MONTEREY BAY SANCTUARY CITIZEN WATERSHED MONITORING NETWORK

SNAPSHOT DAY 2001

Hubs

San Mateo

Santa Cruz

Monterey

Cambria

Prepared By:
Bridget Hoover, Monterey Bay Sanctuary Citizen Watershed Monitoring Network
Ross Clark, California Coastal Commission
Tamara Clinard, Coastal Watershed Council

Funding for Snapshot Day was provided by the Monterey Bay National Marine Sanctuary, the Central Coast Regional Water Quality Control Board and the California Coastal Commission

Snapshot Day 2001 was organized by:

The **Monterey Bay Sanctuary Citizen Watershed Monitoring Network** (Network) supports citizen monitoring programs throughout the Monterey Bay National Marine Sanctuary. (831) 883-9303. http://www.mbnms.nos.noaa.gov/monitoringnetwork/welcome.html

The **California Coastal Commission** is proud to help support the Central Coast Snapshot Day as an important educational program linking land & water quality stewardship with coastal resource protection. (831) 427-4863. http://www.coastal.ca.gov/

The **Monterey Bay National Marine Sanctuary (MBNMS) Water Quality Protection Program** works to protect the watersheds along nearly 300 miles of the Sanctuary's coastline. (831) 647-4201 http://www.mbnms.nos.noaa.gov/

The **Coastal Watershed Council** is a public education non-profit advocating the preservation and protection of coastal watersheds through establishment of community-based watershed stewardship programs. (831) 426-9012. http://www.coastal-watershed.org/

The Ocean Conservancy (Center for Marine Conservation) is the largest national nonprofit organization committed solely to protecting ocean environments and conserving the global abundance and diversity of marine life through science-based advocacy, research, and public education, as well as informed citizen participation. (831) 425-1363 http://www.cmc-ocean.org/

Supported by the

California Coastal Commission's
Whale Tail License Plate Grants Program

This document has been reproduced from Whale Tail License Plate funding.

Participating Agencies and Organizations

Arana Gulch Watershed Alliance
Beckman's Bakery
Big Creek Reserve
California Coastal Commission
California State Parks
Central Coast Regional Water Quality Control Board
City of Santa Cruz
City of Pacifica
City of Watsonville
Coastal Watershed Council
Creekside Environmental Laboratory
Crystal Geyser Water
DeAnza College
Earth Systems Science and Policy Program (CSUMB)
Elkhorn Slough National Estuarine Research Reserve
Garrapata Watershed Council
Greenspace
Land Conservancy of San Luis Obispo County
Monterey Bay Analytical
Monterey Bay National Marine Sanctuary
Monterey Bay Sanctuary Foundation
Monterey Regional Water Pollution Control Agency
New Leaf Market
Noah's Bagels
Pacific Cookie Company
Peet's Coffee
Sanctuary Cruises
San Gregorio Environmental Resource Center
San Lorenzo Urban Restoration Project
San Lorenzo Valley High School
San Luis Obispo County Environmental Health
San Mateo County Environmental Health
Santa Cruz County Environmental Health
Santa Cruz Safeway
Scott Creek Watershed Council
Smuckers J. M. Co.
State Water Resources Control Board Clean Water Team
Surfrider Foundation
The Ocean Conservancy
Trader Joe's
United States Environmental Protection Agency
Upper Salinas Las Tablas RCD
Upper Salinas Watershed Coalition
Watershed Institute, CSUMB
Whole Foods

TABLE OF CONTENTS

EXECUTIVE SUMMARY

On April 21, 2001, the Monterey Bay National Marine Sanctuary celebrated the second annual "Snapshot Day 2001" a one-day, Sanctuary-wide volunteer water quality monitoring event.

On Snapshot Day, 145 trained volunteers waded into creeks, streams, rivers, sloughs, estuaries, and beaches throughout San Mateo, Santa Cruz, Monterey, and San Luis Obispo counties to test water quality and take a "snapshot" of the condition of the Sanctuary's watersheds. The goal of the event was to provide a glimpse at what was flowing into the ocean from coastal streams on that one particular day in April.

Figure 1. CSUMB and Moss Landing Marine Lab students at Soberanes Creek

This year, volunteers tested 160 separate locations on 103 waterways for water temperature, dissolved oxygen (DO), conductivity, turbidity, and acidity/alkalinity (pH). Samples were also collected at each site and tested for nitrate, orthophosphate, Total coliform and *Escherichia coli* (E. coli). These water quality parameters help to identify the general health of a body of water. They further define potential threats to fish and other aquatic organisms, whether the water is safe for human contact, and potential sources of water quality problems.

The Snapshot Day monitoring event is designed to increase public awareness of water quality issues affecting Sanctuary watersheds and to emphasize the importance of water quality monitoring and the key role volunteer monitors play in our area. Snapshot Day also provides information to supplement data collected by other monitoring programs and it helps to find solutions to reduce water quality problems.

The second year for this event was another big success. Forty-two additional monitoring sites were added and 58 more volunteers participated. Nutrient and bacteria analysis was expanded to include all of the sites. With two years of data available, some comparison between years and sites is now possible.

From the streams that were monitored, it appears that most of them that are flowing into the Monterey Bay National Marine Sanctuary are healthy in terms of basic physical measurements defined by state water quality objectives. Basic parameters that determine the health of a natural system include water temperature, pH, dissolved oxygen, and transparency. Most of the results fell within the "healthy" range except for low dissolved oxygen measurements which were commonly found in several of the slough systems.

However, concentrations of bacteria and nutrients in the rivers and creeks often resulted in less than acceptable conditions. Forty-five locations had elevated nutrient levels. In general, nitrate levels were much lower this year than last year but orthophosphate levels were much higher and at significantly more locations. It is important to note that for Snapshot Day 2000, only 60 of the 120 sites were tested for nutrients so the increase in occurrences of orthophosphate is partially due to the expanded sampling.

Bacteria levels were very high at several locations. *E. coli* levels exceeded state and federal standards at 57 different sites. This situation was exacerbated because of the rain the previous day. Rain provides a flushing action that washes pollutants, such as animal waste, into surface waters causing high bacteria concentrations.

Ultimately, the goal of Snapshot Day is to provide the people of the Central Coast with a better understanding of the natural systems that surround them. The results indicate that there are polluted waterways that require attention. For those that are healthy, we must strive to keep them that way.

We greatly appreciate the efforts of all the volunteers who participated in this event and the sponsors who supported it.

Water Quality Monitoring

Why Monitor Water Quality?
Water quality monitoring is a critical component of effective watershed stewardship, education, and management. Monitoring water quality can:

1. provide an overall view of the health of an individual waterbody or a watershed;
2. identify water quality problems and potential sources of pollution;
3. help prioritize water quality management decisions;
4. serve as a baseline for comparing future data and identifying trends over time; and
5. educate residents and help them to become better stewards of their watershed.

The Monterey Bay National Marine Sanctuary Water Quality Protection Program
The Monterey Bay National Marine Sanctuary (MBNMS) covers nearly 300 miles of California's Coast, stretching from the Marin headlands in the north to Cambria in the south. The MBNMS encompasses more than 5300 square miles of water including many diverse ecosystems and nearly 500 different species of fish, seabirds, and marine mammals. Eleven major watershed areas, including over 7000 square miles of land, drain into the MBNMS.

Land use in the Sanctuary's watersheds includes urban and suburban development, extensive areas of irrigated croplands, managed timber lands, grazing lands, and other agricultural activities. Extensive public lands with diverse multiple uses are also present, including lands under the management of the federal, state, and local governments. As water passes over any of the lands in these watersheds, it can pick up a variety of potential pollutants such as sediments, oils and grease, nutrients, pesticides, and pathogens which can be transported to the region's rivers, wetlands, harbors, and nearshore waters.

Recognizing that human activities on land can affect Sanctuary waters and resources, the Monterey Bay National Marine Sanctuary developed a Water Quality Protection Program (WQPP) pursuant to a formal agreement made among federal, state and local agencies when the Sanctuary was founded. The WQPP is a partnership effort to enhance and protect the physical, chemical, and biological conditions in the Sanctuary and its adjacent watersheds. The ability to monitor water quality conditions comprehensively and reliably over time is critical to making effective management decisions. Accordingly, one goal of the WQPP is to provide comprehensive information regarding existing water quality conditions, long-term trends, and the success of pollution management efforts.

The Monterey Bay Sanctuary Citizen Watershed Monitoring Network
Faced with budget and staffing limitations, government agencies monitor less than 10% of California's rivers and streams, and funding for water quality testing has decreased over the past decade. Responding to this problem, citizen volunteers have begun filling the gaps in water quality data by testing local watersheds themselves.

According to a March 1999 survey, over 20 citizen groups actively monitor the watersheds of the MBNMS. Recognizing both the value and the increased potential for citizen watershed monitoring in the Sanctuary, the Coastal Watershed Council, The Ocean Conservancy, and the Monterey Bay National Marine Sanctuary, founded the Monterey Bay Sanctuary Citizen Watershed Monitoring Network in 1998.

Figure 2. Bridget Hoover, Network Coordinator and organizer of Snapshot Day.


