

ORANGE COUNTY'S BEACHES:
AN ENVIRONMENTAL SCORECARD

SUMMARY

Orange County's beaches are a popular tourist attraction as well as a recreational resource for county residents. Contaminated runoff collected in County watersheds is directed to the ocean, where they can pollute County beaches. When beaches are posted or closed due to unhealthful water quality, beachgoers are discouraged from visiting county beaches and this diminishes the overall quality of life. A monitoring system for analyzing the quality of our beach water reports on the daily condition of county beaches. Currently, beach water quality testing requires 24 hours to obtain results. If the results exceed the mandated water quality limits, the beach is posted with a warning sign that informs beach-goers that bacteria levels in the ocean water exceed health standards. In effect, however, the posting is done on the results of sampling done the day before. This could mean that the water quality meets standards but is posted based on the previous day's sample.

Most beach closures are due to sewage spills. Raw sewage containing human pathogens (harmful bacteria) enters urban storm drains and ultimately reaches the ocean. Documented evidence indicates this is a public health risk. Less well understood is the issue of indicator bacteria (non harmful) as a gauge of human health risk. Indicator bacteria are a selected group of bacteria that are used to indicate the possible presence of disease causing bacteria. Indicator bacteria are not generally harmful to humans. Most beach postings are a result of excessive indicator bacteria in the surf.

Indicator bacteria used to determine public health risk are commonly found in beach sand, soil and storm drains without any sewage being present. This could indicate that a posted beach may actually be safe for swimming despite failing the state mandated maximum standards. Tourism is a major contributor to the economy and county beaches are a significant revenue source. Closing and posting beaches due to sewage spills and beach water contamination causes economic loss when tourists cannot use the beach.

Coastal beaches are the final repositories of the outfall from watershed creeks and urban storm drains. Most beach contamination comes from these two sources. Two possible solutions to contaminated beaches are to clean up the sources of pollution of the watersheds and to clean up the watersheds at their outfall to the ocean.

The current monitoring program is not timely due to the lag time from sample to results. Indicator bacteria may not be an accurate predictor of human health risk.

REASON FOR INVESTIGATION

Even though federal and state laws require clean beaches, the issue of beach pollution continues. Beach contamination impacts the health, economic prosperity, and the quality of life of Orange County residents.

The purpose of this report is to study the county's beach water quality and inform the public of our findings.

2006-2007 ORANGE COUNTY GRAND JURY

METHOD OF INVESTIGATION

- Survey Orange County agencies involved with watersheds, storm drains and sanitary sewer services.
- Confer with state, county and private agencies regarding the regulations for reducing water pollution.
- Tour flood control channels, wastewater treatment plants, and watershed creeks and facilities.
- Interview county officials and staff regarding their efforts in reducing water pollution.

BACKGROUND AND FACTS

Orange County's world-famous beaches are an invaluable economic, environmental and recreational resource that must be protected for present and future generations. Pollution from sewage spills and agricultural and urban runoff threatens this critical resource and poses serious threats to the public's health. Beach contamination occurs in both wet weather and dry weather. Federal and state codes require water quality monitoring during the dry weather months at beaches that have over 50,000 annual visitors and are in an area adjacent to a storm drain that flows in the summer. Therefore dry weather contamination is the focus of this report.

Water quality has been a hot topic for the past thirty years. Federal and state agencies address the issue by producing regulations focused on the reduction of waterborne pollutants. Counties and cities have the responsibility for compliance with those regulations. Since the passing of the Federal Clean Water Act in 1972, the State of California has enacted AB 411, the California Ocean Water-Contact Sports Standard (1999). The regulatory elements from this bill were codified into Title 17 of the California Code of Regulations and the California Health and Safety Code.

WATER QUALITY MONITORING

The county has adopted a water quality monitoring program in order to comply with regulations. This program requires monitoring water at the beaches, harbors and watershed outfalls. About 150 locations are monitored along the shoreline. The frequency of sampling ranges from daily to five times a week at select locations and the samples are sent to the Health Care Agency, Orange County Sanitation District and South Orange County Wastewater Authority for analysis. The Health Care Agency is required by state law to post warning signs when the water quality tests fail state standards and to close beaches when a sewage spill contaminates the coastal beach water.

