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FIN EROSION PREVALENCE AND ENVIRONMENTAL CHANGES

Anomalies of several types are present in southern California trawl-caught benthic fishes. Data collected in 1975 and early 1976 are consistent with information obtained in past surveys in that (1) among the diseases with external symptoms, the one most frequently observed is fin erosion, and (2) the species most often affected is the Dover sole *Microstomus pacificus*) .

Dover sole with fin erosion have been most prevalent on the Palos Verdes shelf, the site of a major municipal wastewater outfall system. Overall prevalence of the disease at a standard set of nine stations has remained relatively constant (with some seasonal variations) since the May-June 1972 survey (Figure 1). No major increasing or decreasing trends are apparent in the prevalence of the disease in individuals less than 120 nun standard length (SL), the approximate size of Dover sole living on the bottom for less than 1 year. These data suggest that new cases of fin erosion are still being initiated on the shelf.

Within recent years, there have been a number of changes in the chemistry and biology of the benthic environment on the Palos Verdes shelf (Pages 49 and 205). One of the most dramatic changes involves hydrogen sulfide. Since 1973, the County Sanitation Districts of Los Angeles County, in collaboration with Emil Kalil (University of California, Los Angeles), have measured levels of hydrogen sulfide in the interstitial waters of the shelf at approximately 40 sites in a 60-sq-km survey grid. The method used involved a hydrogen-sulfide electrode and wet chemistry techniques. Water samples with a sulfide potential (corrected for pH) less than or equal to approximately -400 millivolts were considered to contain free hydrogen sulfide at concentrations thought to produce acute and chronic toxic effects (1 micromolar, or 3.4 ppb, or greater). Data collected in these surveys (Figure 1) indicated that the sulfide field (the area in which sulfide potential values were -400 mv or less) decreased from approximately 7 to 10 sq km in 1973 to less than 1 sq km in 1975; there was an increase to approximately 2 sq km in 1976 (Draft EIS/EIR, Joint Outfall System Facilities Plan 1976).

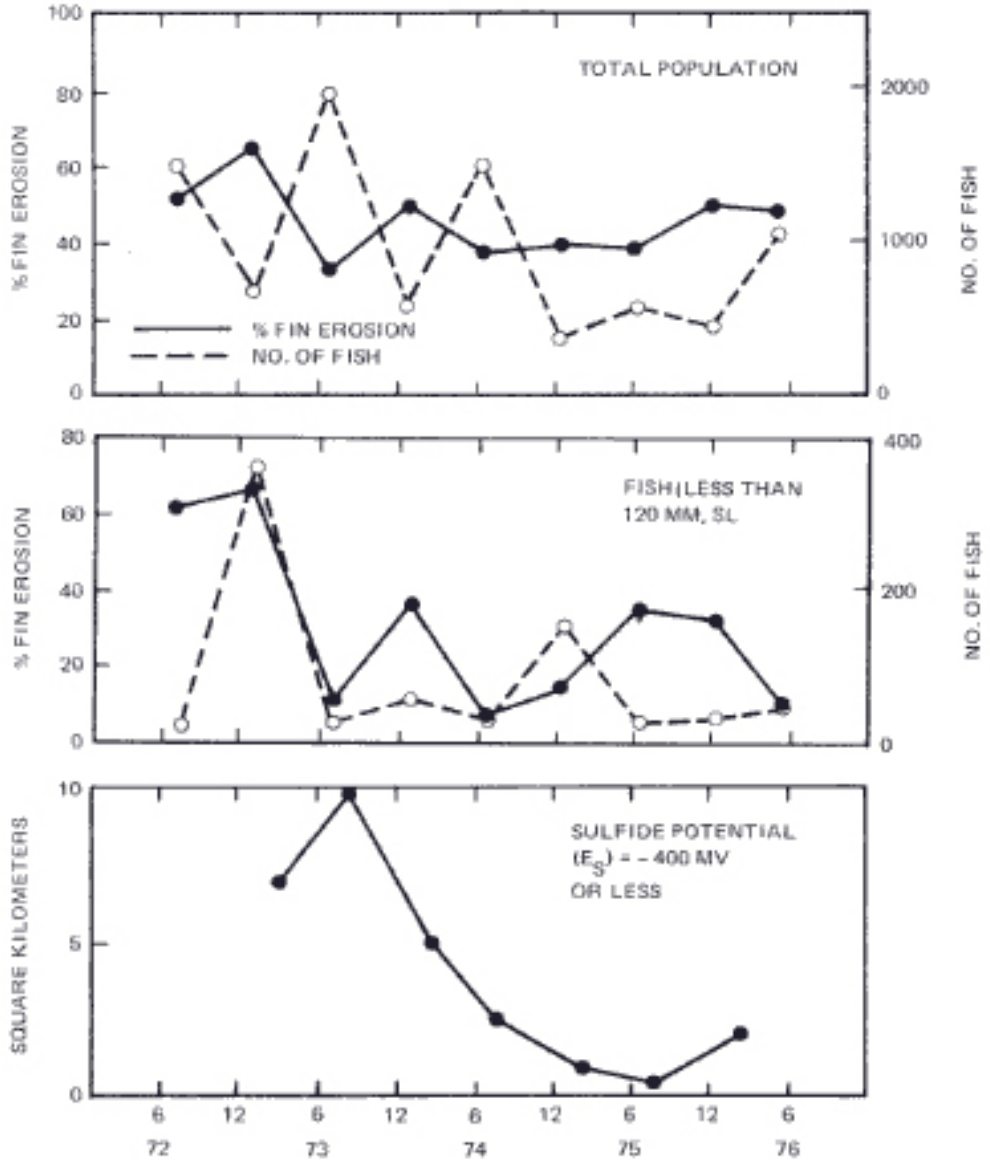
A number of factors associated with the bottom sediments of the Palos Verdes region have been suggested as possible causes of fin erosion in Dover sole. These include elevated levels of trace metals and chlorinated