Watersheds of the Monterey Bay National Marine Sanctuary
San Pablo Bay Estuary and Watershed
Marin Headlands Watershed
San Francisco Bay Estuary and Watershed
North Coastal
Santa Clara Valley Watershed
San Lorenzo River
Pajaro River
Elkhorn Slough
Carmel River
Salinas River
South Coastal Watershed
South Coastal
Cordell Bank National Marine Sanctuary
Gulf of the Farallones National Marine Sanctuary
Monterey Bay National Marine Sanctuary
Tomales Point
Pt. Reyes
Rocky Point
San Francisco
Farallon Islands
Point San Pedro
Pillar Point
Half Moon Bay
Pescadero Point
Pescadero Marsh
Pigeon Point
Point Ano Nuevo
Santa Cruz
Elkhorn Slough
Moss Landing
Point Pinos
Cypress Point
Monterey
Point Lobos
Point Sur
Lopez Point
Cape San Martin
Point Piedras Blancas
Morro Bay
Monterey Bay National Marine Sanctuary
Sanctuary Boundaries
Watersheds
Harbor
Rivers & Creeks
N
10 0 10 20 Kilometers
20 0 20 Miles

The overall goal of the Monterey Bay Sanctuary Citizen Watershed Monitoring Network is to help create integrated, long-term, volunteer-based water quality and watershed monitoring within the Monterey Bay National Marine Sanctuary and its watersheds. These citizen monitoring programs are an integral component of watershed stewardship, education and management.

MONITORING RESULTS

In order to facilitate the goal of the event being a "snapshot" of the waters flowing into the Monterey Bay National Marine Sanctuary, all monitoring took place at approximately the same time on the same day. With the exception of a few groups, all volunteers gathered at their respective hubs at 9:00 AM and were in route to their sampling destinations by 9:30 AM. The weather on Snapshot Day was partly cloudy to sunny, with temperatures ranging from 39°F to 70°F. It rained the day prior to Snapshot Day, with some areas recording as much as 0.21 inches of rain.

Figure 3. Tamara Clinard, Coastal Watershed Council, provides training in Santa Cruz.

Methods and Quality Control

Quality assurance/quality control (QA/QC) was accomplished through a pre-monitoring training and equipment calibration session one week prior to Snapshot Day. Four regional training sessions occurred throughout the Monterey Bay Sanctuary on April 14, 2001 to familiarize all volunteer group leaders and coordinators with monitoring protocols, sampling equipment, datasheets and safety measures. Revital Katznelson of the California State Water Resources Control Board's Clean Water Team, provided information on technical oversight, QA/QC techniques and data collection strategies.

Figure 4. Dr. Revital Katznelson, SWRCB, provides technical expertise at the "calibration party".

Snapshot Day 2001 volunteers tested a range of physical and chemical parameters designed to generate baseline data. The parameters were the same as last year and were selected based on their ability to serve as indicators of general waterbody health as well as ease of testing in the field with available equipment. All Snapshot Day 2001 volunteers were equipped with thermometers, dissolved oxygen kits/meters, pH strips, transparency tubes and conductivity meters. Additionally, samples were collected at every site and analyzed for nitrate (as N), orthophosphate (as P), and coliform in local laboratories.

It must be noted that Snapshot Day involved the use of numerous different instruments and kits from many sources. Quality Assurance for some of the equipment was not available.

Action Levels

To determine whether test results indicated a potential water quality problem, Snapshot Day 2001 results were compared with action levels for each parameter (temperature, DO, pH, nutrients, transparency, and coliform) that were established for the Central Coast Ambient Monitoring Program (CCAMP) by the Central Coast Regional Water Quality Control Board. CCAMP's Action Levels are set at levels which potentially impact beneficial uses such as water contact recreation, cold water fish habitat or agriculture.

They are typically either levels representing existing regulations, levels derived from literature or other agency references, or levels which are elevated relative to the data distribution for that parameter on the Central Coast.

Parameters

All of the data from Snapshot Day 2001 can be found in tabular form in Appendix A. Please refer to the table for results of every parameter listed by site. The data is also reported visually on maps. Map #1 shows sites where physical water quality conditions are poor. Map #2 shows sites where high levels of nutrients and bacteria were found. Map # 3 shows Locations of Concern. The complete data set is also available online at http://www.mbnms.nos.noaa.gov/monitoringnetwork/volunteer_data.html

Water Temperature

Water temperature is an important environmental factor for fish and other aquatic life, as many species need specific temperatures to survive and reproduce. Temperature also affects the concentration of dissolved oxygen in the water column and the rate of photosynthesis for aquatic plants. Human activities such as water diversions that decrease flows or removal of streamside vegetation that shades the water, can lead to elevated water temperatures.

It is important to keep in mind that much of the data was collected in the morning hours, therefore water temperature results likely do not reflect the maximum daily temperature for the waterbody.

The CCAMP action level for water temperature is 22 degrees Celsius (22°C). Temperatures above 22°C can be stressful for coho and steelhead. The recorded water temperatures on Snapshot Day ranged between 8.0°C and 18.5°C. The mean temperature for sites tested was 11.8°C. Last year, seven sites reported temperatures above 20°C with two exceeding the CCAMP action level.

Dissolved Oxygen

All aquatic animals require dissolved oxygen to breathe. The concentration of dissolved oxygen in the water column affects a wide range of behaviors such as feeding, spawning, and incubation. Nutrients found in sewage, fertilizers, and manure provides a food source for algae and aquatic weeds, causing blooms and increased vegetation. This in turn depletes the amount of oxygen available in the water column during the night.

Figure 5. Chris Berry, Coastal Watershed Council, takes measurements at Pilarcitos Creek in San Mateo.

The CCAMP action level for dissolved oxygen is less than 7 milligrams per liter (mg/l), based on the amount of dissolved oxygen needed by migrating steelhead trout. The mean dissolved oxygen level across testing sites was 9.3 mg/l. Eleven sites reported dissolved oxygen levels lower than the CCAMP action level. They included: Elkhorn Slough, Alisal Slough, Watsonville Slough system, Corcoran Lagoon, and Arana Creek.

Conductivity

Conductivity is a measure of the ability of water to conduct electrical current. Measuring conductivity gives an indication of the amount of total solids (such as salts, mineral, acids, and metals) dissolved in the water. Conductivity varies with water source and geographic region. There is no action level for conductivity. However, once a baseline of conductivity values is established, variations may signal a change in the waterbody's composition. For example, a decline in conductivity may be caused by rainwater and an increase in conductivity may signal sources of pollution such as agricultural runoff or municipal wastewater. Snapshot Day volunteers measured conductivity to establish a baseline for future comparisons.

Alkalinity/Acidity (pH)
pH is a measure of the percent of hydrogen ions in a water column. Water with a pH value of 7 is neutral, above 9 is alkaline and below 5 is acidic. Many chemical reactions in aquatic organisms that are important for survival and growth require a very narrow range of pH. Also, fish gills and fins can be damaged in extreme pH conditions.

The CCAMP Action levels for pH are levels either 8.5 and above or below 7.0. The mean pH level for all sites tested was 7.5. Four sites tested above the CCAMP action level. They included: 2 sites on the lower Salinas River reporting a pH of 8.7, Moro Cojo Slough at 8.9 and the Estrella River in San Luis Obispo County reporting 9.0. Sites testing below the CCAMP action level for pH included three sites on the Struve Slough in Watsonville reporting a pH of 6.5.

Turbidity/Transparency
Turbidity is a measure of the amount of suspended particles in water. Natural turbidity levels vary from stream to stream. Excessive turbidity may indicate erosion, nutrient loading, or artificial algae growth. Snapshot Day volunteers assessed area waterbodies using either a transparency tube or the dual cylinder method.

Fourteen sites fell below the CCAMP Action Level for transparency of 25 cm. That means that the water was so turbid that a miniature secchi disc could not be viewed through 25 centimeters of water. These sites included 5 sites in Salinas, 2 sites on the Carmel River, 3 sites along the Big Sur Coast, 2 sites in Monterey, and 2 sites in Santa Cruz.

There is not an established action level for turbidity measured by the dual cylinder method, however, a typical turbidity value for muddy water after a storm is between 20-100 Jackson Turbidity Units (JTU). Two sites near Atascadero recorded 60 and 80 JTU and two sites in San Mateo county recorded 80 and 85 JTU.

.

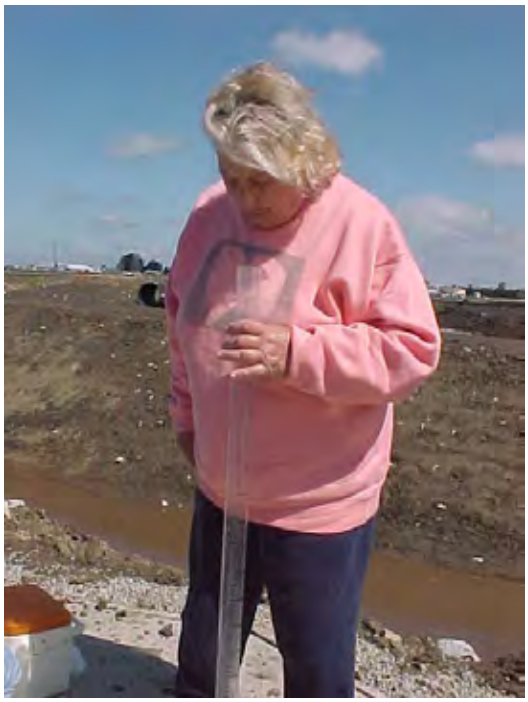


Figure 6. Teresa Dreisbach, volunteer, measures transparency at the Tembladero Slough in Salinas.

