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How effective has the Clean Water Act been at reducing pollutant mass emissions to the Southern California Bight over the past 35 years?

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ABSTRACT

The federal Clean Water Act (CWA) has regulated discharges of contaminants since 1972. Most of the effort over the past 35 years has focused on controlling point source discharges, although recent attention has shifted to address management of nonpoint sources. Hundreds of billions of dollars have been spent nationally to implement CWA requirements; however, regional evaluations of the effectiveness of the CWA at improving water quality are lacking. This is primarily due to the fact that monitoring programs mandated by the CWA do not require integration of data from multiple dischargers or classes of dischargers to assess cumulative effects. A rare opportunity exists in southern California to assess CWA effectiveness by integrating mass emissions data from all major sources of contaminants to the Southern California Bight (SCB) from 1971 to 2000. Sources of contaminants to the SCB include large and small publicly owned treatment works (POTWs), power generating stations, industrial facilities, oil platforms, dredged material, and storm water runoff from a watershed area of over 14,000 km^2. While the coastal population grew by 56% and total effluent volume increased 31% since 1971, mass emissions of nearly all constituents decreased since passage of the CWA, most by greater than 65%. The median decrease in metals emissions was 88%, while total DDT and PCB emissions each decreased by three orders of magnitude. Large POTWs were the dominant point source of many contaminants to the SCB, accounting for more than 50% of the total annual discharge volume. However, large POTWs also accounted for the most significant reductions in pollutant discharge to the SCB, with most pollutant loads being reduced by greater than 90% compared to pre-CWA levels. As point source treatment has improved, the relative contribution of non-point sources, such as storm water runoff has increased. For example, metals contributions from storm water have increased from 6% of the total to 34% of the total annual load between 1971 and 2000. Despite the increased importance of storm water discharges, regional monitoring and data compilation of this source is lacking, making it difficult to accurately assess trends in non-point source discharge. Future efforts to integrate data from storm water monitoring programs and include dry weather runoff monitoring should improve the accuracy of regional mass emission estimates.

Full Text

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