

ENVIRONMENTAL STUDIES OF PORT VALDEZ. EDITED BY D. W. HOOD, W. E. SHIELS and E. F. KELLEY. *Fairbanks: University of Alaska, 1973. (Institute of Marine Science Occasional Publication no. 3). 500 pages, illustrated. \$15.00. DATA VOLUME (800 pp.) available. (Occasional Publication no. 3A) at \$10.00.*

In early 1968, exploratory drilling on the North Slope of Alaska confirmed the existence of over 10 billion barrels of recoverable oil which in turn prompted a series of proposals on how this oil might be moved to the American market. One of these proposals was the building of an 800 mile Trans-Alaskan pipeline from Prudhoe Bay to the Gulf of Alaska, from where the oil would be shipped by tankers to the U.S. west coast, Valdez, a small fishing village on the southern mainland coast of Alaska was chosen as the most suitable site for the pipeline terminal because of its ice-free deep fiord waters and favorable harbour conditions.

As previous events have shown, a close examination of the environmental impact of a major transshipment port is essential. The Institute of Marine Science of the University of Alaska has attempted to examine some of these questions in its present study of the Port Valdez area. This work has focused attention primarily on the influence of crude oil additions from treated ballast-water effluent, rather than on the overall effect of tanker operations. Even with such a limited scope, the study succeeds in providing a baseline picture of the Port Valdez environment.

In the twelve chapters of the text, all major oceanographic disciplines are represented, complemented by chapters on the hydrocarbon and biodegradation aspects and by a section on the phytotoxicity of crude oil. One can understand the editors' wish to make the book more readable, which led them to place most of the raw observations in the adjoining data volume. Even so, some of the numerous figures in the main text could have been further summarized for the readers' benefit.

In Part I, which concerns the physical baseline, standard geological, physical and chemical oceanographic variables are shown for various locations in the Port Valdez and Valdez Arm areas. These observations were taken on six occasions over an annual cycle. They include such items as bottom sediments, suspended matter, temperature, salinity, nutrients and drogue results. Dye dispersion studies were also employed in calculating dilution rates in the area of the proposed ballast-water effluent outfall. The information presented in Part I provides a data base for future work in the area in that it

documents the gross geographic and seasonal variability of the above variables. However, the effect of shorter-period variability at a fixed station, such as tidal period changes of salinity, temperature, suspended matter, nutrients, etc. is not discussed, the only exception being the data provided from the moored current meters. A steady-state assumption for spatially-sampled variables will be altered to some extent by these fluctuations. Meteorological information, such as fog frequency, daily winds and temperature, is not dealt with in detail.

In Part II, the living baseline is presented in studies of primary production, phytoplankton, zooplankton and benthos. These sections primarily catalogue the existing distributions of the marine fauna. The section on primary production shows some interesting comparisons of differing techniques in calculating production and the local effects of turbidity near river mouths. Overall, parts I and II provide a descriptive picture of the Port Valdez marine environment, leaving the interpretation incomplete.

Part III, which concerns the hydrocarbon interaction, differs from the previous two sections in that it deals more specifically with the possible impact of the treated ballast-water effluent on the present marine environment. Although limited to discussion of this particular effluent (and not to those associated with the chronic pollution from continuous tanker operations), the studies of phytotoxicity and biodegradation are very thorough. This work stands by itself as a valuable contribution to environmental studies, apart from its immediate concern with the Port Valdez area.

In the past, fishing has been one of the main occupations in Valdez. The toxic effects of even low concentrations of oil on fish eggs and larvae is an important consideration for the marine environment of Port Valdez and its community. The likelihood of chronic or catastrophic oil pollution of the port must be recognized, and measures taken to deal with it in future.

In summary, the work comprises observations taken in Port Valdez over a one-year period by a multi-disciplinary group with the specific goal of analysing the impact on the marine environment of ballast-water disposal. It is hoped that the results will be used not as a means of reassuring the community that no threat of damage exists from the operation of oil tankers into Port Valdez; rather, they should serve as a basis for further studies of the problem of dealing with probable oil contamination in the area greater than that caused solely by the ballast-water effluent.