Volunteers also recorded turbidity by visual observations, classifying water clarity at a given site as: clear, cloudy, or turbid. Less than 15% of the sites tested were classified as turbid

Nutrients
Nitrate and orthophosphate are nutrients that occur naturally in waterbodies and promote aquatic plant growth. Excessive nutrient levels can lead to algal blooms and extensive aquatic weed growth that in turn depletes the amount of oxygen available in the water column at night. Runoff containing detergents, fertilizers, animal waste, industrial waste, or sewage, contribute to elevated nutrient levels. All sites except for the Big Creek area in Big Sur were tested for nutrients.

Eleven sites exceeded the CCAMP Action Level for nitrate (as N) of 2.25 mg/l. These sites were located on the Salinas and Pajaro rivers as well as Elkhorn and Watsonville sloughs. The two highest concentrations were at Beach Road in Watsonville at 31.3 mg/l and Alisal slough in Salinas at 38.0 mg/l.

Thirty-four sites tested above the CCAMP Action level for orthophosphate (as P) set at 0.16 mg/l. This is significantly more sites than last year which only recorded six exceedances. This may be due to the fact that many more sites were tested in 2001.

Coliform

Coliform bacteria originate from the feces of warm-blooded animals and are an indicator for human sewage or wildlife. Human sewage may contain feces-born organisms that can cause diseases such as hepatitis A, bacterial meningitis, and encephalitis. Excessive coliform counts can thus indicate potential problems for human health.

All of the sites were tested for Total coliform and *E. coli* except for sites in Santa Cruz County and the Big Creek area which were analyzed for Fecal coliform. *E. coli* is a member of the Fecal coliform group. CCAMP Action Levels are the same for Fecal coliform and *E. coli*, 400 MPN/100 ml. Out of 160 sites tested, 57 exceeded the CCAMP action level.

Six locations were well above 5,000 MPN/100ml with the Tembladero Slough reporting greater than 15,000 MPN and Pomponio Creek reporting 19,800 MPN/100 ml.

Conclusion

The second annual Snapshot Day proved to be a rewarding event. We welcomed many new water quality monitors and visited 160 locations on urban and rural streams. The data indicates that there are areas of concern both for high nutrient load and for high bacteria content. Over 30% of the sites tested exceeded state and federal standards for *E. coli*.

Six parameters were chosen to determine Locations of Concern. They include dissolved oxygen, water temperature, pH, nitrate, orthophosphate, and *E.coli*/Fecal coliform. If the CCAMP Action Level was exceeded for three or more of the parameters listed, it was deemed a Location of Concern.

For Snapshot Day 2000, there were five Locations of Concern. In 2001, four of the five remained a Location of Concern and twelve additional sites became Locations of Concern. (See Map #3)

Snapshot Day 2001 provided an opportunity for citizens to collect valuable information while enjoying friends and beautiful places. The information collected and documented in this report will be used by many organizations and agencies to better protect and enhance the water ways flowing into the Monterey Bay National Marine Sanctuary. For example, local health departments incorporate this data with their own data to determine areas of high coliform bacteria. A local university is using the data to support a grant proposal to do restoration work on one of the highly polluted waterbodies. And finally, a new citizen watershed group has been formed to raise awareness and try to improve the water quality of the Tembladero Slough.

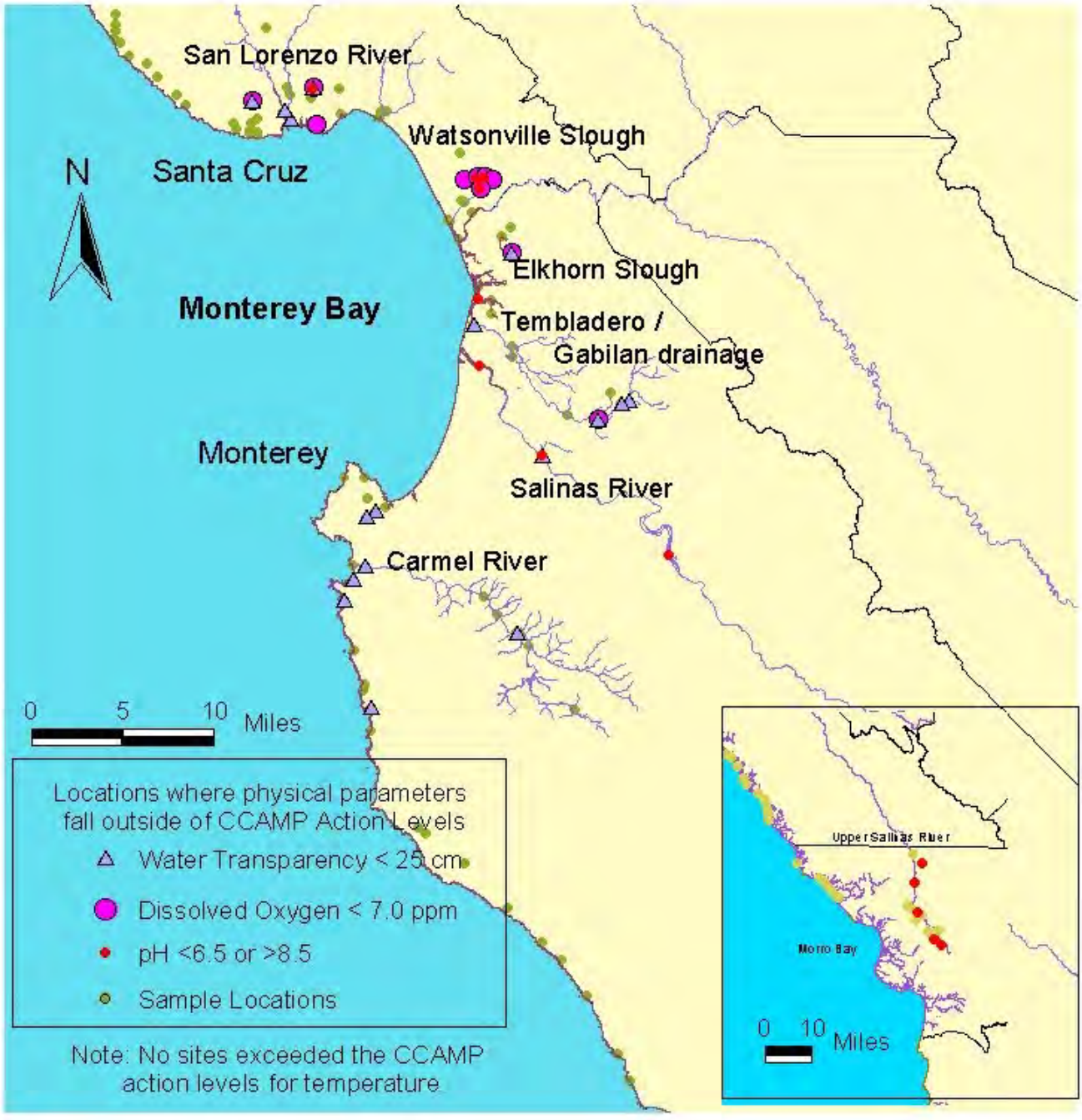
Figure 7. Donna Meyers, City of Santa Cruz, and Maya Conrad, Coastal Watershed Council, enjoy the day.

With each year of data collection, more information is gained and better understood. As we observe trends and consistent results, progress can be made toward improving areas of poor water quality. These locations may require more rigorous monitoring to determine the source of the problem.

