



PICES SPECIAL PUBLICATION

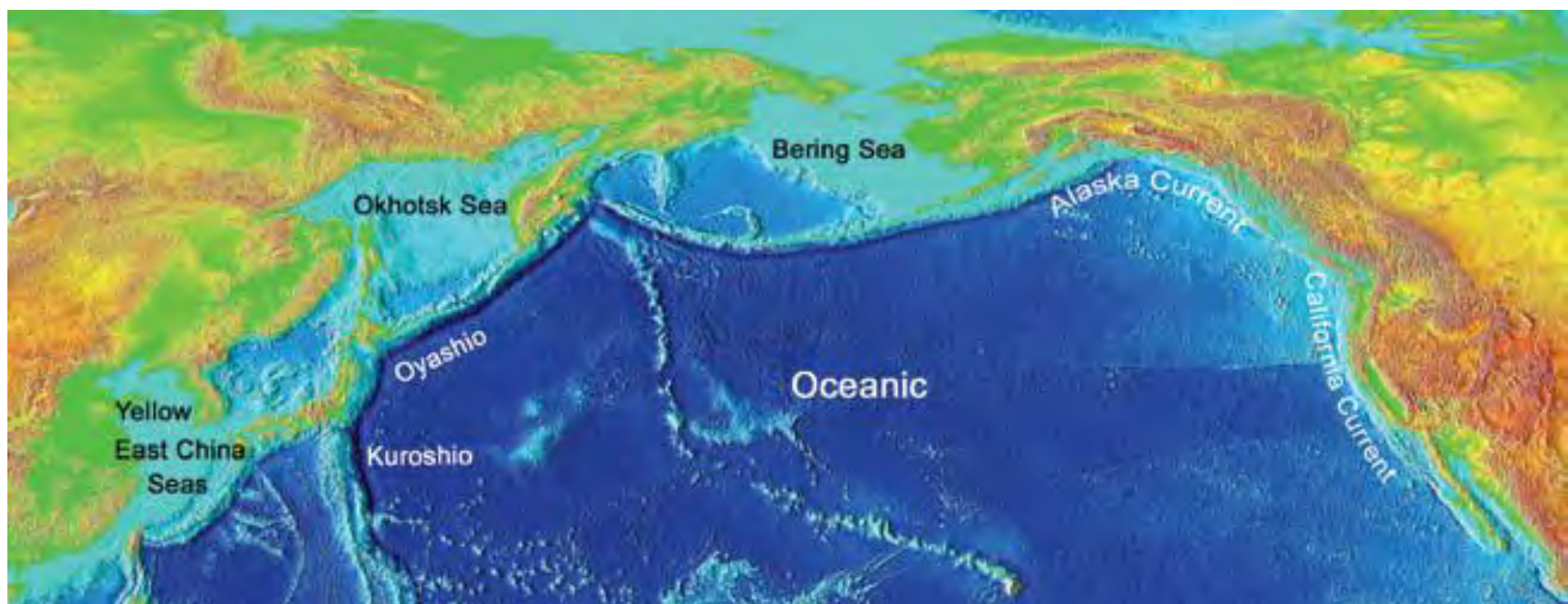
# Marine Ecosystems of the North Pacific

2004



# *North Pacific Ecosystem Status Report*

**[http://www.pices.int/publications/special\\_publications/NPESR/2004/npesr\\_2004.aspx](http://www.pices.int/publications/special_publications/NPESR/2004/npesr_2004.aspx)**



PICES Special Publication 1 (2004)

