California Snapshot Day
2008 Report

Produced By
Orange County Coastkeeper
June 30, 2008

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Executive Summary

On May 3, 2008, approximately fifty citizens from all over Orange County worked together to collect water samples to create a "Snapshot" of the water quality in our streams, lakes and ocean. A snapshot event is characterized by having all the samples collected during a single day; this provides a "Snapshot" of water quality for that day. During the 24 hours allotted for the sample collection, thirty- two samples were collected from twenty-eight sites on eight streams, two estuaries, three lakes and ten marine sites. In addition to conducting the water quality tests, members of the public and participants from local environmental organizations gained firsthand knowledge about water quality issues in their local stream or lake, and what they can do to help improve water quality countywide.

The event began with an intercalibration session at the Orange County Coastkeeper office on Wednesday, April 30, where volunteers from participating environmental groups calibrated their monitoring equipment against certified standards for each of the variables they would be testing on May 3rd. Several citizen volunteers also attended and were trained in sample collection and analysis, and given educational level test kits to use and assigned monitoring sites.

On the day of the event a "hub" was set up at the Bolsa Chica Wetlands Interpretive Center. At the hub, volunteers from the participating environmental groups dropped off the samples and data they had collected from their assigned sites earlier in the day. Members of the public could pick up testing equipment, receive training and site assignments, and see displays on water quality issues at booths set up by participating members.

The products of this effort are: quality controlled bacteria data from all 28 sites and quality controlled physical and chemical data collected by experienced water monitoring volunteers from twenty four sites. Also, non-quality controlled chemical data was collected by the general public at four sites including Huntington Beach Central Park Lake, Greer and Park Lake, the Talbert Channel at Magnolia St., and Santiago Oaks Regional Park. The testing methodology differed for the two chemical results categories. Quality controlled testing was done using meters, colorimeters and color comparators following state accepted standard methods. At the other sites, all tests other than bacteria were run by the citizens at the site using educational testing kits. Before being issued the kits, the citizens were trained in sample collection techniques, testing methods and the reasoning behind each of the test parameters. While the results of the educational level kits can be considered descriptive of the site characteristics, it is not of sufficient quality to use to determine exceedences of water quality standards. After the event, all of the data collected was analyzed to produce this report. The results analysis for the quality controlled data was developed separate from the non-quality controlled data.

The data from this event shows that while our ocean water quality was good, water quality in most of the county's coastal streams and some city park lakes was poor on May 3rd. Most coastal streams suffer from an excess of nutrients and high bacteria counts, the classic indicators of urban runoff. The poor water quality of most of our streams is no surprise to water quality experts; efforts costing millions of dollars have been underway for years to improve water quality. However, the government can only do so much to clean up the problems we all generate. The most effective way to improve water quality is for the general public to reduce or eliminate the trash, chemicals and other human waste that end up in our waters by changing habits that result in runoff.

By bringing the general public into the process of water monitoring to directly see the results of urban runoff, we hope to make an impact on the amount of pollutants entering our streams. We can reach a much wider audience than just the project participants by creating watershed advocates out of our volunteers. The data from this event will be used to continue the efforts to improve the water quality in our county's streams by raising public awareness and increasing personal involvement by citizens. For more information on water monitoring in Orange County see the Citizen Watershed Monitors of Orange County website at www.cwmoc.org or the Orange County Coastkeeper website at www.coastkeeper.org

Background

California Snapshot Day is the product of a continued effort by the California State Water Resources Control Board to involve the public in water quality issues. In 2003 the Board funded the first California Snapshot Day event through a grant to the Monterey Bay Sanctuary Foundation. The 2003 event covered the entire state and collected data from over six hundred monitoring sites. Simultaneously, the State Water Board's Clean Water Team, a group of State Water Board water monitoring specialists created to support citizen monitoring efforts, facilitated the creation of loose coalitions of organizations involved in water monitoring activities including non-profits, universities and public agencies. Through this effort CWMOC (Citizen Watershed Monitors of Orange County) was formed. With Orange County Coastkeeper leading the organization's activities, CWMOC participated in the 2003 event and has carried on the event through the present. CWMOC has also expanded the program by participating in the annual World Water Monitoring Day events that occur in October of each year to celebrate the anniversary of the creation of the USEPA. As a result, Orange County has benefited through the creation of a group of highly trained and organized volunteer water monitors who educate the public and act as advocates for clean water while collecting valuable water quality data that can be used by the water boards and local agencies in making water quality decisions. California Snapshot Day 2008 is the sixth continuous year that CWMOC has hosted the event during which it has grown from primarily a data collection event by the member groups into a major public outreach event designed to involve the public in water quality through direct participation in water monitoring countywide.

