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

**STAFF REPORT FOR MEETING OF JULY 31-AUGUST 1, 2014**
Prepared July 11, 2014

**ITEM NUMBER: 11**

**SUBJECT: CCAMP-Groundwater Assessment and Protection (GAP) Update and Summary of Groundwater Basin Data with Respect to Nitrate**

**STAFF CONTACT: Matthew Keeling 805/549-3685; matt.keeling@waterboards.ca.gov**

## SUMMARY

This staff report provides an update of the groundwater nitrate pollution conditions in the Central Coast Region. The data evaluated in this report are from several sources, including the California Department of Public Health (CDPH), Santa Clara Valley Water District (SCVWD), Central Coast Water Board and State Water Board collaborative studies, and results from the Central Coast Regional Water Board Ag Order groundwater monitoring requirements.

The data clearly show that groundwater pollution due to nitrate is severe and widespread in the Central Coast Region, affecting public water supply systems, domestic wells, and small unregulated water systems. Numerous communities in the Central Coast are affected by nitrate pollution. Of particular concern are the high percentages of domestic wells that are polluted with nitrate at concentrations far exceeding the drinking water standard in many Central Coast counties and groundwater basins. This presents a major health risk to domestic well users and small communities because their drinking water is unregulated and many of these residents do not know that their drinking water is polluted. Tens of thousands of Central Coast residents are at risk. The Central Coast Region relies on groundwater for 86% of its total water supply.

For example, the SCVWD sampled 556 domestic wells in the Llagas Area subbasin of the Gilroy-Hollister Valley groundwater basin between October 2011 and February 2014 as part of an ongoing voluntary program. Approximately 42.3% (235 out of 556) of the domestic wells sampled contained nitrate in excess of the drinking water standard. The highest measured nitrate concentration for these data is approximately 60.6 mg/L-N (over 6 times the drinking water standard).

Another example is the data collected between April 2010 and April 2014 per the Central Coast Water Board's Agricultural Order groundwater compliance monitoring requirements. The nitrate concentration results for 902 on-farm domestic wells throughout the region show that some areas have very high percentages of polluted domestic wells: 45% of on-farm domestic wells sampled in Monterey County exceed the drinking water standard; 64% of on-farm domestic wells sampled in the East Side Aquifer subbasin of the Salinas Valley groundwater basin exceed the drinking water standard; 47% of on-farm domestic wells sampled in the Santa Maria Valley groundwater basin exceed the drinking water standard. The highest measured nitrate concentration for the sampled on-farm wells is 137.2 mg/L-N (over 13.7 times the drinking water standard), detected in Monterey County in the East Side Aquifer subbasin of the Salinas Valley groundwater basin.

In conclusion, the groundwater quality data summarized in this report show severe pollution of drinking water supplies and underscores the importance of the Central Coast Regional Water Board's efforts to reduce nitrate pollutant loading from irrigated agriculture through the Ag Order, obtain replacement water for small communities with contaminated drinking water, and notify the public so they can take steps to protect themselves. Protection of the drinking water beneficial use is the Central Coast Water Board's highest priority.

Although we have more groundwater quality data than ever before, we only have recent data for 1,627 domestic wells out of a total of approximately 44,000 domestic wells (3.7% of the total) in the region. This, and the need to show tangible water quality improvement over time, underscores the importance of the Central Coast Water Board's Groundwater Assessment and Protection (GAP) program. The purpose of the GAP program is to create a comprehensive groundwater database, assessment tools, and to provide critical information for the Central Coast Water Board's regulatory programs.

## BACKGROUND

By themselves, the individual sources of groundwater data evaluated in this staff report provide a portion of the overall water quality picture and are characteristic of the areas that were sampled and the location, depth and type of well sampled. Collectively, these data provide a more comprehensive characterization of regional and basin-scale groundwater quality conditions with respect to nitrate and the municipal and domestic supply (MUN) drinking water beneficial use. This characterization is restricted with respect to depth given well construction information (e.g., age, size, total depth, screen depth, etc.) are not known for most of the wells included in the evaluated data sets. Although well completion reports may be available for some of the wells, it is extremely difficult and time consuming to associate a well completion report with a given well location. Notwithstanding the lack of well construction information, it is reasonable to assume that domestic wells tend to access relatively shallow groundwater; public water system wells tend to access relatively deeper groundwater with discreet screening levels in discreet aquifers; Ag irrigation wells vary greatly in depth and can be screened across multiple aquifers.

The data contained within this staff report serve as an initial benchmark for the ongoing assessment of groundwater and drinking water quality in the Central Coast Region with respect to nitrate. Water Board staff intend to conduct similar analyses at regular intervals over time to inform and measure the performance of our programmatic activities addressing nitrate loading. These data will also be used to inform the implementation of nitrate related outreach and education efforts and domestic well sampling.

### Data Sources

This staff report contains an evaluation of recently collected water quality nitrate data from several sources (i.e., within approximately the last two to four years). The data sources evaluated include:

- California Department of Public Health (CDPH) - public water system drinking water supply well compliance monitoring
- Santa Clara Valley Water District (SCVWD) – South County Water Quality Testing Program (i.e., domestic well sampling program)

- CCAMP-GAP/USGS Domestic Well Project – 2012/2013 Salinas Valley and Pajaro Valley study area
- State Water Board Groundwater Ambient Monitoring and Assessment (GAMA) Program Domestic Well Project – 2011 Monterey County Study
- Central Coast Water Board Agricultural Order groundwater compliance monitoring for on-farm domestic wells and irrigation supply wells

The data were evaluated on a region-wide, county and groundwater basin/subbasin basis. The data evaluations are contained in the Data Summary Tables and Figures section at the end of this staff report and consist of tabular statistical summaries and figures depicting the spatial distribution of the data. These data indicate that groundwater nitrate pollution conditions are severe region-wide and extremely severe on more localized scales associated with various well types and county and groundwater basin/subbasin boundaries.

For consistency, nitrate is reported on an as-nitrogen (N) basis throughout this staff report with respect to the Federal Drinking Water Standard of 10 mg/L as nitrogen (mg/L-N). A public water system well refers to a drinking water supply well associated with a municipal or privately owned water system serving 15 or more residential connections or regularly serves at least 25 individuals daily at least 60 days out of the year. Public water systems are regulated by the state's Drinking Water Program to assure that drinking water meeting public health standards is delivered to its customers. A domestic well refers to a drinking water well serving an individual residence. Domestic wells are not regulated by the state and may be regulated to a limited extent by county level drinking water and well permitting programs. The same is generally true for water systems with less than 15 residential service connections. An irrigation supply well refers to an agricultural well used for irrigation purposes.

Findings

The following findings underscore the significance of our reliance on groundwater for drinking water purposes and summarize the evaluated data sources along with some of the most notable nitrate water quality statistics with respect to well type and geographic area.

General Findings:

- Water Code section 106 states: *"It is hereby declared to be the established policy of this State that the use of water for domestic purposes is the highest use of water and that the next highest use is for irrigation."*
- Water Code section 106.3 states: *"It is hereby declared to be the established policy of the State that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitation purposes."*
- Statewide, groundwater provides about 39% of the total water use. In the Central Coast we rely on groundwater to provide 86% of our total water supply for all uses. In many areas of the Central Coast groundwater is the sole source of water supply.

Public Water System Well Findings:

- There are currently about 1,165 public water system drinking water supply wells in service in the Central Coast Region (domestic wells are discussed separately). Approximately 7.5% (87 out of 1,165) of these public water system wells are currently polluted with nitrate in excess of the drinking water standard.
- There have been approximately 1,998 public water system wells in service in the Central Coast Region since 1979 (i.e., over the last 35 years). Approximately 287, or 14.4%, of

these wells are or were polluted with nitrate in excess of the drinking water standard. Approximately 200 public water system wells have been taken out of service over the last 35 years due to nitrate pollution.

- Approximately 9.7% (40 out of 414) public water system wells in Monterey County are polluted with nitrate in excess of the drinking water standard.
- Approximately 20.2% (22 out of 109) public water system wells in the Santa Maria Valley groundwater basin are polluted with nitrate in excess of the drinking water standard.
- Approximately 32.6% (15 out of 46) public water system wells in the East Side Aquifer subbasin of the Salinas Valley groundwater basin are polluted with nitrate in excess of the drinking water standard.
- The highest reported nitrate concentration for a public water system well within the last two years was 173.7 mg/L-N (over 17 times the drinking water standard). The well in question is located in Santa Barbara County and the Cuyama Valley groundwater basin.

Domestic Well Findings:

- There are an estimated 44,000 domestic wells in the Central Coast Region.
- Approximately 1,627 domestic wells have been sampled in the Central Coast Region since 2010 as part of voluntary efforts, compliance sampling related to Water Board activities, and the SCVWD South County Water Quality Testing Program.
    - This represents only about 3.7% of the total estimated number of domestic wells in the Central Coast Region.
    - Approximately 27.9% (454 out of 1,627) of the domestic wells sampled in the Central Coast Region since April 2010 contained nitrate in excess of the drinking water standard.
- The State Water Board sampled 79 domestic wells in Monterey County in May and June of 2011 as part of the its Groundwater Ambient Monitoring and Assessment (GAMA) Program Domestic Well Project:
    - Approximately 11.4% (9 out of 79) of the domestic wells sampled contained nitrate in excess of the drinking water standard.
    - The maximum domestic well nitrate concentration was approximately 53.8 mg/L-N (over 5 times the drinking water standard).
- The SCVWD sampled 556 domestic wells in the Llagas Area subbasin of the Gilroy-Hollister Valley groundwater basin between October 2011 and February 2014 as part of an ongoing voluntary program:
    - Approximately 42.3% (235 out of 556) of the domestic wells sampled contained nitrate in excess of the drinking water standard.
    - The maximum domestic well nitrate concentration was approximately 60.6 mg/L-N (over 6 times the drinking water standard).
- The United States Geological Survey (USGS) sampled 90 domestic well household taps for CCAMP-GAP between October 2012 and May 2013 in the Salinas and Pajaro Valleys:
    - Approximately 31.1% (28 out of 90) of the domestic well sampled contained nitrate in excess of the drinking water standard.
    - The maximum domestic well nitrate concentration was approximately 65.6 mg/L-N (over 6.5 times the drinking water standard).
- Between April 2010 and April 2014, 902 on-farm domestic wells were sampled throughout the region per the Central Coast Water Board's Agricultural Order groundwater compliance monitoring requirements:
    - Region wide, approximately 20.2% (182 out of 902) of the on-farm domestic wells sampled contained nitrate in excess of the drinking water standard.

- The region-wide maximum on-farm domestic well nitrate concentration of approximately 137.2 mg/L-N (over 13.7 times the drinking water standard) was detected in Monterey County in the East Side Aquifer subbasin of the Salinas Valley groundwater basin.
- Approximately 45.5% (86 out of 189) of the on-farm domestic wells sampled in Monterey County contained nitrate in excess of the drinking water standard.
- Approximately 64.0% (16 out of 25) of the on-farm domestic wells sampled in the East Side Aquifer subbasin of the Salinas Valley groundwater basin contained nitrate in excess of the drinking water standard.
- Approximately 47.5% (56 out of 118) of the on-farm domestic wells sampled in the Santa Maria Valley groundwater basin contained nitrate in excess of the drinking water standard.

Irrigation Supply Well Findings:

- Between August 2011 and April 2014, 1,693 irrigation supply wells were sampled throughout the region per the Central Coast Water Board's Agricultural Order groundwater compliance monitoring requirements:
  - Region-wide, approximately 24.6% (417 out of 1,693) of the irrigation wells sampled contained nitrate in excess of the drinking water standard.
  - The region-wide maximum irrigation well nitrate concentration of approximately 134.0 mg/L-N (over 13 times the drinking water standard) was detected in Santa Barbara County in the Santa Maria River Valley groundwater basin.
  - Approximately 41.3% (33 out of 80) of the irrigation wells sampled in Santa Clara County contained nitrate in excess of the drinking water standard.
  - Approximately 56.7% (183 out of 323) of the irrigation wells sampled in the Santa Maria River Valley groundwater basin contained nitrate in excess of the drinking water standard.
  - Approximately 65.5% (38 out of 58) of the irrigation wells sampled in the East Side Aquifer subbasin of the Salinas Valley groundwater basin contained nitrate in excess of the drinking water standard.

<u>Societal Considerations</u>

Region-wide we rely on groundwater for 86% of our total water supply. In many areas of the region groundwater is the sole source of our drinking water supply. This is particularly true for rural residents throughout the region who get their drinking water from domestic wells. Having 27.9% of the 1,627 recently sampled domestic wells in the region, 65% of the domestic wells within a groundwater subbasin, and 45.5% within a county polluted with nitrate at levels of up to 13 times the drinking water standard, constitutes an unprecedented level of drinking water beneficial use impairment and a very significant public health issue. These data only represent about 3.7% of the domestic portion of the municipal and domestic supply drinking water beneficial uses in the Central Coast. There are approximately 42,373 additional domestic wells throughout the Central Coast, and 2000 small community wells that could be polluted with nitrate. Most of these wells have never been sampled for nitrate.

Although it is difficult to enumerate the societal costs associated with the level of drinking water pollution documented within this staff report, the societal costs and health implications are real and significant. Municipalities, water districts and water purveyors are paying increasing costs, in the tens of millions of dollars, to replace wells. Ongoing water treatment can be even more costly. Individual homeowners are also replacing wells, treating their water, or buying bottled water at a significant cost.