Over the past 40 years, the Health Care Agency (HCA) and two local sanitation agencies, the Orange County Sanitation District (OCSD) and the South Orange County Wastewater Authority (SOCWA), have been cooperatively testing the coastal waters in Orange County for indicator bacteria. The sanitation agencies and HCA program staff participate in the weekly collection of water samples at ocean, bay, harbor and drainage locations throughout coastal Orange County. The Ocean Water Protection Program, conducted by HCA, receives the results of 650-750 bacteriological samples each week. These are reviewed daily to determine compliance with state requirements. When a water sample fails to meet any of the standards, warning signs are posted at the affected ocean or bay areas indicating that the

2006-2007 ORANGE COUNTY GRAND JURY

waters have exceeded or violated health standards. In addition, the Ocean Water Protection Program staff responds on a 24-hour basis to investigate reports of sewage or other contamination incidents affecting Orange County's coastal waters. Poor water quality leading to postings is largely attributed to urban runoff.

Current testing methods require a sample to be incubated for up to 24 hours and the amount of bacteria colonies to be counted. The results can only indicate the quality of the sample when it was collected. This lag time between collecting and receiving test results often means that beaches are posted after the pollution has possibly dissipated. Furthermore, the tests can only show the presence of certain indicator bacteria that are tracers for pathogens found in raw sewage. It is assumed that the presence of indicator bacteria also points toward the presence of pathogenic bacteria. Members of two bacteria groups, coliforms and enterococcus, are used as indicators of possible sewage contamination because they are commonly found in human and animal feces. However, they are also found in sand, soil and leaves. These indicator bacteria are not generally harmful to humans, therefore testing for them can lead to false postings at beaches that actually are safe for recreational activities.

The monitoring of beach water quality is not designed to protect the public against the full range of waterborne illnesses. Viruses, protozoa and fungi in beach water are not evaluated.

WARNING SIGNS



WATER QUALITY REPORTING: Several agencies report on the results of water quality testing on Orange County's beaches.

Heal The Bay 2006 Summer Report Card: Heal the Bay is a nonprofit environmental organization dedicated to making Southern California coastal waters and watersheds safe, healthy and clean. The report is based upon the results of routine beach water monitoring conducted by local health and sanitation agencies. During the period June through September 2006, the reported overall water quality of county beaches was excellent. Of the

2006-2007 ORANGE COUNTY GRAND JURY

102 water quality monitoring stations covered by the report, 96 received “A” or “B” grades. Six locations received a score of “C” or lower. These were Huntington State Beach, Doheny Beach, Poche Beach and three locations at Baby Beach in Dana Point. The 2006 report card for Orange County indicated an overall improvement over the past four years.

2005 Annual Ocean and Bay Water Quality Report: The Orange County Health Care Agency, Environmental Health Department reports annually on the state of the county’s beaches. The report uses beach mile days as an indicator of the overall effect poor water quality has on the environment. Beach mile days are calculated by multiplying the number of days of posting or closed by the number of miles of beach posted or closed. This takes into account the amount of county beach affected by the posting/closure. Orange County’s 42-mile coastline has 31 miles of beaches and 70 miles of harbor and bay frontage. Sewage spills accounted for most of the beach closures. Pipeline blockages and breaks accounted for 71% of the spills. Responsibility for the operation and maintenance of sewer lines rests with a number of agencies – cities, special districts, water districts and the Orange County Sanitation District. The report shows 367 sewage spills occurred in 2005 causing 36 ocean and bay closures for a total of 75 beach mile days. This equals 0.2% of the available beach mile days. Moreover, 203 warning postings resulted in 600.7 beach mile days posted. This represents only 1.5% of the total number of beach mile days available.