Data results and maps of the sites are available online at

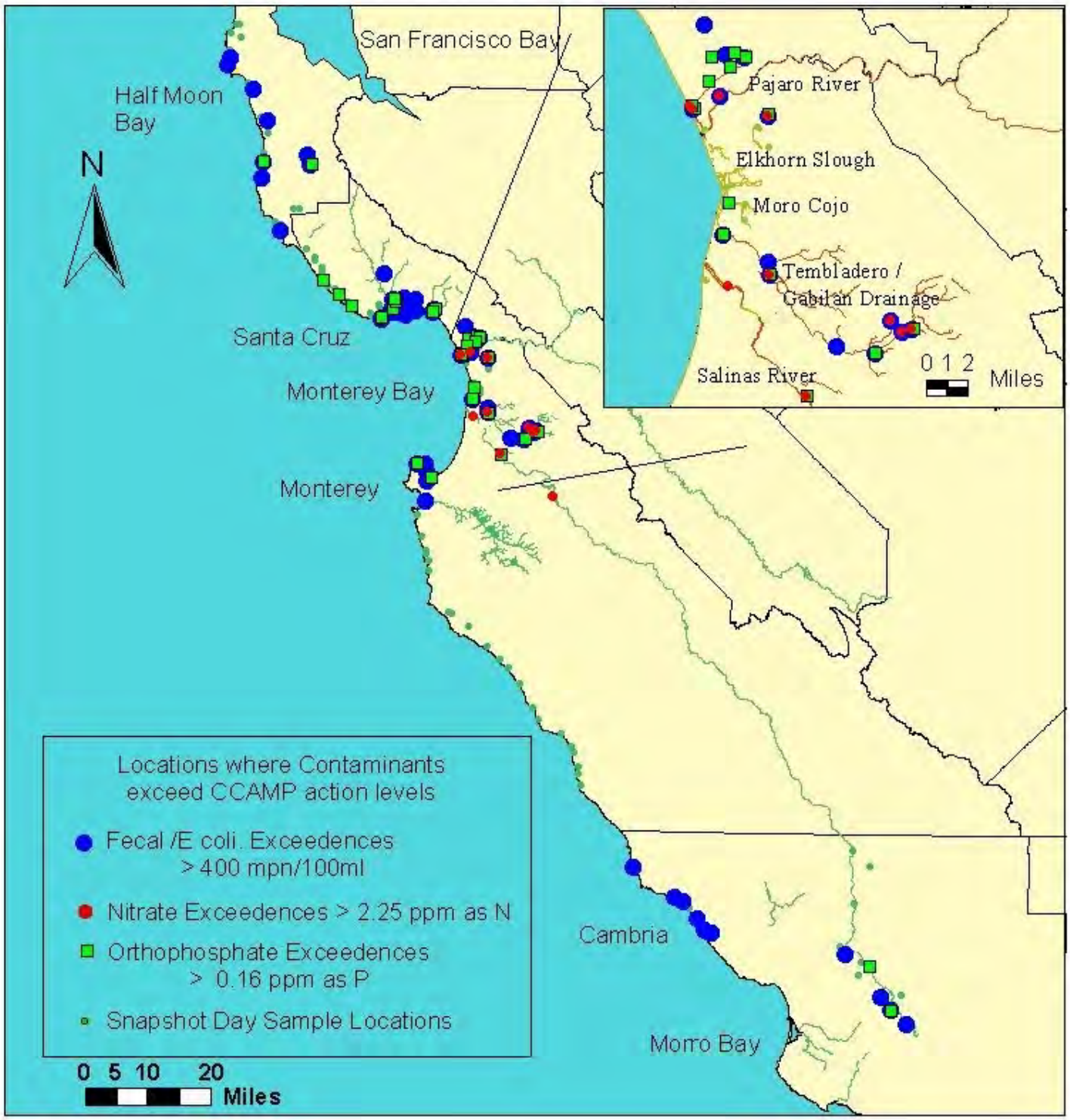
http://www.mbnms.nos.noaa.gov/monitoringnetwork/volunteer_data.html

#1 Snapshot Day Locations with Poor Basic Physical Conditions

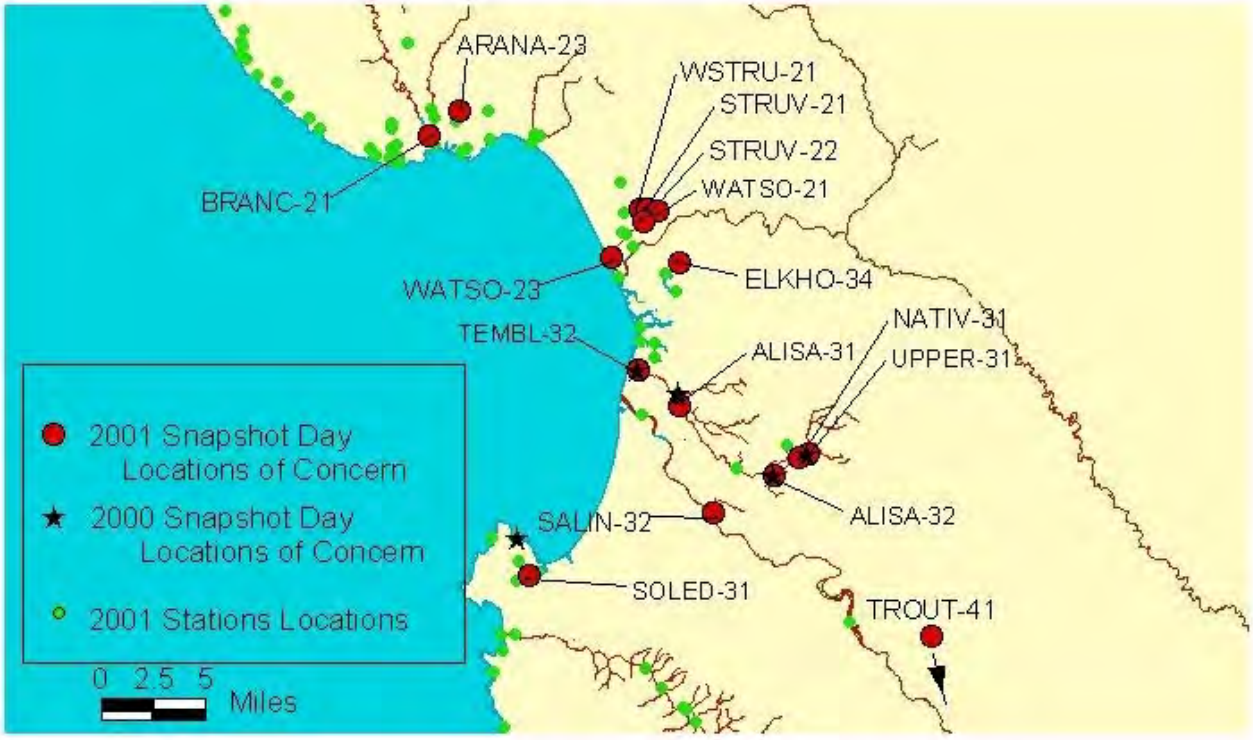


<u>CCAMP Action Levels</u>: To determine whether test results indicated a potential water quality problem, Snapshot Day 2001 results were compared with action levels for each parameter (temperature, DO, pH, transparency, nutrients, and coliform) that were established for the Central Coast Ambient Monitoring Program (CCAMP) by the Central Coast Regional Water Quality Control Board. (Action Levels are found in the map's legend)

Snapshot Day Locations with High Nutrient and Bacteria Levels



#3 Snapshot Day Locations of Concern



Six parameters were chosen to determine Locations of Concern. They include dissolved oxygen, water temperature, pH, nitrate, orthophosphate, and E.coli/fecal coliform. If the CCAMP Action Level (found in the legend on the previous two maps) was exceeded for three or more of the parameters listed, it was deemed a Location of Concern.

For Snapshot Day 2000, there were five Locations of Concern. In 2001, four of the five remained a Location of Concern. Twelve additional sites became Locations of Concern.

WHERE DO WE GO FROM HERE?

The Future of the Monterey Bay Sanctuary Citizen Watershed Monitoring Network

With a second year of funding from the Central Coast Regional Water Quality Control Board and the Monterey Bay National Marine Sanctuary, Bridget Hoover will continue to coordinate citizen monitoring activities throughout the Sanctuary's watersheds.

This year, the goal of the Network is to implement a certification program for all citizen based programs that conduct water quality monitoring throughout the Sanctuary. Bridget hopes to spend more time with each group, documenting their programs, reviewing protocols and setting up a computer file to assist them in uploading their data to the CCAMP database. A tiering system has been developed in which data collected from all monitoring groups is categorized on a scale from 1 to 3. This categorization is based on the sample design, training, protocols, quality assurance and record keeping capabilities of the group collecting the data. When the data is uploaded into CCAMP it will contain that qualifier. This process will provide the data users with more information regarding the quality of the data.

Participants in the Network are working to refine citizen monitoring methods throughout the Monterey Bay Sanctuary watersheds, and to ensure a standard level of quality for regional citizen monitoring results. As it continues to develop and grow, the Network will provide a regional template for other regions throughout coastal California.

If you would like to know more about the Network or be on the Network listserv contact Bridget Hoover at (831) 883-9303. The Network also has a new website **www.mbnms.nos.noaa.gov/monitoringnetwork/welcome.html**

This report and all of the results can be found on the Network website.

The Future of Snapshot Day

It is our hope that Snapshot Day will become a coastwide annual water quality monitoring event, inspiring California citizens to become more involved both in water quality monitoring and in watershed protection. Over time, Snapshot Day will provide useful information on water quality trends throughout the Sanctuary's watersheds as well as all watersheds flowing into the Pacific Ocean from California.

Ultimately, Snapshot Day and the Monterey Bay Sanctuary Citizen Watershed Monitoring Network share one goal: protection and enhancement of water quality throughout the Sanctuary and its watersheds.

Thank You to our Volunteers!

Snapshot Day was truly a community effort. Volunteers ranged from school children to County Supervisors, and included government agencies, community organizations, and concerned citizens. Local, State and Federal agencies loaned water quality monitoring equipment to the effort, and area businesses donated products and services from bagels to Sanctuary Cruises.

Figure 8. The Atkin's make Snapshot Day a family event.

