

**STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION**

STAFF REPORT FOR REGULAR MEETING OF JANUARY 30 - 31, 2020

Prepared on January 8, 2020

ITEM NUMBER: 5

SUBJECT: Central Coast Drinking Water Well Testing Program – Progress and Results

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ACTION: Information / Discussion

SUMMARY

Over eighty percent of Central Coast residents rely on groundwater for their drinking water and other uses. While larger municipal drinking water wells are routinely tested for contaminants and treated to ensure that the water is safe to drink, small water systems and domestic drinking water wells are often not tested, and many do not have necessary drinking water treatment to remove contaminants.

Additionally, many domestic wells and small water systems are located in rural areas or small communities, within or adjacent to areas with the likelihood of potentially contaminating activities (e.g., intensive irrigated agriculture or high-density septic system areas). These wells are at a higher risk of contamination, given their relatively shallow depths. Drinking water well testing is essential to identify areas of potentially unsafe drinking water supply, inform drinking water well users of water quality, measure individual groundwater basin health, and determine the effectiveness of our efforts to protect and improve groundwater quality. This work also supports the Central Coast Water Board's environmental justice priorities and implements the region's Human Right to Water Resolution¹ which is discussed in greater detail as part of Item No. 4.

The Central Coast Water Board conducted a drinking water well testing pilot project in San Luis Obispo County in 2017 and launched the program region-wide in October 2018. Excluding the results of the pilot project, the program has collected water samples from 276 wells in the Central Coast region. Preliminary results indicate that approximately 38% of wells tested have least one maximum contaminant level (MCL) exceedance for nitrate, arsenic, 1,2,3-Trichloropropane (1,2,3-TCP), perchlorate, or the interim screening level for Chromium VI.

¹ Human Right to Water Resolution No. R3-2017-0004, https://www.waterboards.ca.gov/centralcoast/board_decisions/adopted_orders/2017/2017-0004_hrtw_fnl.pdf

BACKGROUND

In September 2017, the Central Coast Water Board initiated a domestic well testing pilot project in coordination with AmeriCorps CivicSpark and San Luis Obispo County Environmental Health. The primary purpose of the project was to provide free well testing to domestic well users to help them to make informed decisions about their drinking water. The pilot project also allowed Central Coast Water Board and county staff an opportunity to gain a deeper understanding of groundwater and domestic well water quality in San Luis Obispo County. The pilot project tested 190 domestic wells in San Luis Obispo County for 26 water quality parameters and concluded in September 2018. Due to differences in well testing parameters, the pilot project results are not included in this Staff Report however, a Project Summary is attached to this report as Attachment 1.

Drawing on lessons learned from the pilot project, the Central Coast Water Board began implementing the drinking water well testing program across the entire Central Coast region in October 2018. Participation in the program is both voluntary and free to anyone in the region who receives their drinking water from a private domestic well, a local small water system with two to four residential connections, or a state small water system with five to 14 residential connections. Consistent with the Human Right to Water Resolution, resources are prioritized to conduct outreach and testing to support disadvantaged communities (DACs), however all qualified participants are welcome.

Central Coast residents can sign up for free testing by filling out an online – and smartphone compatible - application form via the following website or by calling the following number:

[Website Link](#) (English)

[Enlace de página web](#) (Español)

1 (844) 613-5152 (English / Español)

PROJECT PARTNERS AND FUNDING

Numerous entities contribute to the success of the drinking water well testing program. Community Water Center (CWC) provides support to conduct outreach and coordination with Spanish-speaking communities and DACs. Tetra Tech Inc. is contracted to handle intake screening of participants, scheduling, and sample collection. Fruit Growers Laboratory (FGL) analyzes the samples and transmits results. Funding is provided by the Central Coast Ambient Monitoring Program – Groundwater Assessment and Protection (CCAMP-GAP) program administered by the Bay Foundation of Morro Bay. Additionally, the program has benefited from the support of county agencies, water purveyors, and various State Water Board programs including the Division of Financial Assistance (i.e., Cleanup and Abatement Account provided initial funding to develop Quality Assurance Project Plan), and Office of Public Participation and Office of Public Affairs for outreach and education.

