

Public Perceptions of Environmental Quality: A Survey Study of Beach Use
and Perceptions in Los Angeles County

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Abstract

Despite documented successes in the battle to clean up the coastal waters of Southern California, Los Angeles County residents continue to view the ocean more as a place of pollution than a vibrant and healthy place for bathing and swimming. This study shows that residents of Los Angeles County tend to hold perceptions of marine water quality that are at odds with data on bacteriological measures of water quality collected by local sanitation districts (and reported by not-for-profit Heal the Bay.) Summary results of a survey of 400 randomly chosen households in Los Angeles County are given. Respondents were asked about their beach use and perceptions of environmental quality: both coastal water quality and air quality. The results suggest that perceptions of coastal water quality may be influenced less by "current coastal education campaigns" and more by the media and other factors.

keywords: Los Angeles, water quality, bacteria, beaches, sociological aspects, pollution effects

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People using the beach differ in many ways, including the types of recreation activities they undertake as well as their personal characteristics and perceptions about this recreation environment (Bird, 1996.) A person's socio-economic status, cultural ties, and past experiences influence how they perceive environmental quality (Renn et al., 1992.) In addition, familiarity with, or exposure to information about, environmental quality can interact with these personal attributes to affect overall perceptions and leisure activities. Combinations of these unique leisure patterns across individuals ought to influence how specific recreation areas are managed (Jackson et al., 1989.)

In 1999, the Southern California Beach Project at the University of Southern California undertook a survey study to explore environmental perceptions and recreation experiences among a cross-section of Los Angeles residents. Special attention was given to beach use and perceptions of marine water quality. The relationship between the public and the natural environment is complex. On the one hand, people's recreation behavior is indirectly affected by environmental quality, via the individuals' formulations of perceptions about their environment. On the other hand, the public possesses the ability to directly affect the quality of the natural environment through individual behaviors, which may depend on people's perceptions of the environment. Consequently, it is crucial to seek a better understanding of how individuals form their perceptions about environmental quality and how accurate these perceptions are in reality.

The 1999 Environmental Perceptions Survey was undertaken as part of the USC Beach Project to seek a better understanding of how Southern California residents

experience and perceive their environment. Specifically, the survey questions were designed to elicit respondents' perceptions about environmental quality, beach recreation, and various other social issues relevant to Los Angeles County residents. The survey collected information about each individual's participation in outdoor recreation activities, particularly at the beach, as well as their perceptions about water and air quality, and crime. The survey also obtained information about respondents' socio-economic backgrounds, ethnicity, and length of residence in the Los Angeles area.

Survey Information:

Households in Los Angeles County were contacted using random digit dialing. Initially, 4700 units were purchased for the following Los Angeles area codes: 310, 424, 323, 562, 626, 818, 213. Surveys were conducted in English and Spanish on weeknight evenings (Monday through Thursday) during July, August, and September of 1999.

Quality Indices Used in Data Analysis:

In three separate survey questions, we probe the accuracy of the respondents' perceptions about various issues; coastal water quality, air quality, and crime by asking them to compare various beaches and cities in terms of these quality attributes. In order to assess the accuracy of respondents' perceptions about environmental quality, we collected statistics on water quality, air quality, and crime for the various cities and beaches used for comparison.

Water quality indices for local beaches used in the survey were created from the not-for-profit Heal the Bay's Beach Reports for each week posted during the survey period. Beach reports are posted online each week at www.healthebay.org. These beach grades are the only immediate and daily source of information about beach water quality that the public can access. Beaches are classified on a grade scale of F to A+ based on bacterial pollution levels present in the surf zone.

Air quality data for the various cities used in the survey were collected daily from the Air Quality Management District website: <http://www.aqmd.gov>. We obtained daily reports of the pollution standards index (PSI) for three types of pollutants: ozone, nitrogen dioxide, and carbon monoxide. We constructed a single air quality index by averaging these three PSIs for each day. This was done for each district containing a city used in the survey question.

Crime indices for the Los Angeles areas used in the survey question were constructed using 1997/1998 crime statistics obtained from California Department of Justice database and the Los Angeles Police Department reporting district records for those years.

Results and Analysis

General Demographics

The respondents in our sample are fairly representative of the total population in LA County. From a randomly generated set of 4700 telephone numbers, provided and screened by SSI Incorporate, 403 surveys were completed. In order to judge our sample in relation to the general population demographics of Los Angeles County, we compared

our respondents to the 1990 US census data on Los Angeles. Though these data may be somewhat out of date, we believe that the lack of a better data set make this census the best option until the year 2000 statistics become available.