If you would like to participate in Snapshot Day 2002, please contact Bridget Hoover, Network Coordinator, at (831) 883-9303 or the Coastal Watershed Council at (831) 426-9012.

Appendix A - Table of Results

(Red values represent CCAMP exceedences)

COUNTY	WATER BODY	SITE TAG	AIR_TEMP (C)	CONDUCTIVITY (µS)	DISSOLVED OXYGEN (ppm)	PH	TRANSPARENCY (cm)	TURBIDITY (JTU)	H2O_CLARITY	WATER_TEMP (C)	NITRATE_N (ppm)	ORTHOPHOSPHATE_P (ppm)	E. COLI MPN/100 ml	FECAL COLIFORM cfu/100 ml
San Mateo	Alpine Creek	ALPIN-11	12.0	860	12.1	7.5		45.0	Turbid	9.0	0.33	**0.36**	**3654**	
San Mateo	Calera Creek	CALER-11	21.0	310	10.0	7.5		<5.0	Clear	12.0	0.36	<.05	185	
San Mateo	Calera Creek	CALER-12	17.5	410	10.0	7.0		<5.0	Clear	12.0	0.37	0.05	109	
San Mateo	Denniston Creek	DENNI-11	15.7	210	9.8	7.0		<5.0	Clear	11.8	<1.0	<0.05	158	
San Mateo	Frenchman's Creek	FRENC-11	13.4	311	10.6	7.0			Clear	11.0	0.76	0.11	187	
San Mateo	Gazos Creek	GAZOS-11	14.0	210	11.0	7.0		<5.0	Turbid	9.0	<1.0	0.06	146	
San Mateo	Gazos Creek	GAZOS-12	13.0	200	11.0	7.0		<5.0	Cloudy	8.5	<1.0	0.05	10	
San Mateo	Gazos Creek	GAZOS-13	11.0	230	11.0	7.0		<5.0	Cloudy	8.5	<1.0	<0.05	<10	
San Mateo	La Honda Creek	LAHON-11		830	11.6	7.5		30.0	Cloudy	9.0	<1.0	0.11	**529**	
San Mateo	Lobitos Creek	LOBIT-11	13.0	670	11.4	8.0		88 NTU	Turbid	8.7	0.20	0.10	**7270**	
San Mateo	Martini Creek	MARTI-11	11.4	210	10.0	7.0		80.0	Turbid	9.9	0.26	<0.05	10	
San Mateo	Montara Creek	MONTA-11	13.3	390	8.6	7.0		40.0	Cloudy	11.2	0.43	<0.05	**763**	
San Mateo	Montara Creek	MONTA-12	10.3	360	7.8	7.0		40.0	Cloudy	11.4	0.57	<0.05	**1153**	
San Mateo	Pescadero Creek	PESCA-11	10.0	0.5	10.8	7.0			Turbid	11.0	0.08	0.05	**886**	
San Mateo	Pescadero Marsh	BUTAN-11	12.0	0.3	9.8	7.0			Turbid	10.0	0.50	0.05	228	
San Mateo	Pilarcitos Creek	PILAR-11	18.0	5.28	10.9	7.5			Turbid	12.2	1.05		**988**	
San Mateo	Pilarcitos Creek	PILAR-12	11.9	637	11.8	7.5			Cloudy	8.0	0.98	0.08	31	
San Mateo	Pomponio Creek	POMPO-11	11.5	500	10.5	7.0			Turbid	10.0	0.19	**0.21**	**19862**	
San Mateo	Purisma Creek	PURIS-11	11.6	476	11.2	7.5			Cloudy	8.9	0.20	0.09	10	
San Mateo	San Gregorio Creek	SANGR-11		840	9.6	7.2		85.0	Turbid	13.0	0.19	**0.17**	211	
San Mateo	San Pedro Creek	SANPE-11	20.0	410	10.0	7.0		<5.0	Clear	14.0	0.49	<0.05	166	
San Mateo	San Pedro Creek	SANPE-12	19.5	380	10.2	7.0		<5.0	Clear	11.0	0.70	0.06	335	
San Mateo	San Vicente Creek	SANVI-11	14.1	230	9.7	7.0		10.0	Clear	11.6	0.45	<0.05	**1178**	
San Mateo	Whitehouse Creek	WHITE-11	9.8					15.0	Cloudy	9.5	0.16	0.09	98	
San Mateo	Whitehouse Creek	WHITE-12	13.0			7.0		30.0	Turbid	10.0	0.12	0.06	**450**	
Santa Cruz	Aptos Creek	APTOS-21	12.0	600	10.7	7.5		15.0	Clear	7.5	0.01	0.12		160
Santa Cruz	Aptos Creek	APTOS-22	15.5	600	10.5	7.5		10.0	Clear	9.5	0.01	0.13		220
Santa Cruz	Aptos Creek	APTOS-23	14.0	500	10.5	7.0		20.0	Cloudy	12.5	0.17	**0.19**		**420**
Santa Cruz	Arana Creek	ARANA-21	12.9	430	8.4	7.0	37		Clear	10.4	0.22	0.03		**1320**
Santa Cruz	Arana Creek	ARANA-22	11.8	280	13.6	7.0	49		Cloudy	8.8	0.25	**0.21**		220
Santa Cruz	Arana Creek	ARANA-23	12.1		**3.8**	**8.5**	84		Turbid	11.1	0.56	0.03		**900**
Santa Cruz	Arroy Seco Creek	ARROY-21	12.5	410	8.8	7.5	118		Clear	9.8	0.17	0.03		360
Santa Cruz	Arroy Seco Creek	ARROY-22	13.0	320	9.7	7.0	43		Clear	15.7	0.44	**0.26**		**1000**
Santa Cruz	Arroy Seco Creek	ARROY-23	14.3	360	9.7	7.0	79		Clear	14.5	1.26	**0.18**		**560**
Santa Cruz	Bean Creek	BEANC-21	17.0	500	9.7	7.5		15.0	Clear	9.0	0.22	0.03		**520**
Santa Cruz	Branciforte Creek	BRANC-21	16.8	200	9.0	7.0	**22**		Turbid	13.0	0.40	**0.19**		**1700**
Santa Cruz	Branciforte Creek	BRANC-22	20.0	300	7.0	7.0	25		Turbid	11.0	0.53	**0.19**		**7220**
Santa Cruz	Carbonera Creek	CARBO-21	12.0	490	10.4	7.9		5.0	Clear	9.0	0.54	**0.21**		**6380**
Santa Cruz	Corcoran Lagoon	CORCO-21	12.9	210	8.0	7.0		25.0	Turbid	9.0	0.39	0.03		**2520**
Santa Cruz	Corcoran Lagoon	CORCO-22	14.5	1000	**6.2**	7.5		30.0	Cloudy	13.0	0.31	0.03		**2300**
Santa Cruz	Ferrari Creek	FERRA-21	16.0	360	10.0	7.0		<5.0	Clear	13.5	0.01	0.03		120
Santa Cruz	Harkins Slough	HARKI-21	14.2	390	**4.8**	7.5			Cloudy	15.3	0.80	**0.69**	233	
Santa Cruz	Harkins Slough	HARKI-22	12.5	760	7.5	7.5			Cloudy	13.8	0.50	**0.33**	86	
Santa Cruz	Harkins Slough	HARKI-23	11.7	280	10.2	7.0				8.7	1.10	0.11	**2909**	
Santa Cruz	Laguna Creek	LAGUN-21	15.0	290	10.0	7.0		<5.0	Clear	9.8	0.18	0.03		180
Santa Cruz	Lidell Creek	LIDEL-21	13.5	320	10.5	7.0		10.0	Clear	10.3	1.33	**0.22**		36
Santa Cruz	Little Creek	LITTL-21		270	9.0	7.0			Clear	10.0	0.14	0.03		100
Santa Cruz	Majors Creek	MAJOR-21	14.0	230	10.7	7.0		20.0	Cloudy	8.5	0.01	**0.21**		180
Santa Cruz	Molino Creek	MOLIN-21	16.0	210	10.5	7.0		5.0	Clear	10.8	0.60	**0.21**		100
Santa Cruz	Moore Creek	MOORE-21	12.5	400	7.0	7.0	46		Cloudy	14.9	0.01	<0.03		220
Santa Cruz	Moore Creek	MOORE-22	14.4	447	**6.0**	7.0	57		Clear	11.0	0.18	<0.03		20
Santa Cruz	Moore Creek	MOORE-23	12.9	406	9.2	7.5	44		Cloudy	10.9	0.52	<0.03		360
Santa Cruz	Moore Creek	MOORE-24	14.7	461	9.6	7.0	118		Clear	10.2	0.16	<0.03		140
Santa Cruz	Moore Creek	MOORE-25	13.9	374	9.8	7.0	118		Clear	10.9	0.13	<0.03		152
Santa Cruz	Moore Creek	MOORE-26	14.9	400	9.0	7.0	105		Clear	16.0				
Santa Cruz	Pajaro River	PAJAR-21	16.7	760	9.3	7.5			Cloudy	11.8	**4.50**	0.12	**816**	
Santa Cruz	San Lorenzo River	SANLO-21	20.5	300	7.0	7.0	60		Cloudy	12.4	0.25	0.03		**2140**
Santa Cruz	San Lorenzo River	SANLO-22	15.6	300	7.0	7.0	51		Cloudy	12.4	0.32	0.03		**2860**
Santa Cruz	San Vicente Creek	SANVI-21	15.5	220	10.0	7.0		<5.0	Clear	10.5	0.18	0.03		16
Santa Cruz	Scott Creek	SCOTT-21		160	10.0	7.0			Clear	8.9	0.01	0.03		92
Santa Cruz	Scott Creek	SCOTT-22		160	9.0	7.0			Clear	10.0	0.12	0.03		180
Santa Cruz	Scott Creek	SCOTT-23		160	9.0	7.0			Clear	10.0	0.11	0.03		80
Santa Cruz	Scott Creek	SCOTT-24		160	10.0	7.0			Clear	10.6	0.11	0.03		88
Santa Cruz	Soquel Creek	SOQUE-21	18.0	370	10.4	7.5		30.0	Turbid	11.0	0.13	0.03		**900**
Santa Cruz	Soquel Creek	SOQUE-22	15.5	380	10.6	7.5		50.0	Turbid	12.0	0.14	0.03		**960**
Santa Cruz	Struve Slough	STRUV-21	13.5	340	**3.4**	**6.5**			Clear	12.8	0.70	**0.39**	41	
Santa Cruz	Struve Slough	STRUV-22	12.9	360	**3.2**	**6.5**			Clear	14.4	0.60	**1.08**	41	
Santa Cruz	Struve Slough	WSTRU-21	10.8	360	**6.2**	**6.5**			Cloudy	8.7	0.60	0.10	**2909**	
Santa Cruz	Valencia Creek	VALEN-21	14.5	500	10.5	8.0		<10.0	Cloudy	9.5	0.16	**0.22**		260
Santa Cruz	Valencia Creek	VALEN-22	15.0	500	10.3	7.5		50.0	Turbid	9.0	0.32	**0.19**		**800**
Santa Cruz	Waddell Creek	WADDE-21		220	9.6	7.5		20.0	Turbid	9.0	0.11	0.03		120
Santa Cruz	Watsonville Slough	BEACH-21	13.5	1840	10.5	7.5			Cloudy	12.4	**31.30**	**1.29**	122	
Santa Cruz	Watsonville Slough	WATSO-21	15.3	350	**2.6**	7.5			Cloudy	12.4	0.60	**0.70**	**1223**	