Additionally, when possible, Central Coast Water Board staff attempts to coordinate the drinking water well testing program with other well testing programs to help fill data gaps, especially related to domestic wells or small water systems. Recently staff coordinated with the California Department of Pesticide Regulation's (DPR) Groundwater Protection Program to test selected drinking water wells for pesticides that may contaminate groundwater. DPR's study is ongoing and the results of the pesticide analyses are not yet available. Staff also coordinated with Lawrence Livermore National Laboratory (LLNL) to include selected drinking water wells in a study to evaluate groundwater age and sources of nitrogen.

Through coordination between Central Coast Water Board staff, CWC, Pajaro/Sunny Mesa Community Services District (PSMCS), and the State Water Board Division of Financial Assistance and Division of Drinking Water, water quality data from the program was used to inform and support the implementation of emergency replacement water for approximately 218 residences in a disadvantaged community in Monterey County north of Moss Landing and west of State Highway 1 in the Struve Road, Springfield Road and Bluff and Jensen Road areas served by small water systems and private domestic wells polluted with nitrate and 1,2,3-TCP. Long-term replacement water solutions are being evaluated for the disadvantaged community.

Depending on available CCAMP-GAP funding, the goal is to continue to offer the drinking water well testing program on an ongoing basis in collaboration with others to provide information to drinking water well users and assess groundwater quality.

PROGRAM OUTREACH AND PHASED ROLLOUT

Since program participants volunteer to have their wells sampled, effective public outreach is essential. Central Coast Water Board staff conducts outreach for drinking water well testing program, in both English and Spanish, in collaboration with the State Water Board's Office of Public Participation (OPP) and Office of Public Affairs (OPA), CWC, county environmental health departments, local nonprofit groups and charities including food banks, migrant farmworker centers, and other community groups. Potential participants learn about the program through a variety of methods including the program website, direct mailings, press releases, public service announcements, community events, posters in high traffic public areas, word-of-mouth, and local radio.

Due to the high level of outreach required to publicize the program and attract participants, the program focuses outreach efforts on one county at a time based on a specific outreach strategy developed to maximize response and participation. The counties and dates when testing started, are shown below.

- San Luis Obispo County – October 2018
- Monterey County – December 2018
- San Benito County – August 2019
- Santa Cruz County – April 2020 (Planned)
- Santa Barbara County – October 2020 (Planned)

It's important to note that participants are accepted from across the Central Coast region at any time, regardless of county. The phased rollout simply allows Central Coast Water Board staff and program partners to focus their outreach and community engagement in certain geographic areas for a period of time, thus generating heightened community awareness and program momentum in those areas.

Eligible parties may schedule an appointment to have their drinking water well tested by either filling out the online registration form ([English](#) / [Español](#)) or calling the toll-free phone number, 1 (844) 613-5152. The online registration form and the toll-free phone number are available in both English and Spanish.

CONSTITUENTS ANALYZED AND DATA QUALITY

To ensure data quality, samples are collected and analyzed per a Quality Assurance Project Plan (QAPP) and the analyses are conducted by an Environmental Laboratory Accreditation Program (ELAP) certified laboratory with the demonstrated ability to upload results electronically to GeoTracker.

Drinking water well samples are analyzed for the following constituents:

- Arsenic
- Chromium VI (also known as Hexavalent Chromium)
- Nitrate as Nitrogen
- Perchlorate
- 1, 2, 3-Trichloropropane (1,2,3-TCP)
- Alkalinity (as CaCO₃)
- Bicarbonate (as HCO₃)
- Calcium
- Carbonate
- Chloride
- Hydroxide
- Magnesium
- Potassium
- Sodium
- Sulfate
- Total Dissolved Solids
- pH
- Specific Conductance

Because of the known health impacts associated with drinking water that exceeds one or more Primary MCLs, program staff focus their attention on constituents that have a California Primary MCL, as shown below.

