

1. INTRODUCTION

1.1. Data sharing, international boundaries and large marine ecosystems

Marine science and marine management organizations have a need to know, first-hand and quickly, pertinent details of marine ecosystems to facilitate planning and management. The North Pacific Marine Science Organization (PICES), for example, produces reports on the status of North Pacific marine ecosystems that are intended to periodically review and summarize the status and trends of the marine ecosystems in the North Pacific, and to consider the factors that are causing, or are expected to cause, change in the near future. The first report (PICES, 2004) served as a pilot project for what might be possible. This report was based largely on geographic locations and subjects for which time series data or information were readily available. The report also identified locations and subjects where data were collected but were not yet available.

For the most part, marine ecosystem data are

contained in archives of national ocean data centers, academic institutions and other agencies. Some of these bodies serve some or all of their archived information through the World-Wide Web. Many data, however, remain hidden from public search and use. Even discovering the data that are available on line can be an onerous task. For example, obtaining information on the East China Sea requires access, at least, to marine data of the People's Republic of China, Republic of Korea and Japan. The situation is repeated for many other marginal seas of the North Pacific Ocean.

More and more, ecosystem management focuses on Large Marine Ecosystems (LMEs, Fig. 1.1). LMEs are regions of ocean space encompassing coastal areas from river basins and estuaries to the seaward boundaries of continental shelves and the outer margins of the major current systems. They are relatively large regions on the order of 200,000 km² or greater, characterized by distinct (1) bathymetry, (2) hydrography, (3) productivity,

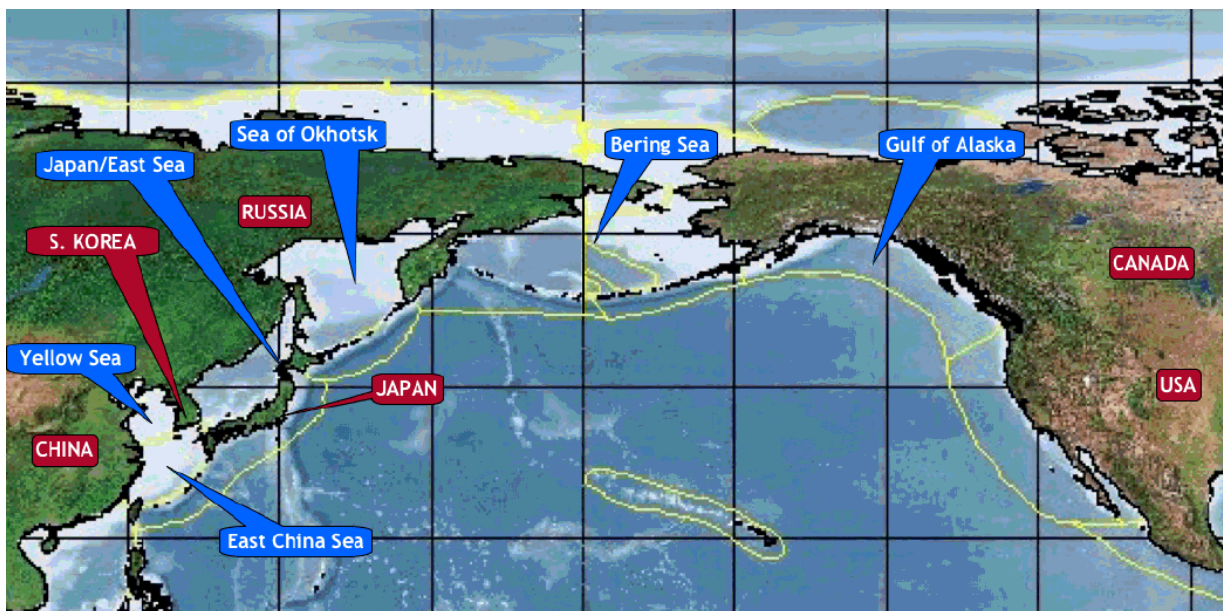


Fig. 1.1 The North Pacific Ocean and its marginal seas (blue labels), PICES member nations (red labels), and Large Marine Ecosystems (yellow boundaries).

and (4) trophically dependent populations. On a global scale, 64 LMEs produce 95% of the world's annual marine fishery biomass. Within their waters, most of the global ocean pollution, overexploitation, and coastal habitat alteration occur. Yet, vital information on these processes is not centrally available, nor even easily available, for public scrutiny, let alone international management efforts.

The PICES Technical Committee on Data Exchange (TCODE) is working to address this problem. TCODE has among its terms of reference: (1) *to identify the data management requirements of PICES* and (2) *to develop strategic plans to meet these requirements*. TCODE has established the PICES Long Term Time Series and endorsed the North Pacific Ecosystem Metadatabase (NPEM). The latter is the precursor to the project documented in this report, and NPEM is discussed further in section 3.1. Part of TCODE's working plan for the last

several years has been the PICES Metadata Federation project. This project attempts to alleviate the shortcomings of international ecosystem data sharing by creating a "federation" of marine ecosystem data servers, using standard data cataloging and communication protocols. This is not new technology. Similar systems have been in existence for many years, used mainly by library and museum systems. Scientific clearinghouses exist, as well, and the method described in this report makes use of such a clearinghouse.

The remainder of this report presents the objectives of the project, its history, a general discussion of metadata and communication standards, and the specific application selected to support the PICES metadata federation. The report concludes with a discussion of challenges to implementation and presentation of future activities, as this project is not yet completed.