

The Monterey Bay Sanctuary Citizen Watershed Monitoring
Network and the Coastal Watershed Council's



9th Annual



Snapshot Day Report

May 3rd, 2008



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Watershed Monitoring Network Coordinator



The 9th Annual Snapshot Day Event was coordinated by:

The Monterey Bay Sanctuary Citizen Watershed Monitoring Network,
which supports citizen monitoring programs throughout the Monterey Bay National
Marine Sanctuary.

831-647-4227

www.montereybay.noaa.gov/monitoringnetwork/welcome.html

Coastal Watershed Council,

A public education non-profit advocating the preservation and protection of coastal
watersheds through the establishment of community-based stewardship programs.

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A Quick Look at Snapshot Day

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Scott Creek Watershed Council
Sewer Authority Mid-Coastside (SAM)
Starbuck's Coffee
Stormwater and Education Alliance
Surfrider Foundation
The Bagelry

What: Snapshot Day 2008

Who: 180 Volunteers

Where: 173 creeks and streams
flowing into the Monterey Bay
National Marine Sanctuary

When: May 3rd, 2008 (9th annual)

Why: To collect valuable information
on the quality of water in local streams
as well as provide an opportunity for
the community to learn about
environmental protection.

How: Volunteers from the Marin
Headlands in the north to Morro Bay
in the south, monitored creeks and
streams for ambient water quality
conditions such as temperature,
turbidity, conductivity, dissolved
oxygen, pH, nitrate, orthophosphate,
and bacteria.

Trader Joe's
United States Environmental Protection Agency
UC Santa Cruz Environmental Studies Department
Upper Crust Pizza
Upper Salinas Las Tables RCD
Upper Salinas Watershed Coalition
Watershed Institute, CSUMB

Methods

One volunteer training was conducted in each of the four counties that drain into the



Monterey Bay Sanctuary (San Mateo, Santa Cruz, Monterey, and San Luis Obispo). Volunteers learned about the history of the program, specific monitoring protocols, field safety and event logistics. In addition, volunteers were divided into teams, assigned a team leader and specific sampling sites.

Paul Michel, MBNMS Superintendent, welcomes volunteers at the Watershed Institute at CSUMB

On the morning of the event, volunteers met at hubs in San Mateo, Santa Cruz, Monterey, and Cambria. They signed in, enjoyed breakfast and checked out their monitoring equipment. In Monterey, Paul Michel, Superintendent of the MBNMS, and Bonnie VanHise, assistant to Congressman Sam Farr, offered welcoming comments. In Santa Cruz, Mayor Ryan Coonerty welcomed volunteers. After a group photo was taken, volunteers split into their groups and set out to monitor their sites.



Mayor Coonerty of Santa Cruz welcomes volunteers

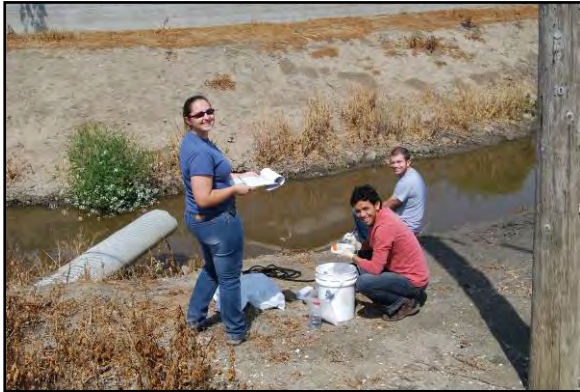
Monterey County volunteers take a group photo before heading out to their monitoring sites



Parameter	Why it's measured	Instruments Used	Water Quality Objective	Source of WQO
Dissolved Oxygen (ppm)	Oxygen is essential to all life. Aquatic organisms rely on sufficient amounts of dissolved oxygen to perform regular behaviours like feeding, spawning, and incubating. Excessive nutrients in water can cause excess plant growth; when organisms break down these plants, they deplete the amount of oxygen available for others.	YSI Dissolved Oxygen Meter, Winkler, or CHEMets Kit	Not lower than 7 or greater than 12	Basin Plan Objective for Cold Water Fish
pH	pH is a measure of the percent of hydrogen ions in a water column. A value of 7 is neutral, above that is alkaline and below is acidic. Aquatic organisms require a narrow pH range to carry out necessary biological functions.	Machery-Nagel non-bleeding pH strips	Not lower than 6.5 or greater than 8.5	General Basin Plan Objective
Water Temperature (degrees C)	Water temperature affects the life and health of aquatic ecosystems. Fish and other aquatic life need a certain range of water temperatures in which to survive and reproduce. Water temperature can also affect the amount of dissolved oxygen in the water column and the rate of photosynthesis in aquatic plants.	Digital or bulb thermometer	Not greater than 22	Basin Plan Objective for Cold Water Fish
Turbidity (JTU) and Transparency (cm)	High turbidity levels can indicate problems upstream such as erosion, nutrient loading, or extraordinary algae growth.	Transparency tube or a Dual Cylinder turbidity kit	Transparency: not greater than 25 cm. Turbidity: not greater than 20 JTU	Central Coast Ambient Monitoring Program (CCAMP)
Nitrate as N and Orthophosphate as P (mg/l or ppm)	Naturally occurring in streams, rivers, and lakes, excess nutrients can be leached into water bodies in the form of fertilizers, pesticides, detergents, animal waste, sewage, or industrial waste. Excessive nutrients can lead to extreme algae or other plant growth, which when broken down can deplete the amount of dissolved oxygen in the water column.	Grab sample-sample processed at laboratory	Not to exceed 2.25 mg-N/l Nitrate-N and 0.12 mg-P/l Orthophosphate-P.	Central Coast Ambient Monitoring Program (CCAMP)
Bacteria: <i>E.coli</i> and Total coliform (MPN/100ml)	Coliform bacteria are generally used as an indicator of food and water sanitation. Most coliform bacteria originate from the feces of warm blooded animals and therefore can indicate the presence of human sewage or wildlife feces. Coliform bacteria are usually not themselves the cause of sickness, they can indicate that other harmful pathogens are present.	Grab sample-sample processed at laboratory	Not to exceed 400 MPN/100ml <i>E. coli</i> and 10,000 MPN/100ml Total coliform	EPA Ambient Water Quality Criteria

Table 1. A quick look at SSD parameters and WQO's

The parameters measured by the volunteers are referenced in Table 1. In addition to the equipment listed in Table 1, monitoring kits also included a thermometer for air temperature, distilled water, gloves, paper towels, a trash bag, pens/pencils, sample bottles, and a clipboard with data sheets, instructions, maps, and photo documentation forms.



Meagan Maughan, Sacha Lozano and Jason Williams at the Salinas Reclamation Ditch.

The sample collection and field measurement protocols were developed for the coast-wide SSD event in 2003 by the State Water Resources Control Board's Clean Water Team. All SSD results are compared with water quality objectives (WQO's) recommended by

the Central Coast Ambient Monitoring Program (CCAMP), the Basin Plan, or the US Environmental Protection Agency. All collection methods and lab analysis followed the requirements set forth in a state approved Quality Assurance Project Plan and Monitoring Plan ensuring all data is of known quality.



Erica Burton measures conductivity with Sydney Watts.