Project Description

California Snapshot Day consists of four major components. The first component is public outreach to solicit public participation in the event. One of the primary goals is to directly involve the public in water quality by recruiting citizen volunteers to conduct water monitoring on the day of the event. This outreach consists of media announcements in local print (O.C. Register, HB Independent) and television outlets (HBTV, KOCE). There is outreach from the CWMOC member organizations including direct mail and email campaigns, website announcements on the CWMOC website (www.cwmoc.org) and those of the member environmental organizations, and government websites including the Orange County Stormwater Division (www.ocwatersheds.com) and the city of Huntington Beach. The idea is to recruit teams of citizen volunteers in advance and train them in water monitoring techniques, issue them test kits, and assign monitoring sites for the event.

The second component is an intercalibration session less than one week before the event where the citizen volunteers receive training and their test kits, and the CWMOC member groups

calibrate their monitoring equipment in a laboratory setting using certified standards to insure the accuracy of the data they collect for the event. All the calibration activities are documented and records are kept at the O.C. Coastkeeper office.

The third component is to organize a "hub." The hub serves a location for the event participants to drop off the water samples they collect for additional analysis that has not been done in the field such as bacterial and nutrient analysis. Additionally, the hub serves as a location for the general public to show up on the day of the event and receive information on water quality issues in their area, meet with water quality professionals, and participate in demonstrations of water quality monitoring activities. CWMOC members and local agencies set up booths at the hub to highlight their projects and provide educational materials to show how they can make a difference in water quality. While the number of people at the hub has been low, generally less than one hundred individuals, those who participate leave with an excellent understanding of the water quality in Orange County and what they can do to improve it.

The final component is the production of a Snapshot Day report detailing the results of the water monitoring conducted for the event. The report is widely distributed and the results are routinely reported in the media. Previously this has resulted in actions by local and regional agencies, non-profits, and educational institutions to respond to the issues reported, resulting in the desired increased focus on water quality in Orange County.

Project Participants

Many thanks to the non-profit organizations and local agencies that participated:

- D.I.V.E.R.S – Divers Involved Voluntarily Environmental Rehabilitation Safety
- Orange County Coastkeeper
- Bolsa Chica Conservancy
- Surfrider Foundation
- Goldenwest College
- County of Orange (Project Pollution Prevention)
- City of Huntington Beach

Special thanks to the County of Orange (Department of Public Works) for funding, Orange County Coastkeeper for organizing the event, and Bolsa Chica Conservancy for hosting the California Snapshot Day event at the Bolsa Chica Wetlands Interpretive Center.

Water Analysis Parameters:

Bacteria Tests:
- *E. Coli* (EC)
- Total Coliform (TC)
- Enterococcus

Chemical Tests:
- Orthophosphate
- Ammonia-Nitrogen
- Nitrate-Nitrogen
- Dissolved Oxygen
- pH

Physical Tests:
- Water temperature
- Air temperature
- Conductivity
- Turbidity/Clarity

Testing Methodology

All Bacteria testing was done using the IDEXX Colilert 18 and Enterolert most probable number method. All bacteria samples were processed at the O.C. Coastkeeper lab in Costa Mesa using USEPA approved methods and holding times. Chemical testing was done in the field for pH and dissolved oxygen at all sites using electronic meters or color comparators. Nutrient testing (orthophosphate, Nitrate-Nitrogen, Ammonia Nitrogen) was done in the field by groups possessing the proper equipment using LaMotte and HACH colorimeters or Chemetrics color comparator kits. Samples that could not be analyzed for nutrients in the field were put on ice and the nutrient tests were run at the O.C. Coastkeeper lab. Physical tests for water and air temperature, conductivity and turbidity/clarity were run in the field. The Educational test kits provided to the general public are produced by the LaMotte Company and include tests for all the above chemical and physical tests except for ammonia and conductivity. Due to the variety of equipment and test methods used, a detailed discussion of the specific equipment and test methods used is not included in this report. Equipment and test method questions should be directed to Ray Hiemstra at ray@coastkeeper.org

Data Results Discussion (Quality Controlled data only):

- Water Temperature – The temperature of water affects aquatic life because most species can only thrive within a certain temperature range. Other factors, such as dissolved oxygen, can be affected by the temperature, which in turn, affects the rate of photosynthesis in aquatic plants. Human intervention can affect temperature by removing canopy cover and building or removing water diversions along the stream or in the stream, causing a rise in water temperature. The temperatures we measured were not at levels that would affect the beneficial uses of these streams.

