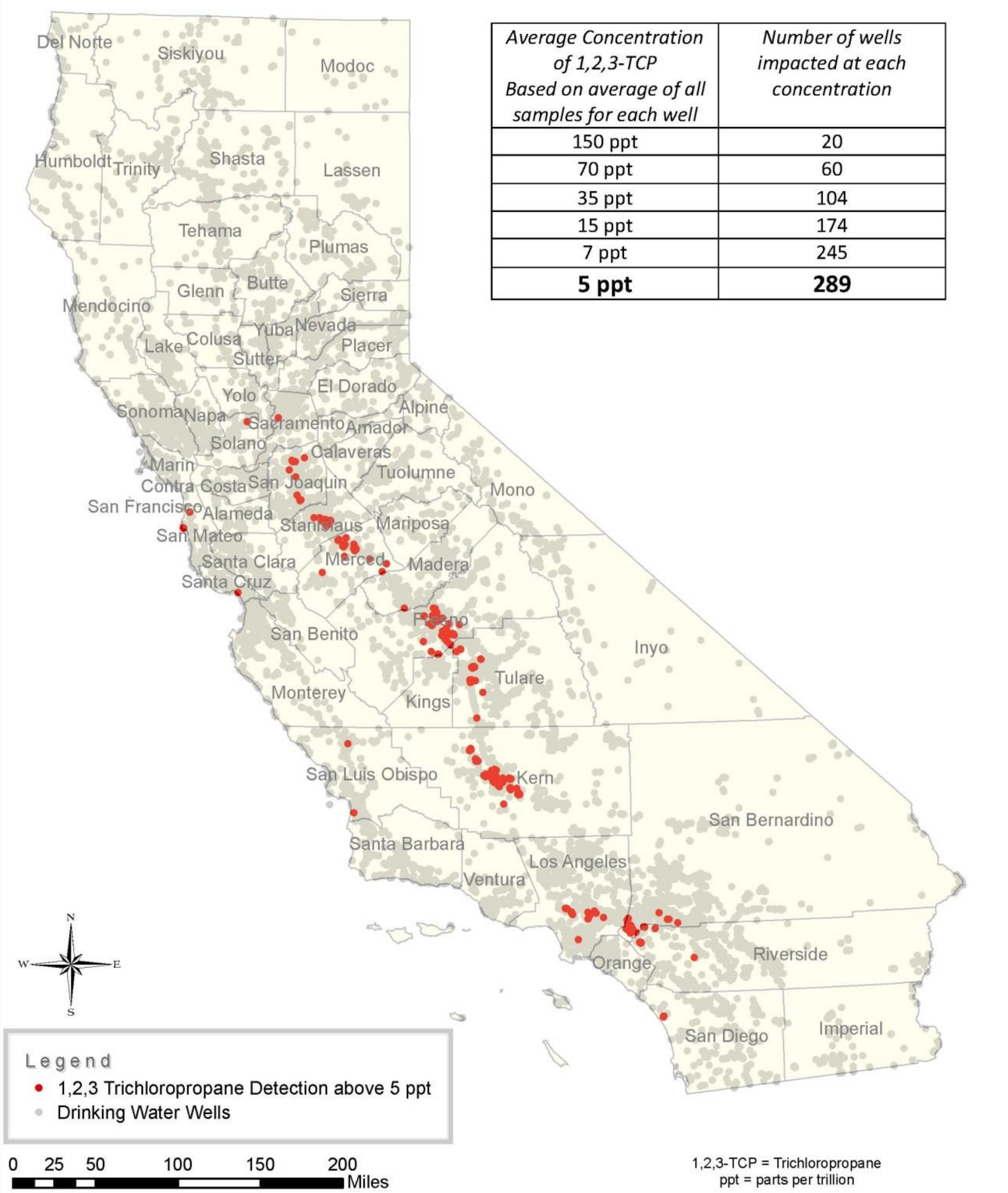
Other State Agencies

The Department of Toxic Substances Control (DTSC) and Regional Water Boards may use the adopted MCL in their evaluation of groundwater contamination problems and associated cleanup actions. The establishment of an MCL would provide an additional resource for these agencies in evaluating groundwater contamination problems and associated remedial actions.

No other significant direct or indirect impacts on other State agencies associated with the adoption of this MCL have been identified. It is possible that there will be some minor indirect impacts on some State agencies as a result of construction projects associated with new treatment facilities. The potential indirect impacts might include the review of planning documents and California Environmental Quality Act documents. These potential impacts should be able to be absorbed within existing resources and staffing.