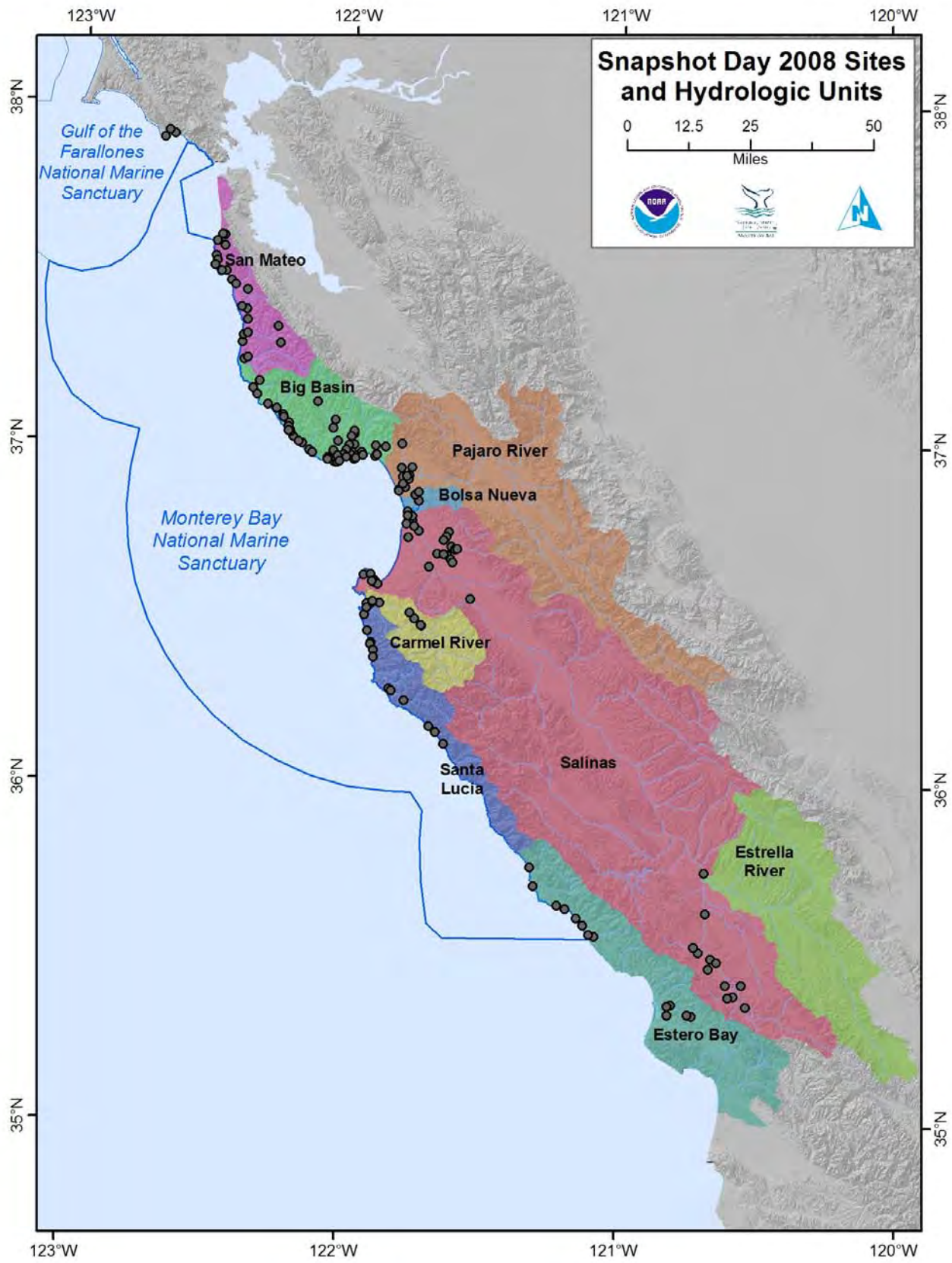


Figure 1. Snapshot Day sites

Results

Intermittent fog and clouds hung above much of the Central Coast on SSD. Volunteers sampling inland sites saw more sun and more heat; coastal sites were wet and cool. The air temperature ranged from 9.9 degrees Celcius in Marin county at 9:35 am, to 25.6 degrees Celcius along the Tembladero Slough in Monterey county at 10:35am. No rain was recorded with in 24 hours prior to the event.

Just 49% of the sites sampled met the water quality objectives for all parameters. In 2007, 50% of sites met all objectives. Specifically, this year 84 of 173 sites met the Water Quality Objectives (WQO) for all parameters (See Table 2 for a quick look at all statistical results). Tabular results of Snapshot Day 2008, by site and parameter, are found in Appendix 1. Spatial results are in Figures 2-4).



Alex Michel records measurements on a field data sheet.

Table 2. Statistical Results

Parameter	WQO	Stations Sampled/Tested	Number of Exceedances	% of Sites with Exceedances	Minimum Result	Maximum Result	Average Result	Median Result
Air Temp (°C)	none	156	N/A	N/A	9.5	25.6	10.0	14.8
Water Temp (°C)	≤ 22	162	5	3%	8.8	26.7	13.7	12.5
Dissolved Oxygen	≥ 7, ≤ 12	151	24	16%	3.0	13.2	9.2	9.0
pH	≥ 6.5, ≤ 8.5	162	8	5%	6.0	9.5	7.2	7.0
Conductivity (µS)	none	159	N/A	N/A	51	19900	N/A	N/A
Transparency (cm)	≥ 25	96	16	17%	1	120	94	120
Turbidity (JTU)	≤ 20	52	0	0%	0	20	6	5
E. Coli (MPN/100ml)	≤ 400	165	40	24%	2	61314	1040	125
Total coliform (MPN/100ml)	≤ 10,000	165	30	18%	20	≥ 241960	11747	2014
Nitrate-N (mg-N/L)	≤ 2.25	171	34	20%	ND	65.70	3.79	0.10
Orthophosphate-P (mg-P/L)	≤ 0.12	171	18	11%	ND	0.70	0.07	0.05

Water Temperature

The WQO for water temperature is below 22 degrees Celcius ($^{\circ}\text{C}$). This year, just five sites exceeded this objective, the same number as last year. The maximum water temperature reached 26.7°C , which was measured in the Moro Cojo Slough. The minimum water temperature was 8.75°C , measured at San Gregorio Creek in San Mateo County.

The average water temperature on May 3rd was 13.7°C and median was 12.5°C .



Bobby Jo Close near Santa Margarita Creek

Dissolved Oxygen

The WQO for dissolved oxygen is greater than seven and less than 12 ppm. Twenty-four of 151 sites monitored did not meet this objective (16%). This is down from last year, when 21% of sites did not meet this objective. This year, the maximum



Marlene Hurtado on the Salinas River

dissolved oxygen concentration was 13.23 mg/l at Upper Choro Flats (near Morro Bay), and the minimum concentration was 3 mg/l along Elkhorn Slough. The average concentration was 9.2 mg/l , and the median was 9 mg/l . This is similar to last year's average and median.

Conductivity

There is no WQO for conductivity; it is a relative measurement of ambient water quality conditions indicating the amount of polar molecules (salts) in the water. This measurement changes for each site based on water source and geology. The minimum

conductivity reading was 51 micro Siemens and the highest reading was 19,900 micro Siemens.

pH

The WQO for pH is greater than 6.5 and less than 8.5. One hundred and sixty-two sites were monitored for pH; just eight of these did not meet the WQO (5%).



Shayna Gonzales, Chris Bailey, and Tara Gonzales on the upper Salinas River.

Five of these were below 6.5 and three were above 8.5. The highest pH was 9.5 measured in the Moro Cojo Slough.

Transparency/Turbidity

Most of the Monterey and San Luis Obispo county sites measured transparency with a transparency tube, while most of the Santa Cruz and San Mateo county sites used dual cylinder turbidity kits. The WQO for

transparency is greater than 25 cm. Of the 96 sites that measured transparency, 16 did not meet the WQO (17%). In 2007, 13% of the sites did not meet the WQO. The average transparency this year was 94 cm, the median was 120 cm, and the minimum was one centimeter found at Moro Cojo Slough.

For turbidity, 52 stations used turbidity kits that measured in Jackson Turbidity Units (JTUs). The WQO for turbidity is less than or equal to 20 JTUs. No sites exceeded that objective this year, which is down from 14% exceedance last year. Volunteers were also asked to record visual observations about the site's water clarity. Twenty-six



Sara Kelly, Steve Richmond, and Kim Ha at the Carmel River

sites were recorded as murky, 21 as cloudy, and 105 as clear.