Grouping respondents by annual income, we find that the sample closely resembles the 1990 Census for LA County. Only one category differs from the control by more than 1-2%. The \$35-53,000 range is over represented by 4%.

The ethnic composition of our sample differs slightly from the 1990 census data and probably reflects the growing population of non-Caucasian and multi-racial individuals in the Southern California Area (see Table I.) Non-Mexican Hispanics are slightly over represented (6%), while people who identified themselves as Mexican, or of Mexican ancestry, are slightly underrepresented (2%.) Caucasians were the most underrepresented group, making-up 41% of the total censused population, but only 34% of respondents. Also, Asians and Pacific Islanders were underrepresented by about 4%, Native Americans made up 4% of respondents though they are less than 1% of the Censused population, and individuals in the "other" category were over represented by about 5%. Africans and African Americans were the only group that was represented in a proportion perfectly consistent with the census data. A comparison of our results with data for 1998 from Los Angeles County's official website (<http://www.co.la.ca.us/statistics.htm>) shows that our survey represents all groups proportionally except Asian/Pacific Islanders (underrepresented) and Native Americans (over represented).

Females were over represented in the survey (57.57%) compared to census figures that show 50.13% of the local population is female. However, we did institute a

procedure requiring that the respondent be the person in the household who was over 18 and had the next birthday. Thus, it may be that the discrepancy was caused by a difference in willingness to participate.

Unfortunately, it is not possible to compare our respondents' levels of education to the 1990 Census results, since the Bureau's categories are quite different from those we used. Still, the results seem fairly reasonable. High school graduates (21%), those with some college education (22%) and college graduates (24%) each represent almost a quarter of the sample. Respondents having no formal education to those with some high school were about 18% of the sample; those with professional or master's degrees together were about 9%. The smallest category was those with Ph.D.s, only 2% of responses.

Beach Plans

The survey collected data on beach visitation and use patterns. Table 2 summarizes the frequency of beach visitation among surveyed respondents. The majority of respondents replied that they went to the beach at least once per month during a typical summer (49.62%). Of those who said they do go to the beach, only 38.46% said that they actually get in the water when they go to the beach. Almost half of the respondents who went to the beach, but did not get in the water, cited pollution as the reason they avoided water contact. Other reasons and the frequency of responses are given in Table 3. Of those who did not go to the beach at all (16.13% of total), only 14.10% cited concerns about water pollution as the primary reason for not going. This suggests that water

pollution is more important in determining the behavior of people that do go to the beach, than actually influencing whether people go to the beach at all.

Access to Information About Beach Attributes and Water Quality

Unlike air pollution, it is difficult for people to readily gauge levels of marine water quality. Access to information about water quality may significantly impact people's perceptions of the marine environment. The survey dealt with two types of "information gathering" by respondents: personal experience and media exposure. First, we asked if the respondent or any of his/her family had ever gotten sick within two weeks after swimming at the beach. Only 16.13% had experienced this type of "direct" interaction with the consequences of ocean water pollution. We also asked about beach closures and warning signs. More than half (50.86%) of the respondents said that they could recall personally seeing a sign at the beach warning "no swimming." A larger number, 68.24%, recalled hearing about a beach closure in the last year. Further, 73.45% of those surveyed could remember seeing or hearing a news story about water quality at the beach and the source of those stories was overwhelmingly from television news. From this, we gather that much of our respondents' information about beach pollution came from media exposure rather than personal experience.

Perceptions of Beach Water Quality

This survey was specifically designed to accomplish two tasks: first to determine how people perceive beach pollution and second to discern whether or not their opinions are consistent with the actual levels of ocean water pollution and the related health risks.

Respondents were asked whether they thought ocean water pollution had gotten better or worse over the last five years. The majority of respondents (58.06%) said that it had gotten worse, 19.85% said it had gotten better, 9.42% said it was the same and 12.66% said they didn't know. In fact, the Southern California Coastal Water Research Project is only now compiling information that would permit one to say that water quality for Southern California had improved or declined over the last five years. Dr. Guangyu Wang of the Santa Monica Bay Restoration Project (personal communication) reports that water quality for Santa Monica is thought to have stayed the same or improved slightly over the last five years. Respondents were also asked a similar question regarding air pollution to which 49.13% responded that it has gotten worse, 37.71% thought it had gotten better, 7.44% said it was the same and 4.96% claimed that they didn't know (see Table 4.) There appears to be more pessimism and more self-professed ignorance where ocean water pollution is concerned compared to air pollution.