ATTACHMENT 1

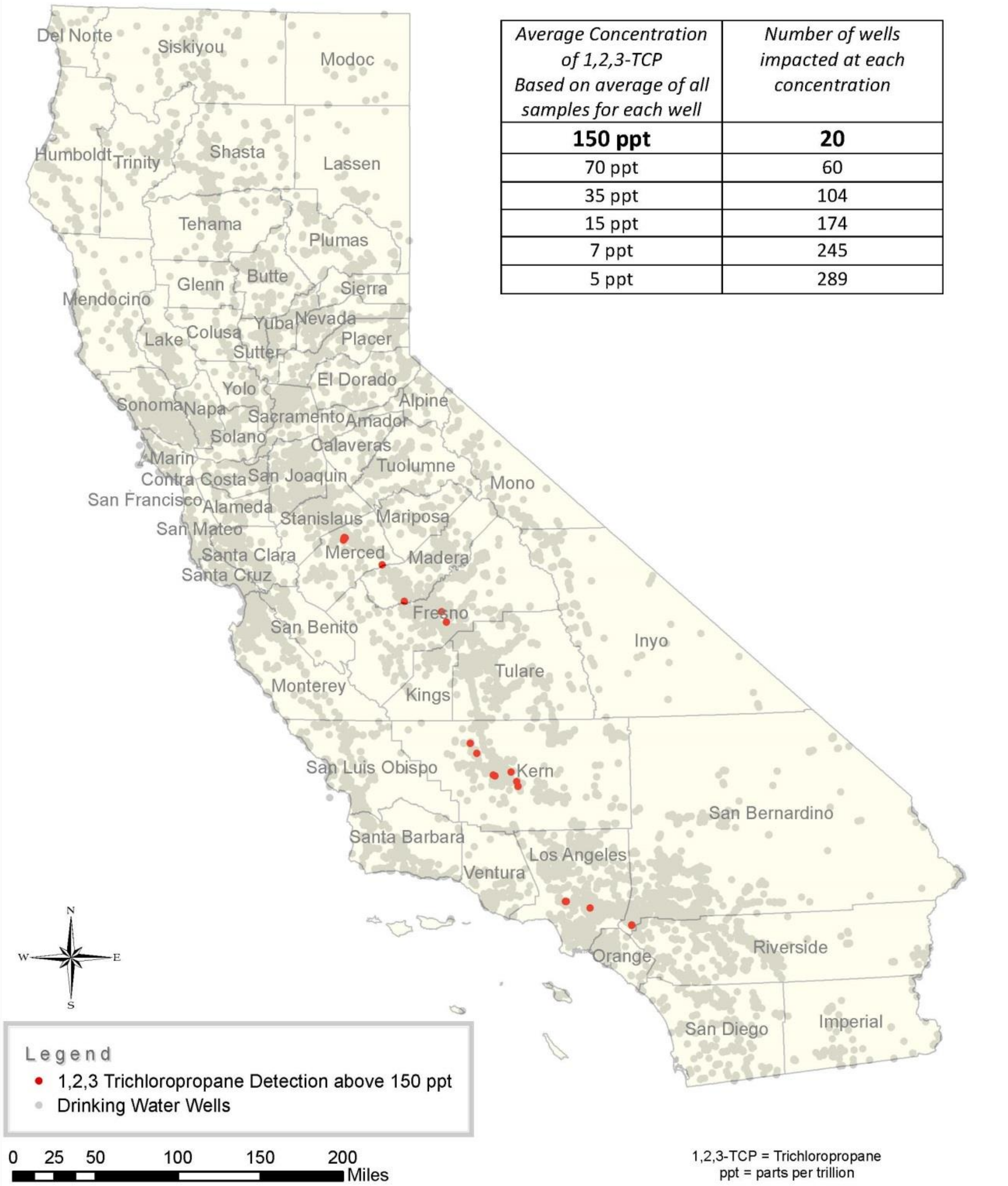
1,2,3-TCP Concentrations Above 5 ppt



Average Concentration of 1,2,3-TCP Based on average of all samples for each well	*Number of wells impacted at each concentration*
150 ppt	20
70 ppt	60
35 ppt	104
15 ppt	174
7 ppt	245
5 ppt	**289**

1,2,3-TCP Concentrations Above 150 ppt

Average Concentration of 1,2,3-TCP Based on average of all samples for each well	*Number of wells impacted at each concentration*
150 ppt	**20**
70 ppt	60
35 ppt	104
15 ppt	174
7 ppt	245
5 ppt	289



1,2,3-TCP = Trichloropropane
ppt = parts per trillion