Nutrients

Nitrate-N ($\text{NO}_3\text{-N}$)

The WQO for nitrate as nitrogen is 2.25 mg-N/l. This year, 34 of the 171 sampled sites exceeded this WQO (20%). This is up from last year's exceedance rate of 14%. Of the 34 sites that exceeded this WQO, most (24) were in the Lower Salinas Valley Watershed. The maximum concentration of nitrate was 65.7 mg-N/l, found at Upper Natividad Creek. Last year, the greatest nitrate concentration was 37 mg-N/l. The average nitrate concentration this year was above the WQO at 3.79 mg-N/l, and the median was 0.1 mg-N/l.

Orthophosphate-P ($\text{PO}_4\text{-P}$)

The WQO for orthophosphate is 0.12 mg-P/l. Eighteen of the 171 sites sampled exceeded the WQO, an exceedance rate of 11%. This is just under last year's exceedance rate of 12%. The maximum concentration of orthophosphate was 0.7 mg-P/l measured on the Salinas Rec Ditch, the average was 0.07 mg-P/l, and the median was a non-detect reading of 0.05 mg-P/l.

Bacteria

For *Escherichia coli* (*E. coli*), the WQO is 400 MPN/100ml. This year, 40 of 165 sites (24%) exceeded the WQO, down from 23% last year. The maximum concentration was 61,314 MPN/100ml, found in Santa Rita Creek in the City of Salinas. The average concentration was 1,040 MPN/100ml, and the median was 125 MPN/100ml.



Santa Rita Creek

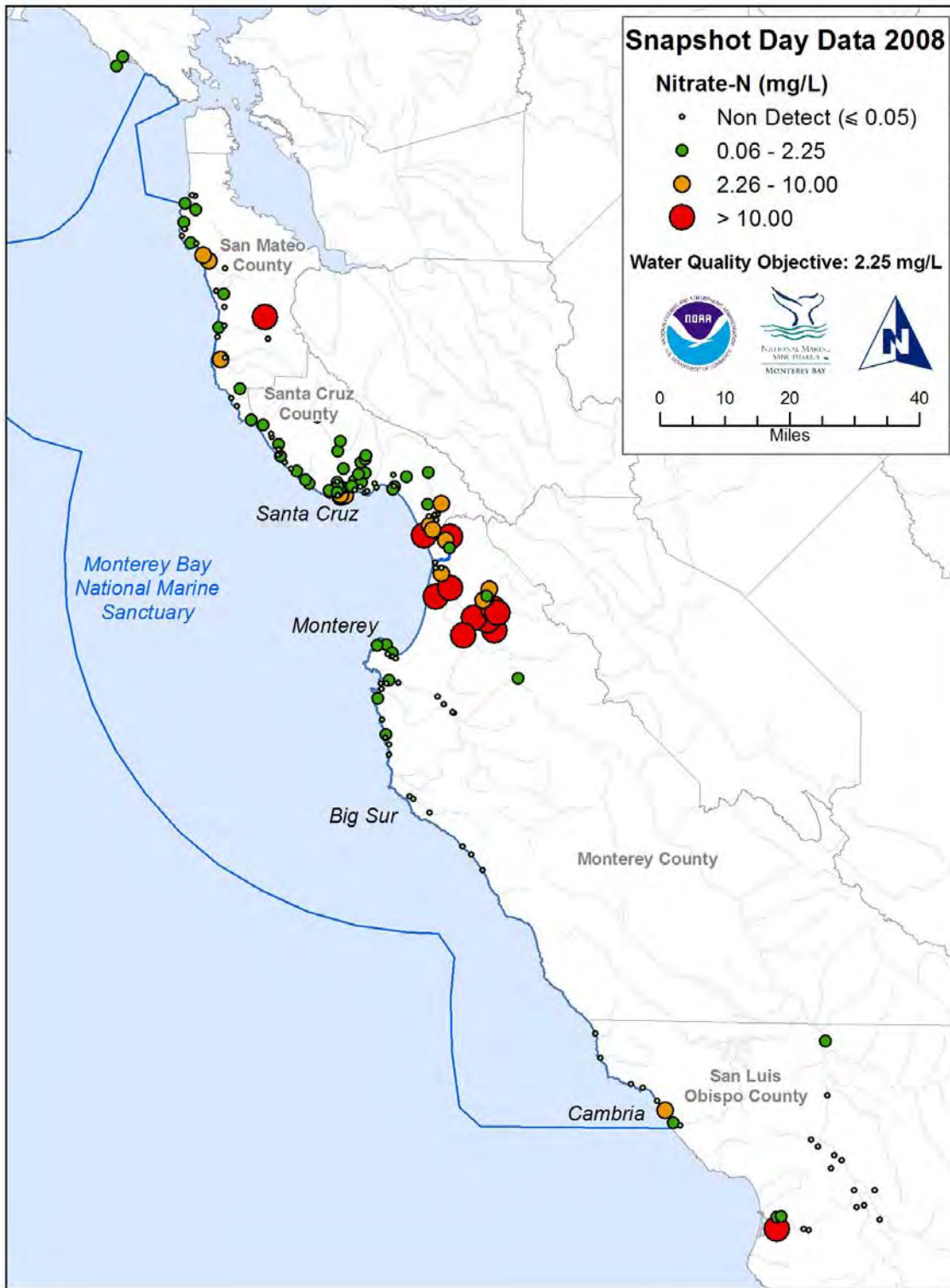


Figure 2. Nitrate-N concentrations for Snapshot Day 2008.

