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Effluent discharges to the Southern California Bight from large municipal wastewater treatment facilities from 2005 to 2009

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ABSTRACT

The four largest municipal wastewater treatment facilities (publicly owned treatment works; POTWs) in southern California discharge treated effluent that has historically been the greatest point source of contaminants to the Southern California Bight (SCB). Each POTW conducts flow and effluent chemistry monitoring and testing in compliance with its discharge permit, but the monitoring requirements do not address regional pollutant emissions from multiple sources. Since 1971, SCCWRP has been integrating POTW effluent monitoring data to assess the status and trends of contaminant discharges from multiple sources to the SCB. This study analyzes effluent discharges from the four largest POTWs from 2005 through 2009 in terms of effluent volumes, contaminant mass emissions, average constituent concentrations, and toxicity. These data update a continuous 39-year record of regional POTW effluent discharges. Total effluent volume from large POTWs decreased from $1,497 \text{ L} \times 10^9$ in 2005 to $1,184 \text{ L} \times 10^9$ in 2009, which was the lowest annual volume since regional assessments began in 1971. Reductions in effluent volume resulted primarily from water conservation and increased recycling of treated effluent for beneficial reuse, even as population continued to grow. Similar to the volume pattern, mass emissions of most monitored constituents decreased from 2005 to 2009, with many constituent loads including suspended solids, BOD, oil/grease, and several metals, dropping to historic lows. Suspended solids emissions decreased 92% between 1971 and 2009, from 295,000 to 25,000 metric tons (mt). Copper emissions decreased 97%, from 535 mt in 1971 to 17 mt in 2009. Although most constituent loads have decreased, average concentrations have been more variable, with several constituents including ammonia-N, chromium, and zinc concentrations increasing from 2005 to 2009. The largest reductions in contaminant loads observed prior to 2005 resulted from improved wastewater treatment, but recent reductions in these loads have been influenced more by declining effluent volume than by effluent quality improvement. Due to significant decreases in large POTW mass emissions since previous comparisons, it is possible that point source contaminant loads are now equaled or exceeded by loads from non-point source runoff; however, more comprehensive and updated regional estimates of runoff loads to the SCB are needed to address this hypothesis.

Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2011AnnualReport/ar11_223_236.pdf