

### Sewage on San Diego Beaches

For a casual reader of the San Diego Union-Tribune, the ongoing debate about sewage is incomprehensible. Scientists, congressional representatives, and regulatory bodies have opinions about everything, and their opinions often appear to defy logic to the point of being internally inconsistent.

Former Congressman Brian Bilbray (who represented the district that includes La Jolla until this year) presented himself as an environmentally-minded surfer. Indeed, Bilbray's disgust with environmental on the beaches where he used to work as a lifeguard has been a major driver in his political career.

A big source of beach pollution is sewage. Tijuana is estimated to generate 50 million gallons of sewage a day; its main treatment plant handles 17 million gallons. An additional 25 million gallons per day are treated by the International Wastewater Treatment Plant. The remainder flows from Tijuana across the border to IB and ultimately straight into the Pacific Ocean. As mayor of IB, Bilbray was famed for having taken charge of a skip loader to stop the flow of sewage.

As a member of Congress, Bilbray carried out two contradictory actions. First in 1995 he sought a waiver of sewage treatment standards, so that San Diego could dump less seriously treated sewage into the ocean. Then he sought funding for the international sewage treatment plant to help process Mexican waste. And finally, in 2000, he helped push through legislation to provide secondary treatment of the Tijuana sewage. As a result, sewage from Tijuana will be held to a higher treatment standard than sewage from San Diego.

Why would Bilbray seek a waiver to reduce sewage treatment but then push to insure that all Tijuana sewage was treated? Regardless of your opinions of Bilbray and his politics, his handling of sewage runoff was relatively sensible in light of our scientific understanding.

In your groups, select a group leader, spokesperson, recorder, and fact checker, making sure that everyone has a different job than they had last time.

Consider the following questions:

(1a) Where do you expect sewage outfall to end up? (You may want to look at the textbook's discussion of upwelling and downwelling, and you may want to glance at the discussions of waves and tidal currents.)

(1b) Sewage planners spend a lot of time debating the length and depth of outfall pipes. The Point Loma pipe that handles San Diego sewage is about 4 miles long and 320 feet deep, while the Tijuana pipe is 3.6 miles long and 95 feet deep. What impact do you expect the pipe characteristics to have on where sewage ends up?

(2) One big issue for understanding sewage treatment has to do with heavy metals. Tijuana is home to a number of maquiladoras that spew substances such as dioxin into their wastewater stream. Contaminant concentrations are high enough to be toxic at the pipeline discharge point. Why aren't dioxin or heavy metal a problem when Tijuana sewage is mixed with San Diego sewage in the Point Loma outflow pipe?

(3) When plans were first made to address the heavy metals in Tijuana pollution, environmentalists advocated using a network of ponds to settle the toxic components of the sludge. IB residents were not so happy about the plan and suggested conventional factory-style sewage treatment instead. Why would neighbors feel so strongly about sewage treatment ponds?

(3b) Who are the other stakeholders in the sewage treatment question and what opinions would you expect them to voice?

(4) Finally, given the risks of coastal contamination, speculate about the reasons why environmentalists have agreed that the city of San Diego does not need to carry out secondary sewage treatment. What issues might be involved? Do you need additional information to help explain this apparent callousness toward the environment?

Next time we'll delve into the complexities of San Diego sewage, we'll ask what processes are responsible for pollution and beach closures, and we'll ask how sewage treatment might have to change as the population of this region continues to grow. Assign each group member to represent a stakeholder, and divide up your outstanding questions so that everyone has something to research.

For next time, read the remainder of this case, decide how the stakeholders that you represent might respond, and do additional background research on the outstanding questions of this case. In our final meeting on this topic, your groups will be asked to present plans to accommodate future population growth in San Diego County and Tijuana.

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Despite all the media hype about sewage, sewage isn't the only process responsible for closing our beaches and polluting our oceans (nor does it receive all the hype). Read the following OpEd piece by San Diego County Board of Supervisors member Greg Cox. This appeared in the October 18, 2000 edition of the San Diego Union-Tribune under the headline "Cleaning up our beaches and bays".

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No one wants to face the ugly truth about our most beautiful asset, but in San Diego County there were 141 reported cases of contamination at area beaches last year. We had unsafe water at our beaches more than 68 percent of the year. This means that a family who wanted to go to the beach over a three-day weekend was likely to have been met with unsafe water for two of those three days.

Beach closures in San Diego, typically caused by either sewage contamination or storm water run-off, have become an all too familiar occurrence. Everyone has heard of sewage spills on certain San Diego beaches, but the reality is that our pollution problems encompass every stretch of coast from the border to Camp Pendleton.