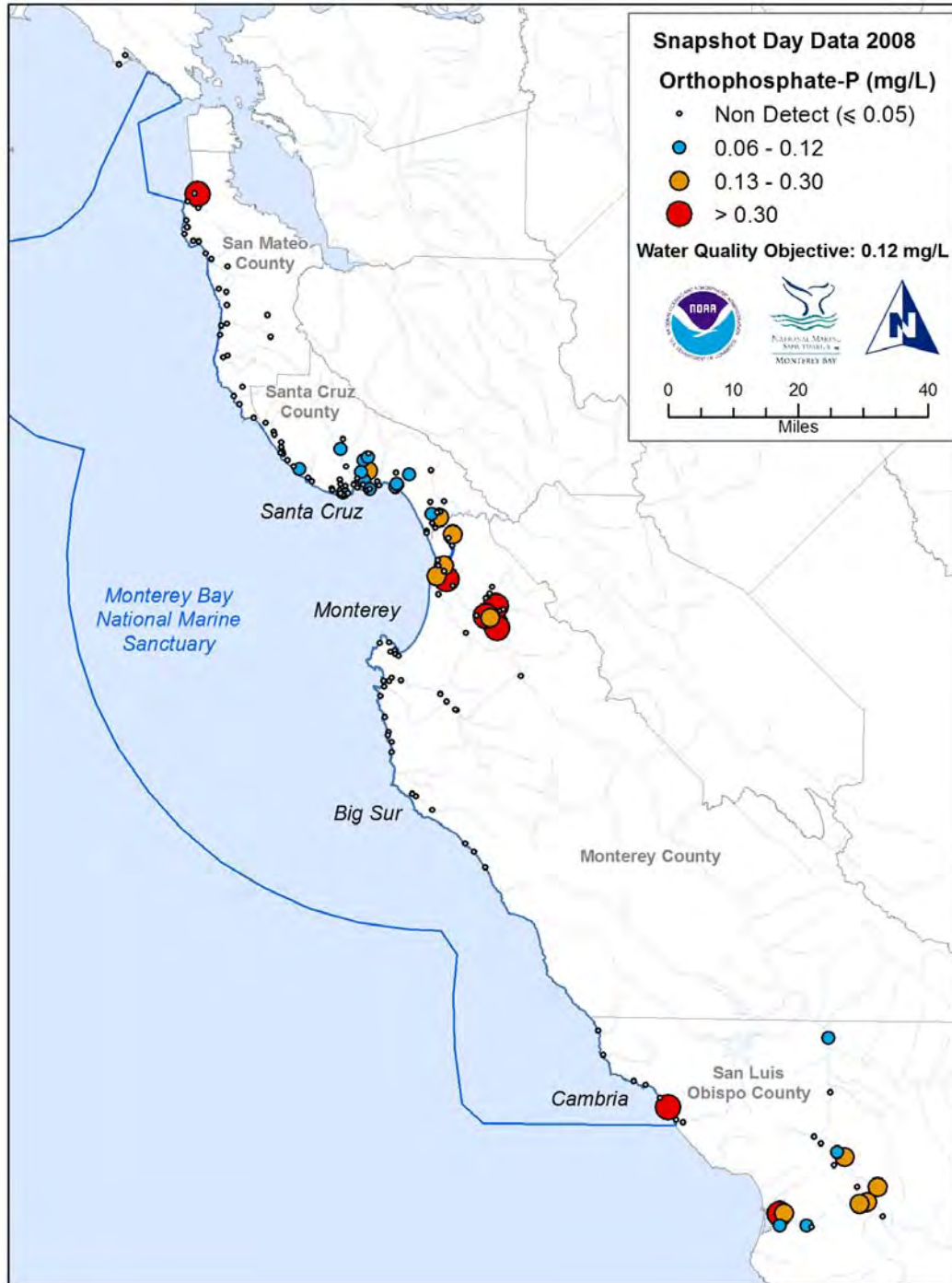


Figure 3. Orthophosphate-P concentrations for Snapshot Day 2008

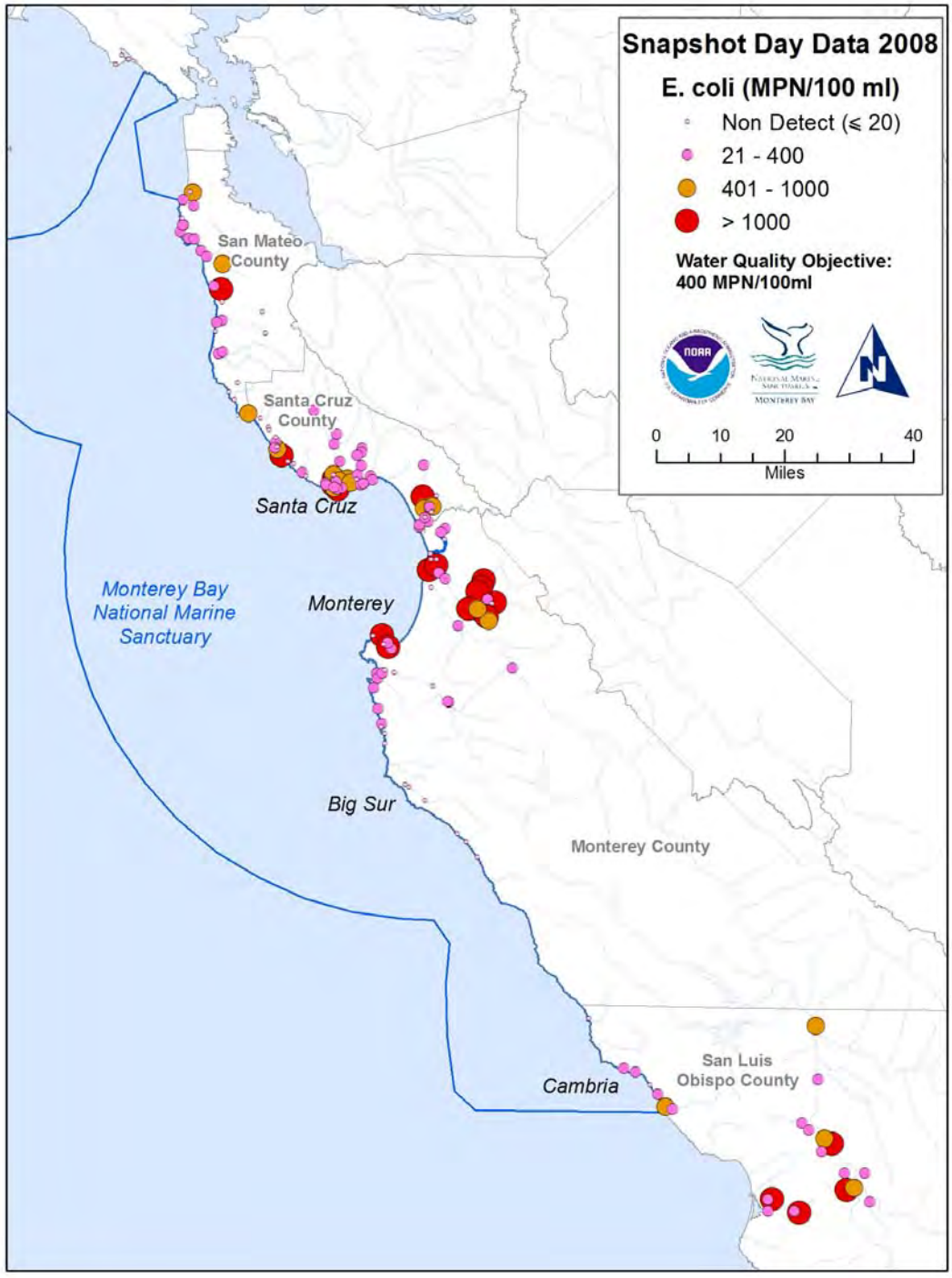


Figure 4. *E. coli* concentrations for Snapshot Day 2008.

Areas of Concern

Sites that exceed three or more WQO's are designated as "Areas of Concern" (Figure 6). Over the past several years, a trend has emerged of more than one Area of Concern per water body. For example, in 2007 and 2008, the Reclamation Ditch, Santa Rita Creek, and the Tembladero Slough all have more than one site that is an Area of Concern. Last year, a switch was made to the graph in Figure 5 to represent water bodies instead of individual sites. This trend information points to increasing problems on certain water bodies.