- Arsenic – 10 micrograms per liter (ug/L)
- Nitrate as N – 10 milligrams per liter (mg/L)
- Perchlorate – 6 ug/L
- 1,2,3-TCP – 0.005 ug/L

There is not a current MCL for Chromium VI. The previous Primary MCL of 10 ug/L was rescinded in 2017 by the Superior Court of Sacramento County. The court found the MCL invalid because the California Department of Public Health “failed to properly consider the economic feasibility of complying with the MCL.” The court also ordered the State Water Board to adopt a new MCL for Chromium VI. Evidence indicates Chromium VI is a carcinogen at low levels. In the interest of human health, staff are using the rescinded MCL of 10 ug/L as an interim screening level until a new MCL is developed for Chromium VI.

The remaining constituents are included to inform general groundwater quality conditions, but are not subject to primary MCLs or public health goals, but several do have secondary standards that are based on aesthetic concerns such as taste, odor, etc.

The QAPP describes the program goals, data needs and assessment, quality assurance and quality control roles and measures, and reporting requirements. The QAPP specifies that five percent of samples will be quality control samples. Quality control samples are collected in the field and consist of field blanks and field duplicates. Field duplicates are analyzed by the laboratory and results are compared to the results for the primary sample. Field blanks are analyzed for any detections of the target constituents. To date, the program has consistently met all data quality objectives.

WELL TESTING AND DATA MANAGEMENT

The program goal is to sample a participant’s well within 30 days of receiving their request. Drinking water well samples are collected by Tetra Tech staff according to the QAPP, typically at the closest spigot to the wellhead and before any filtration or treatment occurs. Tetra Tech submits the samples to FGL for analysis, and uploads field documentation to GeoTracker for each sampled well.

FGL uploads the laboratory results to GeoTracker using geographic well locations. Central Coast Water Board staff review all GeoTracker uploads for accuracy and compliance with the program’s QAPP prior to making the data available to the public on the State Water Board’s Groundwater Ambient Monitoring and Assessment (GAMA) website². Consistent with standard practice to ensure privacy of individuals participating in voluntary programs, drinking water wells are identified by a unique identification number and participant personal information is not displayed (e.g. personal names, addresses, or contact information).

RESULTS COMMUNICATION AND DATA SHARING

Drinking water well test results are emailed to the participants by FGL. Hard copy results are mailed to participants who don’t have email. Results are also transmitted to Central Coast Water Board staff and CWC. Central Coast Water Board and Tetra Tech staff review all results and flag exceedances of water quality standards. Program staff telephone the participant to discuss results if the data show an exceedance of an MCL

² GAMA Program Groundwater Information System
Website <https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/>.

and/or the program's interim Chromium VI screening level. Central Coast Water Board staff typically telephone the participants; however, CWC staff make the phone call if they introduced the participant to the program or if the participant is Spanish speaking.

The priority is to provide drinking water well test results to participants in a timely manner. The average time between testing and results transmittal to participants is approximately 18 business days. Staff will continue to focus on providing timely reports to program participants.

Results from the drinking water well testing program are shared on the GAMA website to maximize the availability and accessibility of drinking water quality data to support the development of solutions and inform all stakeholders, including communities that lack adequate, affordable, or safe drinking water. In particular, staff encourages groundwater sustainability agencies (GSAs) to incorporate drinking water testing program data into groundwater sustainability plans (GSPs) to help identify water quality priorities for Sustainable Groundwater Management Act (SGMA) implementation.

PRELIMINARY RESULTS

The drinking water well testing program is ongoing and at the time of this Staff Report, 276 wells have been sampled since October 2018. Laboratory results are available for 249 wells; and of these, 95 wells (38%) show an exceedance of an MCL and/or the program's interim screening level for Chromium VI. Figure 1 shows the sample points and locations of exceedances. A summary table of results, by county, is also presented below in Table 1 and the relative percent of exceedances in each county is shown in Figure 2.