The exposure risks associated with nitrate pollution are relatively low for Central Coast residents who get their drinking water from a public water system. This is because public water systems are required to document that they meet public health standards by implementing regular water quality testing and treatment as necessary. The significant nitrate pollution related costs for public water systems are spread out over a large number of rate payers over time. In many cases, public water system customers don't know they are paying nitrate pollution related costs as part of their monthly water bill.

The potential nitrate pollution risk exposure and costs to Central Coast residents who do not get their drinking water from a public water system are significant. This is because domestic wells and water systems with less than 15 service connections are rarely tested for nitrate and individual homeowners often have to bear a larger portion of the cost or the entire cost to address a polluted drinking water supply if it is identified. The number, location and water quality associated with domestic wells and to a lesser extent, water systems with less than 15 service connections, are essentially undocumented given most of these wells and water systems have never been sampled for nitrate.

The societal costs and health risks associated with nitrate pollution will continue to increase indefinitely until nitrate loading is reduced to levels that result in decreasing nitrate concentration trends in groundwater over time.

CDPH Public Water System Supply Wells

Drinking water compliance monitoring data for public water system[1] supply wells are readily available on the State Water Resources Control Board's GeoTracker Groundwater Ambient Monitoring and Assessment (GAMA) information system. At a minimum, public water system wells are required to be sampled for nitrate annually. Quarterly sampling is required if annual sampling indicates increasing concentration trends and if the nitrate concentration is equal to or greater than one-half of the drinking water standard (i.e., maximum contaminant level or MCL). The public water system data summarized herein represent the raw groundwater quality associated with water supply wells. These data generally do not represent the quality of drinking water delivered for potable use given public water systems are required to blend the water with other sources or treat it to meet drinking water standards prior to distributing it for use. In some cases a bottled water notice may be issued when the water purveyor can't provide safe drinking water in a timely manner.

These data only represent the public water system portion of MUN drinking water beneficial uses of groundwater and the water quality associated with the existing groundwater sources of public supply. Public water system well data are generally biased towards better groundwater quality conditions because public water system wells are typically located in areas and screened at depths to avoid pollution. In addition, public water system wells are usually taken out of service once they become polluted. This becomes increasingly apparent when evaluating public water system well data over larger historical time periods. The following table summarizing public water system well data for the Central Coast for the last two to 35 years shows that both the number of wells in service and the relative number of wells polluted with nitrate increase as

[1] Per section 116275 of the California Health and Safety Code, "Public water system" means a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year. This definition is inclusive of "non-community" type water systems associated with schools, businesses, parks, rest-stops, etc.

the historical study period increases. For example, whereas about 7.5% of the public water system wells currently in service are polluted with nitrate in excess of the drinking water standard, about 14.4% of all the public water system wells in service over the last 35 years were polluted with nitrate in excess of the drinking water standard. These data suggest that approximately 200 public water system wells have been taken out of service over the last 35 years due to nitrate pollution. These wells were likely destroyed and replaced at a considerable cost. The remaining 87 public water system wells that are still in service with nitrate concentrations in excess of the drinking water standard require costly treatment or blending with better quality water to meet the drinking water standard.

**Figure 1: Public Water System Historical Well and Nitrate Trends**

| Metrics | Time Period of Analysis | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Last 2 Years** | **Last 5 Years** | **Last 10 Years** | **Last 15 Years** | **Last 20 Years** | **Last 25 Years** | **Last 30 Years** | **Last 35 Years** |
| **Number of Wells in Service** | 1,165 | 1,319 | 1,529 | 1,784 | 1,855 | 1,946 | 1,994 | 1,998 |
| **Number of Wells with Nitrate > MCL** | 87 | 119 | 170 | 232 | 257 | 276 | 279 | 287 |
| **Percent of Wells with Nitrate => MCL** | 7.5% | 9.0% | 11.1% | 13.0% | 13.9% | 14.2% | 14.0% | 14.4% |

Domestic Wells and Local Small and State Small Water Systems

Unlike for public water system wells, the number, location and water quality associated with domestic wells (i.e., well providing drinking water to a single household) are widely unknown within the Central Coast Region and statewide. This is also true for local small and state small water systems with 2 to 4 and 5 to 14 residential service connections, respectively. This is because there are no consistent data collection and management requirements for water systems with less than 15 residential service connections. Although county level well and water system permitting programs collect data for these systems/wells as part of the initial well or water system permitting action, historical data is often only available in paper formats. More recent data is sometimes available in disparate electronic formats on a county by county basis. Based on county level census data, there are an estimated 44,000 domestic wells in the Central Coast Region. Based on county and Water Board estimates there are about 2,000 local small and state small water systems in the Central Coast Region. Water Board staff is in the process of conducting parcel-scale analyses to determine the potential location of these water system wells in the region. The most complete data set for local small and state small water systems is available for Monterey County. In Monterey County there are about 694 local small and 276 state small water systems. Review of the nitrate data for these was provided in Appendix G of the Ag Order. Approximately 20% of these systems are polluted with nitrate at concentrations of up to 7.7 times the drinking water standard. The parcels served by these systems are

mapped out with respect to nitrate concentration on the CCAMP-GAP website.[2] The water quality data associated with these systems were not evaluated for this staff report because the well locations are currently unknown.

Domestic wells and wells associated with local small and state small water systems are generally more susceptible to nitrate contamination given they are typically shallow (i.e., pumping groundwater from depths closer to the ground surface) and are more likely to be located in rural areas within or adjacent to agricultural areas. They are also more susceptible to potential nitrate contamination from co-located on-site wastewater treatment systems (i.e., septic systems).

South County Water Quality Testing Report (SCVWD) – Llagas Subbasin

The Santa Clara Valley Water District (SCVWD) implemented voluntary domestic well sampling projects in the Llaga subbasin of the Gilroy-Hollister Valley groundwater basin in 1968 and 1998.[3] This program was reinitiated in 2011, and is now part of an ongoing South County Water Quality Testing Program. Program funding was approved by the SCVWD Board of Directors and local rate payers along with an accompanying nitrate treatment system rebate program. The free sampling program is available to wells owners in the District, and consists of testing for general minerals, including nitrate, and total coliform bacteria. Information about the water quality testing program is available on the SCVWD website at:

http://www.valleywater.org/services/GroundwaterQuality.aspx

Since October 2011, The SCVWD has sampled 556 domestic wells in the Llagas subbasin. The SCVWD provided Water Board staff with the data used to develop the statistical summary contained within this staff report.

2012/2013 GAP Domestic Well Project

In December 2012 CCAMP-GAP entered into a collaborative agreement with the USGS to sample domestic wells in the Pajaro and Salinas Valleys. Between October 2012 and May 2013, USGS sampled 90 household taps associated with shallow wells with an emphasis on domestic wells. For consistency with the Central Coast Agricultural Order groundwater compliance monitoring requirements, USGS analyzed the tap samples for the parameters listed in Table 3 (Groundwater Sampling Parameters) of the Agricultural Order (No. R3-2012-0011) monitoring and reporting program. Consistent with the nitrate or nitrate plus nitrite testing option contained in Table 3, USGS analyzed the samples for nitrate plus nitrite due to cost considerations associated with longer allowable sample holding times.

The USGS implemented this project in conjunction with the State Water Board's Groundwater Ambient Monitoring and Assessment (GAMA) Program Priority Basin Project (GAMA-PBP) Shallow Aquifer Assessment for the Monterey-Salinas Study Unit. The USGS sampled 100 shallow wells for the GAMA-PBP. The locations of the one hundred GAMA-PBP wells were selected based on a randomized grid-cell network applied to the study areas to provide a statistically unbiased, spatially distributed assessment of the quality of groundwater resources

[2] See "Small Water System Mapping and Nitrate Data" at: http://www.waterboards.ca.gov/centralcoast/water_issues/programs/gap/index.shtml

[3] Summaries of the 1968 and 1998 SCVWD domestic well data are contained within Appendix G of the Central Coast Water Board Agricultural Order (R3-2012-0011)

within the shallow aquifer system (i.e., at least one well sampled per grid cell). The Pajaro Valley study area was divided into fifteen 7-square mile grid cells and the Salinas Valley study area was divided into forty 19-square mile grid cells. The USGS defined study areas are generally consistent with the Department of Water Resource (DWR) Bulletin 118 defined groundwater basin boundaries.

Seventy of the household tap samples collected for CCAMP-GAP were collected in the Salinas and Pajaro Valley GAMA-PBP study areas to provide a greater spatial density of data within various grid-cells in order to better define the distribution of inorganic constituents such as nitrate. Twenty of the household tap samples were collected in conjunction with 20 GAMA-PBP well samples to evaluate the relationship between well and tap samples. Preliminary evaluations by USGS indicate that tap samples are characteristic of raw groundwater collected directly from the well head with the exception of minerals that can be imparted by plumbing appurtenances (e.g., copper, zinc, lead, etc.).

The data summary contained within this staff report is only for the 90 tap samples collected per the CCAMP-GAP collaborative agreement with USGS given the data for the 100 wells sampled for the GAMA-PBP are not yet available to Water Board staff. The tap sample data do not provide for a statistically unbiased, spatially distributed assessment of the quality of groundwater in the study areas because they only consist of data for a subset of the study area grid cells. These data are preliminary until USGS formally releases its technical report, which will include both the GAMA-PBP and CCAMP-GAP data.

Central Coast Water Board staff provided the 90 CCAMP-GAP Domestic Well Project participants with the water quality testing results on December 20, 2013 (i.e., within approximately two weeks of receiving the data from USGS). Supporting information about what to do if the drinking water is polluted, with an emphasis on nitrate, was included in the water quality notification packages. This information is consistent with the nitrate notification materials we send to growers with on-farm domestic wells containing nitrate, or nitrate plus nitrite, in excess of drinking water standards.

SWRCB GAMA Program Domestic Well Project

The State Water Resources Control Board GAMA Program has conducted domestic well sampling within specific areas of the State as part of its Domestic Well Project. The GAMA Program sampled 79 domestic wells in Monterey County in May/June of 2011. The data from this study were only used to summarize the combined domestic well sampling efforts in the Central Coast Region and develop some of the Executive Summary findings. More detailed information about the GAMA Program Domestic Well Project and the Monterey County focused study are available at the following State Water Board website:

http://www.waterboards.ca.gov/gama/domestic_well.shtml

Agricultural Order Groundwater Compliance Monitoring

Since the adoption of the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Agricultural Order No. R3-2012-0011) on March 15, 2012, approximately 902 on-farm domestic [drinking water] wells and 1,693 irrigation supply wells have been sampled in the Central Coast Region. These wells were sampled per either the individual monitoring requirements or Central Coast Groundwater Coalition (CCGC) program.

Groundwater samples were collected from these wells between April 15, 2010 and April 24, 2014. As allowable per the Agricultural Order groundwater monitoring and reporting program requirements (i.e., Table 3. Groundwater Sampling Parameters), some of these wells were tested for nitrate and some of them were tested for nitrate plus nitrite. All of the data presented herein have been converted to common units of mg/L of nitrate as-nitrogen (mg/L-N). In some cases, groundwater quality data collected prior to the adoption of the Ag Order were submitted for compliance purposes as allowable per the Ag Order monitoring and reporting program.

Many of the wells were sampled twice, generally once during the dry season and once during the wet season, over the reporting period. The maximum concentration was used instead of the average concentration for the statistical and spatial summaries contained in this staff report due to the potentially significant drinking water and public health implications associated with people who may be drinking water from these and other wells in the area. Studies have shown that significant fluctuations in pollutant concentrations, including nitrate, can be caused by pumping influences from nearby wells and the drinking water well in question.[4] As such, nitrate levels within a well and at the tap may fluctuate daily or seasonally between concentrations above and below the drinking water standard. On any given day, residents relying on polluted wells will not be drinking the average concentration of nitrate given the nitrate concentration may be high one day and low the next. Therefore, the maximum concentration is a better indicator of potential drinking water exposure risk associated with elevated nitrate concentrations.