- Dissolved Oxygen – Oxygen is needed for respiration, movement, feeding, and growth. Therefore, the amount of oxygen in the water affects the number of aquatic animals and plants and the amount of bacteria in the water. The minimum acceptable level of dissolved oxygen, as stated in the Regional Water Boards Basin Plan, is 5mg/L. 50% of the sites that tested for dissolved oxygen met the minimum acceptable level. The freshwater sites that did not meet the standard included the Bolsa Chica Wetlands Fischer's Garden, Big Canyon Creek, Santiago Oak Regional Park, Greer Park, and Huntington Lake (tested four times by the public). Additionally, Wintersburg Channel and the Muted Tidal Pocket in the Bolsa Chica Wetlands had low dissolved oxygen levels. These low dissolved oxygen levels are reasons for concern as they can affect the survival of wildlife.

- Conductivity/Salinity – By measuring conductivity we can gauge the amount of dissolved solids in the water. Dissolved solids include acids, minerals, salts and metals. Conductivity varies for many reasons but high conductivity may be a signal of bigger problems. The acceptable limit of conductivity we have chosen to use for this study is 1.0 ms/cm for fresh water based on goals set for Silverado Creek by the Regional Water Board. None of the sites tested for conductivity/salinity exceeded the acceptable limit. Salinity is primarily used to determine if sites are salt or freshwater. Salinity that is elevated or reduced from normal levels can affect wildlife. Salinity levels were within normal levels at the project sites.

- pH – pH is a measure of hydrogen ions that controls the acidity and the alkalinity of the water. Most aquatic life can only survive within a narrow range of pH, thus it is important to monitor. The acceptable level for pH is between 6.5/7.0 (freshwater/marine) and 8.6. Four of the twenty-one sites tested for pH exceeded the objective, including Wintersburg Site 2, Wintersburg Site 4, Talbert Channel Magnolia/Garfield, and Greer Park.

- Orthophosphate – Phosphates most commonly enter waterbodies through lawn and garden fertilizer with run-off or soil erosion. Increased phosphate concentrations can lead to increased growth of algae and plants, which then deplete dissolved oxygen in the water. The U.S. EPA has recommended that phosphate should not exceed the levels of 0.1mg/L in arid regions, so that is the level we have selected for this report. 78% of the sites that were tested for Phosphate exceeded the limit of 0.1mg/L.

- Nitrate-Nitrogen – Similar to phosphate, nitrate is a plant nutrient that usually enters waterbodies through overuse of fertilizer. Thus, it also promotes algae blooms and excessive aquatic plant growth that can suffocate other life. Excess levels of nitrates in drinking water can cause methemoglobinemia (blue baby disease), a congenital heart disease. All the sampled sites are within the Regional Board's Basin Plan objective of 10mg/L.

- Ammonia-Nitrogen – Ammonia is another plant nutrient of which the primary sources are fertilizer and animal waste. Ammonia is an important chemical to monitor because it can accumulate to toxic levels and affect metabolism. This toxic can also affect organisms higher in the food chain. The acceptable limit of Ammonia- Nitrogen as detailed in the Regional Water Board's Basin Plan varies depending on site conditions. The acceptable freshwater limit can be calculated using a formula dependent on the temperature and pH. The marine standard used by the Los Angeles Regional Water Board is .09 mg/l and a similar standard is used for the Santa Ana River. 83 % of the sites that were sampled for Ammonia-Nitrogen exceeded the standards, including a saltwater site (at the Edison Plant).

- Turbidity/Transparency – Turbidity and transparency are measurements of the clarity of water. Turbidity measurements are made using special meters and are reported as NTU's and transparency is measured as the distance in centimeters that an object can be seen underwater. High turbidity and low transparency levels indicate a large amount of suspended particles in the water. These suspended particles can block sunlight and impede respiration, having a major effect on organisms. Additionally, high levels of turbidity create concern since suspended particles often carry pollutants. Natural turbidity varies from site to site but is generally below 100 NTU. If turbidity is above average, this may indicate erosion, nutrient loading, or excessive algae growth. Levels exceeding 100 FAU in fresh water would be considered unusual and would be a level of concern. None of the sampled sites exceeded the limit for turbidity.