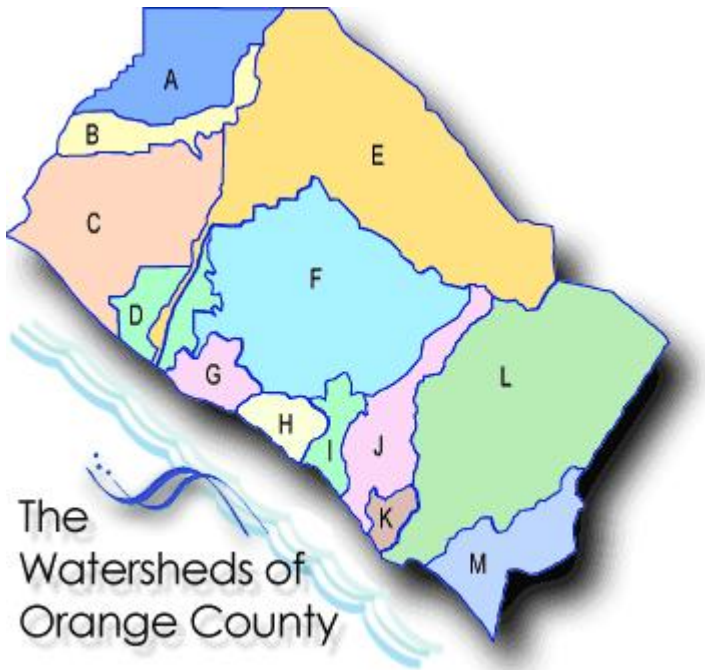
Orange County Community Indicators Report, 2006: This is a Community publication sponsored by Orange County and associated agencies. According to the report, the number of beach closures is low but sewage spills remain high. Sewage spills have declined for the third year in a row, but overall have increased 225% from 1995 to 2004. Possible causes for the increase is an aging infrastructure and better reporting. Much of our 5,000 mile long sewer collection system dates back to the early 1920’s. The report also indicated that the number of postings fell for the third year in a row.

Annual reports to the public regarding the water quality at local beaches are published on the internet at www.healthebay.org, www.ocbeachinfo.com and www.nrdc.org.

In summary, water quality monitoring at beaches has confirmed the beach water quality is good.

WATERSHED QUALITY

Orange County contains 13 watersheds, each of them depositing water into the ocean. Water flowing through a watershed picks up pollutants from the land along the way. The rapid urbanization of Orange County’s coastal watersheds has led to increased contributions of contaminants from land based sources to the ocean. The volume of water flowing from the watersheds into the ocean is significant, typically 33 million gallons per day in dry weather.



Runoff is classified into two types – Point Source and Nonpoint Source.

Point source runoff is discharged into a water body by a pipe or ditch from an industrial plant, farm, municipality, business or any identifiable source. Contaminated point source runoff degrades surface waters making them unsafe for drinking, fishing, swimming and other activities. The National Pollutant Discharge Elimination System (NPDES) program, an element of the Federal Clean Water Act, controls water pollution by regulating point sources that discharge pollutants into waters of the United States. In California, this program is administered by the State Water Resources Control Board (SWRCB).

Nonpoint source runoff includes all other non-identifiable sources such as urban runoff from homes, ditches, agriculture, parks, golf courses, construction sites, leaking septic systems, and other sources not readily identifiable. Since these sources are not readily identifiable they cannot be regulated; therefore clean-up at the source is challenging. Some of the causes of nonpoint source runoff are:

- over watering of lawns;
- washing cars on the driveway;
- hosing-down driveways;
- agricultural watering;
- golf course and park watering;
- fats, grease and oils from homes and restaurants;
- clean-up from home improvement projects; and
- disposal of fluids into the gutter.

2006-2007 ORANGE COUNTY GRAND JURY

Urban runoff is currently the suspected leading cause of beach pollution. What used to be forest, grassland and farms are now high-rise buildings, sidewalks, roads, parking lots and other impervious surfaces that promote runoff. This runoff collects from roadways and gutters into storm drains, from there goes into flood control channels and ultimately into the ocean at flood control outfalls. In non-urban and rural areas, runoff collects in culverts and watershed creeks and from there goes into the ocean at creek outfalls. This water may contain concentrations of animal waste, fertilizers, pesticides, chemicals, dissolved metals, oils, automotive fluids and human pathogenic bacteria.

Waterways are drained by one or more watersheds. Waterways that contain contaminants in excess of state standards and cannot support their designated uses are designated as “impaired.” A list of impaired waterways, as prepared by the State Water Resources Control Board from data received from the Santa Ana Regional Water Quality Control Board and the San Diego Regional Water Quality Control Board, includes Aliso Creek, Buck Gully Creek, Dana Point Baby Beach, Huntington State Beach, Los Trancos Creek at Crystal Cove, Poche Beach, San Clemente Beach, San Diego Creek, San Juan Creek, and Seal Beach. These waterways are major contributors to the overall amount of postings on county beaches.

