

Newport Bay Watershed Monitoring Evaluation

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ABSTRACT

The Newport Bay Watershed is a valuable ecological resource containing over 300 km of stream miles and the largest estuary in Southern California. Water bodies within the watershed are also a valuable human resource for fishing, swimming, and non-contact recreation. However, water bodies within the Newport Bay Watershed are also potentially at risk of pollution from urban runoff, boating activities, historical inputs, agricultural legacy inputs, and alterations in groundwater hydrology. As a result, a number of regulatory management programs have been instituted including NPDES discharge permits and TMDLs. Associated with these management programs are monitoring requirements to assess the magnitude of the water quality impact and track improvements as management actions are implemented. Some of these monitoring programs have existed for decades while others have just begun, but old and new monitoring requirements are rarely integrated with one another. As a result, there is concern about inefficiencies once management questions have been addressed.

The goal of this project was to evaluate the effectiveness and efficiency of monitoring programs in the Newport Bay Watershed, and then make recommendations for improvement. This evaluation followed a four step process to:

- Develop the list of management questions,
- Create an inventory of existing monitoring efforts,
- Assess the effectiveness of the current monitoring elements to address the questions of interest, and
- Redesign selected monitoring elements for improved effectiveness and efficiency to address the questions of interest.

This process was implemented using an Advisory Committee that included regulatory, regulated, advocacy, and academic stakeholders from throughout the watershed.

Five management questions were identified for which monitoring data would help make decisions. These five questions included:

- Is the ecosystem protected?
- Is it safe to eat the seafood?
- Is it safe to swim?
- Are we in attainment of water quality standards?
- What are the sources of pollutants?

Embedded within each question is also an element of trends.

The inventory of monitoring effort indicated that there is a tremendous quantity of effort expended on monitoring in the Newport Bay Watershed, the likes of which is rarely seen in California. In total, 13 long-term monitoring programs were identified that sample 139 sites for 399 different constituents. The net result was over 32,000 sample analyses per year.

After a series of one-on-one interviews with many of the Stakeholder Advisory Committee members, the assessment of current monitoring effort fell into one of four categories:

- Monitoring that was effective and efficient
- Monitoring that was effective, but inefficient
- Monitoring where effectiveness and efficiency was uncertain

- Monitoring that does not currently exist

The most *effective and efficient* monitoring programs were the regional-based programs that incorporated the Newport Bay Watershed within the greater Southern California region. These regional programs, such as the Southern California Bight regional marine monitoring program that samples the bay or the Stormwater Monitoring Coalition regional stream monitoring program, effectively addressed the “ecosystem protection” question. Well-developed assessment tools and monitoring infrastructure, plus placing the Newport Bay Watershed within the context of other Southern California watersheds, provided scientifically sound answers at watershed scales.

A second effective monitoring program worthy of continued investment was the beach monitoring program conducted by the Orange County Health Care Agency for assessing the “safe to swim” question. This monitoring program is highly valued by the public and has documented water quality improvements as management actions have been implemented to clean beach water quality.

Mass loading monitoring programs, whereby sampling stations are located at the end of major tributaries to Newport Bay to answer questions about “attainment of water quality standards” and “sources of pollutants,” was deemed *effective, but not efficient*. These mass loading sites are sampled weekly, sometimes for decades, and concentrations are compared to receiving water standards or TMDL load allocations. In many cases, the monitoring has shown a decrease in concentrations and loads that correspond to management actions ameliorating upstream pollutant sources. Re-answering the questions on such a frequent basis was no longer necessary. Statistical power analysis, based on the results from 2002-2012, indicated that sampling could be reduced to quarterly in dry weather for individual mass loading stations. Selecting optimal sampling frequencies based on power analysis for answering trends questions is recommended, particularly should concentrations begin to increase. The power analysis also confirmed that an optimized sampling effort for trends will provide sufficient data to make statistically sound conclusions about attainment of regulatory thresholds.

The TMDL monitoring programs for selenium and pesticides have only recently been designed and few data have been collected to address their questions regarding “attainment of water quality standards”. As a result, monitoring *effectiveness and efficiency was uncertain*. Therefore, revisiting the design of these monitoring programs after additional data has been collected is recommended.

There currently is *no ongoing monitoring* program for assessing the “safe to eat the seafood” question in Newport Bay. Angler warnings for seafood consumption exist along the open coast of Newport Beach, but there is insufficient data within the Bay to make conclusions about whether similar warnings are needed. Two individual monitoring projects have collected samples of seafood tissues from within the Bay, but these projects are not recent and the sparse results were mixed. However, the RWQCB has recently completed a tissue sampling program that included bioaccumulation through several trophic levels including sport fish. Waiting until these data are fully analyzed before making a decision about designing and implementing an ongoing seafood monitoring program is recommended.

Full Text:

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