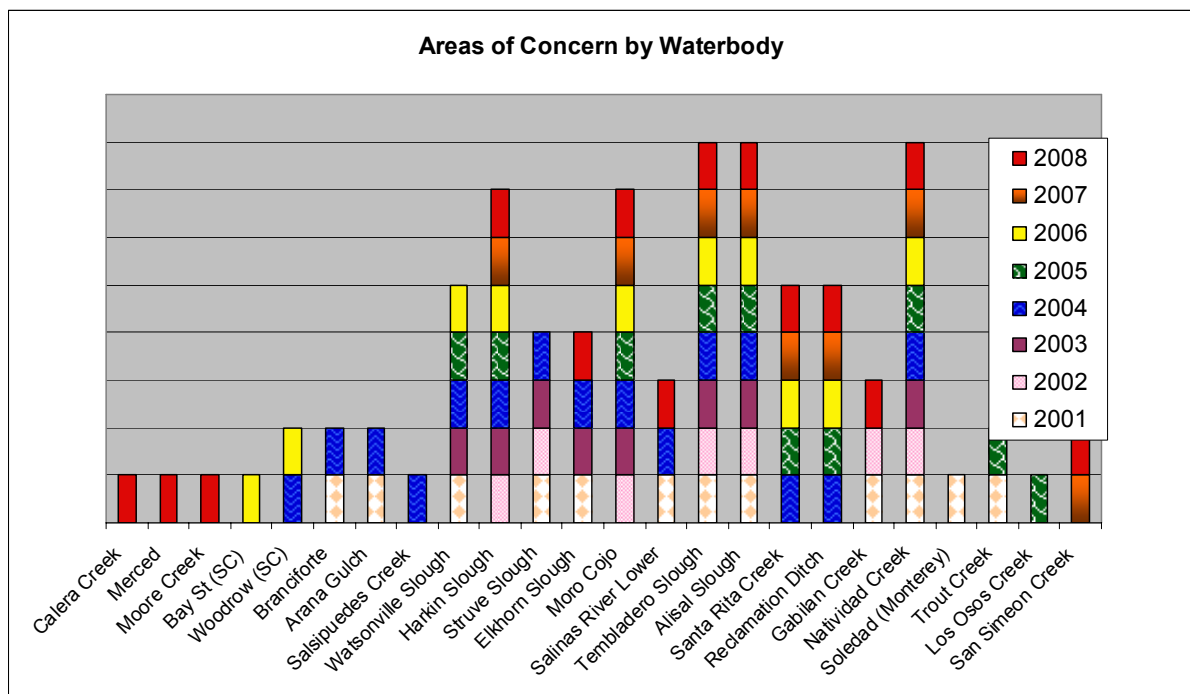


Figure 5. Eight year trend of water bodies listed as Areas of Concern. (Soledad Creek has not been monitored since 2003).

This year, Snapshot Day participants helped to identify 26 Areas of Concern, up from 16 last year. The majority of these sites (22) are located on just 14 water bodies.

The California State Water Resources Control Board puts out a list of impaired water bodies called the 303(d) list. This is a list of water bodies that are found to be

impaired by one or more pollutant. Of the 14 water bodies identified as Areas of Concern, nine of these are listed in 303(d) for Region 3 (central coast). These 303(d) listed waterbodies include: Elkhorn Slough, Gabilan Creek, Moro Cojo Slough, Natividad Creek, Salinas River and Old Salinas River, Salinas Reclamation Canal (Rec Ditch), Santa Rita Creek, Tembladero Slough and the Watsonville Slough.

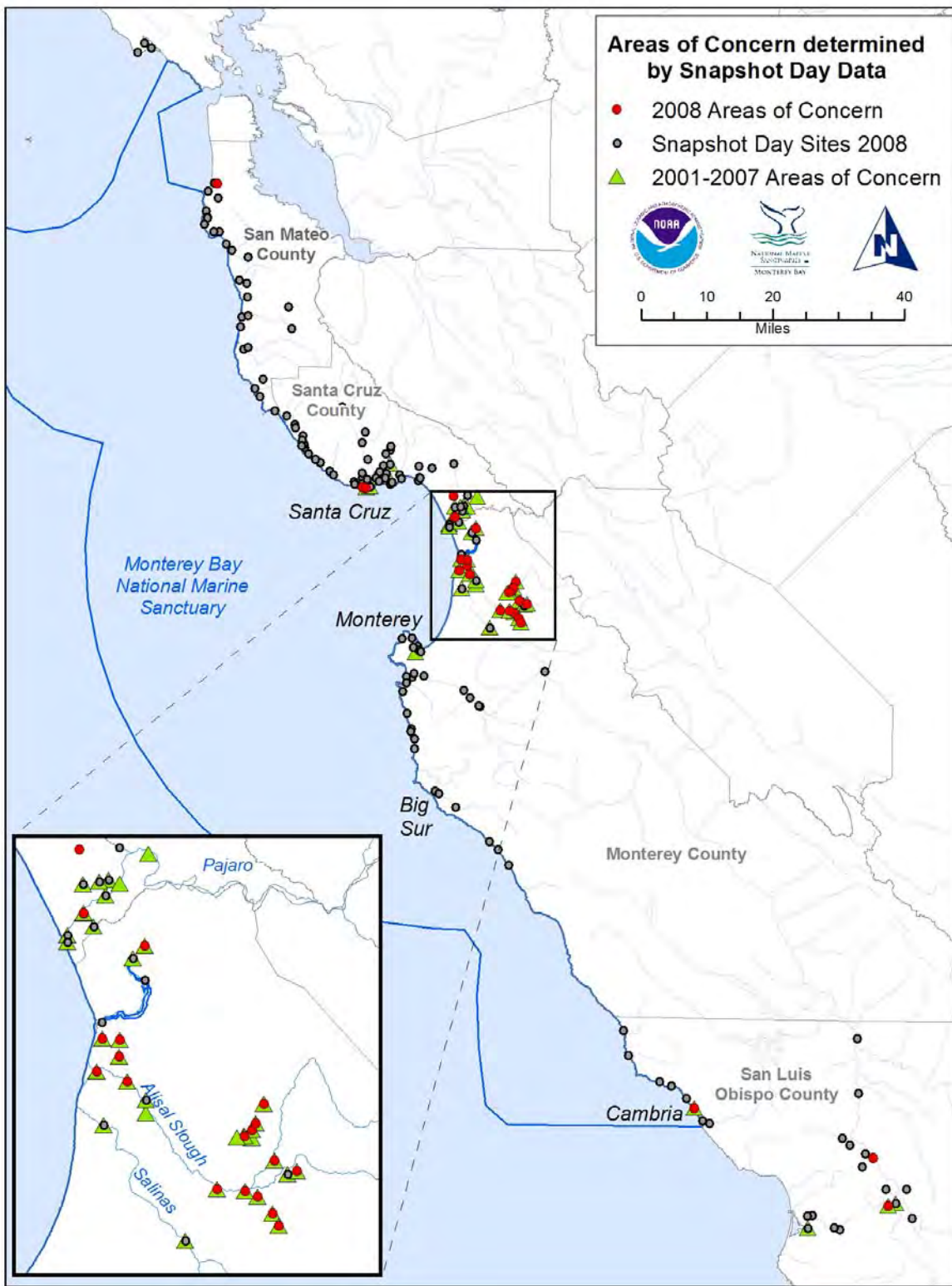


Figure 6. Snapshot Day Areas of Concern.

Conclusion

This 9th annual Snapshot Day event brought together over 180 citizens concerned with central coast water quality. These volunteers pulled together to complete a monitoring effort that could not have been accomplished by resource agencies alone. Thanks to the efforts of these volunteers, we now have another year of data from 173 creeks and streams along the central coast.

This data has been combined with the data from the past eight Snapshot Day events and gives us an idea of the quality of water on the central coast. In general, results from the waterbodies along the San Mateo Coast and Big Sur Coast continue to demonstrate healthy conditions for cold water fish. Overall, the percentage of sites that did not meet the water quality objectives for water temperature, *E. coli*, and orthophosphate remained the same as in 2007. Turbidity exceedances were down 14% in Santa Cruz and San Mateo counties. Exceedences of the dissolved oxygen WQO were also down 5% from 2007. The only parameter with more exceedences than in 2007 was nitrate, up 6%, with higher average concentrations as well.



Lisa Lurie and Sophie DeBeukelaer assist Anna Holden-Martz check in volunteer Sacha Lozano



The 2008 Snapshot Day Areas of Concern jumped this year to 26 from 16 last year. However, in 2006 there were also 26 Areas of Concern (not the same 26). Like in previous years, most Areas of Concern were found on just 14 water bodies.

For years the Sanctuary and its agricultural partners have been working together through the Agriculture Water Quality Alliance (AWQA). AWQA provides

farmers with tools to monitor their runoff and interpret monitoring results. AWQA partners encourage growers to improve water quality by providing education and assistance on implementing a number of management practices on their farms that can reduce polluted runoff. This information and assistance allows growers to take action to voluntarily clean up their farm practices.

Efforts are also taking place in local cities, through the Phase II Stormwater Management Plan implementation, by passing ordinances and implementing best management practices to reduce urban pollutants such as metals, nutrients and bacteria. By these major efforts and by zeroing in on the Areas of Concern, it is our hope that water quality conditions throughout the watersheds flowing to Monterey Bay National Marine Sanctuary will improve.

