



Marine Ecosystems of the North Pacific



PICES Special Publication Number 1

North Pacific Ecosystem Status Working Group

The PICES North Pacific Ecosystem Status Report (NPESR) Working Group was established at the PICES 11th Annual Meeting in October 2002 to oversee the completion of the report. The Working Group, chapter lead authors and invited participants met at the NPESR Workshop from

25-27 August 2003 in Victoria, Canada to review the work of chapter lead authors and to synthesize their findings as the first chapter of this report. The NPESR WG Chairman, Dr. R. Ian Perry (PICES Science Board Chairman), was the lead author of the synthesis.

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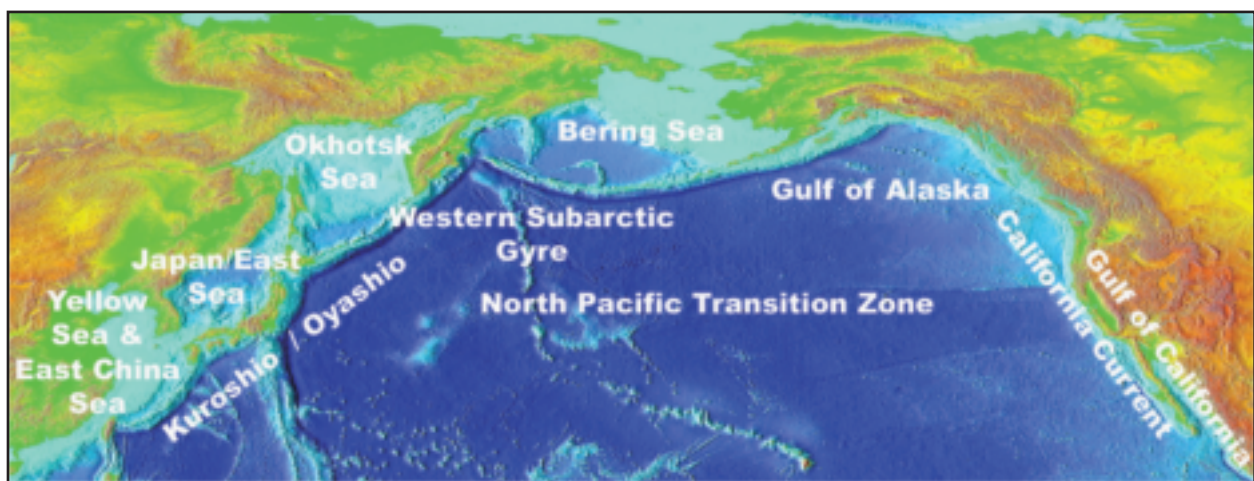
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[foreword]

The world has changed. This has become an oft-repeated axiom, but it describes recent events in politics, economics, and the environment over the past five years, and particularly in the North Pacific Ocean. The North Pacific ecosystem status report is a contribution by the North Pacific Marine Science Organization (PICES) to identify, to describe, and to integrate observations of change in the North Pacific Ocean that are occurring now, and that have occurred during the past several years. This effort is, and will remain, a work-in-progress as new observations are made, new discoveries reported, and new questions are asked. Nevertheless, this report represents the first attempt to describe, in a systematic and integrated fashion, the state of the North Pacific Ocean. Although this first report is uneven, with many themes (such as contaminants) and some regions (such as the North Pacific Transition Zone) lacking detailed observations (usually because of a lack of data), these gaps will be filled eventually and the fact that they have been identified as gaps in this report may lead to greater attention and effort on improving knowledge of these issues. The purpose of this report is to:

- describe the present state of the marine ecosystems of the North Pacific Ocean (status), in the context of their recent (past five years) and longer variability (trends);
- summarise these regional assessments into a broad basin-wide synthesis;
- identify critical factors that cause changes in these ecosystems; and to
- identify key questions and critical data gaps that inhibit understanding of these marine ecosystems.