Figure 1. Drinking water well sample locations. Green circles represent samples without an exceedance. Red crosses show locations with one or more exceedance.

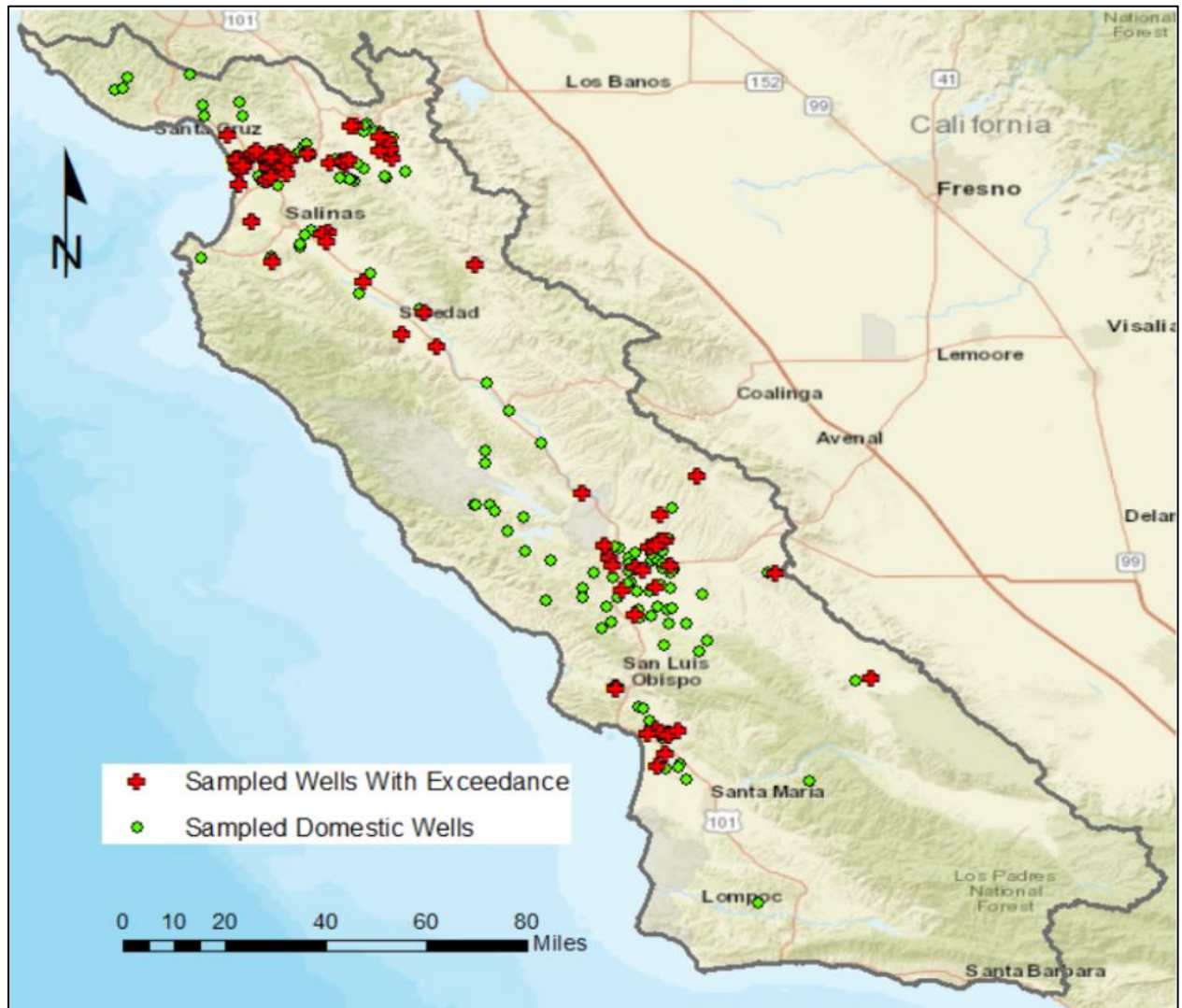
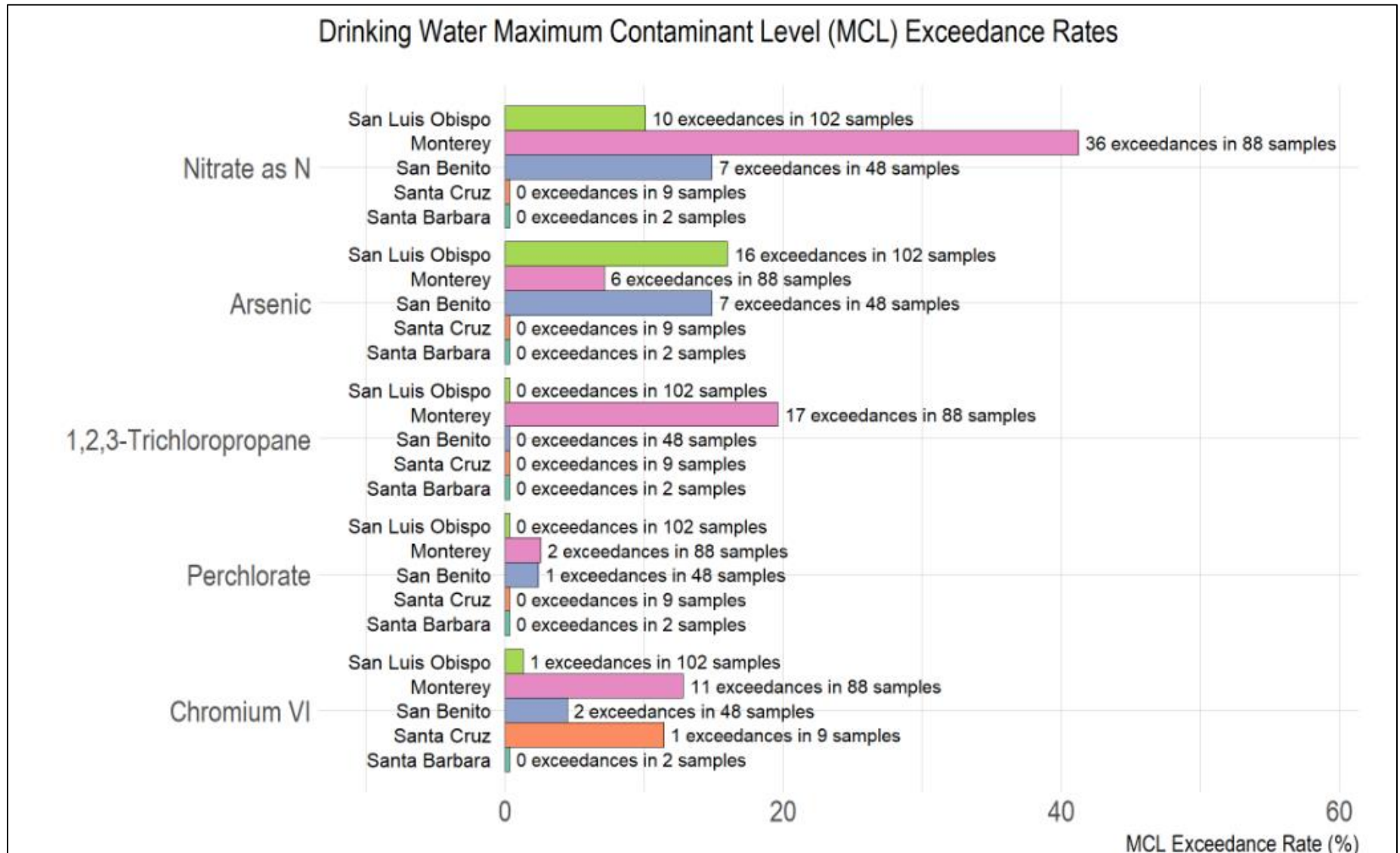