- Bacteria (*E. coli*, Total Coliform and Enterococcus) – High levels of these indicator bacteria imply a high probability of pathogens in the water. Total Coliform comes from a broad range of environmental sources including plants and animals. The presence of *E.coli* is an indicator of fecal contamination from warm-blooded animals and in some cases can cause severe illness. The accepted sample limits for *E.coli* (recommended by the U.S. EPA) are 126 MPN/ 100mL (single sample) and 235 MPN/100mL (geomean). The state standards for Total Coliform are 1,000 MPN/100mL (Single Sample) and 10,000 MPN/100mL (geomean). 8% of the sampled sites for

E.coli exceeded the geomean standard and 12.5% of the sampled sites exceeded the Single Sample standard. Total Coliform levels which exceeded the geomean were found at 29% of the sampled sites, and Total Coliform levels which exceeded the single sample standards were found at 20% of the sampled sites. The state standard for Enterococcus is 35 MPN/100mL (geomean) and 104 MPN/100mL (single sample). Enterococcus is considered the best indicator of human sources of bacteria contamination. Enterococcus concentrations exceeded the geomean at 35% of the project sites, and exceeded the single sample standard at 13% of the project sites. The Wintersburg Sites 2 and 4 had extremely high levels of Enterococcus. The standards for Total Coliform and Enterococcus are derived from the California standard for ocean water and recreational use, AB 411. While all the sites were sampled for all three bacteria types, the test results for *E.coli* and Total Coliform at two sites were discarded due to excess incubation time.

Figure 1 – Concentration of *E. coli* present at Snapshot Day May 3, 2008 sample sites. Orange indicates exceedence of USEPA recommended single sample standard 235 mpn/100ml.

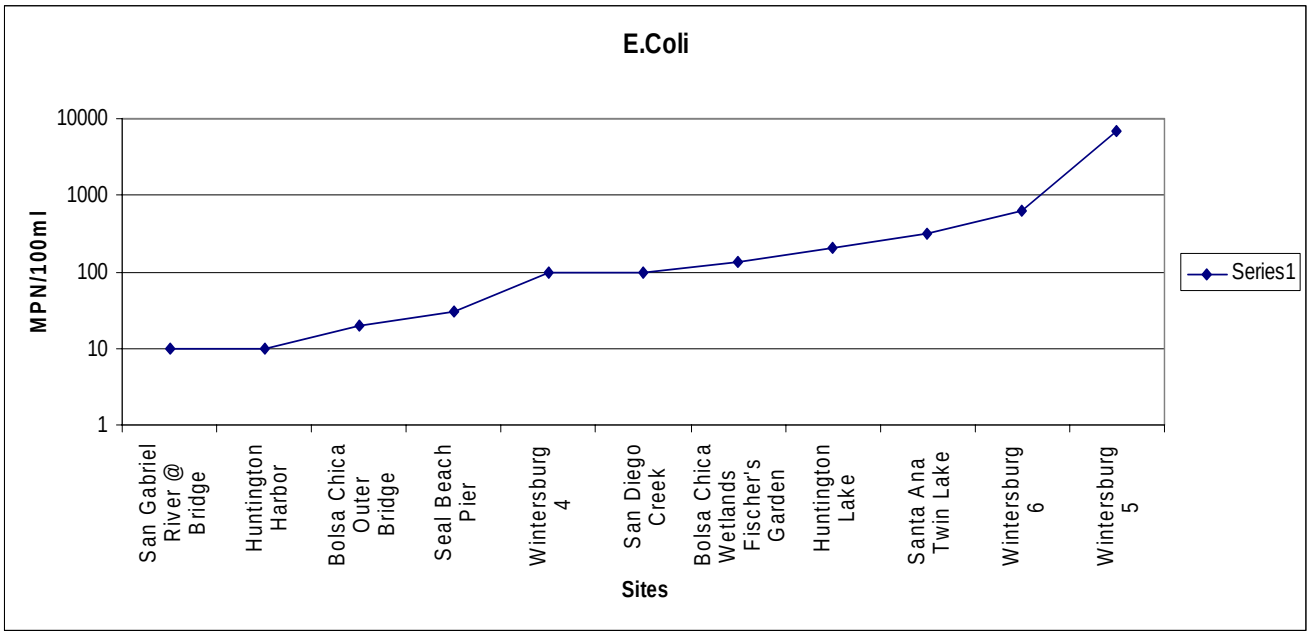


Figure 2 – Concentration of Total Coliform present at Snapshot Day May 3, 2008 sample sites.