Marine Ecosystems of the North Pacific

**ISSN 1813-8527**

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## **Japan/East Sea**

## **Okhotsk Sea**

## **Oyashio / Kuroshio**

## **Western Subarctic Gyre**

## **Bering Sea**

## **Gulf of Alaska**

## **California Current**

## **Gulf of California**

## **Transition Zone**

## **Tuna**

## **Pacific halibut**

## **Pacific salmon**

# Key Messages

- **North Pacific climate is different now than during past 30 years.**
  - **atmospheric pressure systems suggest a pattern different than the “typical” PDO, with more North-South variation rather than East-West**
  - **result is continuation of “warm” conditions in Bering Sea, “cool” conditions in Sea of Okhotsk, but a switch to different conditions in southern regions (e.g. “cool” in California Current)**
- **Strong El Niño of 1997/98, strong La Niña of 1999, and weak El Niño of 2002/03 added further variability and unpredictability**
- **Unusual plankton blooms have occurred in the past 5 years, and harmful algal blooms are increasing**
- **Fishing adds further unpredictability**
  - **A number of stocks in eastern and western North Pacific have been heavily exploited**
  - **Pacific salmon has been at historic abundances, but with some regional stocks in difficulty**
  - **Active and conservative management has helped to maintain important stocks (e.g. walleye pollock in eastern Bering Sea)**

# **Key Messages (Continued)**

- **Fluctuations of some small pelagic fish stocks appear to be largely under environmental control, e.g. sardine**
  - **however, example of California Current System suggests that ability to respond to environmental variations may be affected by human actions**
- **Intensive mariculture is well-established and continues to increase dramatically, particularly in parts of the western Pacific**
- **Significant issues that exist for improving understanding of North Pacific marine ecosystems include:**
  - **Lack of information on nutrients, plankton, un-exploited fish species**
  - **Near-shore and inter-tidal environments**
  - **Continuation, and expansion, of ocean observing programs**

# **Other Items**

## **Human Population**

- **North Pacific rim ranges from lightly to heavily populated areas**
- **Proportions of population living within 100 km of coast range from 15% (Russia) to 100% (Korea)**
- **Projected population growth rates over next 5 years range from - 0.2% (Russia) to 0.8% (Canada, USA)**
- **Continuing population increases and urbanisation will stress marine ecosystems of the North Pacific**

## **Contaminants and Habitat Modifications**

- **A major gap in this report**

## **Mariculture**

- **China, Japan, Korea account for 74% of world aquaculture (FAO)**
- **Average annual rate of increase in China 14%**
- **Likely to have important impacts, but not well described in report**



PICES SPECIAL PUBLICATION 4

# Marine Ecosystems of the North Pacific Ocean 2003-2008



2010





# *North Pacific Ecosystem Status Report*

**[http://www.pices.int/publications/special\\_publications/NPESR/2010/NPESR\\_2010.aspx](http://www.pices.int/publications/special_publications/NPESR/2010/NPESR_2010.aspx)**

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**Synthesis**

Highlights

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**Alaska Current**

**Bering Sea**

**Sea of Okhotsk**

**Oyashio**

**Kuroshio**

**Yellow and East China Seas**

Note *focus period* from  
2003-2008

# Key Messages

- enhanced climatic and ecological „variability, particularly in the eastern North Pacific
- after 2002-2003 El Niño, normally dominant Pacific Decadal Oscillation (PDO) climate pattern was diminished until October 2007 when shifted to negative
- subtropical North Pacific with low surface chlorophyll ( $<0.07 \text{ mg}\cdot\text{m}^{-3}$ ) expanded in size by about  $2.2\% \text{ y}^{-3}$  from 1998-2006
- extent of sea ice in Sea of Okhotsk continued downward trend since 1978; Bering Sea ice extent had no trend in winters since 1978 but spring and fall had persistent declines in 1997; years from 2006-2008 saw increasing sea ice in the eastern Bering Sea.
- summer of 2008 had an atypical bloom of phytoplankton across the North Pacific

# Key Messages (cont)

- amount of hypoxic water (low in oxygen) has increased along the North American continental margin
- zooplankton in the California Current System showed a remarkable reorganization and/or poleward shift of patterns of lower trophic level productivity that has persisted to present.
- most dramatic biological changes in the Asian marginal sea regions have been increases in gelatinous macrozooplankton
- first effects of Three Gorges Dam (Changjiang River, China; 2003) are being observed downstream in the East China Sea, with less discharge and reduced sediment volumes.
- total catch of Pacific salmon in North Pacific was highest on record during the focus period, due to increased catches in Asia;
- biomass of walleye pollock in the eastern Bering Sea declined because of unprecedented years of low recruitment