Table 1. Summary of MCL Exceedances by County

County	Number of Samples	Nitrate as N ≥ 10 mg/L	Arsenic ≥10 ug/L	1,2,3-TCP ≥ 0.005 ug/L	Perchlorate ≥ 6 ug/L	Chromium VI ≥ 10 ug/L*
San Luis Obispo	102	10	16	0	0	1
Monterey	88	36	6	17	2	11
San Benito	48	7	7	0	1	2
Santa Cruz	9	0	0	0	0	1
Santa Barbara	2	0	0	0	0	0
TOTAL	249	53	29	17	3	15

*Interim project screening level based on former MCL.

Figure 2. Bar Chart of MCL Exceedances by County



Results for each county are discussed in the following sections, and the full dataset is available at the GAMA Program Groundwater Information System website.

San Luis Obispo County

- The drinking water well testing program initiated outreach to San Luis Obispo County in October 2018 and has sampled 102 wells to date. Of these, 10 wells contained nitrate at levels that exceeded the California MCL of 10 mg/L. The exceedances ranged from 11.2 mg/L to 31.6 mg/L.
- Sixteen wells in San Luis Obispo County contained arsenic at levels that exceeded the California MCL of 10 ug/L. The exceedances ranged from 10.2 ug/L to 58.9 ug/L.
- No wells in San Luis Obispo County contained 1,2,3-TCP at levels that exceeded the California MCL of 0.005 ug/L.
- No wells contained perchlorate at levels that exceeded the California MCL of 6 ug/L.
- One well in San Luis Obispo County contained Chromium VI levels that exceeded the program's interim screening level of 10 ug/L. The exceedance was 11.5 ug/L.

Monterey County

- The drinking water well testing program initiated outreach to Monterey County in December 2018 and has sampled 88 wells to date. Of these, 36 wells contained nitrate levels that exceeded the California MCL of 10 mg/L. The exceedances ranged from 10.6 mg/L to 67.3 mg/L.
- Six wells in Monterey County contained arsenic levels that exceeded the California MCL of 10 ug/L. The exceedances ranged from 10.2 ug/L to 52.9 ug/L.
- Seventeen wells in Monterey County contained 1,2,3-TCP levels that exceeded the California MCL of 0.005 ug/L. The exceedances ranged from 0.007 ug/L to 0.2 ug/L.
- Two wells in Monterey County contained perchlorate levels that exceeded the California MCL of 6 ug/L. The exceedances ranged from 7.6 ug/L to 10.5 ug/L.
- Eleven wells in Monterey County contained Chromium VI levels that exceeded the program's interim screening level of 10 ug/L. The exceedances ranged from 10.6 ug/L to 22.6 ug/L.

San Benito County

- The drinking water well testing program initiated outreach to San Benito County in August 2019 and has sampled 48 wells to date. Of these, seven wells contained nitrate at levels that exceeded the California MCL of 10 mg/L. The exceedances ranged from 10.4 mg/L to 20.9 mg/L.
- Seven wells in San Benito County contained arsenic levels that exceeded the California MCL of 10 ug/L. The exceedances ranged from 11.3 ug/L to 231 ug/L.
- No wells in San Benito County contained 1,2,3-TCP levels that exceeded the California MCL of 0.005 ug/L.
- One well in San Benito County contained perchlorate at a level that exceeded the California MCL of 6 ug/L. The exceedance was 10.2 ug/L.

- Two wells in San Benito County contained Chromium VI levels that exceeded the program's interim screening level of 10 ug/L. The exceedances ranged from 12.4 ug/L to 28.7 ug/L.