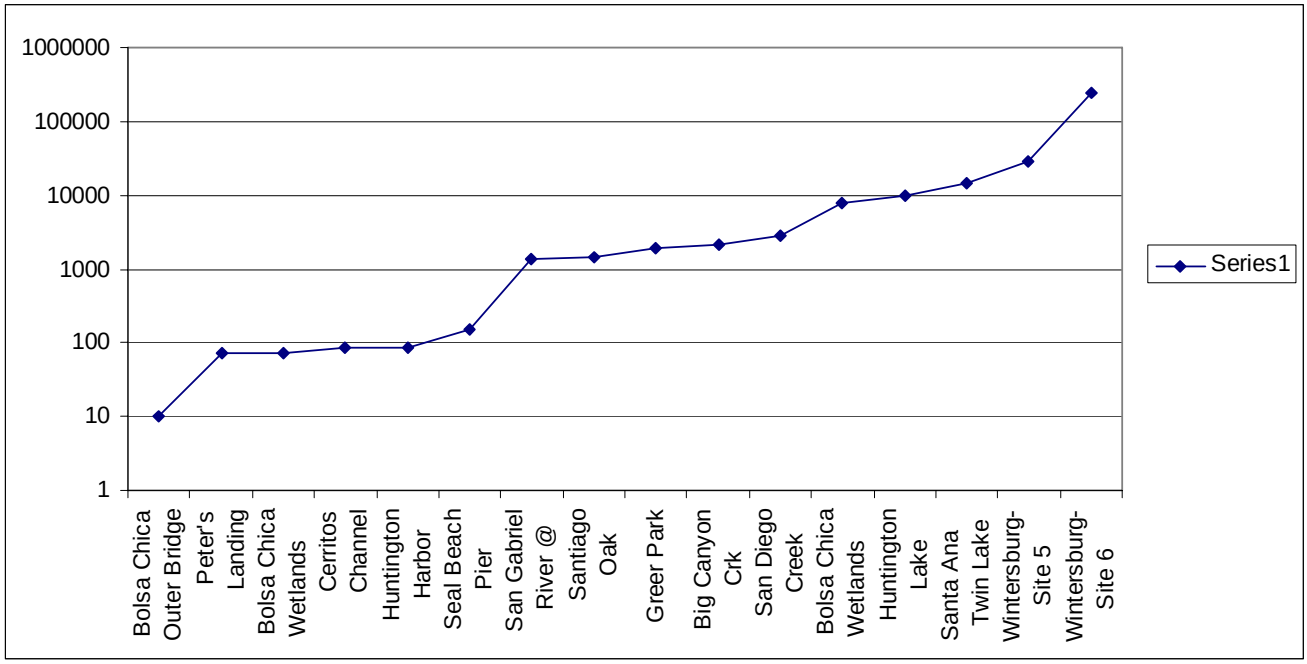
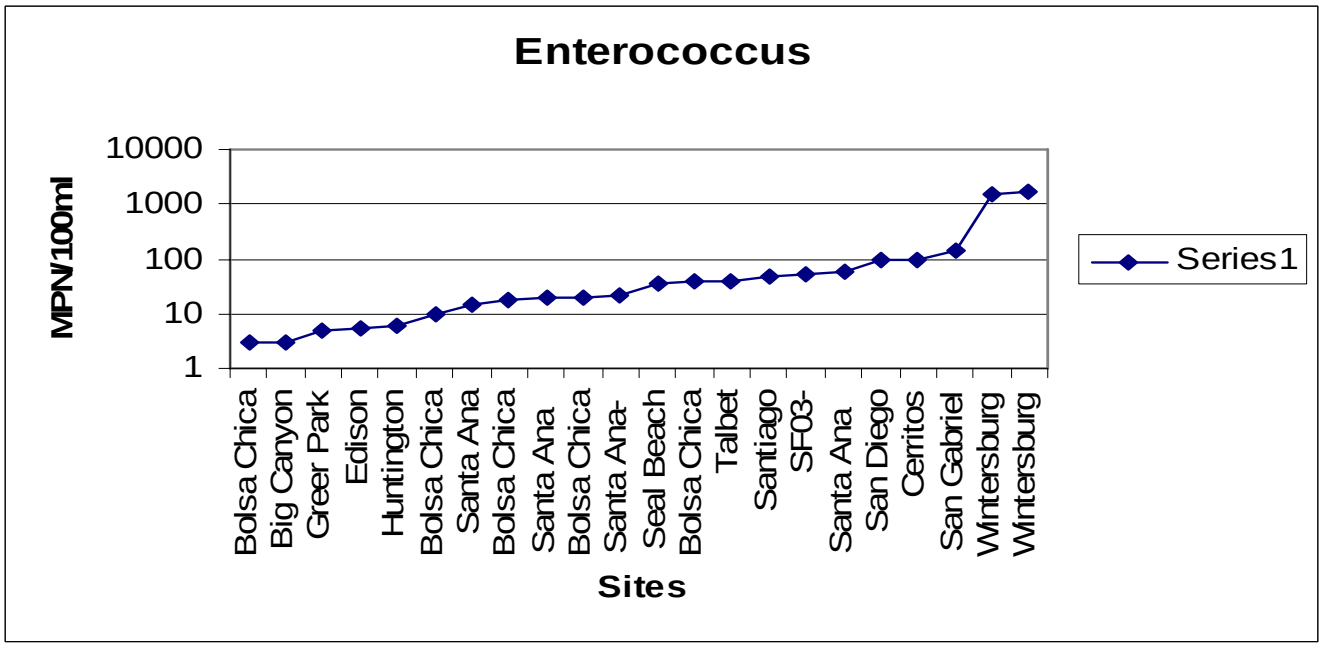


Figure 3 – Concentration of Enterococcus present at Snapshot Day May 3, 2008 sample sites.