Central Coast Groundwater Basins

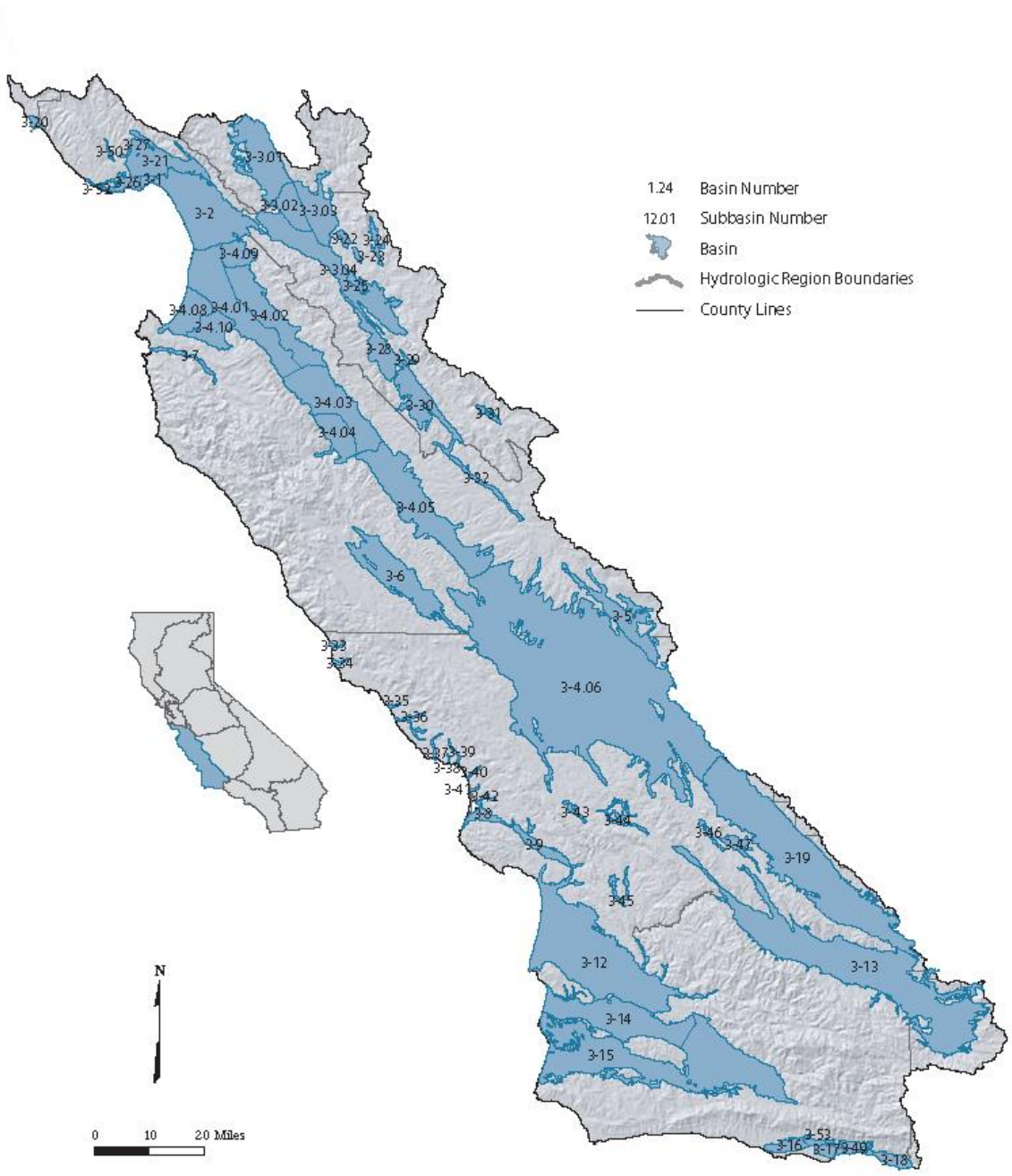
As defined by the California Department of Water Resources, there are 50 groundwater basins in the Central Coast Hydrologic Unit. Two of these groundwater basins are divided into 12 groundwater subbasins. The groundwater basins and subbasins vary in size and depth and are primarily based on geologic and hydrologic boundaries. Some groundwater basins consist of multiple aquifers that are separated by confining, or less permeable, layers. Groundwater use and potential contaminant loading are primarily based on the predominant land uses overlying the basin or subbasin. Some basins/subbasins are more vulnerable to certain types of contamination depending on the physical and geochemical properties of the subsurface soils and the amount and source of recharge.

[4] Jean E. Moran, Bradley K. Esser, Darren Hillegonds, Marianne Holtz, Sarah K. Roberts, Michael J. Singteton, and Ate Visser, (2011) *California GAMA Special Study: Nitrate Fate and Transport in the Salinas Valley*. Lawrence Livermore National Laboratory LLNL-TR-484186 (http://www.waterboards.ca.gov/gama/docs/salinas_rpt.pdf)

The following is a list of the Central Coast groundwater basins and subbasins by number and name, and is cross referenced by basin and subbasin number within the accompanying basin map on the following page.

**Basin/subbasin Number & Name**

3-1 Soquel Valley
3-2 Pajaro Valley
3-3 Gilroy-Hollister Valley
  3-3.01 Llagas Area
  3-3.02 Bolsa Area
  3-3.03 Hollister Area
  3-3.04 San Juan Bautista Area
3-4 Salinas Valley
  3-4.01 180/400 Foot Aquifer
  3-4.02 East Side Aquifer
  3-4.04 Forebay Aquifer
  3-4.05 Upper Valley Aquifer
  3-4.06 Paso Robles Area
  3-4.08 Seaside Area
  3-4.09 Langley Area
  3-4.10 Corral de Tierra Area
3-5 Cholame Valley
3-6 Lockwood Valley
3-7 Carmel Valley
3-8 Los Osos Valley
3-9 San Luis Obispo Valley
3-12 Santa Maria River Valley
3-13 Cuyama Valley
3-14 San Antonio Creek Valley
3-15 Santa Ynez River Valley
3-16 Goleta
3-17 Santa Barbara
3-18 Carpinteria
3-19 Carrizo Plain
3-20 Ano Nuevo Area
3-21 Santa Cruz Purisima Formation
3-22 Santa Ana Valley
3-23 Upper Santa Ana Valley
3-24 Quien Sabe Valley
3-25 Tres Pinos Valley
3-26 West Santa Cruz Terrace
3-27 Scotts Valley
3-28 San Benito River Valley
3-29 Dry Lake Valley
3-30 Bitter Water Valley
3-31 Hernandez Valley
3-32 Peach Tree Valley
3-33 San Carpoforo Valley
3-34 Arroyo de la Cruz Valley
3-35 San Simeon Valley
3-36 Santa Rosa Valley
3-37 Villa Valley
3-38 Cayucos Valley
3-39 Old Valley
3-40 Toro Valley
3-41 Morro Valley
3-42 Chorro Valley
3-43 Rinconada Valley
3-44 Pozo Valley
3-45 Huasna Valley
3-46 Rafael Valley
3-47 Big Spring Area
3-49 Montecito
3-50 Felton Area
3-51 Majors Creek
3-52 Needle Rock Point
3-53 Foothill




Central Coast Hydrologic Region

## CONCLUSIONS

The data contained within this staff report document severe and widespread basin-scale pollution of the municipal and domestic supply (MUN) drinking water beneficial use of groundwater from nitrate throughout the Central Coast Region. This pollution is a result of discharges that have been ongoing for decades and that continue today. This pollution results in significant public exposure to groundwater sources of drinking water containing nitrate at concentrations that are several times greater than the public health standard.

The domestic well data contained within this staff report only represent about 3.7% of the domestic portion of the municipal and domestic supply (MUN) beneficial uses in the Central Coast. Consequently, there are approximately 42,373 additional domestic wells throughout the Central Coast, many of which could be polluted with nitrate. These wells, along with wells associated with approximately 2,000 small unregulated water systems, are the most at-risk from nitrate pollution because they tend to be located in rural areas within or adjacent to agricultural areas. Many of these wells have never been sampled for nitrate. Consequently, thousands of Central Coast residents may be drinking groundwater containing unsafe levels of nitrate and not know it.

Given our reliance on groundwater for drinking water purposes in the Central Coast Region it is imperative that our actions effectively address this very significant water quality and public health problem. Ongoing monitoring and assessment in conjunction with outreach and education, with an emphasis on domestic wells and unregulated water systems, are needed to help identify and inform the most at-risk segment of the population. Interim and long-term replacement water supplies are needed for those individuals and communities who currently don't have a safe source of drinking water.

The societal costs and health risks associated with nitrate pollution will continue to increase indefinitely until nitrate loading is reduced to levels that result in decreasing nitrate concentration trends in groundwater over time. Consequently, nitrate loading from agriculture and other significant sources must be reduced to the maximum extent practicable, and be documented through ongoing performance measurement, to reduce the long-term societal costs and health risks.

## DATA SUMMARY TABLES AND FIGURES

The section contains figures and tables providing statistical and spatial evaluations of the data. The data were evaluated on a region-wide, county and groundwater basin/subbasin basis.

### Context

The data contained within the summary tables has a very real human and public health component that can be obscured by the statistics. For example, the mean (average) and median nitrate concentrations are meaningless from a public health perspective because people are not drinking water containing the average or median nitrate concentration in the groundwater surrounding their well; they are drinking the concentration supplied by their well at any given time. From a public health perspective the most important statistics are associated with the number and location of polluted drinking water wells. The other statistics are provided as tools to evaluate the water quality conditions over broader areas that can be used evaluate

regional-scale water quality trends over time. The ultimate public health receptor is not the groundwater or a well, but the individuals who are drinking the groundwater.

Applied Statistics

The data summary figures and tables contained within this staff report include statistical values calculated from the individual data sets. The following describes the applied statistics:

"**Min**" or minimum represents lowest quantifiable concentration (i.e., confirmed detection at specified concentration).
"**Max**" or maximum represents the highest quantifiable concentration.
"**Mean**" or arithmetic average represents a measure of central tendency of the data distribution.
"**Median**" represents the middle most value of the data set when the data are arranged from the lowest value to the highest value; it is the numeric value separating the lower half of the data set from the upper half.
The "**Standard Deviation**" is a measure of the amount of variation, or dispersion, from the average/mean. A low standard deviation (i.e., close to zero) indicates that the data tend to be close to the average/mean; a high standard deviation indicates that the data are spread out over a large range of values
**Quartiles** – the first quartile represents the value separating the first 25% of the data from the last 75% of the data when it is arranged from the lowest value to the highest value, and the third quartile represents the value separating the first 75% of the data from the last 25% of the data when it is arranged from lowest to highest (i.e., 50% of the data falls between the first and third quartiles). The median represents the second quartile (see median above) and the maximum represents the fourth quartile.
"**Non-detect**," or "**ND**" represents zero or qualified concentration values below the reporting limit or method detection limit (e.g., a reported value of <0.2 mg/L-N indicates that the sample did not contain quantifiable concentrations of nitrate of 0.2 mg/L-N or greater).

For the purposes of the statistical analyses contained herein, the mean, median, standard deviation and quartiles were calculated using the qualified non-detect (ND) concentrations (e.g., < 0.2 mg/L-N) where reporting limits were provided. Where zero (i.e., "0") ND values were reported instead of the reporting limit, a "0" value was used to calculate the reported statistical values.

Whereas all of the Central Coast counties for which nitrate data were available are represented in the summary tables, not all of the groundwater basins are represented. Groundwater basins were not listed within the summary tables if there were either no or limited data for these basins. For the purposes of this staff report, limited data generally consists of less than 6 to 10 well sample points for which the nitrate concentrations are less than one half of the drinking water standard. In addition, some of the sampled wells are located outside of the defined groundwater basins; these wells are located in upland areas. The data for the basins with limited and the wells outside of basins were subsequently lumped together to simplify the summary tables. The data for these wells were included in the region-wide and county level evaluations.

Nitrate Unit Convention

For consistency, nitrate is reported on an as-nitrogen concentration basis (mg/L-N), versus on an as-nitrate basis, throughout this staff report. This is because the unit conventions of the evaluated data sources consist of a mix of nitrate and nitrate plus nitrate concentration units expressed as either nitrate or nitrogen. As has been well documented by the U.S. Geological Survey (USGS), the combined nitrate plus nitrite concentration is representative of the nitrate concentration under most circumstances given nitrite is very unstable and is rarely detected at significant levels relative to nitrate. The "as-nitrogen" basis is consistent with the Federal Safe Drinking Water Act maximum contaminant level (MCL), or public health drinking water standard, for nitrate of 10 mg/L-as nitrogen (N) and is roughly equivalent to the California MCL of 45 mg/L-as nitrate (NO3). The Federal and California MCLs for nitrate plus nitrite are also 10 mg/L-as nitrogen (mg/L-N).