Santa Cruz County

- The program plans to initiate outreach to Santa Cruz County in April 2020. However, based on early participation, the program has sampled nine wells in this area. Of these, no wells contained nitrate, arsenic, 1,2,3-TCP, or perchlorate at levels that exceeded the respective California MCL for these constituents.
- One well in Santa Cruz County contained Chromium VI at a level that exceeded the program's interim screening level of 10 ug/L. The exceedance was 16.8 ug/L.

Santa Barbara County

- The program plans to initiate outreach to Santa Barbara County in October 2020. However, based on early participation, the program has sampled two wells in this area. Neither well showed exceedances for nitrate, arsenic, 1,2,3-TCP, perchlorate, or Chromium VI.

Small portions of San Mateo, Santa Clara, Ventura, and Kern Counties fall within the boundaries of the Central Coast region. At the time of this Staff Report, no samples have been collected in these areas.

DATA INTERPRETATION

Nitrate

The program data indicate that nitrate is the most common contaminant in the drinking water wells sampled to date. The nitrate MCL of 10 mg/L was exceeded in over 21% of wells sampled (53 of 249 wells). Infants below the age of six months who drink water that contains nitrate in excess of the MCL may quickly become seriously ill and, if untreated, may die because high nitrate levels can interfere with the capacity of the infant's blood to carry oxygen. High nitrate levels may also affect the oxygen-carrying ability of the blood of pregnant women.

The nitrate results support previous regional data showing that nitrate is a significant groundwater contaminant in the Central Coast region. Elevated nitrate levels in groundwater can be associated with high density septic system areas, poorly run wastewater treatment plants, improperly managed manure storage or spreading operations, and over application of fertilizer in commercial irrigated agriculture.

Arsenic

Arsenic exceeded the MCL of 10 ug/L in 29 wells, approximately 11% of sampled wells. Arsenic is associated with numerous human health issues. Some people who drink water that contains arsenic in excess of the MCL may experience skin damage or circulatory system problems and have an increased cancer risk. High arsenic concentrations are typically a result of natural interactions between groundwater and the subsurface geology.

1,2,3-TCP

1,2,3-TCP exceeded the MCL of 0.005 ug/L in 17 wells, approximately 7% of sampled wells. 1,2,3-TCP is known to cause cancer in laboratory animals, and in 1992, 1,2,3-TCP was added to the list of chemicals known to the state to cause cancer.

1,2,3-TCP is a man-made chemical that is extremely persistent in the environment. Historically 1,2,3-TCP was used as a paint and varnish remover, a degreasing agent, and as a solvent. In addition to these industrial uses, 1,2,3-TCP is also associated with some agricultural pesticides and fumigants.

The 1,2,3-TCP exceedances are concentrated in two geographic areas. Fifteen of the exceedances are grouped near Moss Landing in Monterey County. There are also two exceedances located southeast of the City of Salinas. The source of the elevated 1,2,3-TCP in the samples has not been established, however 16 of the 17 wells with exceedances of 1,2,3-TCP also had nitrate exceedances. Central Coast Water Board staff will continue to evaluate the prevalence and source of the 1,2,3-TCP and share data with other state and local agencies.

Chromium VI

Chromium VI exceed the program's interim screening level of 10 ug/L in 15 wells, approximately 6% of the sampled wells. Chromium is a naturally occurring heavy metal. The trivalent form of Chromium has very low toxicity, however, Chromium VI (the hexavalent form) is more toxic and has been known to cause cancer. Much of the Chromium VI found in groundwater is naturally occurring, a result of natural interactions between groundwater and the subsurface geology. There are also areas of Chromium VI groundwater contamination in California associated with historic industrial use.

Ten of the Chromium VI exceedances are located east and northeast of Moss Landing, in Monterey County. As discussed previously, there is currently no MCL for Chromium VI. The State Water Board is currently developing a new MCL. In the interim, program staff will continue to screen testing results and notify participants if their drinking water exceeds the previous MCL of 10 ug/L.