City Parks Lake Analysis

One of the analysis we are doing this year is to take a look at the water quality in lakes located in city parks. Because of their close proximity to the event location, three city park lakes in Huntington Beach were selected for testing; Greer Park, Santa Ana Twin Lake, and Huntington Lake in Huntington Beach Central Park. Data collected from Greer Park, Santa Ana Twin Lake and Huntington Lake illustrated:

- Bacteria:

For Enterococcus, Greer Park and Huntington Lake met the accepted standard while Santa Ana Twin Lake exceeded the chronic level of 35 MPN/100mL. For *E.Coli* and Total Coliform, the Huntington Lake and Santa Ana Twin Lake both exceeded the chronic level for Total Coliform and acute level for *E.Coli*. Greer Park exceeded the chronic level for Total Coliform but met the accepted level for *E.coli*.

- Phosphate (PO4):

It was also found that Greer Park, Huntington Lake, and Santa Ana Twin Lake were all above the level for Phosphates found in the water with 0.29 (mg/L), 0.98 (mg/L), and 0.61 (mg/L), respectively.

- pH:

The pH level at Greer Park was above the acceptable limit with a pH of 10. Huntington Lake and Santa Ana Twin Lake were between the accepted pH standards.

- Dissolved Oxygen (DO):

The average DO at Greer Park was below the accepted limit, having a concentration of 0 ppm, as well as Huntington Lake having an average concentration of 3.3 ppm.

Summarizing the city parks lakes analysis, we found that bacteria counts for indicator bacteria were well above recommended levels at all the lakes. Additionally, phosphate and pH levels were high at some of the lakes tested for these variables. The very low dissolved oxygen readings should be followed up on. These results are not surprising considering that city park lakes are often the direct recipients of large volumes of urban runoff.

Overall Conclusions:

California Snapshot Day 2008 was a huge success. A small army of citizen volunteers managed to monitor water quality at thirty-two project sites covering many of the streams draining to the coast, including three city park lakes. This monitoring resulted in a comprehensive look at water quality countywide on May 3rd. The CWMOC member organizations, along with the city of Huntington Beach, County of Orange, and the State Water Board hosted a “hub” at the Bolsa Chica Wetlands interpretative center that served its purpose as a gathering point for the public to browse booths promoting water quality. The data from all the project sites was analyzed against accepted federal, state and local water quality objectives to determine if exceedences existed. The vast majority of the data was generated by highly trained citizen monitors using state approved methods. The data generated by the general public using educational test kits is included in the database but was analyzed separately from the quality controlled data to assure accurate conclusions.

The results of the data show bacteria levels were lower than in previous years. This is a good sign and the first time we have seen significant reductions in bacteria exceedences. We hope to see additional improvements at our next Snapshot event in October.

In the meantime, there is still much we can do to improve water quality. There is a huge amount of information available to the public on how to solve this problem; it is up to us all to act on it to see change. The ocean sites tested did not exceed bacterial standards, and is the normal situation for Orange County ocean waters during dry weather. We can definitely be proud of that.

Plant nutrients are also an issue of concern with the majority of the freshwater sites tested showing excessive amounts of phosphate and ammonia. Phosphate levels are naturally high in Orange County so little can be done to change that. However, with the naturally high levels of phosphate that occur in Orange County waters, even levels of nitrate below the regional board standard can result in algal blooms and other problems for our freshwater streams. We all need to make the effort to reduce our use of plant nutrients to reduce the levels of ammonia and nitrates in our waters.

Dissolved Oxygen and pH were not found to be major water quality issues in this study but there were a few sites of concern. Exceptionally low DO readings at Greer Park and Huntington Lake should be followed up on. Additionally, the very high pH at Chris Carr and Greer parks should be further investigated.

The physical parameters were also generally good, an improvement that we should build on.

It should be noted this is only a snapshot of the water quality in Orange County. Thus, the results may not represent long term conditions. However, exceedences should be noted for future analysis.