List of Figures



List of Tables

**Figure 1**

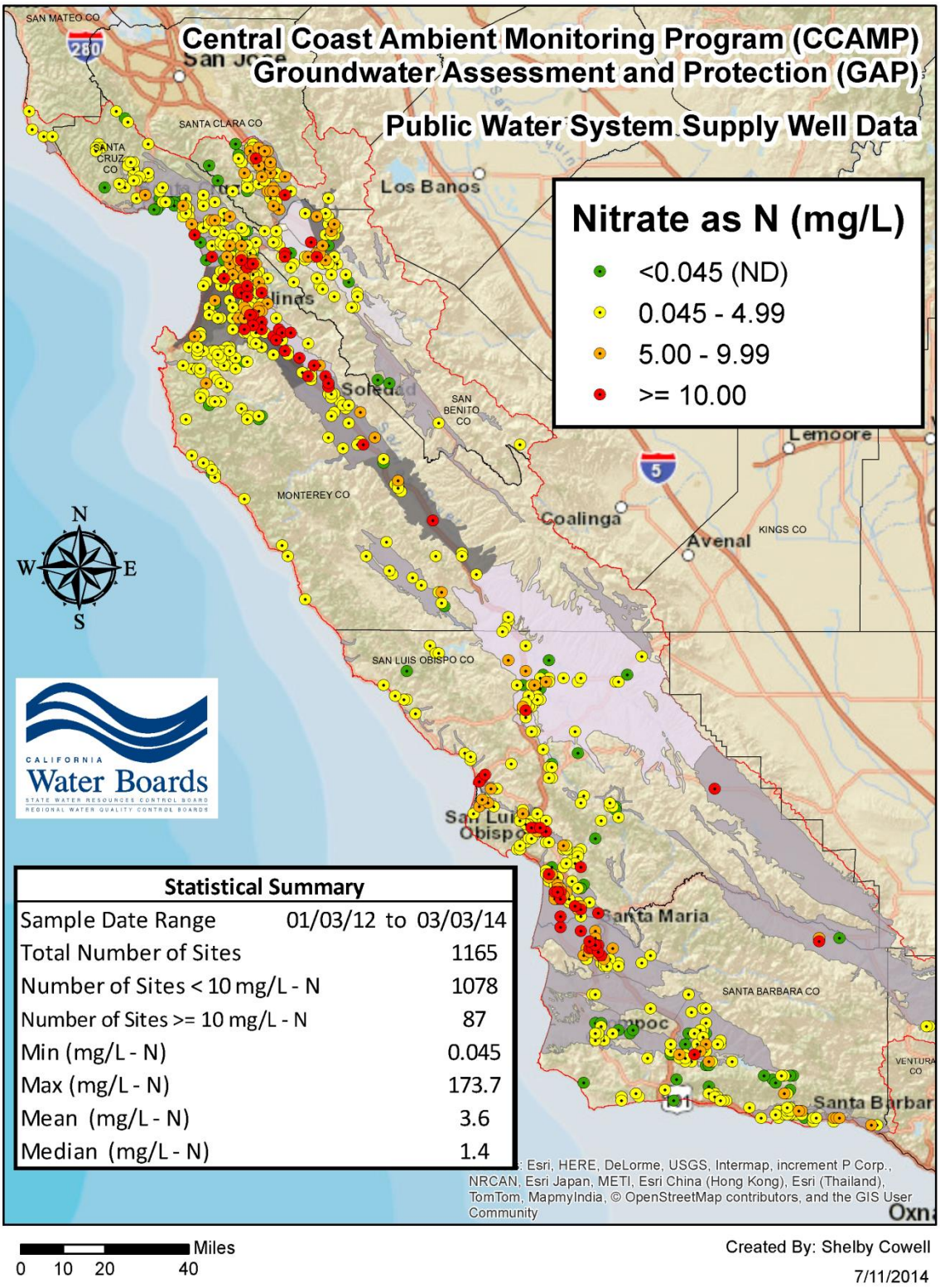

Central Coast Ambient Monitoring Program (CCAMP)
Groundwater Assessment and Protection (GAP)
Public Water System Supply Well Data
Nitrate as N (mg/L)
<0.045 (ND)
0.045 - 4.99
5.00 - 9.99
>= 10.00
SAN MATEO CO
SANTA CLARA CO
SANTA CRUZ CO
Los Banos
SAN BENITO CO
MONTEREY CO
Coalinga
Avenal
KINGS CO
Lemoore
SAN LUIS OBISPO CO
SANTA BARBARA CO
VENTURA CO
Santa Maria
Statistical Summary
Sample Date Range 01/03/12 to 03/03/14
Total Number of Sites 1165
Number of Sites < 10 mg/L - N 1078
Number of Sites >= 10 mg/L - N 87
Min (mg/L - N) 0.045
Max (mg/L - N) 173.7
Mean (mg/L - N) 3.6
Median (mg/L - N) 1.4
Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Miles
0 10 20 40
Created By: Shelby Cowell
7/11/2014

**Figure 2**

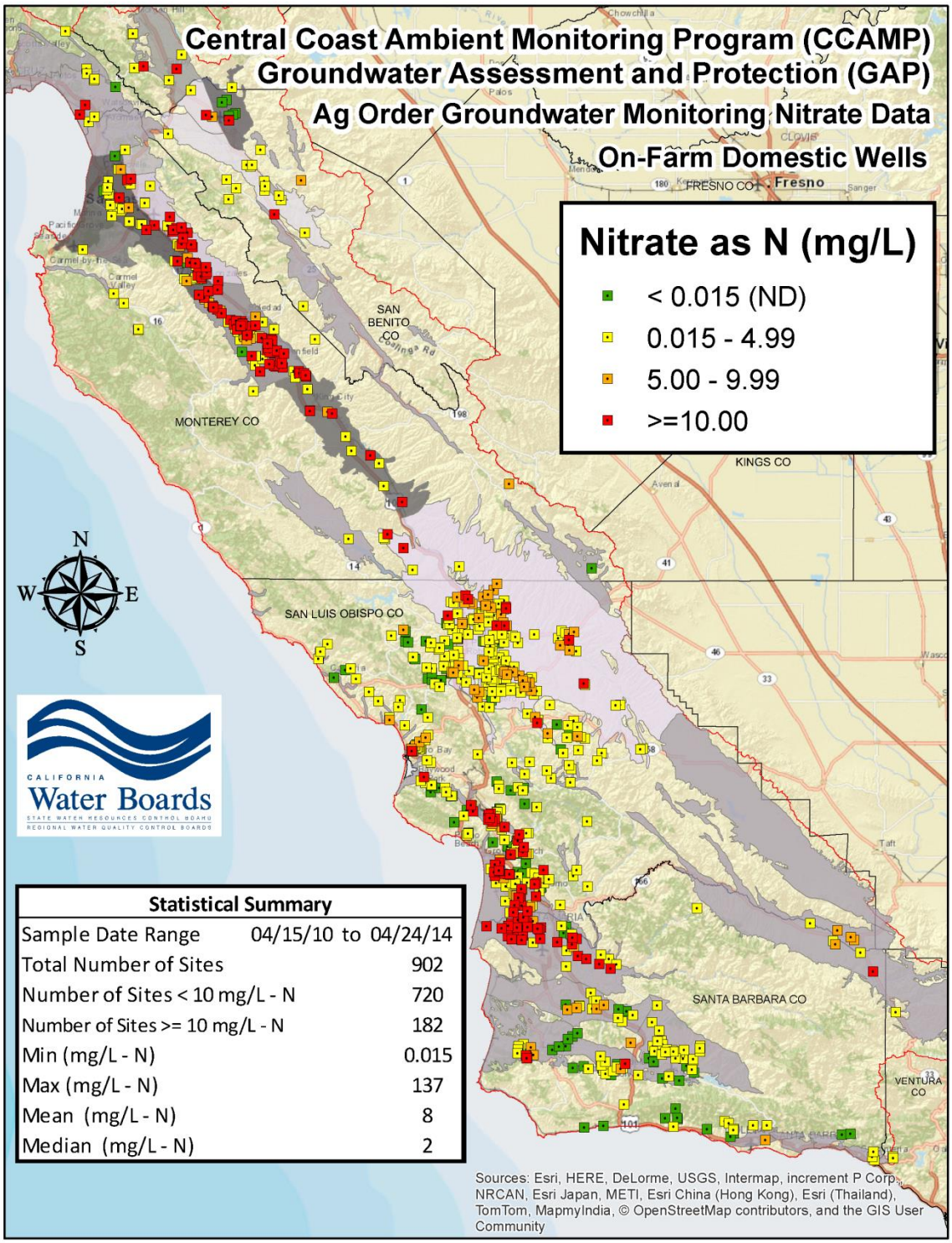

Central Coast Ambient Monitoring Program (CCAMP)
Groundwater Assessment and Protection (GAP)
Ag Order Groundwater Monitoring Nitrate Data
On-Farm Domestic Wells
Nitrate as N (mg/L)
< 0.015 (ND)
0.015 - 4.99
5.00 - 9.99
>=10.00
FRESNO CO
Fresno
SAN BENITO CO
MONTEREY CO
KINGS CO
SAN LUIS OBISPO CO
SANTA BARBARA CO
VENTURA CO
N
W
E
S
CALIFORNIA
Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS
Statistical Summary
Sample Date Range 04/15/10 to 04/24/14
Total Number of Sites 902
Number of Sites < 10 mg/L - N 720
Number of Sites >= 10 mg/L - N 182
Min (mg/L - N) 0.015
Max (mg/L - N) 137
Mean (mg/L - N) 8
Median (mg/L - N) 2
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Miles
0 5 10 20
Created By: Shelby Cowell
7/11/2014

**Figure 3**

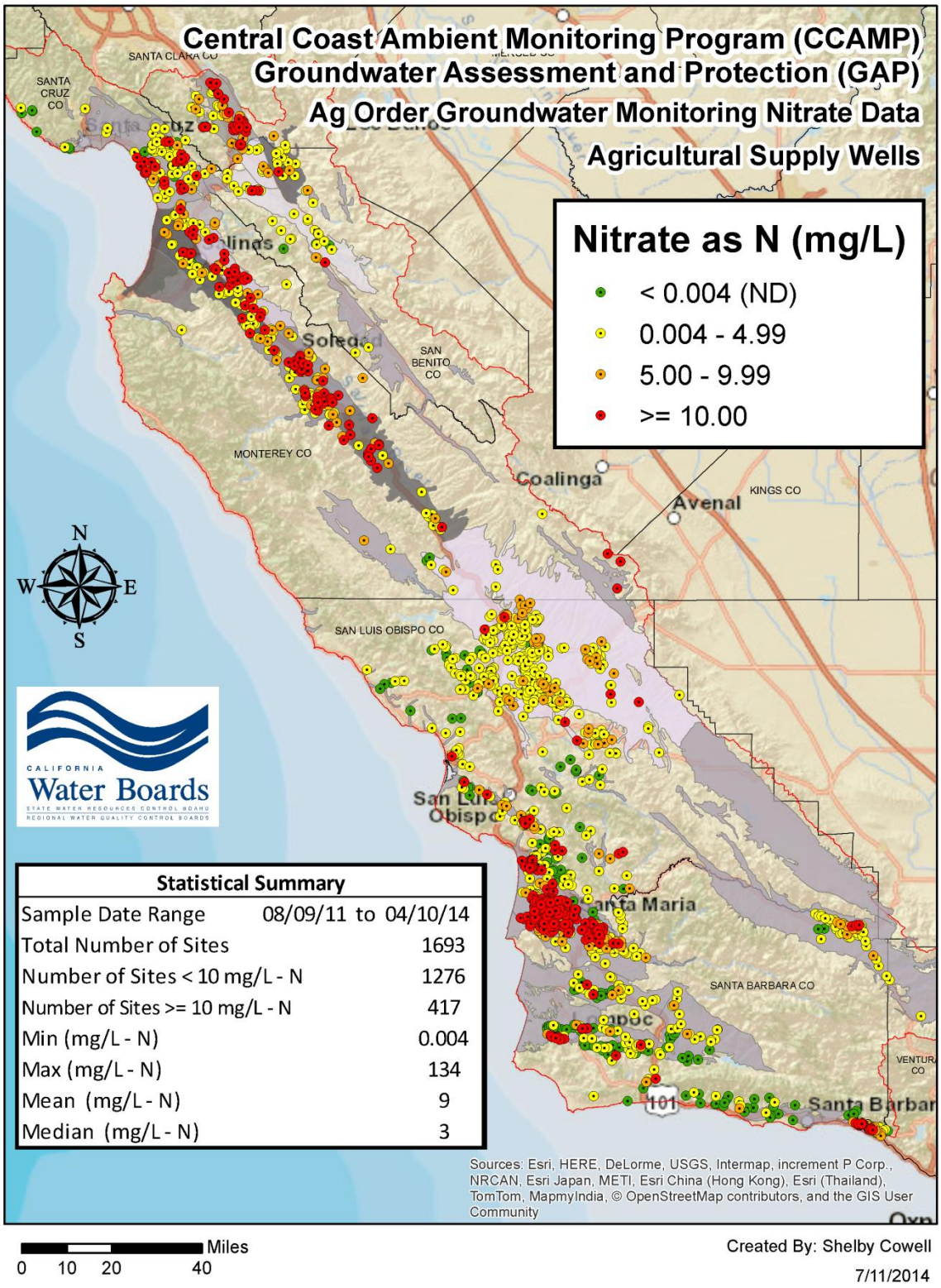

Central Coast Ambient Monitoring Program (CCAMP)
Groundwater Assessment and Protection (GAP)
Ag Order Groundwater Monitoring Nitrate Data
Agricultural Supply Wells
Nitrate as N (mg/L)
< 0.004 (ND)
0.004 - 4.99
5.00 - 9.99
>= 10.00
SANTA CRUZ CO
SAN BENITO CO
MONTEREY CO
Coalinga
Avenal
KINGS CO
SAN LUIS OBISPO CO
SANTA BARBARA CO
VENTURA CO
101
N
W
E
S
CALIFORNIA
Water Boards
Statistical Summary
Sample Date Range 08/09/11 to 04/10/14
Total Number of Sites 1693
Number of Sites < 10 mg/L - N 1276
Number of Sites >= 10 mg/L - N 417
Min (mg/L - N) 0.004
Max (mg/L - N) 134
Mean (mg/L - N) 9
Median (mg/L - N) 3
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Miles
0 10 20 40
Created By: Shelby Cowell
7/11/2014