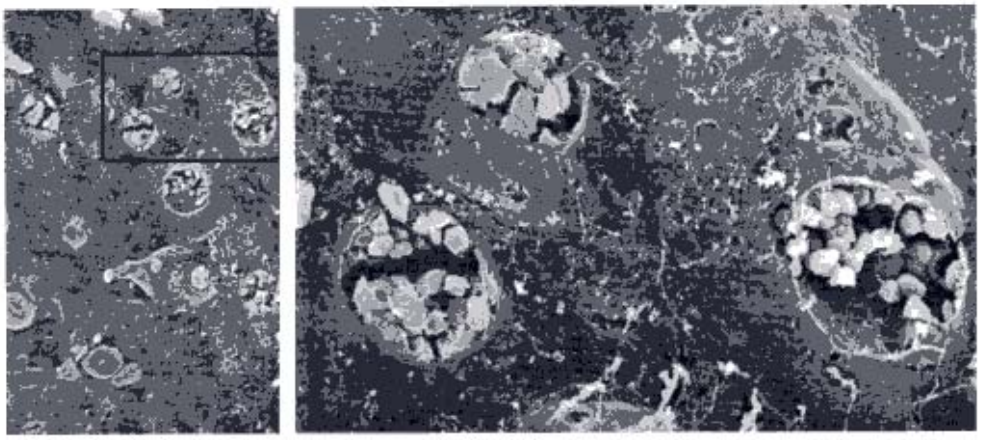
hydrocarbons associated with sediment particles, a reduction in the size of sediment particles, reduced pH in sediment interstitial waters, abrasive particles in the sediment, and the presence of hydrogen sulfide in sediment interstitial waters. If the hydrogen sulfide was a significant factor in initiation of the disease, we would expect recent reductions in the prevalence of fin erosion in Dover sole less than 120 mm SL. Since this trend is not evident in the data, it appears that hydrogen sulfide in the Palos Verdes sediments was not a major factor in the initiation of the disease.

REFERENCES

Draft EIS/EIR, Joint outfall system facilities plan, Sanitation Districts of Los Angeles County. 1976. Rept. C-06-1051-DIO, SCH-740-506-05, U.S. Environmental Protection Agency, San Francisco, and Sanitation Districts of Los Angeles County, Whittier, Calif.

Figure 1. Prevalence of fin erosion in Dover sole taken from a standard set of nine stations and changes in the area in which free hydrogen sulfide was present in interstitial waters on the Palos Verdes shelf, 1972-76.





Scanning electron micrographs of Dover sole with and without fin erosion were taken by Dr. Anthony Cundell, Harvard University. Dr. Cundell indicated that the most obvious observation that could be made about the eroded tissue was the absence of microorganisms within the tissue. This observation is consistent with previous studies on the histology and microbiology of the fin erosion disease in Southern California Dover sole.

Shown here are photographs of the base of the dorsal fin of the Dover sole magnified 510 (left) and 2000 (right) times. The round crater-like structures appear to be the mucous cysts identified by Dr. Raymond Bendele, Texas Veterinary Medical Diagnostic Laboratory, in tissue sections examined by light microscopy (shown in our 1975 annual report).