This was the seventh annual snapshot day event, and a comparison with previous Snapshot Day events shows that the water quality problems found have seen improvement this year. Hopefully the costly efforts by local and state agencies to improve water quality through treatment processes and regulatory efforts are succeeding. There is still room for improvement and waiting for “someone else” to improve our water quality is an ineffective strategy. The only way we will see long term significant improvements in the water quality of our streams is if all Orange County citizens change their habits to reduce the human sources of bacteria and nutrients that pollute our streams. As outlined in the summary above and presented in detail in the tables on the following pages, the water quality in Orange County’s creeks is improving but we have much to do before we can achieve the maximum beneficial uses we expect and deserve from our local waterways. This report is intended to inform the public at large of the problems we face as a community in regards to water quality.

This event has helped to raise awareness of the water quality issues in Orange County, and directly demonstrate to the public the effects of pollutants on our waters. This report also provides data to the public and local agencies that can be used in planning actions to improve water quality. A digital copy of this data along with data from past years is available at www.cwmoc.org and www.coastkeeper.org.

Table 1: Bacteria Results for Snapshot Day May 3, 2008 Marine Sites. Values in Red exceed State or USEPA recommended levels.

Site	Group	Total Coliform: (MPN/100ml)	Total E. Coli: (MPN/100ml)	Total Enterococcus (MPN/100mL)
Bolsa Chica Wetlands-New Inlet (Flood)	BCC	<10	<10	**39.3**
Bolsa Chica Wetlands-New Inlet (Ebb)	BCC	<10	<10	20.3
Huntington Harbor	BCC	86	10	**>2419.2**
Santa Ana River	DIVERS	<100	<100	15
Surfrider 01-Edison Plant Downcoast	Surfrider	<10	<10	5.2
Surfrider- 05 San Gabriel River @ Bridge	Surfrider	**1,374**	10	**145**
Surfrider 03-Peter's Landing	Surfrider	73	<10	**53.7**
Surfrider04-Seal Beach Pier	Surfrider	148	30	**35**
Surfrider 06-Cerritos Channel	Surfrider	86	<10	**98.7**
Surfrider-Bolsa Chica Outer Bridge	Surfrider	10	20	17.5
Santa Ana Newport Slough	OCCK	<100	<100	19.1
Santa Ana Bolsa Chica State Beach	OCCK	<10	<10	21.8

Table 2: Bacteria Results for Snapshot Day May 3, 2008 Freshwater Sites. Values in Red exceed State or USEPA recommended levels.

Site	Group	Total Coliform: (MPN/100ml)	Total E. Coli: (MPN/100ml)	Total Enterococcus (MPN/100mL)
Bolsa Chica Wetlands Fischer's Gulch	BCC	**7,701**	**135**	3
Bolsa Chica Wetlands Wintersburg Channel	BCC	74	<10	9.5
San Diego Creek	DIVERS	**2,909**	100	**90.8**
Big Canyon Crk	DIVERS	**2.908**	<100	3.1
Greer Park	OCCK	**1,870**	<100	5
Huntington Lake	PUBLIC	**9,880**	**200**	6
Wintersburg- Site 2	OCCK			**1553.1**
Wintersburg- Site 3	OCCK			**1732.9**
Wintersburg- Site 4	OCCK	**>241,920**	100	
Wintersburg- Site 5	OCCK	**29,090**	**6,830**	
Wintersburg- Site 6	OCCK	**241,920**	**630.0**	
Santa Ana Twin Lake	OCCK	**14.390**	**310.0**	**60.8**
Talbert Channel Magnolia/Garfield	OCCK	**>241,926**	<100	**40.2**
Santiago Oak Regional Park	OCCK	**1,480**	<100	**45.9**

Table 3: Chemical Results for Snapshot Day May 3, 2008 Marine Sites. Values in Red exceed State or USEPA recommended levels.

Site	Group	PO4 average (mg/L)	NO3 Average (mg/L)	NH3 average (mg/l)	NH3 objective (mg/L)	pH	Average DO (mg/l)
Bolsa Chica Wetlands-New Inlet (Flood)	BCC					8.4	9.22
Santa Ana River	DIVERS	**0.17**	0	**0.12**		8	7.3
Surfrider 01-Edison Plant Downcoast	Surfrider	0.006	1.03	**0.26**			
Surfrider-02 Edison Plant	Surfrider						
Surfrider- 05 San Gabriel River @ Bridge	Surfrider	**0.125**	1.76	**0.176**			
Surfrider 03-Peter's Landing	Surfrider	0.096	0.86	**0.27**			
Surfrider04-Seal Beach Pier	Surfrider	0.023	1.0	**0.13**			
Surfrider 06-Cerritos Channel	Surfrider	0.066	0.9	**0.12**			
Surfrider-Bolsa Chica Outer Bridge	Surfrider	**0.22**	1.26	**0.36**			
Bolsa Chica Wetlands-Muted Tidal Pocket	BCC	**0.17**	0.7	0.01		7.94	**5.24**
Santa Ana Newport Slough	OCCK	**0.165**	0.8	0.25			
Santa Ana Bolsa Chica State Beach	OCCK	**0.35**	0.9	**0.25**		8.18	7

Table 4: Chemical Results for Snapshot Day May 3, 2008 Freshwater Sites. Values in Red exceed State or USEPA recommended levels.