**Figure 4**

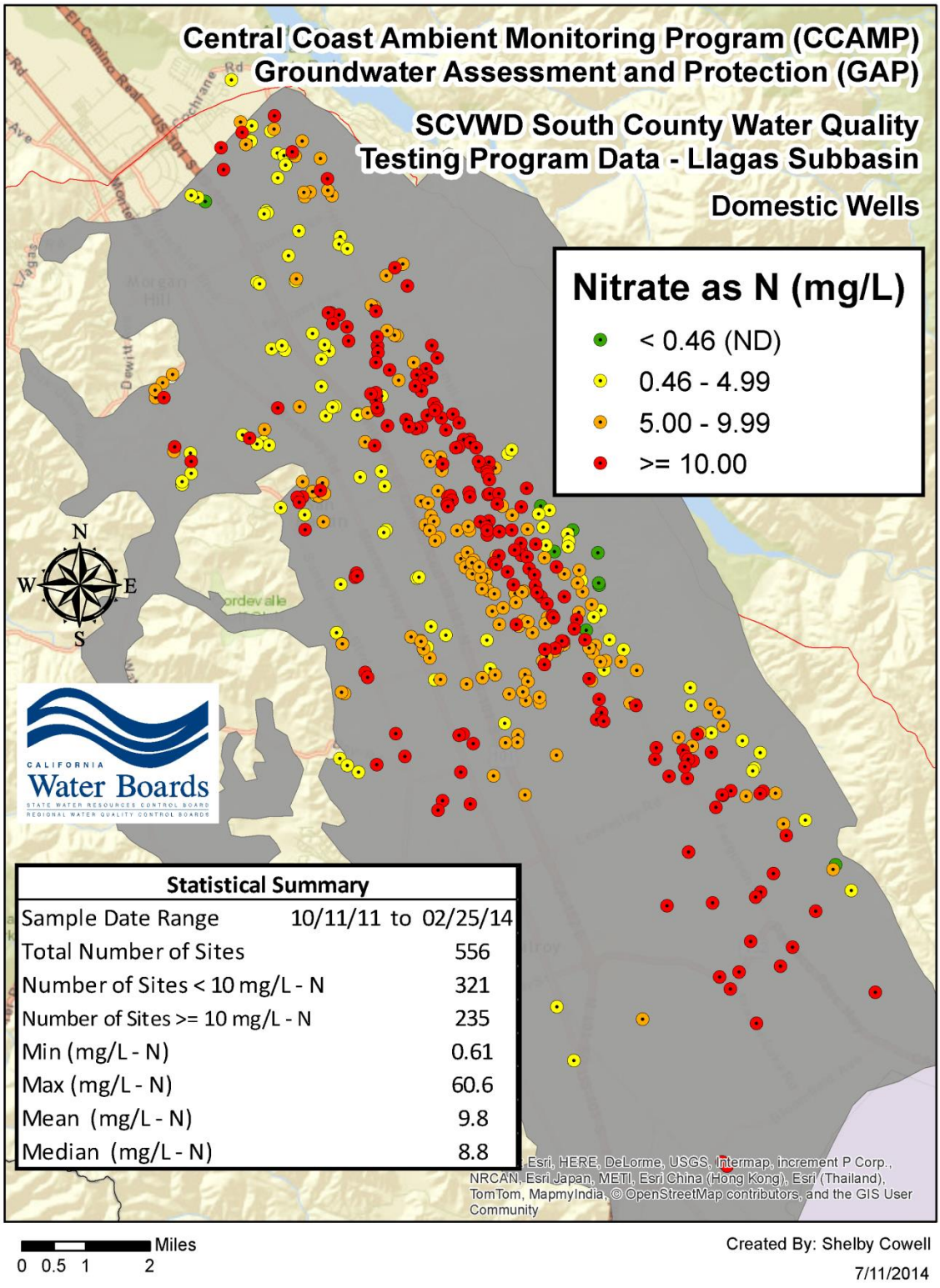

Central Coast Ambient Monitoring Program (CCAMP)
Groundwater Assessment and Protection (GAP)
SCVWD South County Water Quality Testing Program Data - Llagas Subbasin
Domestic Wells
Nitrate as N (mg/L)
< 0.46 (ND)
0.46 - 4.99
5.00 - 9.99
>= 10.00
N
W
E
S
CALIFORNIA Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS
Statistical Summary
Sample Date Range 10/11/11 to 02/25/14
Total Number of Sites 556
Number of Sites < 10 mg/L - N 321
Number of Sites >= 10 mg/L - N 235
Min (mg/L - N) 0.61
Max (mg/L - N) 60.6
Mean (mg/L - N) 9.8
Median (mg/L - N) 8.8
Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Miles
0 0.5 1 2
Created By: Shelby Cowell
7/11/2014

**Figure 5**

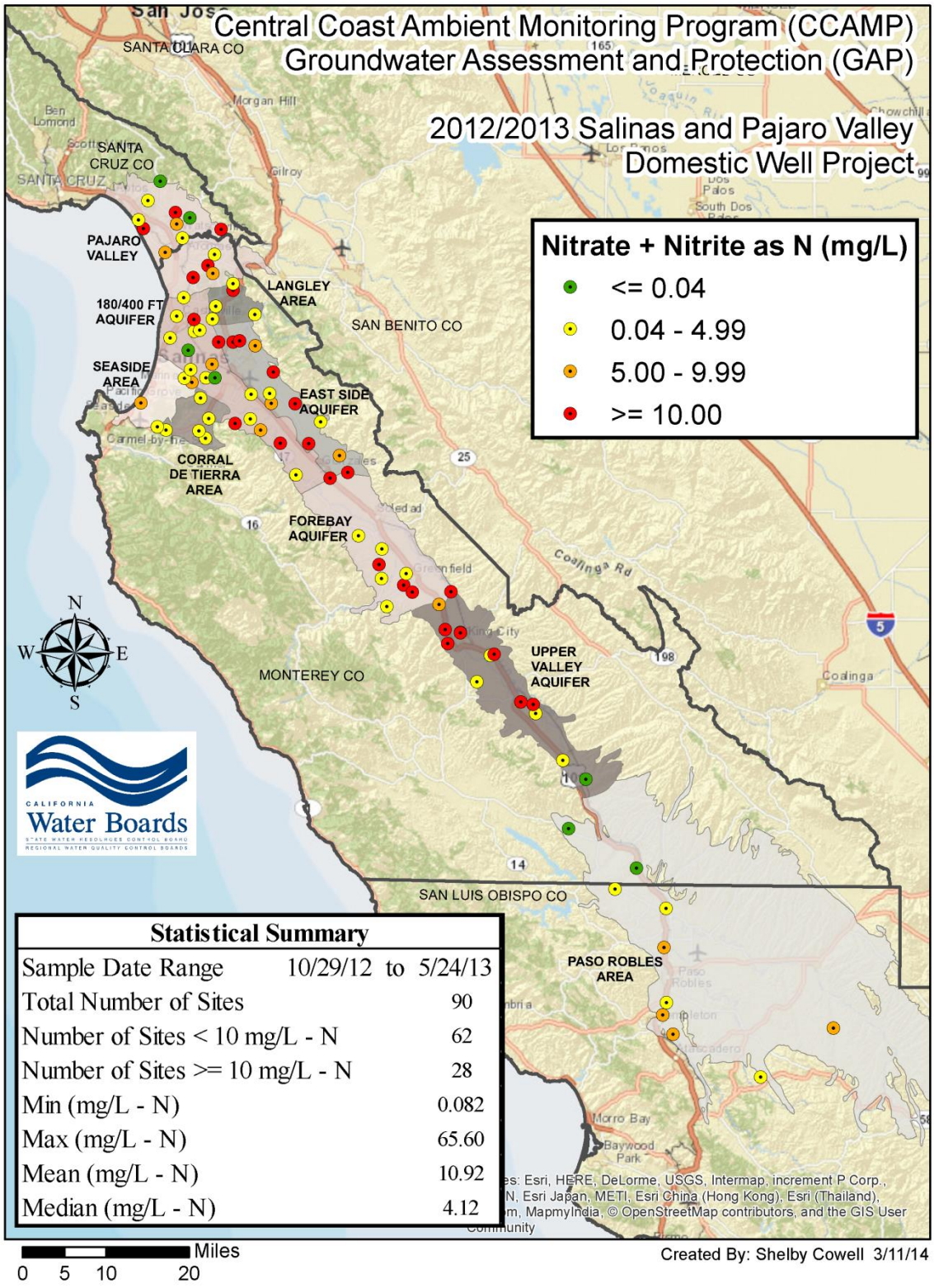

Central Coast Ambient Monitoring Program (CCAMP)
Groundwater Assessment and Protection (GAP)
2012/2013 Salinas and Pajaro Valley
Domestic Well Project
Nitrate + Nitrite as N (mg/L)
<= 0.04
0.04 - 4.99
5.00 - 9.99
>= 10.00
SANTA CLARA CO
SANTA CRUZ CO
SAN BENITO CO
MONTEREY CO
SAN LUIS OBISPO CO
PAJARO VALLEY
180/400 FT AQUIFER
LANGLEY AREA
SEASIDE AREA
EAST SIDE AQUIFER
CORRAL DE TIERRA AREA
FOREBAY AQUIFER
UPPER VALLEY AQUIFER
PASO ROBLES AREA
Statistical Summary
Sample Date Range 10/29/12 to 5/24/13
Total Number of Sites 90
Number of Sites < 10 mg/L - N 62
Number of Sites >= 10 mg/L - N 28
Min (mg/L - N) 0.082
Max (mg/L - N) 65.60
Mean (mg/L - N) 10.92
Median (mg/L - N) 4.12
Miles
0 5 10 20
Created By: Shelby Cowell 3/11/14

**Table 2: Regional Nitrate (mg/L-N) Data Summary by Source and Well Type**

| Data Source & Well Type | Public Water System Wells | Domestic Wells | | | Ag Order Irrigation Supply Wells |
|---|---|---|---|---|---|
| | | SCVWD - Llagas Subbasin | GAP/USGS Domestic Well Project | Ag Order On-farm Domestic Wells | |
| **Number of Well Sample Sites** | 1165 | 556 | 90 | 902 | 1693 |
| **Sample Date Range** | 1/3/2012 | 10/11/2011 | 10/29/2012 | 4/15/2010 | 8/9/2011 |
| | 3/3/2014 | 2/25/2014 | 5/24/2013 | 4/24/2014 | 4/10/2014 |
| **Min (mg/L-N)** | 0.045 | 0.61 | 0.08 | 0.02 | 0.005 |
| **Max (mg/L-N)** | 173.7 | 60.6 | 65.6 | 137.2 | 134.0 |
| **Mean (mg/L-N)** | 3.6 | 9.8 | 10.9 | 8.5 | 8.7 |
| **Median (mg/L-N)** | 1.4 | 8.8 | 15.2 | 2.4 | 3.0 |
| **Standard Deviation** | 7.7 | 6.8 | 0.9 | 16.8 | 14.3 |
| **First Quartile (mg/L-N)** | 0.4 | 5.22 | 0.90 | 0.45 | 0.45 |
| **Third Quartile (mg/L-N)** | 4.3 | 13.6 | 15.8 | 7.7 | 9.5 |
| **Number of Wells with non-detect (ND)** | 334 | 11 | 7 | 146 | 241 |
| **Number of Wells Between ND And 4.99 mg/L-N** | 585 | 119 | 40 | 463 | 817 |
| **Number of Wells Between 5.00 And 9.99 mg/L-N** | 159 | 191 | 15 | 111 | 218 |
| **Number of Wells Equal to or Above MCL (10 mg/L-N)** | **87** | **235** | **28** | **182** | **417** |
| **Percent of Wells Equal to or Above MCL** | **7.5%** | **42.3%** | **31.1%** | **20.2%** | **24.6%** |

**Table 3: Public Water System Supply Well Nitrate (mg/L-N) Data by Region and County**

| Geographic Area | Region-wide | County | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Monterey | San Luis Obispo | Santa Barbara | Santa Cruz | San Benito | Santa Clara | San Mateo | Ventura |
| **Number of Well Sample Sites** | 1165 | 414 | 291 | 198 | 100 | 84 | 72 | 4 | 2 |
| **Sample Date Range** | 1/3/2012 | 1/3/2012 | 1/3/2012 | 1/18/2012 | 2/1/2012 | 1/3/2012 | 1/4/2012 | 4/5/2012 | 4/18/2012 |
| | 3/3/2014 | 2/24/2014 | 3/3/2014 | 2/20/2014 | 2/11/2014 | 2/12/2014 | 2/11/2014 | 10/1/2013 | 1/18/2013 |
| **Min (mg/L-N)** | 0.045 | 0.131 | 0.090 | 0.090 | 0.045 | 0.045 | 0.609 | 0.474 | 3.25 |
| **Max (mg/L-N)** | 173.7 | 66.1 | 38.6 | 173.7 | 12.4 | 22.3 | 36.8 | 2.4 | 3.5 |
| **Mean (mg/L-N)** | 3.6 | 3.9 | 3.7 | 3.7 | 1.4 | 3.1 | 4.3 | 0.9 | 3.4 |
| **Median (mg/L-N)** | 1.4 | 1.4 | 1.4 | 0.8 | 0.5 | 2.0 | 3.7 | 0.5 | 3.4 |
| **Standard Deviation** | 7.7 | 7.2 | 5.8 | 13.1 | 2.3 | 3.8 | 4.7 | 1.0 | 0.2 |
| **First Quartile (mg/L-N)** | 0.4 | 0.5 | 0.4 | 0.1 | 0.1 | 1.0 | 1.8 | 0.4 | 3.3 |
| **Third Quartile (mg/L-N)** | 4.3 | 4.3 | 4.9 | 2.9 | 1.6 | 3.4 | 5.6 | 0.9 | 3.5 |
| **Number of Wells Below 0.225 mg/L-N (ND)** | 334 | 105 | 66 | 83 | 59 | 12 | 7 | 2 | 0 |
| **Number of Wells Between 0.226 and 4.99 mg/L-N** | 585 | 220 | 155 | 76 | 33 | 57 | 40 | 2 | 2 |
| **Number of Wells Between 5.00 and 9.99 mg/L-N** | 159 | 49 | 43 | 27 | 7 | 10 | 23 | 0 | 0 |
| **Number of Wells Equal to or Above MCL (10 mg/L-N)** | **87** | **40** | **27** | **12** | **1** | **5** | **2** | **0** | **0** |
| **Percent of Wells Equal to or Above MCL** | **7.5%** | **9.7%** | **9.3%** | **6.1%** | **1.0%** | **6.0%** | **2.8%** | **-** | **-** |