The frequency of beach closures in our region has even gained the national spotlight. In its July edition, *Forbes* magazine rated Mission Bay and La Jolla beaches among America's most polluted. The magazine wrote, "If San Diego County has established itself as the California capital of sewage spills, then [Mission Bay] is its White House." The same article also gave La Jolla Shores the "dubious distinction as one of California's most polluted."

Sewage spills get more news coverage, but urban runoff is another major culprit in our water pollution problem. A growing urbanized area like San Diego County creates more and more paved surfaces. Everything from rain and irrigation runoff, to soap suds from household car washing will run down the driveway, into gutters and is channeled through our storm drain system, into the ocean. This water often carries pollutants like oil and chemicals from cars, household cleaners and solvents, animal waste, pesticides, and fertilizers. And a heavy

storm only works to make matters worse by washing all storm drain water directly into the ocean.

It would be easy if we could just point to a large industrial polluter or some greedy developers who didn't take appropriate measures to prevent runoff, but the facts are more complicated than that and actually implicate all of us. Our cars, our homes, our businesses, our daily habits all contribute to this problem. Informal and inadequate prevention measures make water pollution a region-wide problem that we all need to help solve.

Today, the county is launching a regional effort to address water contamination and clean up our beaches, bays, rivers and streams. Supervisor Ron Roberts and I have convened a conference of the Board of Supervisors this morning, with the goal of crafting a comprehensive regional clean water strategic plan. We have invited the region's top experts, as well as official representatives from the county's 18 cities and the Port of San Diego. Our goal is to engage all of the local government agencies in an ongoing cooperative effort to develop a specific plan with real solutions and measurable outcomes.

Today's conference is only the beginning of a regional effort although some good individual projects have already begun. The county's Department of Environmental Health recently partnered with the San Diego Supercomputer Center to develop high-tech "modeling tools" that use the power of technology to more accurately assess and manage our water quality. The county is working closely with developers and contractors in an effort to limit storm water run-off at residential and commercial construction sites.

And last week at the request of Supervisor Pam Slater, the Board of Supervisors unanimously approved a resolution supporting regional efforts to reduce pollutants and preserve the quality of our water and our precious coastal and inland resources. The board asked that a new clean water tool known as "numeric sizing" be evaluated for inclusion in all the county's storm water pollution prevention programs.

The idea of numeric sizing aims to reduce or eliminate pollution from the first runoff of a storm. When the first half-inch or so of rain hits the ground in a storm, discarded waste and pollutants are picked up and carried into our storm drain system, our waterways and the ocean. Numeric sizing would require changes to prevent this from happening. It can include catch basins that intercept the first rainfall and make sure it filters into the ground instead of flushing pollutants into the storm drain system, making paved surfaces permeable to allow water to filter into the soil or actually capturing the runoff for treatment. The details have to be worked out, but the idea is another promising way to help keep our water clean.

Clearly, more must be done. Greater collaboration is needed because every citizen in San Diego County has a stake in improving the quality of water at our beaches, bays, lagoons, lakes, rivers, and streams. That is why Supervisor Roberts and I will personally continue to work with representatives from all 18 cities through a newly formed Clean Water Subcommittee. None of us can tackle this problem alone.

A serious cooperative effort across our region can produce positive change. The challenges that we face today are similar in some ways to those we have faced with our air quality. And, the good news is that we now have the cleanest air quality in San Diego since 1955. Just as we are working together to clean up our air, we can, and we will clean up our water.

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What's the relative balance of pollution from storm sewers versus pollution from partially treated sewage?

These items from a FAQ put together by the Southern California Coastal Water Research Project offer some information on ocean pollution (<http://www.sccwrp.org/faq/faq2.html>):

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*Are contaminant inputs into the ocean increasing or declining?*

We can answer this question with the most certainty for municipal wastewater (sewage), which has been rigorously monitored for contaminants since the 1970's. There have been dramatic improvements in sewage quality during the past two decades for virtually every type of contaminant. For example mass emissions of DDT (a pesticide) and PCBs (a group of toxic industrial chemicals) have declined more than a thousand-fold since the 1970's to levels that are usually undetectable by routine chemical methods. Large declines are also evident for other contaminants also, in spite of ever increasing sewage flows related to population growth.