In another question, we asked respondents to compare ocean water pollution with some other issues that have proven important in Los Angeles. The results are summarized in Table 5. When asked to compare ocean water pollution to crime, 73.45% of respondents said that crime was the more important issue, 7.19% ranked them the same, and 19.35% claimed that ocean water pollution was more important. The quality of public education was also compared with ocean pollution, and 79.16% of respondents said that the former was more important to them than the latter, only 4.47% said that they were equally important and 16.38% put ocean water first. Finally, when asked to rank the relative importance of ocean water and air pollution, 66.75% of respondents chose air pollution as the more important problem, 8.68% said they were the same, and 24.56%

replied that ocean water pollution was more important to them personally than air pollution. For the most part people would stress the salience of the three counter issues, crime, education, and air pollution, in their decisions to favor them over ocean water pollution.

Through the survey, we attempted to determine peoples' attitudes about marine pollutants and their beliefs about the health risks that may be associated with these pollutants. For the most part, when asked about sources of ocean water pollution in the pre-tests of our survey, respondents had difficulty answering the question or would not respond with all of the sources we wished to ask them about. Therefore we established a "volunteer, then prompt" structure around the four primary sources of ocean water pollution in Southern California: storm drains, raw sewage, trash, and industrial or chemical wastes. The respondent was first asked what she felt were the sources of ocean water pollution. Those causes that the respondent volunteered were scored, then the respondent was asked if he or she felt that a person swimming in water contaminated with the volunteered pollutant(s) could get sick from such contact. If the response was positive, then the respondent was asked if that person would get sick or very sick from each pollutant. Once the answers that had been volunteered were completed, the surveyor would then prompt the respondent with the remaining types of pollutants, marking YES or NO, depending on whether or not the respondent said that the prompted pollutant was a problem in Southern California. If the answer was YES, the questions regarding sickness and the severity of possible illness were asked as well. The results of this question can be seen in Figures 1.

Respondents volunteered most frequently that trash was an important source of water pollution (43.18%±4.84%), while industrial waste and other ranked second (41.19%±4.80%). Well-known sources of bacterial contamination were volunteered by much less frequently by respondents. Sewage was volunteered as an important source of marine pollution by 29.28% (±4.44%), while stormwater was volunteered by only 24.07% (±4.17%) of respondents. Of course, many more responded that trash, industrial wastes, sewage, and stormwater were pollutants when prompted.

Numerous public education campaigns exist to warn potential beach goers of the risks of bathing in polluted coastal waters in Southern California (e.g. programs by Heal the Bay and the Santa Monica Bay Restoration Program.) While risks from sewage have been largely contained through sewage treatment, stormwater still poses a serious threat to beach goers (SMBRP 1996.) Not surprisingly, three quarters of all respondents believed that contact with stormwater could make one sick; a similar number also said trash could make one sick (75.93%±4.17.) While the perils of stormwater have been advertised actively in recent years, sewage (89.33%±3.01%) and industrial wastes (90.07±2.92%) each were cited by more respondents than stormwater as a potential cause of sickness.

To gauge people's ability to evaluate the quality of the water at the beach, we asked them to compare the water quality at two randomly chosen beaches (see Table 6 for the list of beaches.) Each respondent was given a separately generated random pair of beaches. If at least one beach in the pair was unfamiliar to the respondent, they were given a second randomly chosen pair of beaches. Their answers were then evaluated using the Beach Grades published on the web by the Heal the Bay Foundation. Though

we use weekly grades corresponding to the week before the date of the interview, for purposes of brevity we present a summertime average in Table 6. Only 26.05% (± 4.28%) of respondents were able to correctly identify the beach with the better water quality. Further, 33.25% (± 4.60%) were wrong about which beach had cleaner water. The remainder of the sample did not know (19.35%±3.86%) or did not recognize (21.59% ± 4.02) both beaches in the pair.

We asked a similar question regarding air pollution in 11 commonly recognized cities in Los Angeles county, using Los Angeles Air Quality Management District data to decide if respondent correctly chose the city with the better air quality (see Table 7.) While 42.18% (± 4.82%) were right, 40.69% (± 4.80%) chose incorrectly and only 17.12% said they didn't know (8.44% ± 2.71%) or didn't recognize any of the four cities we asked about (8.68% ± 2.75%.)