According to the Natural Resources Defense Council’s “2006 Annual Guide to Water Quality at Vacation Beaches,” the water monitored at many of the outfalls of the county’s watersheds exceeded state standards for pollutants.

Due to ocean hydrodynamics, rates that exceeded state standards decreased at testing locations farther away from the creek along the beach. This indicates that the storm drain and watershed outfalls contain high levels of bacteria but this concentration is quickly dissipated by the time the contaminants reach a beach. Nevertheless, the specter of bacteriological pollution still threatens the health of our beaches. The county’s monitoring program cannot assure that all human pathogens do not exist in the surf. The true water quality with regard to human health risk is unknown. There is a need for additional research into the natural contribution to water pollution before one can understand the contribution by mankind.

Three possible solutions to the watershed water quality issue are Diversions, Reclamation and Outfall Treatment. These, augmented with public education, may result in an overall improvement in beach water quality.

Diversions is the practice of diverting part of the dry weather water in a flood control channel or watershed creek into a sanitary sewer treatment plant. The urban runoff is treated along with the sewage and discharged into the sea. There are three sanitary treatment outfalls in Orange County, one in Huntington Beach and two in South County. The Orange County Sanitation District (OCS&D) and the South Orange County Water Authority (SOCWA), in a collective effort to reduce the amount of urban runoff, have implemented diversion programs. Wet weather runoff from winter storms will overwhelm the capacity of the treatment plants; therefore, only dry weather runoff is treated. Currently, the county has 17 diversion locations in the north portion of the county and 14 locations in the southern portion of the county.

2006-2007 ORANGE COUNTY GRAND JURY

Reclamation is the process of treating watershed flow through a small treatment plant at appropriate wastewater outfalls and selling the treated water for agricultural and recreational irrigation projects. This requires additional distribution infrastructure to deliver the supply of reclaimed water to customers. Reclamation efforts, to date, have been only partially successful due to the high amount of dissolved mineral salts in the water. Reclamation of watershed water, treatment, and reuse serves both to improve beach water quality and conserve scarce fresh water resources.

Outfall Treatment is the process of treating the watershed flow at the outfall to the ocean. This reduces the contaminants reaching the surf and improves local water quality. One such facility is already in operation at Salt Creek Beach. The Salt Creek Treatment Facility is an advanced watershed treatment plant that has reduced the number of beach health warnings at Salt Creek Beach and Monarch Beach during dry weather by reducing the bacteria concentration of the Salt Creek outfall into the ocean. Prior to the construction of this plant, both beaches frequently received “F” grades from ocean water quality monitoring programs. The facility captures about 1.5 million gallons per day of urban runoff, treats it by filtration and disinfection with ozone gas, and returns the cleansed water to the ocean. Bacteria levels at the facility outlet and at both beaches are monitored in order to verify the effectiveness of the facility.

COUNTYWIDE EFFORTS TO IMPROVE WATER QUALITY

Orange County is proactive in water quality improvements and supports many research programs in order to determine the human health risks present in beach and bay waters. Diversion, treatment and education are priorities in this effort. Diversion is being used to redirect some of the nuisance water to wastewater treatment facilities. Reclamation efforts are also employed to recycle water from watersheds.

Orange County employs the use of bioswales to improve the quality of surface flow water. Bioswales are artificial wetlands that act as storm water detention facilities and allow suspended solids to settle. These contaminants are immobilized and/or decomposed by plants and microbes. The bioswales employ engineered basins that direct a portion of water from creeks and watersheds through a meandering system of natural vegetation and filtration that removes sediment, nitrogen, harmful bacteria and other contaminants and prevents them from reaching the harbors, beaches and bays. In effect, bioswales use nature as technology. Bioswales are currently used in Newport Beach alongside Pacific Coast Highway and Newport Boulevard.

The Irvine Ranch Water District has constructed a large scale engineered bioswale to treat a portion of the water from the San Diego Creek at a location in Irvine. The cleaner water is then allowed to flow back into the creek on its way to the ocean. The system is cost effective, environmentally friendly, uses natural processes and is scalable to local needs. More recently, a portion of Measure M funds has been allocated for the mitigation of transportation generated pollution by funding the development of roadside bioswales that filter runoff from streets, roads and freeways.