Unlike sewage effluent, temporal trends in the composition and amount of runoff entering Southern California waters are poorly known. The largest rivers are now monitored on a regular basis, but the types and frequency of these measurements are variable. The historical data on runoff composition is even more limited. The limited data and high variability in stormwater discharge volume between years makes it difficult to describe trends with much certainty. We do know that there haven't been the same dramatic improvements in runoff quality over the last two decades that are seen for sewage. Inputs of chemicals which are now banned or more tightly regulated (e.g. DDT's, PCBs, and lead) from runoff have declined since the 1970's, while it is likely that inputs of other chemicals and nutrients have increased in proportion to population growth in Southern California. One of the priorities for SCCWRP and other Southern California public agencies is to make better estimates of the mass of contaminants entering our waters from runoff.

*Does urban runoff get treated in the same way as sewage?*

Runoff usually receives no treatment before discharge.

There are two general categories of runoff: large pulses of stormwater resulting from rainfall and dry weather flow, a daily discharge arising from many sources such as highly treated sewage, street runoff, and various small permitted discharges (e.g. swimming pool drainage water and air conditioning condensate). The daily dry weather flow entering the ocean can amount to several million gallons per day in areas such as the Santa Monica Bay coast. Very little of this flow is treated because the drainage system has no connection to existing treatment plants (the flood control system was never intended to provide treatment of the runoff). Several southern California municipalities are trying to provide treatment to dry weather flow. A pilot program was conducted by the city of Los Angeles to treat dry weather flow from the Pico-Kenter storm drain. The city of San Diego also has a program to divert dry weather flow to local sewage treatment plants for treatment. It is likely that the amount of treated dry weather flow will increase in the future.

Stormwater treatment is a much more difficult task. When it rains on Southern California urban areas, the water rapidly drains from paved areas into the flood control system and flows to the ocean. Routing stormwater to existing sewage treatment plants would easily exceed their treatment capacity, resulting in spills of raw sewage in the ocean and on city streets. A sample of the monitoring data collected by the Los Angeles County of Public Works illustrates the magnitude of stormwater runoff. A February 1995 storm produced 0.95 inches of rainfall in 34 hours over the City of Los Angeles. The resulting flow from Ballona Creek (a storm drain system serving a portion of the City of Los Angeles) amounted to about 900 million gallons. The average volume of sewage handled by all coastal treatment plants in

Southern California is about 1,600 million gallons per day. Considering that Ballona Creek contributes only about 5% of the stormwater flow to the Southern California Bight, it would take a massive system of expensive plants to provide stormwater treatment at even the most basic level. In fact, just the relatively small amount of stormwater that now unintentionally enters the sewage system can place a dangerous burden on sewage treatment plants.

It is unlikely that stormwater treatment using methods applied to sewage will happen on a significant scale in the future. Such an approach would be extremely expensive, require huge areas of land, and may be infeasible from an engineering perspective. There are alternatives that may reduce the contaminants entering the ocean from runoff, however. The most effective approach is to reduce the pollutants entering storm drains by modifying residential and business activities (e.g. excessive application of fertilizers). Most municipalities have regulations and public education campaigns in place or planned to reduce contaminant inputs into storm drains. Another alternative is to restore or enhance riparian and wetland habitats in the flood control system. Wetland areas slow the flow of stormwater into the ocean, thereby providing a zone of contaminant deposition and/or filtration that can reduce the input of contaminants into the ocean. Some municipalities in California have pilot programs or plans to treat runoff in this manner.

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In San Diego, strategies for handling sewage and storm runoff continue to be debated, because these issues impact the lives of San Diego citizens. According to a January 10, 2001 Union Tribune report, portions of Mission Bay were closed for 290 days last year due to contamination. While this is most often due to storm runoff, at the end of February this year, the Bay was closed to recreational users after rocks and other debris clogged a sewer line in Tecolote Canyon, causing raw sewage to spill into Tecolote Creek.

Here's a report from the March 23, 2001 Union-Tribune headlined "Candidates differ on ways to cut Mission Bay pollution " by Caitlin Rother

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A land surveyor and an environmental activist opposing each other in the District 6 race for the San Diego City Council have offered very different plans to clean up Mission Bay.

The other eight candidates in the race agree the city needs to find a way to stop sewage spills resulting in millions of dollars in fines against the city over the years. Their proposals, however, are not as detailed as those put forward by surveyor Michael Pallamary and Donna Frye, a member of the mayor's new Clean Water Task Force.

Pallamary suggests the city start by spending \$100,000 to install high-tech alarms along the creeks that flow into the bay. He said some of that money, to be taken from the general fund, also should be used to buy rubber dams to prevent spills from spreading.

"This technology is all available, and we need to put it into place," Pallamary said at a news conference Tuesday at Rose Creek in Pacific Beach that three of his opponents attended.