**It must be noted that Snapshot Day involved the use of many different instruments and kits from different sources. QA/QC for some of the equipment was not available.

COUNTY	WATER BODY	SITE TAG	AIR_TEMP (C)	CONDUCTIVITY (µS)	DISSOLVED OXYGEN (ppm)	PH	TRANSPARENCY (cm)	TURBIDITY (JTU)	H2O_CLARITY	WATER_TEMP (C)	NITRATE_N (ppm)	ORTHOPHOSPHATE_P (ppm)	E. COLI, MPN/100 ml	FECAL COLIFORM cfu/100 ml
Santa Cruz	Watsonville Slough	WATSO-22	11.0	720	8.2	7.5			Cloudy	13.4				
Santa Cruz	Watsonville Slough	WATSO-23	12.5	2500	8.8	7.5			Turbid	13.2	**8.30**	**0.62**	**816**	
Santa Cruz	Wilder Creek	WILDE-21	15.0	340	10.0	7.5		<5.0	Clear	9.0	0.26	0.03		80
Santa Cruz	Wilder Creek	WILDE-22	17.5	380	9.4	7.0		<10.0	Clear	13.0	0.25	0.03		160
Monterey	Alisal Slough	ALISA-31	16.7	2700		8.0			Turbid		**37.99**	**0.70**	**1430**	
Monterey	Alisal Slough	ALISA-32	15.0	400	**6.2**		**<4**		Turbid	15.0	0.51	**0.23**	**7380**	
Monterey	Asilomar	ASILO-31	18.5	1200	7.6	7.0		15.0	Clear	18.0	0.08	**0.18**	**2430**	
Monterey	Big Creek	BIGCR-31				8.3			Clear					<10
Monterey	Big Sur River	BIGSU-31	12.5				123		Clear	10.4	0.02	0.03	<100	
Monterey	Big Sur River	BIGSU-32	12.5			7.0	123		Clear	9.7		0.00	<100	
Monterey	Carmel River	CARME-33	12.8	260	11.0	7.0	117		Cloudy	11.1	0.01	<0.05	218	
Monterey	Carmel River	CARME-35	13.2	250	10.4	7.0	89		Turbid	12.9	0.01	<0.05	160	
Monterey	Carmel River	CARME-36	11.8	200	10.4	7.0	65		Cloudy	11.5	0.01	<0.05	216	
Monterey	Carmel River	CARME-37	11.5	200	9.8	7.0	35		Cloudy	12.5	0.01	0.05	216	
Monterey	Carmel River	CARME-38	13.3	300	9.2	7.0	**21**		Cloudy	12.8	0.01	<0.05	**471**	
Monterey	Carmel River	GARZA-31	11.2	160	10.1	7.0	**20**		Turbid	10.8	0.01	<0.05	110	
Monterey	Central and 13th	CENTR-31	19.0	1700	8.4	7.5		5.0	Clear	18.5	0.73	0.07	**1870**	
Monterey	Dani Creek	DANIC-31				8.3			Clear					<10
Monterey	Doud Creek	DOUD-31	15.7	400	10.2	7.8	110		Clear	11.0	0.23	<0.05	135	
Monterey	Elkhorn Slough	ELKHO-31	16.7	52140	**6.9**	7.8			Clear	14.4	<0.1	0.15	15	
Monterey	Elkhorn Slough	ELKHO-32	16.7	51200	7.0	7.9			Clear	15.9	0.20	0.14	49	
Monterey	Elkhorn Slough	ELKHO-33	8.9	52080	7.0	7.7			Clear	13.2	0.30	0.08	25	
Monterey	Elkhorn Slough	ELKHO-34	8.9	1191	8.5	7.8			Cloudy	13.5	**24.30**	**1.71**	**1860**	
Monterey	Espinoza Slough	ESPIN-31	16.7	2500		8.0			Turbid		0.70	0.15	**1100**	
Monterey	Gabilan Creek	GABIL-31	21.0		7.2	7.6	100		Clear	16.0	**16.80**	0.07	**630**	
Monterey	Garrapata Creek	GARRA-31	10.8	180	11.1	7.0	29		Cloudy	9.0	0.06	<0.05	98	
Monterey	Hot Springs Creek	HOTSP-31	15.0		10.4	7.5	115		Clear	10.5	0.03		200	
Monterey	Limekiln Creek	LIMEK-31				8.3			Clear					<10
Monterey	Major Sherman	MAJOR-31	11.0	1000	9.8	7.0	83		Clear	10.0	0.23	0.05	200	
Monterey	Malpaso Creek	MALPA-31	11.7	240	11.0	7.0	**22**		Cloudy	9.1	0.55	<0.05	110	
Monterey	McWay Canyon	MCWAY-31			10.4	7.5	115		Clear	11.0	0.03	0.02	<100	
Monterey	Mill Creek	MILLC-31				8.2			Clear			0.05		<10
Monterey	Moro Coho Slough	MOROC-33	11.0		8.8	**8.9**	60		Cloudy	14.2	0.04	**0.48**	<100	
Monterey	Moro Cojo Slough	MOROC-34	12.3	1900	10.0	7.7	42		Cloudy	18.3	0.05	**0.26**	**410**	
Monterey	Natividad Creek	NATIV-31	17.0		8.4	7.8	**9**		Turbid	12.0	**8.50**	0.01	**2620**	
Monterey	Palo Colorado Cyn.	PALOC-31	14.3	200	9.0	8.3	**10**		Cloudy	10.1	0.05	<0.03	246	
Monterey	Partington Canyon	PARTI-31	12.5		11.0	7.5	115		Clear	10.5	0.03		<100	
Monterey	Plaskett Creek	PLASK-31				8.0			Clear					<10
Monterey	Prewitt Creek	PREWI-31				8.0			Clear					<10
Monterey	Rocky Creek	ROCKY-31	10.2	180	11.5	7.0	35		Cloudy	8.5	0.05	<0.05	327	
Monterey	Salinas River	SALIN-31	12.3	2100	11.5	**8.7**	74		Cloudy	15.0	**9.70**	0.10	<100	
Monterey	Salinas River	SALIN-32			10.0	**8.5**	**7**		Cloudy	16.0	**4.30**	**0.28**	100	
Monterey	Salinas River	SALIN-33	16.0		11.0	**8.7**	96		Clear	14.0	**6.20**	0.06	<100	
Monterey	San Jose Creek	SANJO-31	15.5	200	11.0	7.7	**15**		Turbid	8.0	0.01	0.10	364	
Monterey	Skyline	SKYLI-31	12.5	200	9.5	7.0	**9**		Cloudy	10.0	0.12	0.10	**850**	
Monterey	Soberanes Creek	SOBER-31	17.0	300	11.0	8.0	114		Clear	10.0	0.01	<0.05	63	
Monterey	Soledad	SOLED-31	17.0	500	9.2	7.5	**13**		Cloudy	14.0	0.21	**0.19**	**1320**	
Monterey	Sycamore Canyon	SYCAM-31	13.0				63		Cloudy	11.1	0.02	0.02	100	
Monterey	Tembladero Creek	TEMBL-31	16.7	600		7.5			Turbid		0.74	0.15	**15290**	
Monterey	Tembladero Creek	TEMBL-32	12.0	400	7.2	7.9	**<4**		Turbid	14.5	1.03	**0.92**	**5200**	
Monterey	Upper Natividad Ck	UPPER-31	22.0		8.0	7.8	**7**		Turbid	12.0	**10.40**	**0.80**	**3010**	
Monterey	Veteran's Park	VETER-31	16.0	1600	8.6	7.0		15.0	Clear	18.0	0.02	0.02	**520**	
Monterey	Vicente Creek	VICEN-31				8.3			Clear					18
Monterey	Wild Cattle Creek	WILDC-31				8.2			Clear					<10
Monterey	Willow Creek	WILLO-31				8.1			Clear					11
San Luis Obispo	Arroyo de la Cruz Creek	ARROY-42	13.0	450	10.0	7.4		<5.0	Clear	13.3	0.01	0.03	**681**	
San Luis Obispo	Arroyo del Puerto Creek	ARROY-41	15.0	610	8.0	7.9		<5.0	Clear	12.2	0.01	0.02	**1789**	
San Luis Obispo	Atascadero Creek(309)	ATASC-41	8.0	700		8.0		5.0	Clear	11.0	0.10	0.07	323	
San Luis Obispo	Atascadero Creek(309)	ATASC-42	9.0	440		**8.5**		0.0	Clear	9.0	0.01	0.03	134	
San Luis Obispo	Estrella River	ESTRE-41	13.0	2600		**9.0**	40	5.0	Cloudy	18.5	0.01	0.03	253	
San Luis Obispo	Graves Creek	GRAVE-41	10.5	750		8.0		0.0	Clear	10.0	0.20	0.02	**435**	
San Luis Obispo	Little Pico Creek	LITTLE-41	12.0	570	9.0	6.9		<5.0	Clear	11.4	0.01	0.04	**708**	
San Luis Obispo	Paso Robles Creek	PASOR-41	10.5	710		8.0	100		Clear	12.5	0.01	0.03	119	
San Luis Obispo	Pico Creek	PICOC-41	16.0	550	10.6	7.5			Clear	11.0	0.01	0.03	345	
San Luis Obispo	Rinconada	RINCO-41	7.0	560	8.0	**8.5**		80.0	Turbid	10.0	0.20	0.10	**2098**	
San Luis Obispo	Salinas River	SALIN-44	10.0	640		8.0		10.0	Clear	11.0	0.20	0.06	443	
San Luis Obispo	Salinas River	SALIN-45	7.5	450	8.0	**8.5**		20.0	Cloudy	13.0	0.01	0.02	20	
San Luis Obispo	Salinas River	SALIN-46	12.0	840		8.0	60	10.0	Cloudy	15.5	0.70	**0.24**	368	
San Luis Obispo	Salinas River	SALIN-47	11.5	760		8.0	50	10.0	Cloudy	14.0	0.30	0.08	173	
San Luis Obispo	San Simeon Creek	SANSI-41	18.0	500	11.2	7.0		<5.0	Cloudy	11.0	0.30	0.03	**441**	
San Luis Obispo	Santa Margarita Creek	SMARG-41	9.0	620	8.0	8.0		40.0	Cloudy	11.0	0.20	0.09	**3255**	
San Luis Obispo	Santa Rosa Creek	SANTA-41	16.0	740	11.6	8.0		10.0	Cloudy	10.0	0.10	0.03	**1401**	
San Luis Obispo	Santa Rosa Creek	SANTA-42	14.0	720	11.8	7.5		10.0	Cloudy	11.0	0.20	0.04	**1664**	
San Luis Obispo	Trout Creek	TROUT-41	8.0	540	8.0	**8.5**		60.0	Cloudy	11.0	0.20	**0.36**	**759**	