2006-2007 ORANGE COUNTY GRAND JURY

A brief summary of water quality accomplishments in public education during 2006 includes:

- 7,060,765 hits on Orange County's watershed website; and
- county offices distribution of 39,810 outreach materials regarding water pollution;

While municipal activities:

- cleaned 26 miles of drainage facilities including 2,119 catch basins;
- removed 117 tons of solid debris from the storm water system;
- diverted 327 million gallons of urban runoff to the sanitary sewer for treatment from diversion projects in Huntington Beach, Fountain Valley, and Costa Mesa; and
- responded to 155 pollution complaints resulting in 30 enforcement actions.

Most of the marine debris found on our beaches actually starts as urban trash or street litter. Thousands of volunteers participated in California Coastal Cleanup Day, September 16, 2006. They scoured county beaches and watersheds for trash and during the four hours devoted to this effort collected 78,015 pounds of trash and 13,414 pounds of recyclables for a total of 91,429 pounds of material.

BEACH SAND

The most recent water quality reports concerning county beaches indicate most beaches have good to excellent quality. Indicator bacteria levels that exceed the state standard may be due to non-human originated pathogens, the source of which cannot be determined. The secret may be in the sand.

Recent studies have investigated the presence of indicator bacteria in the sand itself. In 1994, researchers began to notice that the concentrations of E. coli bacteria were much higher in the sand and in shallow water than in deeper water. A 2003 U. S. Geological Survey study found that indicator bacteria levels in sand averaged 5 to 10 times higher than levels in adjacent swimming waters. Scientists suspect that while many pathogens find water a less hospitable environment, bacteria harbored in the sand may persist longer than in the water because they adhere to sediment particles, unlike free bacteria in the water. This suggests that sand may actually serve as a reservoir for indicator bacteria and could be a source of benign contamination. Only further research will reveal the true nature of the relationship between sand, bacteria and human health risk.

A recent three year study funded by the California Sea Grant agency was launched in early 2006 to identify the rhythmic ebb and flow of indicator bacteria at Huntington State Beach. Researchers found that indicator bacteria levels increase with tidal extremes and could build up in the beach sand. The ground water beneath Huntington Beach has been shown to contain high levels of nitrates, a form of nitrogen that can feed the growth of bacteria. The lead researcher has stated that if this bacteria is naturally present in beach sand, it is a good indicator of health risk.

Researchers at UCLA's Samueli School of Engineering and Applied Science conducted a survey of beaches in Los Angeles and concluded that the sand may act as a source of indicator bacteria. A disturbing discovery was that bacteria were found in their highest concentrations in the sand of enclosed beaches often favored by parents with children

2006-2007 ORANGE COUNTY GRAND JURY

because of the lack of surf. The study ultimately shows the importance of monitoring the sand as well as the water.

A study of 60 beaches in Southern California by Stanford University and the Southern California Coastal Water Research Project suggests that water pollution varies with the lunar cycle, reaching the highest levels during the so-called “spring tides.” Spring tides are exceptionally high or low tides that take place during the full and new moon, but have nothing to do with the season of the year. Concentrations of enterococci, an indicator bacteria used to determine water quality, are about four times higher during spring tides than neap tides. This suggests that spring tides facilitate the flushing of pollutants to the ocean. This is consistent with the growing body of evidence that enterococci are present in the subsurface of beach sands.

The Orange County Public Health Laboratory also studied enterococci and its importance as an indicator of human health risk. A finding indicated that enterococci used to indicate the presence of human sewage appear to thrive in storm drains and other places in the absence of any human waste.

A recent study conducted by Central Michigan University and reported by the Clean Beaches Council found that other indicator bacteria, including a benign form of *E. coli* that poses little health risk to humans, occurs at higher levels in the sand than in the water. They also survive longer in sand than in water. According to one member of this research team, “Often a beach is closed because of high counts of fecal indicators in the water, but we often can’t identify the source for it – no sewage overflow or storms, just unexplained high levels of bacteria in the water.”

