

## Technical Report 202

### 1985 Reference site survey

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#### SUMMARY

The purpose of the Reference Site Survey is to provide information on environmental conditions from the least contaminated areas on the southern California mainland shelf, and to evaluate changes in conditions at these sites from those reported in the 60-Meter Control Survey in 1977 (Word and Mearns, 1979).

Thirteen of the 60-Meter Survey Sites were resampled, and additional reference sites were established at 30 and 150 m in each area, for a total of 38 sites. Grab samples were collected for sediment grain-size, organic material, trace metals, chlorinated and petroleum hydrocarbons, and infaunal analysis. Trawl samples were collected for characterization of megafaunal invertebrate and fish assemblages, and for analyses of tissue contamination and histopathology.

In the 1982 Reference Site Survey sediment types changed with depth from sandy-silt to silty-sand, and organic content increased with shelf depth. Silver (Ag) and Cd were measured in tens and hundreds of ppb (dry wt.) respectively and the other metals (Cr, Cu, Ni, Pb, and Zn) were measured in the tens of ppm range. Trace organic contaminants (total PAHs, total DDTs, and Total PCBs) were measured in the ppb (dry wt.) in sediments. In general, trace contaminants increased in concentration with shelf depth and in areas closer to Los Angeles.

Species composition and structure of infaunal assemblages of the mainland shelf were influenced mostly by depth and sediment type (grain-size and organic content). Mainland shelf assemblages at 30 and 60 m sites were dominated by the ophiuroid *Amphiodia urtica* and polychaete *Siophanes missionensis* except in sandy areas where a much different fauna existed. Infaunal assemblages at the 150 m sites were dominated by the polychaete *Spiophanes berkeleyorum* and *A. urtica*. Differences in species composition and structure from the shallower sites reflected a transition to normal slope assemblages.

Trawl-caught megafaunal invertebrates were heterogeneously distributed on the mainland shelf. The asteroid *Astropecten verrilli*, the urchin *Lytechinus pictus*, and the prawn *Sicyonia ingentis* were the most common and abundant species collected. Similarly, trawl-caught epibenthic and demersal fish were heterogeneously distributed on the shelf. Speckled and Pacific sanddabs, bigmouth sole, and plainfin midshipman were the most common and abundant species collected. At 150 m, both megafaunal invertebrate and fish association showed differences in composition and structure compared with the shallower sites reflecting transitions to the slope fauna. The large amount of variation in the trawl data precluded showing significant trends.

Animal tissues in reference areas were contaminated with lower concentration of chlorinated hydrocarbons than animals collected near sewage outfalls. (For sewage outfall comparison, see Brown, *et al.*, 1986). Livers of four species for flatfish averaged around 4.3 ppm (wet wt.) and hepatopanreas from *Sicyonia* averaged around 0.61 ppm (wet wt.) in chlorinated hydrocarbon contaminants.

Environmental conditions in the Reference Site Survey are similar to those observed in the 60-Meter Survey. Compared with other studies on the mainland shelf of the region, the Reference Site Survey showed similar trends in sediments on biological assemblages with depth. The reference sites sampled represent "normal" mainland shelf conditions, and may be the least contaminated in the region.

#### Full Text

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