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South Coast Areas of Special Biological Significance Regional Monitoring Program Year 2 Results

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ABSTRACT

Over 280 km of shoreline have been designated as marine water quality protected areas, termed Areas of Special Biological Significance (ASBS), in southern California, USA. While the standard for water quality protection in an ASBS is "natural water quality", there are at least 271 documented coastal discharges that potentially threaten this important ecological resource. The goal of this study was to assess the water quality status of ASBS by answering two questions: 1) What is the range of natural water quality near reference drainage locations? and 2) How does water quality near ASBS discharges compare to the natural water quality near reference drainage locations? Previous monitoring of southern California ASBS in 2008-09 was able to produce natural water quality guidelines, and ASBS water quality was generally comparable to these guidelines without widespread, dramatic alterations. The work detailed in this report, describes a second survey in 2012-14, which aims to increase confidence in the natural water quality guidelines and confirm the lack of demonstrative impacts to water quality in ASBS.
The sample design focused exclusively on receiving water (not effluents) and wet weather, which are the locations and times where natural and anthropogenic contributions can mix making pollutants difficult to identify and control. Twenty-seven locations encompassing 57 site-events were sampled immediately prior to (<48 hours), then immediately following (<24 hours) storm events ranging from 0.09 to 2.58 inches rainfall. Mean concentrations of total suspended solids (TSS), nutrients (ammonia, nitrate, nitrite, total phosphorus), total trace metals (arsenic, cadmium, chromium, copper, nickel, lead, silver, and zinc), pyrethroid and organophosphorus pesticides, and polycyclic aromatic hydrocarbons (PAH) from post-storm samples were similar at reference drainage and ASBS discharge sites. The average concentration difference between post-storm geometric mean concentrations at reference drainage vs. ASBS discharge sites across all parameters was <10%. Concentrations of pesticides were infrequent and post-storm samples rarely exhibited significant toxicity despite testing with three different endemic species. In addition, there was no consistent increase from pre- to post-storm concentrations at either reference drainage or ASBS discharge locations. Most post-storm concentrations did not correlate well with storm parameters (i.e., rainfall quantity, duration, intensity) or stormwater tracers (i.e., salinity, TSS), decreasing the utility of these tools for predicting impacts. A reference drainage site based threshold was used as a proxy for distinguishing differences from natural water quality. The reference based threshold included a two-step process: 1) was the individual chemical post-storm discharge concentration greater than the 85th percentile of the reference drainage site post-storm concentrations; and then 2) was the individual post-storm discharge concentration greater than the pre-storm concentration for the same storm event. While the concentrations near ASBS discharges were on average similar to reference site concentrations, there were some individual ASBS discharge sites that were greater than the

reference site based threshold. Cumulatively across all ASBS, the constituents that were most frequently greater than the reference site based threshold were PAHs, pesticides, and nutrients.

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