Conclusion and Policy Implications

More than half of all Angelenos will go to the beach next year, but less than one fifth will ever get in the water. Southern California's most famous, and perhaps most abundant natural resource – its ocean – is also one of its most underutilized natural assets. Despite documented successes in the battle to clean up the coastal waters of Southern California, especially through sewage and industrial treatment, Southern Californians continue to view the ocean more as a reservoir for pollution than a vibrant and natural place for bathing and swimming. Nearly half of all Angelenos interviewed in this study cite water pollution as the major reason for not going to the beach.

The public's perception of ocean water quality often is at odd with the facts. While major advances in sanitation (e.g. the Hyperion Sewage Treatment Facility) and stormwater diversion have reduced total loads of bacteria in coastal waters, the public continues to view marine pollution as a problem that is bad and getting worse. More than half of those surveyed claimed that water quality in Southern California was actually

worse than it was five years ago. Similarly, only seventeen percent of those polled could correctly identify beaches that were most polluted by bacteria. These figures differ sharply with what people know about air quality. Over forty percent of those contacted were able to correctly rank cities by air quality.

Part of the cause of "misperceptions" about water quality may stem from the fact that most people do not view water quality as an important issue. Respondents consistently rank water quality behind crime, education, and air pollution as issues of concern. Furthermore, people do not view stormwater, sewage, or biological contamination as the primary sources of water pollution. Despite the fact that over half those surveyed had seen signs warning about stormwater pollution and more than sixty percent were aware of beach closures, industrial pollution and trash are viewed by the public as the primary contaminants of ocean waters.

Clearly public education campaigns and the media have yet to fully succeed in properly informing the public about coastal water quality issues in Southern California. Coastal waters are generally perceived to be far more polluted than they are known to be. Based on bacteriological data alone, the vast majority of beaches in Los Angeles and Orange County consistently exhibit only low levels of bacterial contamination that are well within standards for human safety. (Remember, bacteria exist naturally in coastal waters.) Nevertheless, media exposure tends to focus on those beaches that are closed or experience long-term water quality problems. Secondly, Angelenos lack the knowledge required to accurately discriminate between beaches that are clean and dirty, at least as measured from a bacteriological perspective. Apparently, efforts by such groups as Heal the Bay, Surfrider Foundation, and the Santa Monica Bay Restoration Foundation have not been fully successful in getting information about beach-specific water quality to potential beach users at large.

Misperceptions about water quality could have significant impacts on the economic well being and health of Southern Californians. The general perception that the ocean is dirty keeps many people from enjoying a natural resource that is, by and large, safe and inexpensive. Furthermore, incorrect perceptions about water quality may lead beachgoers to drive farther than necessary to avoid beaches that are perceived to be dirty, when clean beaches may be closer and more accessible; people may choose

beaches with fewer amenities simply because they believe them to be safer and cleaner. Finally, the inability of Southern California beach goers to accurately discriminate among beaches based on possible levels of bacterial contamination means many beach goers may be unnecessarily exposed to pathogens that can make them sick. Efforts to improve the public's understanding of coastal water quality could result in both economic and health benefits to beach goers.

Table 5: The Relative Importance of Marine Pollution^e

How Issues Compare to Marine Pollution	Crime	% Total	Air	% Total	Education	% Total
More important	296	73.45 (± 4.31)	269	66.75 (± 4.60)	319	79.16 (± 3.97)
Same	29	7.20 (± 2.52)	35	8.68 (± 2.75)	18	4.47 (± 2.02)
Less important	76	19.35 (± 3.88)	99	24.57 (± 4.20)	66	16.38 (± 3.61)

^e 95% Confidence Intervals in parenthesis.Table 6: Water Quality at Selected Beaches 1999^f

Beach	Summer Average (June 1 -- August 31, 1999)
Leo Carillo Beach (1)	4.5
Zuma Beach (2)	4.2
Surfrider Beach, Malibu (3)	4.0
Santa Monica Beach (4)	3.6
Venice Beach (5)	3.5
Manhattan Beach (6)	4.4
Long Beach (7)	3.2
Seal Beach (8)	3.7
Huntington Beach (9)	3.4
Newport Beach (10)	4.2
Redondo (11)	4.2
Laguna (12)	4.5
Doheny State Beach (13)	3.6
San Clemente Beach (14)	3.9

^f Heal the Bay's letter grades were transformed into a numeric system where "A+"=4.5, "A"=4, "B"=3, "C"=2, "D"=1, and "F"=0.

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FIGURES