Snapshot Day is just one of many efforts to try to understand water quality conditions on the central coast. Snapshot data along with twelve other water monitoring programs was compiled into one database through the Central Coast Synthesis, Assessment, and Management (SAM) project. By integrating existing water quality data sets we are better able to identify information gaps, coordinate monitoring more efficiently and address spatial and temporal trends. A Central Coast SAM Water Quality Assessment and other pertinent documents can be downloaded at http://www.ccamp.net/sam/index.php/Main_Page

It is exciting that volunteer data is contributing information for many local efforts to improve the quality of water in local streams. It also increases people's awareness and knowledge about environmental issues. Without the help of so many dedicated volunteers, such a large effort would not be possible. Thanks again to all the wonderful citizens of the central coast who made such an effort possible!

Appendix 1. Results. Highlight represents exceedance of WQO.

County	StationID	Sample Collection Time	AirTemp	Conductivi	DO	ECOLI	NO3-N	pH	PO4	Tcooli	TRANS	TURB	WaterTem
Marin	201-ALC-11	11:00:00 AM	13	15.42	7.04	10			7.8		259	10.5	9.7
Marin	201-BOL-01	11:00:00 AM	15	50.9	7.8	10			7.6		31	8	10.8
Marin	201-DUX-10	10:30:00 AM	11		10.15	10	0.3		7.6	0.05	204	9.56	11.3
Marin	201-PIG-10	10:15:00 AM	19	179.3	10.1	10	0.2		7.4	0.05	288	0.91	11.3
San Mateo	202-ALPIN-11	11:10:00 AM	14	1060	10	10	0.01		8	0.05	341	122	10.5
San Mateo	202-BEARG-11	11:56:00 AM	16	100	8	10	0.01		6.5	0.05	98	120	11
San Mateo	202-BUTAN-11	11:20:00 AM	11	440	9.2	62	4.31		7	0.05	253	120	11
San Mateo	202-CALER-11	11:06:00 AM	12	700	6.3	683	0.01		7	0.5	2014	120	13
San Mateo	202-CALER-12	11:45:00 AM	12	400	8.4	10	0.01		7	0.05	1850	120	12
San Mateo	202-DEERC-12	9:30:00 AM	13	450	10	134	0.01		7	0.05	472	0.5	10.5
San Mateo	202-DENNI-11	12:55:00 PM	14	280	9.4	145	1.17		6.5	0.05	763	0	12
San Mateo	202-FRENC-11	10:37:00 AM	14		10.5	259	3.01		7	0.05	520	1	12.5
San Mateo	202-GAZOS-11	10:30:00 AM	14	400	6	10	0.01		6.5	0.05	132	120	11.5
San Mateo	202-GAZOS-15	12:23:00 PM	13	300	8	10	1		6.5	0.05		120	11
San Mateo	202-LOBIT-11	9:45:00 AM	10.6	990	10.4	1860	1.74		8.5	0.05	2143	5	9.5
San Mateo	202-MARTI-11	9:35:00 AM	10	250	9.8	10	0.78		6.5	0.05	189	5	11
San Mateo	202-MILLC-11	12:07:00 PM	16	830	10.5	480	0.01		7	0.05	1017	0.5	11.5
San Mateo	202-MONTA-11	10:45:00 AM	11	460	7	135	0.01		6.5	0.05	670	5	11
San Mateo	202-MONTA-12	10:45:00 AM	10	470	7	96	0.01		6.5	0.05	794	20	11
San Mateo	202-PESCA-11	12:25:00 PM	11	750	8.65	41	0.01		7	0.05	936	120	12.5
San Mateo	202-PILAR-11	11:17:00 AM	14	530	10.5	231	3.7		7	0.05	624	0	11.5
San Mateo	202-POMPO-11	9:55:00 AM	12	1400	9.4	10	0.01		7	0.05	246	120	13.5
San Mateo	202-PURIS-11	9:08:00 AM	10	690	9.8	309	0.01		8.5	0.05	464	5	10
San Mateo	202-SANGR-11	11:00:00 AM	12	1210	10	86	0.71		8.5	0.05	313	5	14.5
San Mateo	202-SANGR-12	10:50:00 AM	12.8	940	9.6	243	0.01		7.5	0.05	399	120	12.5
San Mateo	202-SANGR-14	9:55:00 AM	12	700	9.4	10	12.64		7.5	0.05	52	122	8.75
San Mateo	202-SANPE-11	12:55:00 PM	14	500	9.4	41	1.57		7	0.05	637	120	12
San Mateo	202-SANPE-13	12:20:00 PM	14	500	9.6	216	1.49		6.5	0.05	754	120	11.5
San Mateo	202-SANVI-11	12:20:00 PM	10	310	9.4	323	0.01		6.5	0.05	1046	10	11
San Mateo	202-TUNIT-11	10:27:00 AM	11.5	910	10.6	10	0.01		8.5	0.05	20	5	9.8
San Mateo	202-WHITE-12	9:33:00 AM	14	300	8	20	0.01		7	0.05	120	120	12
Santa Cruz	304-APTOS-21	10:28:00 AM	14.5	780	9	0	0	7.3	0			0	10.8
Santa Cruz	304-APTOS-22	11:43:00 AM	12	800	8	0	0	7.5	0.082			0	10.6
Santa Cruz	304-APTOS-23	12:00:00 PM	12.5	980	10	0.349	0	7.5	0.104			0	12.8
Santa Cruz	304-ARANA-21	11:54:00 AM	15	600	8.6	305	0.495	6.5	0.106		2909	0	10.5
Santa Cruz	304-ARANA-22	10:06:00 AM	17.5	19000	5.1	5	0	7	0		173	5	13
Santa Cruz	304-ARANA-23	12:53:00 PM	13.5	400	10	31	0.294	6.5	0.146		341	0	11
Santa Cruz	304-ARROY-21	1:10:00 PM	17	710	10	160	0.722	6.5	0		2481		13.5
Santa Cruz	304-ARROY-22	11:47:00 AM	16	670	7	175	2.254	7	0.102		3255	15	18
Santa Cruz	304-ARROY-23	12:35:00 PM	15	670	11	145	3.145	7	0		3255	15	16
Santa Cruz	304-BEACH-21	12:05:00 PM	20	2500	10	52	37.45	8	0		4611	5	19
Santa Cruz	304-BRANC-21	12:15:00 PM	17.5	600	12.45	512	0.42	7.5	0		3076	5	16.5
Santa Cruz	304-BRANC-22	11:35:00 AM	14.5	610	10	0.23	0	7	0.072			35	11
Santa Cruz	304-BRANC-23	10:25:00 AM	13.1	520		0.606	0	7	0			120	11.5
Santa Cruz	304-BRANC-24	11:30:00 AM	15	620	9.8	305	0.211	7	0.06		1467		11.5
Santa Cruz	304-BRANC-25	12:00:00 PM	18	590	10.8	384	0.163	6.5	0		1565	10	11
Santa Cruz	304-CORCO-21	10:30:00 AM	20.5	17600	7.4	185	0	8.5	0		3873	5	17.5
Santa Cruz	304-CORCO-22	11:17:00 AM	17	14600	7.2	52	0	8.5	0		908	10	19
Santa Cruz	304-FERRA-21	10:09:00 AM	14	380	94	24192	0	7	0		24192	5	11
Santa Cruz	304-GRANI-21	10:20:00 AM	12	510	10.6	41	0.26	6.5	0.087		3169	5	9
Santa Cruz	304-LAGUN-21	10:10:00 AM	16	480	10	135	0.153	7	0		763	120	10
Santa Cruz	304-LIDEL-21	12:51:00 PM	13.5	360	8.44	20	0.869	7	0.085		605	0	11
Santa Cruz	304-LITTL-21	11:15:00 AM	13.4	410	10.2	5	0.062	6.5	0		332	120	11
Santa Cruz	304-MAJOR-21	11:00:00 AM	12	410	8	20	0.327	7	0		744	120	10
Santa Cruz	304-MOLIN-21	11:20:00 AM	12	300	10.82	517	0.3	7	0.05		3545	10	11
Santa Cruz	304-MOORE-21	10:28:00 AM	14.5	400	10.2	41	0	7	0		9804	10	18.5
Santa Cruz	304-MOORE-22	10:04:00 AM	13	370	10	0.539	6.5	0	0		933	10	12.5
Santa Cruz	304-MOORE-23	12:25:00 PM	16.5	420		4352	0.356	7	0		5775	10	12
Santa Cruz	304-MOORE-24	10:15:00 AM	16	500		2359	0.106	7	0		7270	20	11
Santa Cruz	304-MOORE-25	11:30:00 AM	15.5	460		548	0	7	0		2046	10	11.5
Santa Cruz	304-MOORE-26	11:28:00 AM	12	1300	8	426	0	6	0		11199	15	17
Santa Cruz	304-NEWYE-11	10:00:00 AM	13.5	700		857	1.311	0	0		1785	0	12
Santa Cruz	304-ROBSC-21	12:00:00 PM	15.5	500	6.7	292	0	7	0.073		14136	5	12
Santa Cruz	304-SANLO-21	11:55:00 AM	17	600	8	749	0.458	7	0		2046	5	17
Santa Cruz	304-SANLO-22	10:12:00 AM	12	14100	8.85	435	0	7	0		4106	5	13.59
Santa Cruz	304-SANLO-26	2:40:00 PM	19.5	418	10.3	62	0.612	7	0		1198	122	1.66
Santa Cruz	304-SANLO-27	1:12:00 PM	20.05	490	10.88	52	0.32	7	0		839	122	0.86
Santa Cruz	304-SANVI-21	12:17:00 PM	14	320	9.21	5	0.05	7	0.05		1414	5	11.5
Santa Cruz	304-SCOTT-21	10:35:00 AM	14.8	300	9.96	10	0	6	0		1223	120	11.8
Santa Cruz	304-SCOTT-22	10:55:00 AM	13.5	230	9.8	10	0.024	6	0		323	120	11.2
Santa Cruz	304-SCOTT-23	11:45:00 AM	15.89	410	10.1	5	0	6.5	0		1081	120	11.6
Santa Cruz	304-SCOTT-24	11:25:00 AM	14.6	250	10.2	52	0.024	6	0		441	120	11.1
Santa Cruz	304-SCOTT-25	12:00:00 PM	12.8	330	10.1	41	0	6	0		383	120	13.1
Santa Cruz	304-SCSD2	12:00:00 PM	14.5	800	5.6	2987	3.44	7.5	0.05		17329	0	16