**It must be noted that Snapshot Day involved the use of many different instruments and kits from different sources. QA/QC for some of the equipment was not available.

APPENDIX B

SNAPSHOT DAY 2001 VOLUNTEERS

Alexis Manning, Salinas
Allison Burleigh, Big Sur
Allison Neuman, Pacific Grove
Amy Trebil, Seaside
Andrew Mauck, Seaside
Angela Schreiner, Salinas
Anthony Nedeau, Seaside
Patrick Atkins, San Jose
Karin Atkins, San Jose
Kendra Atkins, San Jose
Barbara Novelli, Santa Cruz
Barry Tanaka, Corralitos
Bob Harper, Half Moon Bay
Bobbie Haver, Santa Cruz
Bobby Jo Close, Atascadero
Bonnie Van Hise, Pacific Grove
Brad Seek, Cambria
Brett Gonzales, Seaside
Bridget Hoover, Marina
Carl May, Montara
Carolyn Wardrip, Santa Cruz
Chris Berry, Half Moon Bay
Chris Freeman, Marina
Chuck Kozak, Montara
Claudia Rourke, Pescadero
Cristin Martinez, Seaside
Darcy Wells, Sunnyvale
David Norris, Carmel Valley
David Rosner, Santa Cruz
Deborah Chirco-MacDonald, Aptos
Denise Mariscal, Seaside
Diane Hood, Cambria
Donald Cleary, Seaside
Donald Funk, Paso Robles
Donna Meyers, Santa Cruz
Dori Simson, Seaside
Doug Piggott,Capitola
Ed Clement, Pescadero
Elaine Beggelman, Santa Cruz
Elvie Hall,Seaside
Erin Lee, Seaside
Ethan Brown, Seaside
Fred Carter, Marina
Gary Allen, La Honda
Gayle Lubeck, Monterey
Gerri Clemens, Templeton
Gerry Doan, Santa Cruz
Greg Gauthier, Santa Cruz
Hans Peterson, Seaside
Jaclyn Gonzales, Seaside
James Patterson, Atascadero
Jan Rusnak, Redwood City
Janice Jones, Marina
Jason Parke, Daly City
Jelica Arsenijevic, Seaside
Jennifer Martin, Seaside
Jerry Danzig, Pescadero
Jerry Lee, Cambria
Jim Brownell, Cambria
Jim MacKenzie, Santa Cruz
Jim Rourke, Pescadero
John Grundy, Carmel
John Hood, Cambria
Johnny Subia, Carmel Valley
Jon Harman, Pacifica
Karen Gref, Seaside
Karen Wilson, Montara
Kellie Ray, Campbell
Ken Ekelund, Carmel
Kenton Parker , Watsonville
Kimberly McCullick, Marina
Kristen Farrow,Marina
Kristen Sullivan, Santa Cruz
Larry Peterman, Redwood City
Laura Lee Lienk, Carmel Valley
Laura Ridenour, Corralitos
Leanne Bryan, Sonora
Lety Gomez,Seaside
Levi Hanzel, Marina
Liese Schultz, Seaside
Lilia Gallardo, Seaside
Lina Ordonez, Marina
Lisa Gilbane, Monterey
Mack Smith, Seaside
Madeleine Wu, San Francisco
Marie Corwin, Seaside
Mark Fain, Seaside
Mark Gleason
Mark Sullivan, Santa Cruz
Maris Sidenstecker, Seaside
Martha Rodriguez, Seaside
Mary Buck Scannel, Salinas
Mary Flodin, Santa Cruz
Mary Trotter, Big Sur
Matt Johnston, Santa Cruz
Matt Salgado, San Gregorio
Maya Conrad, Santa Cruz
Michele Roest, Cambria
Michelle Daugherty, Seaside
Michelle Simon, Seaside
Mike Powers, Santa Cruz
Mikyong Kim, Seaside
Natalie Zayas, Marina

APPENDIX B

SNAPSHOT DAY 2001 VOLUNTEERS

Nicole Salgado, San Gregorio
Omar Tapia, Seaside
Paul Magpusao, Seaside
Rebecca Babik, Santa Cruz
Renee Flower, Santa Cruz
Renee Hoyos, Davis
Revital Katznelson , Oakland
Richard Rollins, Menlo Park
Rick Hawley, Cambria
Roger Zachary, Atascadero
Rohana Mayer, Big Sur
Rosalie Hackett, Santa Cruz
Rose Smiley, Big Sur
Rosemary Kenner, Pacific Grove
Ross Clark, Santa Cruz
Ruth Brown, Grover Beach
Ryan Andrews, Seaside
Salvatore Turano Jr., Santa Cruz
Samantha Kollar, Seaside
Saori Zurits, Seaside
Sara Geistdorfer, Seaside
Scott Woodruff, Pescadero
Sharon Anderson, Seaside
Sierra MacDonald, Aptos
Stacey Sketo Rosner, Scotts Valley
Stephanie Huber, Seaside
Sun Kang, Seaside
Sus Danner, Bonny Doon
Suzanne Gilmore, Seaside
Tamara Clinard, Santa Cruz
Teresa Dreisbach, Royal Oaks
Teresa Middlebrook, Pacific Grove
Tiffany Worthington, Santa Cruz
Toni Danzig, Pescadero
Traci Roberts, Watsonville
Van Pierszalowski, Cambria
Veronica Espinosa, Seaside
Wendy Newman, Seaside
William Arkfeld, Atascadero
Wm Hanham, Seaside
Zachary Tullis-Thompson, Aptos
Zack Davidson, Seaside