**Table 4: Public Water System Supply Well Nitrate Data (mg/L-N) by Groundwater Basin**

| Geographic Area | Groundwater Basin | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Salinas Valley | Gilroy-Hollister Valley | Santa Maria River Valley | Pajaro Valley | San Luis Obispo Valley | Santa Ynez River Valley | Morro Valley | Carrizo Plain | Cuyama Valley | Goleta | Lockwood Valley | Los Osos Valley | Santa Cruz Purisima Formation | Outside of Groundwater Basins | All Other Basins with Data * |
| **Number Well Sample Sites** | 352 | 131 | 109 | 94 | 28 | 70 | 8 | 1 | 3 | 17 | 11 | 13 | 11 | 236 | 81 |
| **Sample Date Range** | 1/3/2012 | 1/3/2012 | 1/17/2012 | 2/1/2012 | 1/4/2012 | 1/18/2012 | 6/4/2012 | 8/13/2012 | 1/30/2012 | 6/5/2012 | 7/18/2012 | 6/21/2012 | 9/24/2012 | 1/4/2012 | 2/9/2012 |
| | 2/24/2014 | 2/12/2014 | 3/3/2014 | 2/11/2014 | 1/27/2014 | 2/12/2014 | 2/4/2014 | 8/13/2012 | 11/14/2012 | 2/20/2014 | 2/12/2014 | 1/6/2014 | 12/18/2013 | 2/26/2014 | 2/20/2014 |
| **Min (mg/L-N)** | 0.15 | 0.45 | 0.38 | 0.05 | 0.47 | 0.11 | 0.77 | 16.2 | 6.99 | 0.09 | 0.68 | 0.68 | 2.5 | 0.09 | 0.14 |
| **Max (mg/L-N)** | 65.6 | 36.8 | 31.6 | 66.1 | 36.1 | 10.3 | 38.6 | 16.2 | 173.7 | 2.2 | 5.0 | 8.1 | 5.2 | 38.4 | 9.3 |
| **Mean (mg/L-N)** | 4.3 | 4.5 | 6.4 | 3.2 | 5.6 | 1.8 | 18.6 | - | 60.2 | 0.5 | 2.1 | 3.6 | 1.1 | 1.0 | 1.6 |
| **Median (mg/L-N)** | 2.1 | 3.4 | 5.0 | 1.3 | 3.4 | 0.6 | 14.6 | - | 7.0 | 0.5 | 1.8 | 1.4 | 0.5 | 0.2 | 0.5 |
| **Standard Deviation** | 6.8 | 4.5 | 6.5 | 7.5 | 7.4 | 2.6 | 12.2 | - | 98.3 | 0.5 | 1.7 | 3.4 | 1.6 | 2.9 | 2.1 |
| **First Quartile (mg/L-N)** | 0.7 | 1.9 | 1.3 | 0.1 | 1.5 | 0.0 | 13.6 | - | 3.5 | 0.1 | 0.8 | 0.6 | 0.1 | 0.1 | 0.5 |
| **Third Quartile (mg/L-N)** | 5.0 | 5.6 | 8.8 | 3.6 | 5.8 | 2.7 | 23.1 | - | 90.4 | 0.5 | 3.3 | 7.0 | 1.5 | 0.7 | 1.9 |
| **Number of Wells Below 0.225 mg/L-N (ND)** | 49 | 13 | 11 | 33 | 0 | 28 | 0 | 0 | 1 | 12 | 2 | 2 | 8 | 139 | 36 |
| **Number of Wells Between 0.005 and 4.99 mg/L-N** | 216 | 78 | 44 | 46 | 19 | 35 | 1 | 0 | 0 | 5 | 9 | 5 | 2 | 89 | 36 |
| **Number of Wells Between 5.00 and 9.99 mg/L-N** | 49 | 33 | 32 | 11 | 5 | 6 | 0 | 0 | 1 | 0 | 0 | 6 | 1 | 6 | 9 |
| **Number of Wells Equal to or Above MCL (10 mg/L-N)** | **38** | **7** | **22** | **4** | **4** | **1** | **7** | **1** | **1** | **0** | **0** | **0** | **0** | **2** | **0** |
| **Percent of Wells Equal to or Above MCL** | **10.8%** | **5.3%** | **20.2%** | **4.3%** | **14.3%** | **1.4%** | **87.5%** | **-** | **33.3%** | **-** | **-** | **-** | **-** | **0.8%** | **-** |

*Includes: Bitter Water Valley, Carmel Valley, Carpenteria, Chorro Valley, Foothill, Montecito, Pozo Valley, San Antonio Creek Valley, San Benito River Valley, San Simeon Valley, Santa Barbara, Santa Rosa Valley, Soquel Valley, Tres Pinos Valley and West Santa Cruz Terrace.

**Table 5: Public Water System Supply Well Nitrate (mg/L-N) Data by Groundwater Basin and Subbasin**

| Geographic Area | Salinas Valley Groundwater Basin | Salinas Valley Groundwater Basin Subbasin | | | | | | | | Gilroy-Hollister Valley Groundwater Basin | Gilroy-Hollister Valley Groundwater Basin Subbasin | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 180/400' Aquifer | East Side Aquifer | Forebay Aquifer | Upper Valley Aquifer | Paso Robles Area | Seaside Area | Langley Area | Corral de Tierra Area | | Llagas Area | Bolsa Area | Hollister Area | San Juan Bautista Area |
| **Number Well Sample Sites** | 352 | 75 | 46 | 28 | 14 | 83 | 20 | 64 | 22 | 131 | 65 | 3 | 22 | 41 |
| **Sample Date Range** | 1/3/2012 | 1/6/2012 | 1/17/2012 | 1/3/2012 | 2/27/2012 | 1/3/2012 | 3/1/2012 | 2/8/2012 | 3/26/2012 | 1/3/2012 | 1/4/2012 | 2/11/2013 | 1/3/2012 | 1/3/2012 |
| | 2/24/2014 | 2/12/2014 | 2/4/2014 | 1/14/2014 | 11/14/2013 | 2/24/2014 | 12/11/2013 | 2/4/2014 | 1/19/2014 | 2/12/2014 | 2/11/2014 | 1/28/2014 | 12/31/2013 | 2/12/2014 |
| **Min (mg/L-N)** | 0.15 | 0.45 | 0.63 | 0.23 | 0.27 | 0.18 | 0.65 | 0.15 | 0.45 | 0.45 | 0.61 | 0.68 | 0.47 | 0.45 |
| **Max (mg/L-N)** | 65.6 | 42.9 | 65.6 | 26.8 | 32.7 | 16.0 | 7.6 | 13.3 | 3.0 | 36.8 | 36.8 | 22.3 | 7.9 | 16.0 |
| **Mean (mg/L-N)** | 4.3 | 5.3 | 9.7 | 4.0 | 3.8 | 2.2 | 2.2 | 4.1 | 1.3 | 4.5 | 4.7 | 10.2 | 2.3 | 3.8 |
| **Median (mg/L-N)** | 2.1 | 2.5 | 5.4 | 2.1 | 1.3 | 1.4 | 1.2 | 2.4 | 1.1 | 3.4 | 3.8 | 7.7 | 1.7 | 2.5 |
| **Standard Deviation** | 6.8 | 7.9 | 11.6 | 5.8 | 8.4 | 2.5 | 2.2 | 4.2 | 0.9 | 4.5 | 4.8 | 11.1 | 2.1 | 3.9 |
| **First Quartile (mg/L-N)** | 0.7 | 0.9 | 3.0 | 0.5 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 1.9 | 2.5 | 4.2 | 1.0 | 1.1 |
| **Third Quartile (mg/L-N)** | 5.0 | 6.3 | 13.2 | 4.2 | 2.7 | 3.2 | 3.4 | 8.2 | 2.0 | 5.6 | 5.9 | 15.0 | 3.1 | 4.7 |
| **Number of Wells Below 0.004 mg/L-N (ND)** | 49 | 7 | 0 | 2 | 2 | 14 | 8 | 12 | 4 | 13 | 3 | 0 | 4 | 6 |
| **Number of Wells Between 0.005 and 4.99 mg/L-N** | 216 | 44 | 22 | 20 | 10 | 61 | 10 | 31 | 18 | 78 | 37 | 1 | 14 | 26 |
| **Number of Wells Between 5.00 and 9.99 mg/L-N** | 49 | 15 | 9 | 3 | 1 | 7 | 2 | 12 | 0 | 33 | 23 | 1 | 4 | 5 |
| **Number of Wells Equal to or Above MCL (10 mg/L-N)** | **38** | **9** | **15** | **3** | **1** | **1** | **0** | **9** | **0** | **7** | **2** | **1** | **0** | **4** |
| **Percent of Wells Equal to or Above MCL** | **10.8%** | **12.0%** | **32.6%** | **10.7%** | **7.1%** | **1.2%** | **-** | **14.1%** | **-** | **5.3%** | **3.1%** | **33.3%** | **-** | **9.8%** |

**Table 6: On-Farm Domestic Well Nitrate (mg/L-N) Data by Region and County**

| Geographic Area | Region-wide | County | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Monterey | San Luis Obispo | Santa Barbara | Santa Cruz | San Benito | Santa Clara | San Mateo | Ventura |
| **Number of Well Sample Sites** | 902 | 189 | 477 | 188 | 10 | 27 | 8 | - | 3 |
| **Sample Date Range** | 4/15/2010 | 8/6/2012 | 4/15/2010 | 2/23/2012 | 9/11/2012 | 10/19/2012 | 5/23/2012 | - | 9/28/2012 |
| | 4/24/2014 | 4/24/2014 | 3/24/2014 | 3/27/2014 | 6/17/2013 | 2/13/2014 | 1/22/2014 | - | 7/1/2013 |
| **Min (mg/L-N)** | 0.02 | 0.05 | 0.09 | 0.09 | 0.02 | 0.45 | 1.00 | - | 0.23 |
| **Max (mg/L-N)** | 137.2 | 137.2 | 98.0 | 121.0 | 25.0 | 65.7 | 28.0 | - | 4.3 |
| **Mean (mg/L-N)** | 8.5 | 17.1 | 5.2 | 8.6 | 4.2 | 8.4 | 7.0 | - | 1.6 |
| **Median (mg/L-N)** | 2.4 | 7.0 | 2.0 | 2.0 | 0.5 | 1.6 | 1.5 | - | 0.3 |
| **Standard Deviation** | 16.8 | 23.1 | 10.8 | 19.3 | 8.2 | 16.5 | 10.3 | - | 2.3 |
| **First Quartile (mg/L-N)** | 0.5 | 1.3 | 0.4 | 0.0 | 0.1 | 0.5 | 1.1 | - | 0.2 |
| **Third Quartile (mg/L-N)** | 7.7 | 23.5 | 5.4 | 5.8 | 4.5 | 4.7 | 14.5 | - | 4.3 |
| **Number of Wells Below 0.225 mg/L-N (ND)** | 146 | 6 | 80 | 54 | 1 | 5 | 0 | - | 0 |
| **Number of Wells Between 0.226 and 4.99 mg/L-N** | 463 | 76 | 269 | 86 | 7 | 16 | 6 | - | 3 |
| **Number of Wells Between 5.00 and 9.99 mg/L-N** | 111 | 21 | 74 | 14 | 0 | 2 | 0 | - | 0 |
| **Number of Wells Equal to or Above MCL (10 mg/L-N)** | **182** | **86** | **54** | **34** | **2** | **4** | **2** | **-** | **-** |
| **Percent of Wells Equal to or Above MCL** | **20.2%** | **45.5%** | **11.3%** | **18.1%** | **20.0%** | **14.8%** | **25.0%** | **-** | **-** |