Then, to help launch a long-term cleanup plan, Pallamary proposes that the city issue \$20 million in bonds to pay for studies and subsequent engineering work. Pallamary, who serves on the city's Mission Bay Park Planners committee, said the bonds would be paid off with revenue from city leases around Mission Bay Park.

Frye said the kind of "engineering solutions" Pallamary is suggesting are part of "what's

gotten us into this mess. ... You're not going to engineer your way out of the pollution problems."

After reading Pallamary's proposal, Frye said: "It's a waste of the taxpayers' money. I was dumbfounded. ... Doesn't he even have a clue that we've already done these things?"

She noted that the city already has installed berms to try to divert the urban runoff that goes from storm drains into Rose and Tecolote creeks and then into the bay.

But, she said, those types of solutions "are extremely expensive, they're very high-maintenance and they don't work very well."

Frye favors a cheaper and more natural approach. She said regulators should start enforcing existing laws that require a certain portion of runoff to be treated before it enters storm drains. And, she said, people should be educated to do things like turn off their sprinklers before water overflows into gutters and carries pollutants through storm drains and eventually into the bay.

Candidates Steve Danon, Donald Mayes and Tom Switzer attended Pallamary's news conference at Rose Creek, one of three creeks that flow into the bay. The third is Cudahy Creek.

Mission Bay was quarantined for five days earlier this month after 1.5 million gallons of raw sewage spilled into Tecolote Creek. It took the city 10 days to respond to a report of the spill.

"The city can't afford a sewer monitoring system, but it can come up with \$8 million for unused Chargers tickets," said Danon, who is on leave from his job as chief of staff to county Supervisor Ron Roberts.

Danon could not offer a cost for such a monitoring system, but said, "One hundred percent of the revenues of Mission Bay should stay in Mission Bay and the source points of the creeks so we can clean it up."

Danon, economics professor Peter Navarro and attorney Kim Cox agreed that the city needs to readjust its spending priorities to deal with projects such as sewage system upgrades.

"The city has to stop pouring its money into big boondoggle stadiums, the ticket guarantee and the ballpark funded by subsidies," Navarro said. "And it has to start using the money the way the taxpayer intended, and that's to take care of business."

Gary Rotto, executive director of the San Diego regional chapter of the American Jewish Committee, said a device should be installed upstream from Rose Creek to divert pollutants streaming in from University City, La Jolla and Clairemont.

"It will significantly reduce the toxins that go into our bay on a regular basis," he said.

Mayes, an attorney, said he had no plan to clean up the bay, but supports Pallamary's ideas. "Anything that's going to prevent the bay from getting worse is a great thing," he said.

Several candidates said the city should limit commercial development around the bay. The Mission Bay Park Master Plan says no more than 25 percent of park's land should be leased.

"That should not be the goal," Danon said. "It should be under that."

Frye said she believes the city already has violated its charter by surpassing that limit.

Switzer, a businessman, said the city should do whatever it can to keep the park from being turned into "a developer's gold mine."

Cox and Larry Murray, an electrical contractor, agreed.

"I propose limiting new development on the Mission Bay shoreline to those projects that are for the use and enjoyment of the public," Murray said.

Cox said: “The city’s effort to expand the amount of land that is encompassed within Mission Bay Park is yet another example of the private gain coming ahead of public interest.”

Rick Richards, a real estate agent, said he does not support construction of any more tall buildings around the bay. “As far as high-rise hotels and things, I don’t think we need it. It would take away from the views on the bay.”

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In preparation for our second sewage discussion, for each question, write a brief paragraph response. Your group will hand in your individual responses along with your task force reports. Do not be afraid to do a little web surfing or library research to help prepare for your task force discussions.

(1) What are the sources of beach and ocean pollution in San Diego County? What is the relative impact of these sources? Which pollution sources are currently regulated? Which ones is it most important to regulate now?

(2) What new strategies exist for controlling pollution? In addition to the ideas proposed summarized in this handout, you may want to look more closely at recent newspaper coverage (<http://pqasb.pqarchiver.com/sandiego/index.html>) and at the numerous web sites referenced on the course web site.

(3) From the standpoint of the stakeholder that you represent, what are the advantages and disadvantages of available sewage/pollution control strategies?

(4) As the population of San Diego County and Tijuana continues to grow, what possible sewage and runoff policies might the communities choose to implement? How would the stakeholder that you represent respond to these possibilities?

In class, acting as a task force, your group will develop a regional plan for managing sewage and runoff over the next two decades. What are the priorities?

Your task force will share its plan with the rest of the class, and a brief written summary will be due at the end of class (or possibly at the start of the next lecture).