

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

**SUPPLEMENTAL SHEET FOR MEETING OF JULY 31-AUGUST 1, 2014**  
Prepared July 25, 2014

**ITEM NUMBER:** 11

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

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**SUMMARY**

This supplemental sheet contains corrections associated with the public water system well nitrate data contained in the staff report for this item. Specifically, the maximum reported nitrate concentration for public water system wells in the Central Coast Region of 173.7 mg/L as nitrogen was identified as an error carried over from the State's drinking water program database. The correct maximum nitrate concentration for public water system wells that are currently in service in the Central Coast is 66.1 mg/L as nitrogen. This concentration was used to correct the associated text and statistical values contained in the staff report.

The following excerpted pages from the staff report contain corrected text, figures and tables. The corrections are shown in red strikeout and underlined text (with the exception of Figure 1). This supplemental sheet replaces the following pages of the Item No. 11 staff report:

- Pages 3, 4 and 7 (including Table 1)
- Figure 1 (page 16)
- Table 2 (page 21)
- Table 3 (page 22)
- Table 4 (page 23)

- 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 7.57.4% (~~87-86~~ 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 287286, or 14.414.3%, 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 173.766.1 mg/L-N (over 17 times the drinking water standard). The well in question is located in Santa BarbaraMonterey County and the Cuyama-Pajaro 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 historical study period increases. For example, whereas about ~~7.5~~7.4% of the public water system wells currently in service are polluted with nitrate in excess of the drinking water standard, about ~~14.4~~14.3% 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~~86 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.

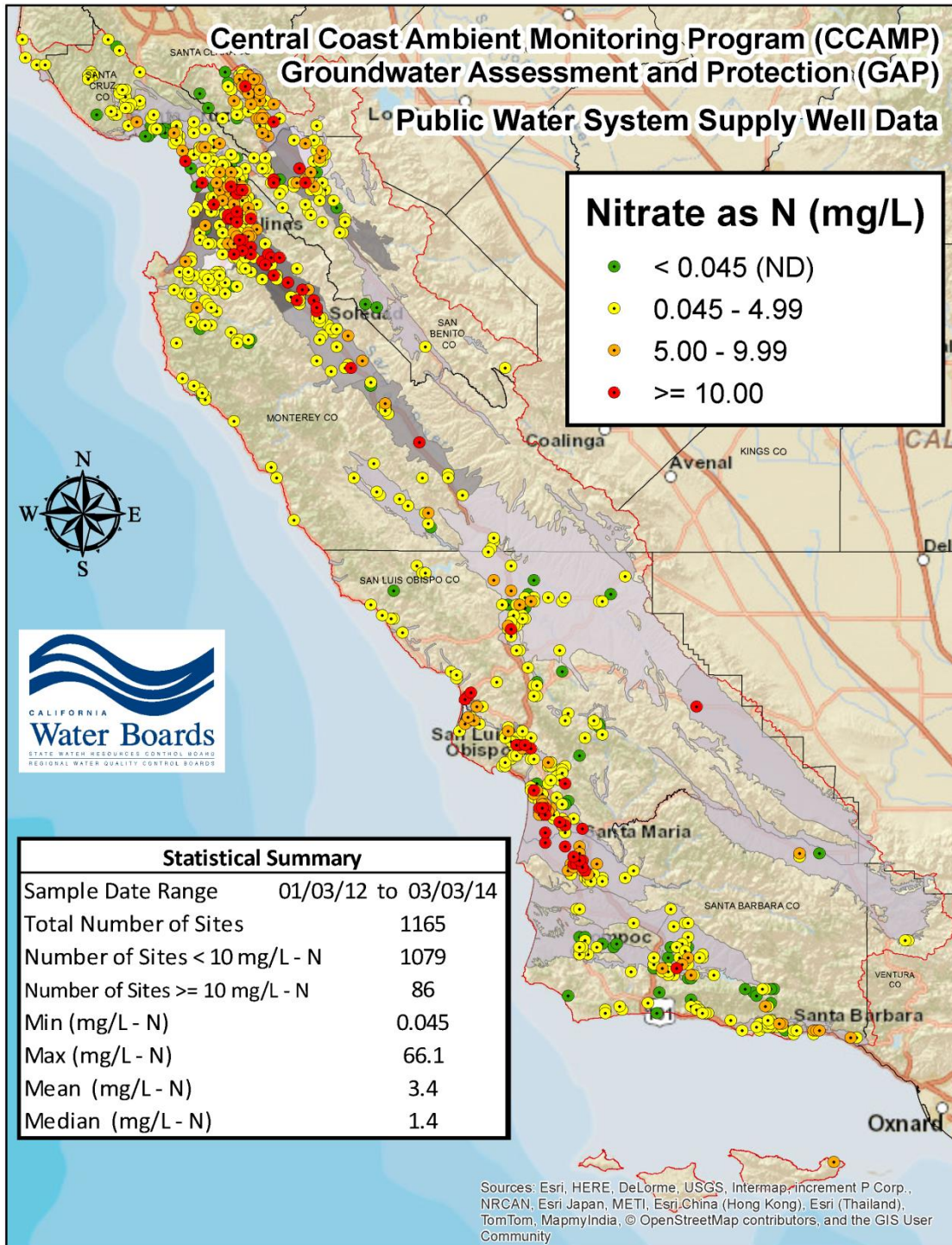
**Figure-Table 1: Public Water System Historical Well and Nitrate Trends**