County	StationID	Sample Collection Time	AirTemp	Conductivi DO	ECOLI	NO3-N	pH	PO4	Tcoli	TRANS	TURB	WaterTem
Santa Cruz	304-SCSD3	10:10:00 AM	19	600	9.5	471	2.151	8	0	3873	0	14
Santa Cruz	304-SCSD4	11:05:00 AM	14	800	7.8	178	2.9	8	0.05	24809	0	15
Santa Cruz	304-SOQUE-21	10:00:00 AM	15	0		145	0	7	0	1223	120	13
Santa Cruz	304-SOQUE-22	12:00:00 PM	8	2000		134	0	7	0	880	50	15
Santa Cruz	304-VALEN-21	12:46:00 PM	14.5	660	10		0.175	7.5	0.104		0	11.5
Santa Cruz	304-VALEN-22	11:19:00 AM	12.5	590	8		0.804	7.2	0.093		0	11.2
Santa Cruz	304-WADDE-21	1:00:00 PM	20	400		10	0.103			1162	0	13
Santa Cruz	304-WILDE-21	11:35:00 AM	14	480	8	134	0.349	7	0	988	120	10
Santa Cruz	304-WILDE-22	12:00:00 PM	14	480	8	97	0.356	6.5	0	1314	120	10
Santa Cruz	304-ZAYAN-21	10:37:00 AM	14.5	469	10.69	52	0.772	7	0.11	1198	122	1.27
Santa Cruz	304-ZAYAN-22	12:08:00 PM	17	606	10.5	89	0.118	7	0	1483	122	1.47
Santa Cruz	305-CORRA-21	11:50:00 AM	13.5	374	8	10	5.446	7	0	1785	130	3
Santa Cruz	305-CORRA-22	12:25:00 PM	13	257		249	0.083	7	0	5794	130	14
Santa Cruz	305-HARKI-21	9:52:00 AM	13	225	7	496	0	6.5	0.067	9208	7.1	17
Santa Cruz	305-HARKI-22	2:13:00 PM	17	1100	5	31	8.329	7	0	24196	0	14
Santa Cruz	305-HARKI-23	11:10:00 AM	17	165	6.5	1607	0.089	7	0	4884	19.6	2
Santa Cruz	305-PAJAR-21	10:40:00 AM	15	1300	8	295	6.037	7	0	1658	10	16.5
Santa Cruz	305-STRUV-21	12:40:00 PM	15.17	310	7.8	487	0	7	0	3076	10	19.5
Santa Cruz	305-STRUV-22	1:48:00 PM	21	420	8.6	5	0	7	0.267	1918	5	24
Santa Cruz	305-WATSO-22	1:50:00 PM	15	1100	6	20	8.331	7	0	24196	5	15
Santa Cruz	305-WATSO-23	12:05:00 PM	17	2300	8	323	14.399	7	0	19863	20	18
Santa Cruz	305-WSTRU-21	12:40:00 PM	25	510	9.4	158	0	7	0	2400	10	22
Monterey	306-ELKHO-31	8:54:00 AM	10.2	19000	6	20	0.3	7.5	0.05	83	96.4	15.1
Monterey	306-ELKHO-32	8:21:00 AM	11.4	19000	3	40	2.8	8	0.05	1074	34.4	16.3
Monterey	306-ELKHO-33	9:31:00 AM	11.4	19000	6	20	0	7.5	0.05	61	43.4	14.7
Monterey	306-ELKHO-34	7:51:00 AM	11.3	1700	8	293	30.9	7.5	0.3	48391	120	12.3
Monterey	306-MOROC-31	10:50:00 AM	24	5400	12	1423	7.1	9	0.05	34658	1	18.2
Monterey	306-MOROC-32	11:20:00 AM	19.2	19900	12	20	0.05	9.5	0.3	149	2	23.3
Monterey	306-MOROC-33	12:00:00 PM	21	19900	12	20	0.05	9	0.05	20	8	26.7
Monterey	307-CARME-35	11:24:00 AM	16.5	380	10	125	0.05	7	0.05	2039	120	12
Monterey	307-CARME-36	11:42:00 AM	16.5	390	9		0.05	7	0.05		120	12.5
Monterey	307-CARME-37	10:30:00 AM	19	400	10	20	0.05	6.5	0.05	2306	120	14.5
Monterey	307-CARME-38	11:23:00 AM	17	390	10	20	0.05	6.5	0.05	4374	120	14.5
Monterey	307-CARME-39	11:53:00 AM				83	0.05		0.05	2966		
Monterey	307-GARZA-31	10:25:00 AM	15.1111	1000	9	346	0.05	7	0.05	2792	120	14.83333
Monterey	307-HATTO-31	11:13:00 AM	22.5	270	9	40	0.05	6.5	0.05	1864	120	12
Monterey	307-HATTO-31	12:17:00 PM	17	1400	8	20	0.3	6.5	0.05	845	120	12
Monterey	308-BIGSU-31	9:40:00 AM	16.3	330	9.05	20	0.05	7	0.05	869	120	12.6
Monterey	308-BIGSU-32	10:20:00 AM	16.8	310	8.83	20	0.05	7	0.05	626	120	11.9
Monterey	308-DOUD-31	11:00:00 AM	15	310	9	125	0.4	7	0.05	3077	120	11
Monterey	308-GARRA-31	11:30:00 AM	17.5	280	12	20	0.05	6.5	0.05	1217	120	11
Monterey	308-HOTSP-31	12:10:00 PM	12.7	390	9.16	20	0.05	7	0.05	957	120	12.8
Monterey	308-MALPA-31	12:00:00 PM	16	370	8	61	0.8	6.5	0.05	2269	120	11
Monterey	308-MCWAY-31	11:50:00 AM	11.5	380	9.24	20	0.05	7	0.05	220	120	11.9
Monterey	308-PALOC-31	12:00:00 PM	13.5	500	8	20	0.05	7	0.05	1542	120	11.5
Monterey	308-PARTI-31	11:25:00 AM	12.7	370	9.53	20	0.05	7	0.05	492	120	11.5
Monterey	308-ROCKY-31	10:30:00 AM	13	280	8	20	0.05	6.5	0.05	991	120	10
Monterey	308-SANJO-31	11:05:00 AM	13.94444	400	10	170	0.05	7	0.05	3301	120	10.61111
Monterey	308-SOBER-31	11:40:00 AM	15.66667	400	10	61	0.05	7	0.05	3587	120	12.05556
Monterey	308-SYCAM-31	10:50:00 AM	15.1	380	3.75	20	0.05	6.5	0.05	149	120	11.5
Monterey	309-ALISA-32	11:07:00 AM	16.8	1400	5.5	2581	26.8	7.5	0.2	48392	7.8	16.6
Monterey	309-ASILO-31	11:37:00 AM	17	1780	5	20	0.6	6.5	0.05	9222	120	13.5
Monterey	309-ATASC-41	9:27:00 AM				63	0		0.02	2143		
Monterey	309-ATASC-42	10:41:00 AM				435	0		0.1	17329		
Monterey	309-CENTR-31	11:01:00 AM	18	1670	7	2034	1.9	6.5	0.05	48392	120	13.5
Monterey	309-DOLPH-31	11:26:00 AM	13.9	1990	7	192	1.1	7.5	0.05	6511	120	11
Monterey	309-GABIL-31	10:34:00 AM	13	1100	7	342	23.5	7	0.6	13733	120	17
Monterey	309-GRAVE-41	10:04:00 AM				63	0		0.02	12997		
Monterey	309-LIBRA-31	10:40:00 AM	13.2	1990	9	1366	0.05	7	0.05	24067	120	11.9
Monterey	309-MAJOR-31	10:05:00 AM	15.7	1420	7	270	0.05	7	0.05	5819	120	11.5
Monterey	309-NATIV-31	11:52:00 AM	22	1030	5	2	10.5	7	0.05	20	120	13
Monterey	309-PASOR-41	9:15:00 AM				110	0		0.04	1860		
Monterey	309-RECDI-31	10:25:00 AM	16.8	1600	6	1666	23.9	7.5	0.05	48392	38.4	15.9
Monterey	309-RECDI-33	11:25:00 AM	23.3	1500	7	1301	42.7	7.5	0.7	48392	11.8	16.8
Monterey	309-RECDI-34	11:58:00 AM	18.4	1300	11	538	32.3	7.5	0.4	48392	15.8	19
Monterey	309-RECDI-35	10:25:00 AM	18.8	1000	9	610	27.7	7.5	0.6	48392	9.2	17.1
Monterey	309-RINCO-41	11:21:00 AM	25		5.5	238	0.05	7.5	0.03	2247		17.5
Monterey	309-SALIN-31	10:54:00 AM		1990	12	20	33.7	8.5	0.05	3587	25	
Monterey	309-SALIN-32	10:00:00 AM	15.6	1410	9	83	21.9	7.5	0.05	48382	89	15.9
Monterey	309-SALIN-33	11:50:00 AM	18.5	500	10	82	1.7	7	0.05	3744	44.6	16.7
Monterey	309-SALIN-44	8:46:00 AM				448	0.1		0.07	540		
Monterey	309-SALIN-45	10:50:00 AM	22		5	185	0.05	7	0	5475		17.5
Monterey	309-SALIN-46	11:35:00 AM				3609	0		0.23	19863		
Monterey	309-SALIN-47	10:40:00 AM				122	0		0.14	5475		