APPENDIX C

SNAPSHOT DAY 2001 WATERBODIES

San Mateo County

Calera Creek
Denniston Creek
Frenchman's Creek
Lobitos Creek
Martini Creek
Mill Creek
Montara Creek
Pescadero Creek
Pescadero Marsh
Pilarcitos Creek
Pomponio Creek
Purisma Creek
San Gregorio Creek
San Pedro Creek
San Vicente Creek
Tunitas Creek
Gazos Creek
Whitehouse Creek

Santa Cruz County

Laguna Creek
Arroy Seco Creek
Ferrari Creek
Lidell Creek
Majors Creek
Molino Creek
Moore Creek
San Vicente Creek
Scott Creek
Wilder Creek
Arana Creek
Bean Creek
Branciforte Creek
Carbonera Creek
Little Creek
San Lorenzo River
Waddell Creek

Santa Cruz County (cont.)

Aptos Creek
Corcoran Lagoon
Soquel Creek
Valencia Creek
Harkins Slough
Pajaro River
Struve Slough
Watsonville Slough

Monterey County

Asilomar
Central and 13th
Skyline
Major Sherman
Veteran's Park
Gabilan Creek
Elkhorn Slough
Espinoza Slough
Moro Cojo Slough
Carmel River
Big Creek
Big Sur River
Bixby Creek
Buck Creek
Castro Canyon
Dani Creek
Dolan Canyon
Doud Creek
Granite Canyon
Grimes Canyon
Hot Springs Creek
Limekiln Creek
Malpaso Creek
McWay Canyon
Mill Creek
Palo Colorado Cyn.

Monterey County (cont.)

Partington Canyon
Plaskett Creek
Prewitt Creek
Rocky Creek
San Jose Creek
Soberanes Creek
Sycamore Canyon
Vicente Creek
Wild Cattle Creek
Wildcat Creek
Willow Creek
Alisal Slough
Moro Coho Slough
Salinas River
Tembladero Creek
Upper Natividad Ck
Garrapata Creek
Natividad Creek
Soledad

San Luis Obispo County

Atascadero Creek
Graves Creek
Paso Robles Creek
Rinconada Creek
Salinas River
Santa Margarita Creek
Trout Creek
Arroyo de la Cruz Cree
Arroyo del Puerto Cree
Little Pico Creek
Pico Creek
San Simeon Creek
Santa Rosa Creek
Santa Rosa Creek
Estrella River

APPENDIX D

Monterey Bay National Marine Sanctuary

Snapshot Day 2001

Field Data Sheet — April 21, 2001

Sponsored by:
Mont. Bay Natl Marine Sanctuary
California Coastal Commission
Coastal Watershed Council
CC Regional Water Quality Control Board
Center for Marine Conservation
CSU Monterey Bay

Please use one sheet for each Station. Use back for comments.

Watershed:
Group Name:
Station (Site) ID
Creek Name:

Please record or complete Station (Site) Location on attached page

Time of Measurements:

Flow discharge (circle):
Stagnant; Trickle (< 1 quart/sec);
moderate (< 5 gal/sec); high (> 5 gal/sec)

Weather Conditions (circle):
clear; cloudy; foggy; misty; calm; breezy;
partly cloudy; rain; windy;

Volunteers (list full names):
1) (leader) 3)
2) 4)
(list additional names on back)

Instrument ID	PARAMETER		UNITS (circle type of units)
	Air Temperature		F or C
	H2O Temperature		F or C
	pH		
	Dissolved Oxygen		mg/l (ppm) % saturation
	Conductivity		uS mS
	Turbidity		JTU NTU
	Transparency		cm

Water Clarity (circle one):
clear cloudy turbid
(water itself, not scum)

Sampling device used? Y N
If so, what kind?
Kemmerer bottle
other:

Sample ID	Time Collected	Collected by:	Container type

Notes and/or Wildlife Observed:
(include any equipment comments/problems)

Fish Observed:
(describe number seen, length of fish, and behavior)

Sample Custody:

Relinquished By: **Date /Time** **Received By:** **Date/Time**

Web entry http://www.thebayfoundation.org/snapshot/FieldSheet.htm

APPENDIX E

Monterey Bay Sanctuary Citizen Watershed Monitoring Network
Snapshot Day 2001, April 21, 2001
Field Data Sheet Instructions

Watershed:
Write the name of the watershed. The watershed names are listed on your map and site location sheet.
Station ID (Site Tag)
The Station ID is the FIRST FIVE LETTERS of the waterbody name and two numbers. The first number indicates the county in which the water body is located. San Mateo –1, Santa Cruz – 2, Monterey – 3, and San Luis Obispo – 4. The second number indicates the location or number of sites on the water body. If there is just one site, the number will be 1. If there is more than one site on a creek or river each site will have an additional number. For instance, Elkhorn Slough has a total of 3 sites. The Station ID will be: ELKHO-31, ELKHO-32, and ELKHO-33. San Vicente Creek has one site. Its code is SANVI-11
Group Name
If the team doing the monitoring is associated with a watershed council or organization, list the name.
Creek Name:
If the creek name is the same as the watershed, write it down. If the creek is a tributary of the watershed and has a different name, write that name down.
Time of Measurement:
Document the time field measurement begin.
Group Leader:
Write down the name of the person and phone number who is the group leader. This person should have attended the April 14, 2001 training.
Volunteers:
List the names of all of the volunteers who helped collect the data at the site and their phone numbers.
Flow discharge
As best you can, estimate the flow by circling the most appropriate discharge rate, ie. Stagnant, Trickle, Moderate, or High.
Weather Conditions:
Circle any and all weather conditions that apply at the time you arrive at the site.
Instrument ID (To be filled in by Regional Coordinator or Group Leader):
Ensure the instrument ID for each piece of equipment is listed in the shaded box. This information will reflect who owns the equipment and what type of equipment is being used for sampling. If you experience a problem with a piece of equipment, make a note of it in the "Notes" section.
PARAMETER:
For each Parameter (Air Temp, H2O Temp, Dissolved Oxygen, pH, Conductivity, and Turbidity), write the test results in the box. If you do not sample a parameter due to lack of equipment or time constraints, please put a slash through the box so we know that the data was not collected.

- Ensure you follow the Standard Operating Procedures provided or instructions as listed on the kit or meter.
- When measuring air temperature, do so in the shade with a DRY thermometer.
- Always record the water temperature with the probe still in the water.
- When measuring conductivity, give the probe time to equilibriate before recording a measurement.
- Always try to have several of the team members confirm the measurements.

UNITS:
Circle the appropriate units for the type of equipment you are using. For instance, if you are using a thermometer that records in Fahrenheit, circle the "F" under units. If your equipment records in units not on the data sheet, please write it in.
Water Clarity:
This is measured by looking into the creek. Only circle one of the options. If you can clearly see the bottom in more than 4" of water, circle Clear. If the water is somewhat cloudy but you can still see the bottom in 4" of water, circle "cloudy". If you cannot see the bottom in 4" of water, circle "turbid". It is ok to estimate the depth at which you can see the creek or river bottom because you probably won't have a ruler.
Was a sampling device used?
If you used a DO collection device such as a Kemmerer bottle, circle "yes" and circle Kemmerer bottle or write in what type of device you used. If you don't know what any of this means and you took your measurement directly in the creek or you collected your sample directly in the creek with a Whirlpak bag or a bottle, just circle "no."
Water Samples
Water samples will be collected by every group for nutrients (nitrate and orthophosphate) and bacteria (Total coliform and E.coli). **Write in permanent marker on the sample container BEFORE you fill it.**
Sample ID: will be the Station ID with a B for bacteria samples or an N for nutrient samples.
Creek Name:
Time of collection: write down the time you collect the sample.
Collected by: Write down the person that collects the sample.
Container type: Some groups will use whirlpak bags, others will have sample bottles from labs. Record the type of container (i.e. 100 ml clear plastic bottle, whirlpak bag).
Notes and/or Wildlife Observed:
Record any other important information here. Examples include: equipment problems, interesting wildlife or botanical observations, trash or other apparent problems.
Fish Observed:
Describe the number of fish seen and what type (if you know). Any other information such as approximate length of fish and their behavior is also important.

Station Location (VERY IMPORTANT INFO!):
Review the location map and written description of the station that is provided to you. Record any information or make any changes to the existing information to clarify the location. To describe the station location, please give directions how to get there. **Be as specific as possible** so that someone who has never been to the site could get there. For example, include driving directions with mileage distances and road names, walking directions (how you access the site) and description of sampling site. A map of your area will be included with the data sheets. Please update the map with a more exact location if possible.