**Table 7: On-Farm Domestic Well Nitrate (mg/L-N) Data by Region and Groundwater Basin**

| Geographic Area | Region-wide | Groundwater Basin | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Salinas Valley | Gilroy-Hollister Valley | Santa Maria River Valley | Pajaro Valley | San Luis Obispo Valley | Carpinteria | Cuyama Valley | Santa Ynez River Valley | San Antonio Creek Valley | Morro Valley | Los Osos Valley | Outside of Groundwater Basins | All Other Basins with Data * |
| **Number Well Sample Sites** | 902 | 385 | 24 | 118 | 9 | 22 | 6 | 11 | 90 | 16 | 11 | 7 | 182 | 22 |
| **Sample Date Range** | 4/15/2010 | 4/15/2010 | 5/23/2012 | 4/27/2012 | 9/21/2012 | 6/27/2012 | 11/12/2012 | 9/25/2012 | 2/23/2012 | 12/12/2012 | 5/21/2013 | 11/21/2012 | 4/23/2012 | 9/11/2012 |
| | 4/24/2014 | 4/24/2014 | 2/13/2014 | 3/27/2014 | 1/31/2014 | 1/8/2014 | 1/7/2014 | 12/9/2013 | 3/27/2014 | 1/23/2014 | 1/7/2014 | 1/8/2014 | 3/24/2014 | 2/13/2014 |
| **Min (mg/L-N)** | 0.02 | 0.05 | 0.68 | 0.23 | 0.02 | 0.23 | 0.41 | 0.23 | 0.10 | 1.0 | 0.68 | 0.11 | 0.09 | 0.1 |
| **Max (mg/L-N)** | 137.2 | 137.2 | 65.7 | 121.0 | 25.0 | 38.6 | 3.0 | 13.0 | 69.2 | 9.5 | 33.9 | 28.0 | 31.6 | 8.5 |
| **Mean (mg/L-N)** | 8.5 | 10.4 | 10.6 | 18.6 | 4.7 | 11.4 | 2.1 | 5.1 | 3.9 | 3.3 | 6.8 | 5.3 | 1.6 | 1.8 |
| **Median (mg/L-N)** | 2.4 | 4.0 | 1.4 | 8.4 | 0.7 | 9.1 | 2.4 | 4.0 | 1.4 | 2.7 | 2.9 | 2.0 | 0.4 | - |
| **Standard Deviation** | 16.8 | 17.6 | 17.8 | 26.5 | 8.5 | 9.3 | 1.1 | 3.6 | 11.3 | 2.9 | 10.2 | 10.1 | 3.7 | - |
| **First Quartile (mg/L-N)** | 0.5 | 1.3 | 0.8 | 1.1 | 0.2 | 3.8 | 1.1 | 2.5 | 0.0 | 1.1 | 0.0 | 0.1 | 0.0 | - |
| **Third Quartile (mg/L-N)** | 7.7 | 10.0 | 15.7 | 22.0 | 7.0 | 17.0 | 3.0 | 6.6 | 3.7 | 5.6 | 8.0 | 2.8 | 2.5 | - |
| **Number of Wells Below 0.225 mg/L-N (ND)** | 146 | 16 | 5 | 15 | 1 | 0 | 0 | 0 | 32 | 3 | 3 | 1 | 68 | 2 |
| **Number of Wells Between 0.005 and 4.99 mg/L-N** | 463 | 208 | 12 | 34 | 6 | 6 | 6 | 6 | 49 | 9 | 3 | 5 | 101 | 19 |
| **Number of Wells Between 5.00 and 9.99 mg/L-N** | 111 | 65 | 1 | 13 | 0 | 6 | 0 | 4 | 5 | 4 | 3 | 0 | 9 | 1 |
| **Number of Wells Equal to or Above MCL (10 mg/L-N)** | **182** | **96** | **6** | **56** | **2** | **10** | **0** | **1** | **4** | **0** | **2** | **1** | **4** | **0** |
| **Percent of Wells Equal to or Above MCL** | **20.2%** | **24.9%** | **25.0%** | **47.5%** | **22.2%** | **45.5%** | **-** | **9.1%** | **4.4%** | **-** | **18.2%** | **14.3%** | **2.2%** | **-** |

*Includes: Chorro Valley, Goleta, Huasna Valley, Lockwood Valley, Pozo Valley, Santa Ana Valley, Santa Barbara, Santa Cruz Purisima Formation, Santa Rosa Valley, Tres Pinos Valley, San Simeon Valley, Rinconada Valley, Villa Valley and Carmel Valley. (Note: database not set up to calculate combined statistics for values as noted with "-" at the time this table was prepared)

**Table 8: On-Farm Domestic Well Nitrate (mg/L-N) Data by Groundwater Basin and Subbasin**

| Geographic Area | Salinas Valley Groundwater Basin | Salinas Valley Groundwater Basin Subbasin | | | | | | | | Gilroy-Hollister Valley Groundwater Basin | Gilroy-Hollister Valley Groundwater Basin Subbasin | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 180/400' Aquifer | East Side Aquifer | Forebay Aquifer | Upper Valley Aquifer | Paso Robles Area | Seaside Area | Langley Area | Corral de Tierra Area | | Llagas Area | Bolsa Area | Hollister Area | San Juan Bautista Area |
| **Number Well Sample Sites** | 385 | 43 | 25 | 88 | 15 | 211 | 1 | 1 | - | 24 | 6 | 3 | 8 | 7 |
| **Sample Date Range** | 4/15/2010 | 8/6/2012 | 10/23/2012 | 10/8/2012 | 11/9/2012 | 4/15/2010 | 5/9/2013 | 1/22/2014 | - | 5/23/2012 | 10/23/2012 | 8/27/2013 | 5/23/2012 | 12/10/2012 |
| | 4/24/2014 | 4/4/2014 | 4/24/2014 | 3/22/2014 | 1/23/2014 | 3/18/2014 | | | - | 2/13/2014 | 1/22/2014 | 10/30/2013 | 2/13/2014 | 2/13/2014 |
| **Min (mg/L-N)** | 0.05 | 0.05 | 0.2 | 0.1 | 0.1 | 0.1 | 3.0 | 2.0 | - | 0.7 | 1.0 | 1.6 | 1.4 | 0.7 |
| **Max (mg/L-N)** | 137.2 | 58.5 | 137.2 | 85.9 | 53.0 | 22.0 | 3.0 | 2.0 | - | 65.7 | 28.0 | 65.7 | 39.1 | 38.0 |
| **Mean (mg/L-N)** | 10.4 | 7.0 | 34.5 | 20.6 | 13.3 | 3.8 | - | - | - | 10.6 | 8.5 | 25.4 | 9.9 | 7.0 |
| **Median (mg/L-N)** | 4.0 | 1.4 | 24.1 | 12.1 | 7.0 | 3.0 | - | - | - | 1.4 | 1.4 | 8.8 | 0.0 | 1.4 |
| **Standard Deviation** | 17.6 | 12.0 | 37.4 | 21.5 | 15.3 | 3.7 | - | - | - | 17.8 | 11.7 | 35.1 | 18.0 | 13.7 |
| **First Quartile (mg/L-N)** | 1.3 | 0.5 | 3.4 | 4.2 | 1.3 | 1.0 | - | - | - | 0.8 | 1.1 | 1.6 | 0.0 | 1.0 |
| **Third Quartile (mg/L-N)** | 10.0 | 10.2 | 57.8 | 31.7 | 16.7 | 5.4 | - | - | - | 15.7 | 20.5 | 65.7 | 29.6 | 3.2 |
| **Number of Wells Below 0.004 mg/L-N (ND)** | 16 | 3 | 0 | 2 | 0 | 11 | 0 | 0 | - | 5 | 0 | 0 | 5 | 0 |
| **Number of Wells Between 0.005 and 4.99 mg/L-N** | 208 | 24 | 8 | 23 | 7 | 143 | 1 | 1 | - | 12 | 4 | 1 | 1 | 6 |
| **Number of Wells Between 5.00 and 9.99 mg/L-N** | 65 | 5 | 1 | 13 | 1 | 45 | 0 | 0 | - | 1 | 0 | 1 | 0 | 0 |
| **Number of Wells Equal to or Above MCL (10 mg/L-N)** | **96** | **11** | **16** | **50** | **7** | **12** | **0** | **0** | **-** | **6** | **2** | **1** | **2** | **1** |
| **Percent of Wells Equal to or Above MCL** | **24.9%** | **25.6%** | **64.0%** | **56.8%** | **46.7%** | **5.7%** | **-** | **-** | **-** | **25.0%** | **33.3%** | **33.3%** | **25.0%** | **14.3%** |

**Table 9: Agricultural Supply Well Nitrate (mg/L-N) Data by Region and County**

| Geographic Area | Region-wide | County | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Monterey | San Luis Obispo | Santa Barbara | Santa Cruz | San Benito | Santa Clara | San Mateo | Ventura |
| **Number of Well Sample Sites** | 1693 | 316 | 652 | 476 | 97 | 65 | 80 | - | 7 |
| **Sample Date Range** | 8/9/2011 | 2/15/2012 | 9/26/2011 | 8/9/2011 | 6/1/2012 | 10/10/2012 | 5/23/2012 | - | 5/30/2013 |
| | 4/10/2014 | 4/4/2014 | 4/10/2014 | 4/4/2014 | 1/31/2014 | 2/13/2014 | 1/22/2014 | - | 1/7/2014 |
| **Min (mg/L-N)** | 0.005 | 0.016 | 0.09 | 0.09 | 0.007 | 0.005 | 0.23 | - | 0.68 |
| **Max (mg/L-N)** | 134.0 | 65.0 | 124.0 | 134.0 | 71.7 | 42.7 | 55.6 | - | 6.1 |
| **Mean (mg/L-N)** | 8.7 | 11.4 | 6.8 | 10.5 | 6.2 | 3.9 | 11.1 | - | 2.7 |
| **Median (mg/L-N)** | 3.0 | 5.2 | 2.5 | 3.0 | 0.3 | 1.4 | 8.4 | - | 2.0 |
| **Standard Deviation** | 14.3 | 14.2 | 13.8 | 16.3 | 12.3 | 6.8 | 10.5 | - | 2.3 |
| **First Quartile (mg/L-N)** | 0.5 | 1.6 | 0.5 | 0.1 | 0.0 | 0.7 | 4.7 | - | 0.7 |
| **Third Quartile (mg/L-N)** | 9.5 | 16.6 | 5.4 | 14.9 | 5.1 | 4.3 | 12.9 | - | 5.4 |
| **Number of Wells Below 0.004 mg/L (ND)** | 241 | 8 | 89 | 117 | 19 | 7 | 0 | - | 1 |
| **Number of Wells Between 0.005 and 4.99 mg/L-N** | 817 | 146 | 386 | 160 | 54 | 45 | 22 | - | 4 |
| **Number of Wells Between 5.00 and 9.99 mg/L-N** | 218 | 46 | 81 | 52 | 4 | 8 | 25 | - | 2 |
| **Number of Wells Equal to or Above MCL (10 mg/L-N)** | **417** | **116** | **96** | **147** | **20** | **5** | **33** | **-** | **0** |
| **Percent of Wells Equal to or Above MCL** | **24.6%** | **36.7%** | **14.7%** | **30.9%** | **20.6%** | **7.7%** | **41.3%** | **-** | **-** |

**Table 10: Agricultural Supply Well Nitrate (mg/L-N) Data by Region and Groundwater Basin**

| Geographic Area | Region-wide | Groundwater Basin | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Salinas Valley | Gilroy-Hollister Valley | Santa Maria River Valley | Pajaro Valley | San Luis Obispo Valley | Carpinteria | Cuyama Valley | Santa Ynez River Valley | San Antonio Creek Valley | Morro Valley | Los Osos Valley | Outside of Groundwater Basins | All Other Basins with Data * |
| **Number Well Sample Sites** | 1693 | 562 | 123 | 323 | 103 | 23 | 53 | 48 | 136 | 38 | 9 | 8 | 228 | 39 |
| **Sample Date Range** | 8/9/2011 | 2/15/2012 | 5/23/2012 | 4/23/2012 | 6/1/2012 | 5/11/2012 | 6/1/2012 | 9/24/2012 | 9/19/2012 | 9/5/2012 | 3/14/2012 | 6/3/2013 | 9/26/2011 | 8/9/2011 |
| | 4/10/2014 | 4/10/2014 | 1/22/2014 | 4/4/2014 | 1/31/2014 | 11/12/2013 | 3/17/2014 | 1/6/2014 | 3/27/2014 | 1/24/2014 | 1/6/2014 | 1/8/2014 | 3/20/2014 | 2/13/2014 |
| **Min (mg/L-N)** | 0.0045 | 0.02 | 0.0045 | 0.10 | 0.01 | 0.30 | 0.09 | 0.23 | 0.10 | 0.10 | 1.00 | 0.45 | 0.09 | 0.04 |
| **Max (mg/L-N)** | 134.0 | 65.0 | 55.6 | 134.0 | 71.7 | 21.1 | 60.1 | 19.3 | 75.0 | 59.0 | 19.2 | 22.0 | 36.4 | 9.3 |
| **Mean (mg/L-N)** | 8.7 | 7.3 | 8.8 | 19.9 | 7.8 | 6.4 | 11.0 | 3.9 | 4.3 | 3.6 | 8.0 | 4.0 | 2.3 | 1.4 |
| **Median (mg/L-N)** | 3.0 | 3.4 | 5.9 | 13.6 | 0.9 | 5.4 | 6.1 | 2.0 | 0.1 | 1.0 | 3.2 | 0.2 | 0.5 | - |
| **Standard Deviation** | 14.3 | 11.1 | 10.2 | 21.5 | 13.4 | 5.3 | 13.8 | 4.8 | 11.8 | 9.9 | 8.0 | 7.8 | 5.1 | - |
| **First Quartile (mg/L-N)** | 0.5 | 1.4 | 2.1 | 3.0 | 0.1 | 2.3 | 1.1 | 1.1 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | - |
| **Third Quartile (mg/L-N)** | 9.5 | 7.1 | 11.5 | 31.0 | 10.2 | 10.2 | 5.0 | 5.0 | 2.3 | 3.1 | 17.6 | 6.5 | 2.5 | - |
| **Number of Wells Below 0.225 mg/L-N (ND)** | 241 | 14 | 5 | 25 | 13 | 1 | 3 | 2 | 68 | 12 | 1 | 4 | 80 | 13 |
| **Number of Wells Between 0.005 and 4.99 mg/L-N** | 817 | 355 | 50 | 73 | 59 | 10 | 21 | 34 | 47 | 21 | 4 | 2 | 118 | 23 |
| **Number of Wells Between 5.00 and 9.99 mg/L-N** | 218 | 83 | 30 | 42 | 4 | 6 | 12 | 8 | 7 | 3 | 1 | 1 | 18 | 3 |
| **Number of Wells Equal to or Above MCL (10 mg/L-N)** | **417** | **110** | **38** | **183** | **27** | **6** | **17** | **4** | **14** | **2** | **3** | **1** | **12** | **0** |
| **Percent of Wells Equal to or Above MCL** | **24.6%** | **19.6%** | **30.9%** | **56.7%** | **26.2%** | **26.1%** | **32.1%** | **8.3%** | **10.3%** | **5.3%** | **33.3%** | **12.5%** | **5.3%** | **-** |

*Includes: Chorro Valley, Goleta, Huasna Valley, Lockwood Valley, Montecito, Needle Rock Point, Pozo Valley, San Benito River Valley, Santa Ana Valley, Santa Barbara, Santa Cruz Purisima Formation, Santa Rosa Valley, Soquel Valley, Tres Pinos Valley and West Santa Cruz Terrace (note: database not set up to calculate combined statistics for values as noted with "-" at the time this table was prepared).