Perchlorate

Perchlorate exceeded the MCL of 6 ug/L in three wells, approximately 1.2% of sampled wells. Perchlorate can disrupt the normal function of the thyroid gland in both children and adults; however, the low number of exceedances indicates that perchlorate is not a common contaminant in the drinking water wells sampled to date. Perchlorate can be present at low concentrations in groundwater under natural, especially arid, conditions. Higher levels of perchlorate in groundwater are typically associated with anthropogenic sources, including industrial; manufacturing; or commercial uses such as rocket fuel, explosives, road flares, and automobile air-bag systems. Historical use of Chilean nitrate as a fertilizer also is a known source of perchlorate.

DATA LIMITATIONS

While the Central Coast Water Board's drinking water well testing program fills an important water quality data gap, sampling small water systems and domestic wells also presents data challenges. One of the most critical limitations is the lack of well construction information because many participants do not possess a Department of Water Resources (DWR) Well Completion Report for their well and are unaware of the well depth and screened interval(s). For this reason, analysis of constituent concentrations and well depth is extremely challenging and must generally be inferred. Additionally, because testing is non-intrusive and the wells are not physically entered, the depth to water inside the wells is not measured. This means that groundwater depths and gradients cannot be evaluated, as would typically occur for a site-specific groundwater investigation. It also limits the ability of the data to be used in conjunction with water supply investigations that evaluate water quality with declining water levels (e.g., due to climate change or pumping).

Finally, the program has only collected initial samples from program participants who volunteer to have their drinking water wells tested as we offer the program throughout the region in phases. Thus, trend analysis is not currently possible and spatial distribution is also limited based on variable participation by geographic area. The size and significance of the data gaps will be reduced as the program matures and expands into additional areas. Depending on available funding, ongoing implementation of the program will be focused in part on resampling select wells to evaluate water quality trends over time.

CONCLUSION

The drinking water well testing program has collected water samples from 276 wells in the Central Coast region since October 2018. At the time this Staff Report was prepared, laboratory results are available for 249 wells and 95 wells (38%) show at least one MCL exceedance for nitrate, arsenic, 1,2,3-TCP, perchlorate, or the program's interim screening level for Chromium VI. The most frequently detected contaminant is nitrate.

Program participation is successful compared to similar programs, and participants report very positive feedback about the program. The program is providing an important service to Central Coast residents who obtain their drinking water from a domestic well or small water system by informing them about the safety of their drinking water. In addition to informing groundwater and drinking water quality, the program is helping Central Coast Water Board and State Water Board staff, local entities and nongovernmental organizations identify and inform drinking water replacement actions for disadvantaged communities, such as those funded through the Safe and Affordable Drinking Water Fund³. Central Coast Water Board staff is committed to ongoing support of these efforts as part of this program.

³ On July 24, 2019 Gov. Gavin Newsom signed Senate Bill 200 creating the Safe and Affordable Drinking Water Fund providing \$130 million annually from 2020 to 2030.

In addition to identifying and informing drinking water replacement actions for disadvantaged communities, data collected through the drinking water well program is used to support environmental justice priorities, implement the region's Human Right to Water Resolution, inform drinking water well users of the quality of their domestic water, support collaboration and data sharing with partner agencies and organizations, provide information to the public through GeoTracker, measure individual groundwater basin health, identify water quality priorities for SGMA implementation, and determine the effectiveness of our efforts to protect and improve groundwater quality.

The program is ongoing throughout the region, and outreach and testing will expand into Santa Cruz and Santa Barbara Counties in 2020. Central Coast Water Board staff will continue to coordinate the well testing program with local and state agencies and nongovernmental organizations to maximize its effectiveness and social and environmental outcomes.

Central Coast residents can sign up for free testing by filling out an online – and smartphone compatible - application form via the following website or by calling the following number:

[Website Link](#) (English)

[Enlace de página web](#) (Español)

1 (844) 613-5152 (English / Español)

ATTACHMENTS

1. San Luis Obispo County Domestic Well Sampling Pilot Project - Project Summary