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	<del>87</del> <u>86</u>	<del>419</del> <u>118</u>	<del>470</del> <u>169</u>	<del>232</del> <u>231</u>	<del>257</del> <u>256</u>	<del>276</del> <u>275</u>	<del>279</del> <u>278</u>	<del>287</del> <u>286</u>
Percent of Wells with Nitrate => MCL	<del>7.5</del> <u>7.4</u> %	<del>9.0</del> <u>8.9</u> %	11.1%	<del>13.0</del> <u>12.9</u> %	<del>13.9</del> <u>13.8</u> %	<del>14.2</del> <u>14.1</u> %	<del>14.0</del> <u>13.9</u> %	<del>14.4</del> <u>14.3</u> %

#### 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

Figure 1 (revised 7/25/14)



0 10 20 40 Miles

Created By: Shelby Cowell

7/25/2014

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 - Liagas 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)	<del>173.7</del> <u>66.1</u>	60.6	65.6	137.2	134.0
Mean (mg/L-N)	<del>3.6</del> <u>3.4</u>	9.8	10.9	8.5	8.7
Median (mg/L-N)	1.4	8.8	15.2	2.4	3.0
Standard Deviation	<del>7.7</del> <u>5.8</u>	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)	<del>334</del> <u>335</u>	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)	<del>87</del> <u>86</u>	235	28	182	417
Percent of Wells Equal to or Above MCL	<del>7.57</del> <u>7.4</u> %	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)	<del>173.766.1</del>	66.1	38.6	<del>173.731.6</del>	12.4	22.3	36.8	2.4	3.5
Mean (mg/L-N)	<del>3.63.4</del>	3.9	3.7	<del>3.72.8</del>	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	<del>7.75.8</del>	7.2	5.8	<del>13.14.9</del>	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)	<del>334335</del>	105	66	<del>8384</del>	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)	<del>8786</del>	40	27	<del>1211</del>	1	5	2	0	0
Percent of Wells Equal to or Above MCL	<del>7.57.4%</del>	9.7%	9.3%	<del>6.15.6%</del>	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													Outside of Groundwater Basins	All Other Basins with Data *
	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		
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	<del>173.76.99</del>	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	-	<del>60.22.3</del>	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	-	<del>7.00</del>	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	-	<del>98.34.0</del>	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	-	<del>3.50</del>	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	-	<del>90.43.5</del>	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	<del>42</del>	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	<del>10</del>	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%	-	<del>33.3%</del>	-	-	-	-	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.