FLOOD CONTROL CHANNEL



2006-2007 ORANGE COUNTY GRAND JURY

BIOFILM

Another issue has recently surfaced in the research of waterborne contaminants – biofilm. Biofilms are a collection of microorganisms surrounded by the slime they secrete, attached to either an inert or living surface. Examples of biofilm include the plaque on your teeth, the slippery slime on river stones, and the gel-like film on the inside of a vase that held flowers for a week. Biofilm exists wherever surfaces contact water. Indicator bacteria are known biofilm producers. The bacteria in biofilm can find their way through watersheds to the ocean and cause compliance failures without the presence of any fecal matter contamination.

In summary, indicator bacteria can exist, indeed thrive, where no human pathogens are present, contradicting the assumptions underlying the assessment of water quality standards based on levels of indicator bacteria, and calling into question the relationship between indicator bacteria levels and swimmer illness.

ECONOMIC IMPACT OF CLOSED BEACHES

Beaches are a popular destination for tourists in Orange County and large revenues are generated by beach-goers for local, state and federal governments. In 1998, a study was conducted by the Public Research Institute at San Francisco State University. The purpose of the study was to research and analyze the economic impact of beach visits on the economy. Huntington Beach was a case study in this research paper. The study revealed that the annual expenditure by all visitors to Huntington Beach was \$139 million with an estimated economic value of \$329 million. Another study by the same university on the city of San Clemente in 2001 revealed that the city receives about \$1.65 million from beach spending. Overall, the estimated economic value of San Clemente's beaches is \$37 million annually.

Visitors traveling to Orange County for recreation and business generate revenue and jobs for the local economy. As an example, shoreline hotels countywide were expected to sell out 1.2 million room-nights in 2006. Taken together, the out-of-town visitors and the local population who use the beaches comprise nearly 44 million visitors a year and this total is growing. One popular area, Huntington Beach, is host to 11 million beach-goers in a typical year. It provides 1,700 jobs and \$38 million in local payrolls. Such benefits are not without risk. Much attention is paid to the condition of the county beaches. Indicator bacteria counts are made frequently; and from time to time, warning signs are posted and in some cases a beach may be closed due to extreme contamination.

A 2002 report was conducted by the Economics Department of San Francisco State University. This report estimated an annual economic loss of \$251 million if Huntington Beach and San Clemente beaches were closed.

A 2006 report by the Southern California Beach Valuation Project, a multi-agency partnership, depicted the local economic impact due to the degradation of water quality of California beaches. The study focused on Zuma Beach in Los Angeles and Huntington

2006-2007 ORANGE COUNTY GRAND JURY

State Beach in Orange County. In the first scenario, Zuma Beach, an grade A beach was downgraded to an F. The estimated result was a local loss of \$1, 284,157.00 annually and the economic loss, if Huntington State Beach was closed for a month, was estimated to be \$864,436.00.

Despite the apparent differences in the foregoing estimates, they both show a substantial economic loss if those beaches were closed.

During interviews with beach city Chambers of Commerce and Visitors Bureaus, the Grand Jury was advised that substantial economic losses would occur should beaches in their respective cities become closed due to contamination or other events. This loss would have a “domino” effect that could result in decreased services to city residents. Service organizations that rely on tourism would be negatively impacted the most. Additionally, a “ripple” effect to cities outside of the beach community could suffer losses as well.

Water pollution has a significant economic effect on Orange County. Failure to invest in clean water projects can result in employment losses, tourism losses, reduced property tax dollars, and slower economic growth.

CONCLUSION

Orange County beach water quality is generally very good and is improving. It is possible that the water quality is even better than reported due to the questionable relationship between the indicator bacteria used to determine water quality and the actual levels of human pathogens.

Orange County is a leader in efforts to clean up their beach and bay waters as county agencies continue to seek innovative solutions to water quality issues. Many improvements have been made and the declining number of postings bear testimony to the county’s laudable commitment to public health. Through these efforts, the public can enjoy year-round water sports without risk of illness.

FINDINGS

In accordance with California Penal Code sections 933 and 933.05, each finding will be responded to by the government entity to which it is addressed. The responses are to be submitted to the Presiding Judge of the Superior Court. The 2006-2007 Orange County Grand Jury has arrived at the following findings:

- F-1. Indicator bacteria are naturally present in beach sand and therefore may be a poor predictor of human health risk.
- F-2. Current testing of beach water is not timely; there is a typical 24 hour delay between the time samples are collected and the time test results are available.
- F-3. Most dry weather beach closures are due to sewage spills.
- F-4. Most beach water bacteria come from watershed outfalls.