Site	Group	PO4 average (mg/L)	NO3 Average (mg/L)	NH3 average (mg/l)	NH3 objective (mg/L)	pH	Average DO (mg/l)
Bolsa Chica Wetlands Fischer's Gulch	BCC	1.28	0.6	0.42		7.76	9
Bolsa Chica Wetlands Wintersburg Channel	BCC	0.156	0.46	0.03		7.92	5.32
San Diego Creek	DIVERS	0.09	0	0.41		8	6.05
Big Canyon Creek	DIVERS	0.83	0	0.08		7.5	4.6
Greer Park	OCCK	0.29	0	0.6		10	0.0
Wintersburg- Site 2	OCCK	0.443	1.2	0.12		9.14	
Wintersburg- Site 3	OCCK	0.21	0.66	0.01		8.11	
Wintersburg- Site 4	OCCK	0.14	0.4	0.23		8.79	
Wintersburg- Site 5	OCCK	0.17	0.86	0.42		8.18	
Wintersburg- Site 6	OCCK	0.14	0.4	0.22		8.52	
Huntington Lake	PUBLIC	1.0	<5			8	4.0
Huntington Lake	PUBLIC	<2	<5			7.5	4.0
Huntington Lake	PUBLIC	0.7	0.5			7.5	1.2
Huntington Lake	PUBLIC	0.21	0.6	0.29		8	4.0
Santa Ana Twin Lake	OCCK	0.61	0.5	0.55		8.27	7.0
Talbert Channel Magnolia/Garfield	OCCK	0.895	0.45	0.5		8.62	7.0
Santiago Oak Regional Park	OCCK	1.0	0	0.6		8	4.0

Table 5: Physical Results for Snapshot Day May 3, 2008 Marine Sites.
Values in Red exceed State or USEPA recommended levels.

Site	Group	Water Temp. (Celsius)	Air Temp. (Celsius)	Average EC (mS)	Turbidity	Transparency	Salinity (ppt)
Bolsa Chica Wetlands-New Inlet (Flood)	BCC	17.9	16.4				33.2
Santa Ana River	DIVERS	16.5	19			>120	34
Surfrider 01-Edison Plant Downcoast	Surfrider				1.66		
Surfrider- 05 San Gabriel River @ Bridge	Surfrider				1.3		
Surfrider 03-Peter's Landing	Surfrider				6		
Surfrider04-Seal Beach Pier	Surfrider				8.6		
Surfrider 06-Cerritos Channel	Surfrider				4		
Surfrider-Bolsa Chica Outer Bridge	Surfrider				11		
Bolsa Chica Wetlands-Muted Tidal Pocket	BCC	20.8	22.5				33.6
Santa Ana Newport Slough	OCCK	19.9					
Santa Ana Bolsa Chica State Beach	OCCK	22					

Table 6: Physical Results for Snapshot Day May 3, 2008 Freshwater Sites. Values in Red exceed State or USEPA recommended levels.

Site	Group	Water Temp. (Celsius)	Air Temp. (Celsius)	Average EC (mS)	Turbidity	Transparency	Salinity (ppt)
Bolsa Chica Wetlands Fischer's Gulch	BCC	19.8	22.5				0.5
Bolsa Chica Wetlands Wintersburg Channel	BCC	20.6	23.1				33.7
San Diego Creek	DIVERS	21	13			28.5	35
Big Canyon Creek	DIVERS	18	18			>120	5
Greer Park	OCCK	24	17.8		>100		
Wintersburg- Site 2	OCCK	25.7				6	
Wintersburg- Site 3	OCCK	27.2				4	
Wintersburg- Site 4	OCCK	25.6					
Wintersburg- Site 5	OCCK	23.4					
Wintersburg- Site 6	OCCK	26.2					
Huntington Lake	PUBLIC	24			0.48		
Huntington Lake	PUBLIC	26	26		50		
Huntington Lake	PUBLIC	24	26		20		
Huntington Lake	PUBLIC	24	26		40		
Santa Ana Twin Lake	OCCK	22.3					
Talbert Channel Magnolia/Garfield	OCCK	24.16	25.55		53.4		
Santiago Oak Regional Park	OCCK	18	28		50	50	