Beaches and Creeks TMDL Cost-Benefit Analysis
Steering Committee Meeting
February 24, 2016

Committee Members Present

Jeremy Haas, San Diego Regional Water Quality Control Board
Jimmy Smith, San Diego Regional Water Quality Control Board
Grant Oliviera, San Diego County Tax Payers Association
Jeff Van Every, City of San Diego Public Utilities Division
Ruth Kolb, City of San Diego, Storm Water and Transportation
Todd Snyder, County of San Diego, Watershed Protection Program
Chris Crompton, County of Orange, Stormwater
Ted Shaw, Atlantis Group

Supporting Roles

Facilitator: Lewis Michaelson
Bree Robertoy, Katz & Associates
Michelle Mata, San Diego Regional Water Quality Control Board
John Peng, County of Orange, Stormwater
Ken Schiff, Southern California Coastal Water Research Project
Stephanie Gaines, County of San Diego
Jo Ann Weber, County of San Diego

Procurement Process Update [J.A. Weber]

- A preferred contractor has been identified but must finish the selection process. There is still an opportunity for other bidders to appeal.
- The development of the cost-benefit analysis (CBA) is behind schedule, and the meeting schedule will have to be revised. Most contractors asked for more frequent meetings in the beginning of the process to front load progress.
    - Action: Two additional meetings will be scheduled. One will be between the April and May meetings, and the other will be between the May and June meetings. M. Mata will send out the meeting invites. It may turn out they are not both needed but group felt it was better to schedule and cancel if not necessary.

Surfer Health Study Results Presentation [K. Schiff]

Background

- Private briefings regarding the results of the study have been given, but the study has not yet been published.
- C. Crompton: Has the Southern California Coastal Water Research Project (SCCWRP) talked to southern California agencies about the study and the importance of conveying the results of this study to surfers.
    - There have been discussions with the County of San Diego.

- Not a lot of epidemiology studies of this type have been done. SCCWRP has done summer studies previously, and the Environmental Protection Agency (EPA) has done studies in areas east of the Mississippi. This is the first study performed in winter wet weather conditions with surfers.
    - J. A. Weber: Why were the other studies during the summer?
        - R. Kolb: It is easier to get participants who are willing to submerge themselves in water during the summer.
- This is the second largest epidemiology study for beaches.

Study Methodology

- Previous studies have collected data on participants who only submerged themselves once in the water in a four-week period. However, since most surfers engage in the activity several times per week, the study had to take a different approach by tracking the participants' surfing behavior and health for a longer period of time. Surfers who went many times in one week were compared to those who did not. This method has been used in drinking water and drug study approaches, although it is the first time it has been applied to an epidemiology study.
- T. Shaw: Did you compare surfers close to outfalls vs those who were not?
    - K. Schiff: Yes, first the study looked at participants who became sick compared to those who did not get sick. Then water quality was analyzed at various locations.
- Hundreds of surfers participated in the study, and 10,000 surf sessions were analyzed.
- Participants were mostly male, employed, middle-aged, and college educated.
    - J. Smith: Is this a typical profile or a special group?
        - K. Schiff: typical for southern California surfers but not for the entire beach going public
- Children did not participate in the study because recruitment was done online and there are strict regulations for children's participation.
    - T. Snyder: Are there data sources for how many kids use the beach?
        - K. Schiff: Yes, we have some. Children's use of the beach during winter is extremely low. There is a slightly higher instance of illness during summer in kids (under the age of four). It is unclear if they're more susceptible or if they're more exposed due to particular beach behaviors (e.g., digging in the sand and swallowing ocean water).
- Data about gastrointestinal illnesses were gathered primarily, as those are the primary drivers for EPA water quality criteria.
- Participants received a reminder via a phone application on Tuesdays to fill out a survey regarding surfing frequency and health status.
- J. A. Weber: Is it possible to obtain data about surfers under the age of 18 from Surfrider?
- Fifteen percent of total surf days reported were in wet weather.
    - T. Snyder: What percentage of participants ignored warnings and surfed in wet weather conditions?
        - K. Schiff: About 90 percent did.
- C. Crompton: Is it possible to differentiate sources and how much a source is producing bacteria?

    - K. Schiff: That would require a QMR assessment. The problem is there hasn't been a successful one completed to create a site-specific objective. A risk model can predict how many pathogens or how much storm water can cause illness. There is a model in process that will be able to answer that better.

Results

- The study found:
    - There was an increased risk of illness associated with surfing
    - The risk was greater during wet weather.
    - There was an association between illness and water quality.
    - The illness risk was lower than EPA objectives predict.

Graph: Indicator Bacteria Ocean Beach

- Water quality samples were not taken at the outfall during dry weather.
- The bacteria concentration becomes lower as it moves away from the outfall. Almost all dry weather is within EPA regulations.
- J. Haas: Can the data be analyzed to look at confounding factors (e.g., the size of a rainstorm or occurrence of big sewer spills)?
    - K. Schiff: Yes.
- T. Shaw: When were the samples taken?
    - The winters of 2013-2014 and 2014-2015.
- All water quality samples were collected per Public Health Department standards: in the morning and in ankle deep water.
- The data were compared to the tidal stage. A slight tide signature was found, but there was not a significant relationship with tide. Other studies found no difference in the time of day.
- J. Smith: Did the study look at the day of the week?
    - K. Schiff: Yes, but bacteria concentrations were more related to tide than day of week and more related to rainfall than anything.
- Why is dog beach above regulations in dry weather?
    - Possibly because of the presence of dogs on the beach, however, there is no data to support this.