2006-2007 ORANGE COUNTY GRAND JURY

Responses to Findings F-1 and F-2 are requested from the Orange County Health Care Agency.

Responses to Finding F-3 are required from the Board of Directors of both the Orange County Sanitation District and the South Orange County Wastewater Authority.

A Response to Finding F-4 is requested from The Orange County Resources and Development Management Department.

RECOMMENDATIONS

In accordance with California Penal Code sections 933 and 933.05, each recommendation will be responded to by the government entity to which it is addressed. The responses are to be submitted to the Presiding Judge of the Superior Court. Based on the findings of this report, the 2006-2007 Orange County Grand Jury makes the following recommendations:

- R-1. The Health Care Agency should develop a more accurate predictor of health risk and should research county beach sands to determine if bacteria are flushed from the beaches during lunar tides and whether these bacteria are pathogenic.
- R-2. The Health Care Agency should develop a more timely method of water quality testing.
- R-3. The Orange County Sanitation District and the South Orange County Wastewater Authority should confer with all Cities and Sewer Districts in the county and develop a plan to manage the aging sewer infrastructure and mitigate sewer line blockages.
- R-4. RDMD should consider developing treatment facilities at creeks with the highest historical concentration of bacteria within the county.

Responses to Recommendations R-1 and R-2 are requested from the Orange County Health Care Agency.

Responses to Recommendation R-3 are required from the Board of Directors of both the Orange County Sanitation District and the South Orange County Wastewater Authority.

A Response to Recommendation R-4 is requested from the Orange County Resources and Development Management Department.

REQUIRED RESPONSES:

The California Penal Code specifies the required permissible responses to the findings and recommendations contained in this report. The specific sections are quoted below:

§933.05(a) For purposes of subdivision (b) of Section 933, as to each grand jury finding, the responding person or entity shall indicate one of the following:

2006-2007 ORANGE COUNTY GRAND JURY

- (1) The respondent agrees with the finding.
 - (2) The respondent disagrees wholly or partially with the finding, in which case the response shall specify the portion of the finding that is disputed and shall include an explanation of the reasons therefore.
- (b) For purposes of subdivision (b) of Section 933, as to each grand jury recommendation, the responding person or entity shall report one of the following actions:
- (1) The recommendation has been implemented, with a summary regarding the implemented action.
 - (2) The recommendation has not yet been implemented, but will be implemented in the future, with a timeframe for implementation.
 - (3) The recommendation requires further analysis, with an explanation and the scope and parameters of an analysis or study, and a timeframe for the matter to be prepared for discussion by the officer or head of the agency or department being investigated or reviewed, including the governing body of the public agency when applicable. This timeframe shall not exceed six months from the date of publication of the grand jury report.
 - (4) The recommendation will not be implemented because it is not warranted or is not reasonable, with an explanation therefore.

GLOSSARY:

Aquifer: A natural underground reservoir holding water that seeps through the ground.

Flood control channel: A channel that accepts water from multiple storm drains and outfalls into the ocean.

Indicator bacteria: A selected group of bacteria that are used to indicate the possible presence of disease causing bacteria. Indicator bacteria are not generally harmful to humans.

Monitoring: The regularly scheduled collection and testing of water samples from the surf and watershed outfalls.

Outfall: Outfalls are where rivers, creeks or flood control channels discharge their volume of water into the ocean.

Posted: A warning sign that informs beach-goers that bacteria levels in the ocean water exceed health standards.

Runoff: Water running off of impervious surfaces such as roads, parking lots, golf courses and other land surfaces. Also called urban runoff.

Sanitary sewer plant: A facility that collects wastewater from homes and businesses, treats, disinfects and pumps the treated wastewater several miles out to sea

Storm drain: An underground system designed to drain excess rain and ground water from paved streets, parking lots and urban impervious surfaces. They generally empty into flood control channels.

Tracer: A physical substance whose presence suggests the presence of another related substance.

Watershed: A geographical area of land that catches rain and urban runoff and drains or seeps into a storm drain, creek or into the groundwater aquifer.

Waterway: A river, creek or flood control channel. Also may be a lake or pond.