**Table 11: Agricultural Supply Well Nitrate (mg/L-N) Data by Groundwater Basin and Subbasin**

| Geographic Area | Salinas Valley Groundwater Basin | Salinas Valley Groundwater Basin Subbasin | | | | | | | | Gilroy-Hollister Valley Groundwater Basin | Gilroy-Hollister Valley Groundwater Basin Subbasin | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 180/400' Aquifer | East Side Aquifer | Forebay Aquifer | Upper Valley Aquifer | Paso Robles Area | Seaside Area | Langley Area | Corral de Tierra Area | Gilroy-Hollister Valley Groundwater Basin | Llagas Area | Bolsa Area | Hollister Area | San Juan Bautista Area |
| **Number Well Sample Sites** | 562 | 66 | 58 | 103 | 38 | 294 | - | 3 | - | 123 | 75 | 10 | 18 | 20 |
| **Sample Date Range** | 2/15/2012 | 6/6/2012 | 2/15/2012 | 7/23/2012 | 3/11/2013 | 8/9/2012 | - | 11/29/2012 | - | 5/23/2012 | 7/16/2012 | 4/12/2013 | 5/23/2012 | 11/2/2012 |
| | 4/10/2014 | 3/14/2014 | 4/4/2014 | 3/14/2014 | 1/23/2014 | 4/10/2014 | - | 5/28/2013 | - | 1/22/2014 | 1/22/2014 | 12/12/2013 | 12/12/2013 | 12/13/2013 |
| **Min (mg/L-N)** | 0.02 | 0.02 | 0.68 | 0.02 | 0.10 | 0.00 | - | 0.10 | - | 0.0045 | 0.23 | 0.68 | 0.0226 | 0.45 |
| **Max (mg/L-N)** | 65.0 | 38.0 | 64.6 | 65.0 | 45.0 | 18.6 | - | 7.0 | - | 55.6 | 55.6 | 9.7 | 42.7 | 26.4 |
| **Mean (mg/L-N)** | 7.3 | 5.9 | 21.5 | 11.8 | 10.0 | 3.0 | - | 2.6 | - | 8.8 | 11.7 | 3.6 | 3.7 | 5.3 |
| **Median (mg/L-N)** | 3.4 | 2.5 | 16.5 | 7.9 | 5.5 | 2.7 | - | 0.7 | - | 5.9 | 8.4 | 2.1 | 1.0 | 2.6 |
| **Standard Deviation** | 11.1 | 8.6 | 18.5 | 13.8 | 10.3 | 2.5 | - | 3.8 | - | 10.2 | 10.5 | 3.3 | 9.9 | 7.3 |
| **First Quartile (mg/L-N)** | 1.4 | 0.5 | 5.5 | 2.9 | 2.7 | 1.0 | - | 0.1 | - | 2.1 | 5.4 | 0.8 | 0.2 | 0.7 |
| **Third Quartile (mg/L-N)** | 7.1 | 7.0 | 33.5 | 16.0 | 17.2 | 4.2 | - | 7.0 | - | 11.5 | 14.2 | 6.4 | 2.3 | 6.9 |
| **Number of Wells Below 0.004 mg/L-N (ND)** | 14 | 1 | 0 | 0 | 0 | 13 | - | 0 | - | 5 | 0 | 0 | 3 | 2 |
| **Number of Wells Between 0.005 and 4.99 mg/L-N** | 355 | 45 | 14 | 43 | 18 | 233 | - | 2 | - | 50 | 18 | 6 | 13 | 13 |
| **Number of Wells Between 5.00 and 9.99 mg/L-N** | 83 | 8 | 6 | 20 | 6 | 42 | - | 1 | - | 30 | 24 | 4 | 1 | 1 |
| **Number of Wells Equal to or Above MCL (10 mg/L-N)** | **110** | **12** | **38** | **40** | **14** | **6** | **-** | **0** | **-** | **38** | **33** | **0** | **1** | **4** |
| **Percent of Wells Equal to or Above MCL** | **19.6%** | **18.2%** | **65.5%** | **38.8%** | **36.8%** | **2.0%** | **-** | **-** | **-** | **30.9%** | **44.0%** | **-** | **5.6%** | **20.0%** |

**Table 12: SCVWD South County Water Quality Testing Program – Llagas Subbasin Domestic Well Nitrate Data**

| **Llagas Area Subbasin – Domestic Well Nitrate (mg/L-N) Data** | |
|---|---|
| **Number of Well Sample Sites** | 556 |
| **Sample Date Range** | 10/11/2011 |
| | 2/25/2014 |
| **Min (mg/L-N)** | 0.61 |
| **Max (mg/L-N)** | 60.6 |
| **Mean (mg/L-N)** | 9.8 |
| **Median (mg/L-N)** | 8.8 |
| **Standard deviation** | 6.8 |
| **First Quartile (mg/L-N)** | 5.2 |
| **Third Quartile (mg/L-N)** | 13.6 |
| **Number of Wells Below 0.45 mg/L (ND)** | 11 |
| **Number of Wells Between 0.45 And 4.99 mg/L** | 119 |
| **Number of Wells Between 5.00 And 9.99 mg/L (10 mg/L-N)** | 191 |
| **Number of Wells Equal to or Above MCL** | **235** |
| **Percent of Wells Equal to or Above MCL** | **42.3%** |

**Table 13: 2012/2013 Salinas and Pajaro Valley GAP/USGS Domestic Well Project Nitrate plus Nitrite (mg/L-N) Data by Project, County and Groundwater Basin**

| Geographic Area | Overall Project | County | | | Groundwater Basin | |
|---|---|---|---|---|---|---|
| | | San Luis Obispo | Monterey | Santa Cruz | Pajaro Valley | Salinas Valley |
| **Number of Well Sample Sites** | 90 | 8 | 72 | 10 | 15 | 75 |
| **Sample Date Range** | 10/29/2012 | 11/8/2012 | 10/29/2012 | 2/11/2013 | 2/11/2013 | 10/29/2012 |
| | 5/24/2013 | 5/23/2013 | 5/24/2013 | 5/10/2013 | 5/10/2013 | 5/24/2013 |
| **Min (mg/L-N)** | 0.082 | 0.968 | 0.082 | 0.332 | 0.131 | 0.082 |
| **Max (mg/L-N)** | 65.6 | 9.26 | 65.6 | 19.5 | 20.6 | 65.6 |
| **Mean (mg/L-N)** | 10.9 | 5.1 | 12.2 | 6.6 | 7.3 | 11.7 |
| **Median (mg/L-N)** | 15.2 | 5.5 | 4.1 | 4.0 | 5.4 | 3.9 |
| **Standard Deviation** | 4.1 | 3.3 | 16.5 | 7.4 | 7.3 | 16.3 |
| **First Quartile (mg/L-N)** | 0.9 | 1.5 | 0.8 | 0.3 | 0.3 | 1 |
| **Third Quartile (mg/L-N)** | 15.8 | 7.9 | 18.5 | 13.7 | 12.6 | 17.5 |
| **Number of Wells Below 0.04 mg/L-N (ND)** | 7 | 0 | 5 | 2 | 2 | 5 |
| **Number of Wells Between 0.04 and 4.99 mg/L-N** | 40 | 4 | 33 | 3 | 5 | 35 |
| **Number of Wells Between 5.00 and 9.99 mg/L-N** | 15 | 4 | 9 | 2 | 3 | 12 |
| **Number of Wells Equal to or Above MCL (10 mg/L-N)** | **28** | **0** | **25** | **3** | **5** | **23** |
| **Percent of Wells Equal to or Above MCL** | **31.1%** | **-** | **34.7%** | **30.0%** | **33.3%** | **30.7%** |

**Table 14: 2012/2013 Salinas and Pajaro Valley GAP/USGS Domestic Well Project Nitrate plus Nitrite (mg/L-N) Data by Salinas Valley subbasin**

| Geographic Area | Salinas Valley Groundwater Basin Subbasins | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 180/400' Aquifer | East Side Aquifer | Forebay Aquifer | Upper Valley Aquifer | Seaside Area | Langley Area | Corral de Tierra Area | Paso Robles Area |
| Number of Well Sample Sites | 17 | 11 | 10 | 13 | 3 | 5 | 6 | 10 |
| Sample Date Range | 10/29/2012 | 10/31/2012 | 11/6/2012 | 11/7/2012 | 11/6/2012 | 11/5/2012 | 10/29/2012 | 11/8/2012 |
| | 5/21/2013 | 5/2/2013 | 4/30/2013 | 5/24/2013 | 5/21/2013 | 4/15/2013 | 4/18/2013 | 5/23/2013 |
| Min (mg/L-N) | 0.347 | 1.13 | 0.184 | 0.443 | 2.3 | 0.082 | 0.232 | 1.03 |
| Max (mg/L-N) | 27 | 65.6 | 56.4 | 45.1 | 8.54 | 10.9 | 3.49 | 9.26 |
| Meant (mg/L-N) | 6.2 | 21.9 | 20.0 | 18.8 | 5.6 | 3.2 | 1.6 | 4.4 |
| Median (mg/L-N) | 2.2 | 11.0 | 8.9 | 21.8 | 5.9 | 1.1 | 1.6 | 3.9 |
| Standard Deviation | 8.1 | 21.8 | 24.4 | 17.2 | 3.1 | 4.5 | 1.2 | 3.6 |
| First Quartile (mg/L-N) | 0.5 | 5.2 | 0.3 | 1.3 | 2.3 | 0.2 | 0.4 | 0.5 |
| Third Quartile (mg/L-N) | 10.6 | 42.6 | 52.3 | 34.8 | 8.5 | 7.4 | 2.5 | 7.7 |
| Number of Wells Below 0.04 mg/L-N (ND) | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Number of Wells Between 0.04 and 4.99 mg/L-N | 9 | 2 | 5 | 4 | 1 | 4 | 6 | 4 |
| Number of Wells Between 5.00 and 9.99 mg/L-N | 2 | 3 | 0 | 1 | 2 | 0 | 0 | 4 |
| Number of Wells Equal to or Above MCL (10 mg/L-N) | **4** | **6** | **5** | **7** | **0** | **1** | **0** | **0** |
| Percent of Wells Equal to or Above MCL | **23.5%** | **54.5%** | **50.0%** | **53.8%** | **-** | **20.0%** | **-** | **-** |

**Table 15: Domestic Well Data Summary**

| Data Source | GAMA Program Domestic Well Project (Monterey County) | GAP/USGS Domestic Well Project (Salinas and Pajaro Valleys) | SCVWD South County Water Quality Testing Program (Llagas subbasin) | CCRWQCB Agricultural Order (region-wide) | Total |
|---|---|---|---|---|---|
| **Sample Date Range** | 5/2/2011 | 10/29/2012 | 10/11/2011 | 4/15/2010 | **-** |
| | 6/30/2011 | 5/24/2013 | 2/25/2014 | 4/24/2014 | **-** |
| **Number of Wells Sampled** | 79 | 90 | 556 | 902 | **1627** |
| **Number of Wells Equal to or Above MCL (10 mg/L-N)** | 9 | 28 | 235 | 182 | **454** |
| **Percent of Wells Equal to or Above MCL** | **11.4%** | **31.1%** | **42.3%** | **20.2%** | **27.9%** |

Note: This summary does not include the 100 domestic or shallow wells sampled by USGS as part of the State Water Board's GAMA Program Priority Basin Project – Shallow Aquifer Assessment in the Monterey-Salinas Study Unit