County	StationID	Sample Collection Time	AirTemp	Conductivi	DO	ECOLI	NO3-N	pH	PO4	Tcoli	TRANS	TURB	WaterTem
Monterey	309-SMARG-41	9:05:00 AM	18	820	8	216	0.05		7	0.01	2613		14.5
Monterey	309-SRITA-32	11:15:00 AM		800	8.54	61314	7.7		7	0.05	241960	1.4	18
Monterey	309-SRITA-33	10:25:00 AM	15.6	700	8.72	8803	8.5		7.5	0.05	241960	1	18.2
Monterey	309-SRITA-34	11:40:00 AM		700	9.17	7328	2.2		7.5	0.05	241960	3.2	24.1
Monterey	309-SRITA-35	12:10:00 PM		800	11.52	5381	3		8	0.05	68667	5	26.5
Monterey	309-TEMBL-31	10:15:00 AM	20.2	3000	7	1570	42.1		7.5	0.3	48392	9	15.4
Monterey	309-TEMBL-32	10:56:00 AM	25.6	2400	7	218	25.4		7.5	0.05	48392	53.5	17
Monterey	309-TEMBL-33	10:36:00 AM	24.5	2100	9	378	42.1			0.4	48392	12.3	16.4
Monterey	309-TROUT-41	10:21:00 AM	16		7.5	441	0.05		7	0.29	2046		12.5
Monterey	309-UPPER-31	11:15:00 AM	18	1640	9	10950	65.7		7	0.05	48392	16	17
Monterey	309-VETER-31	10:18:00 AM	18.5	1990	4.5	20	0.05		7	0.05	3300	120	11.5
Monterey	309-YERBA-41	9:50:00 AM	17	1150	4	1250	0.05		7	0.15	4352		14
San Luis Opispo	310-ARROY-41	10:25:00 AM	12.5	940	9.4	359	0.05		7.5	0.02	4360	120	14
San Luis Opispo	310-ARROY-42		12	520	8.1		0.05		7	0.05		128	15
San Luis Opispo	310-CARPO-41	8:45:00 AM	13	450	8.6	10	0.05		7	0	598	120	14
San Luis Opispo	310-DAL-41	8:15:00 AM		847	7.02	1210	0.05		7.5	0.05	6488		0.6
San Luis Opispo	310-LAGUN-41		12	1050	8	327	0.05		7.5	0.02	1935	81	14
San Luis Opispo	310-PENN-41	10:10:00 AM		773	8.68	323	0.05		7.5	0.06	2755		9.99
San Luis Opispo	310-PICOC-41		20	930	7.8	20	0.05		7	0	2014	120	15
San Luis Opispo	310-SANSI-41	8:23:00 AM	11.5	1180	6	211	7.6		7	0.46	6867	120	12
San Luis Opispo	310-SANTA-41	10:22:00 AM	15	1060		110	0.05		7.5	0.01	7270	120	14.5
San Luis Opispo	310-SANTA-42	9:29:00 AM	14.5	10100	8.2	462	0.3		7.5	0.02	1539	120	13
San Luis Opispo	310-SBE-41	1:18:00 PM		952	11.88	1153	0.6		7.5	0.15	3654		0.79
San Luis Opispo	310-SYB-41	10:15:00 AM		11890	4.8	97	11		7.5	0.09	2909		7.4
San Luis Opispo	310-UCF-41	12:55:00 PM		989	13.23	41	1.4		7	0.5	1793		0.92