Graph: Human Marker and Pathogen

- The pathogens in this graph are all from human sources, and are found almost all the time in wet weather.
- S. Gaines: Does this mean that enterococcus is not what should be tested for in terms of regulating public health?
    - K. Schiff: Historically, it has been much cheaper to test for fecal indicators. With new genetic methods, there is more capability. Agencies might not want to stop testing for enterococcus but may want to add these pathogens.
- T. Snyder: Should agencies focus on these pathogens, which are most likely to make people sick?
    - K. Schiff: Maybe.
- T. Shaw: Are indicator data available for various locations?
    - K. Schiff: Yes, all the way down to Pacific Beach Point.

Graph: Incidence of Gastrointestinal Illness

- The data are statistically significant between unexposed and wet weather, but are not necessarily significant between dry and wet weather.
- The EPA is only concerned with excess risk, which is the risk beyond the unexposed level of risk.
    - The data for this study show 12.2 incidences as the excess risk.
    - EPA guidance considers no more than 32 incidences an acceptable risk.
    - T. Snyder: Theoretically, eliminating bacteria would bring the number of illnesses back down to an unexposed level. Yet, the Total Maximum Daily Load (TMDL) is imposed on stormwater agencies, which may not have capability to eliminate, instead of sewage agencies.

Graph: Risk of Illness per Day into Wet Weather Conditions in Gastrointestinal Illness

- The data show the risk of illness starts to stabilize after three days.
- The difference between day two and day three is not that significant compared to non-wet weather conditions.
- T. Shaw: Can you assess which areas of the beach would be safest?
    - K. Schiff: The data cannot support this.
- J. Smith: Is this study representative of all beaches?
    - K. Schiff: It applies to San Diego County, but the enterococcal relationships are only relative to the two beaches studied. From that data, you could extrapolate. However, another creek in a different type of watershed might not want to accept a presumption of a 100 percent detection of norovirus in their own creek. It depends on which assumptions people are willing to live with.
    - T. Snyder: The County of San Diego has epidemiology data for the entire San Diego coast.
    - R. Kolb: California's AB411 standards were based on data from only three beaches in Santa Monica.

Graph: Incidence in Illness

- The data show an increase in relative risk from surfing exposure during both wet and dry weather conditions, but the risk increases in wet weather.
- R. Kolb: Is risk of infected wounds adjusted for risk from the air?
    - K. Schiff: Yes.
- T. Snyder: What's the sample size for cuts? The error bar is high.
    - K. Schiff: SCCWRP can provide that data.

Graph: Further Stratification by Storm Size in Gastrointestinal Illness

- The increase in the size of a storm (measured by inches of rainfall) is positively proportionate to instances of illness.
- J. A. Weber: Are the differences statistically significant?
    - These figures are based on a low number of illnesses.
- C. Crompton: Runoff depends on how recently a storm occurred previously.
    - K. Schiff: The samples were taken at first flush; most illnesses did not occur during that first storm.

Possible Risk Considerations for CBA

- EPA guidance allows for site-specific objectives or revised numeric targets. The data from this study support that decision making.
- The committee may want to work with the contractor on the difference in risk depending on the size of a storm.
- C. Crompton: What would you recommend for the CBA?
    - K. Schiff: Decide on a range for acceptable excessive cases of illnesses.

General Questions

- J. Haas: When will this be published
    - K. Schiff: In the next couple of months.
- T. Shaw: All sorts of things have been done to treat urban runoff, but that won't address fecal bacteria. We should be looking at the cost-benefit of addressing the pathogen indicators in this study.
- G. Oliviera: How representative is the baseline to the general population? Do you have demographic information?
    - J. Smith: The EPA talks about the general recreator as a baseline, and they specifically mention kids.
    - K. Schiff: The study does not include children, but baseline assumptions have not been established.

New Technology for Risk Warning

- New technology should be considered when looking at costs associated with meeting TMDLs.
- Benefits of the new equipment include:
    - Test results in one hour.
    - Multiple samples can be taken at once.
    - Costs will eventually drop once the technology is mainstreamed. (New machines cost $100,000 now)
    - Human markers can be tested.

Technical Advisory Committee [J. A. Weber]

- A Technical Advisory Committee (TAC) has been proposed to provide technical advice and review the CBA as it is developed. It could include a variety of experts (e.g., best management practices, policy, implementation, CBA, public health, urban planning or sewer infrastructure).
    - C. Crompton: Additional review of the CBA would slow the process down, but it's important to get the best information. It would be important to have the committee in place during the development of the work plan, at key points along the way and at the end for final review. It will have to be funded as well.
    - R. Kolb: The TAC would be valuable in answering questions the steering committee cannot answer.
- TAC members would be chosen via nomination by a steering committee member.
- This discussion has planted the seed for consideration and should be discussed more fully at the next meeting.

Next Steps

- All committee members have been asked to consider alternative scenarios to be considered in the CBA (e.g., only treating large storms, choosing different indicator targets or different management strategies) for discussion at the next meeting and submit to Michelle by March 16.
- All committee members should bring suggestions for specializations and names of potential TAC members to the next meeting.
- J. A. Weber will bring a draft proposal for the TAC to the next meeting for committee review and discussion.