General locations of the regional chapters included within the report*

* This topographic map and similar images used in this report were obtained from the U.S. NOAA National Geophysical Data Center website (<http://ngdc.noaa.gov/mgg/image/2minrelief.html>)

The intended audience for this report includes scientists working in or interested in the climate and marine systems of the North Pacific Ocean, governments who deal with issues of understanding, use, and management of North Pacific marine systems, and the general public. To successfully reach these diverse audiences, the report will need to be used. It needs to be used and contributed to by scientists, in particular those who develop original data and knowledge of this ocean. There is great value in looking broadly as to how a specific study fits into the larger processes of the North Pacific. The report will be useful to governments, particularly those concerned with the tasks of fish stock or coastal zone management, and also useful to policymakers who need to be aware of current trends and future directions in the environment of the North Pacific Ocean and what is driving these changes. And it needs to be used by the general public, to become informed of the changes in North Pacific marine systems. There is considerable public interest as to which changes are due to natural processes and which may be influenced by human activities. It is our hope and expectation that as the North Pacific ecosystem status report becomes more complete and more available, each of these groups will find that it stimulates and leads to new connections and new understanding of the North Pacific Ocean.

The report is designed with an overview synthesis chapter, followed by several chapters representing regions of the North Pacific Ocean or particular fish species groups. To make the report as timely as possible, we focused on conditions within the most recent five years, and put this into the context of the past 20 to 30 years (or longer) when data were available. Each regional chapter has an introductory background section, and then summarises its highlights, critical factors causing change in the region, and the status and trends of physics and climate, chemistry, plankton, fish and commercial invertebrates, and marine birds and mammals. Each of these chapters concludes with a discussion of issues, such as key questions and data requirements. Providing geographic boundaries to each region has proven to be difficult. Some regions, such as the Okhotsk Sea and Bering Sea, have boundaries that are well-defined by land or oceanographic features. Other regions, such as the Gulf of Alaska or the seaward edge of the California Current System, are much less well-defined. We let the Lead Author of each chapter establish an appropriate boundary based on geographical criteria and data availability considerations. The general regions considered in this report are identified by number in the figure above.

This report has taken very hard work from many people over a relatively short period of time. The original concept was brought to PICES by Patricia Livingston, past Chairman of the PICES Science Board. The North Pacific Ecosystem Report Working Group was established in the fall of 2002 and has had the central role in steering the project, with enthusiastic lead authors preparing the individual chapters of the report. The PICES Secretariat has had an indispensable role in keeping the project going. In particular I would like to acknowledge Dr. Skip McKinnell of the Secretariat for his dedication and commitment to this project, without which it would not have occurred. Preparation of the report has been generously supported by the financial contributions of NOAA/Fisheries (Alaska Fisheries Science Center) and the Exxon Valdez Oil Spill Trustee Council. The Census of Marine Life provided financial support for the first workshop, in Honolulu, USA in 2001 (see PICES Scientific Report No. 18). Workshops hosted by TINRO-Center (Vladivostok, 2003), Korea Oceanographic Research and Development Institute (Seoul, 2003) and Seoul National University (Seoul, 2002) made important contributions to this report. The assistance of these organizations is gratefully acknowledged. Three international fisheries commissions also contributed to this report. Scientists of the International Pacific Halibut Commission provided the chapter on Pacific halibut, scientists from the Inter-American Tropical Tuna Commission provided the chapter on North Pacific tunas, and scientists from the North Pacific Anadromous Fish Commission provided the chapter on Pacific salmon. Their contributions are gratefully acknowledged. Ms. Elizabeth Tirpak provided comments on the accessibility of the information in the Synthesis chapter to non-scientists and her contribution led to improvements in the chapter.

An invitation: this report is far from finished, and will never be finished as the North Pacific continues to evolve and change. Your comments, contributions, and feedback on this report, and how to make it better, are invited.

R. Ian Perry
Chairman, PICES Science Board