TWAP
TRANSBOUNDARY WATERS ASSESSMENT PROGRAMME

# Large Marine Ecosystems

## *A Global Comparative Assessment of Baseline Status and Future Trends*

**VOLUME 4: LARGE MARINE ECOSYSTEMS**

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## Status and trends

United Nations Educational, Scientific and Cultural Organization
Intergovernmental Oceanographic Commission
GESAMP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
NORWEGIAN MINISTRY OF FOREIGN AFFAIRS
Center for Marine Assessment and Planning, UCSB
THE PEW CHARITABLE TRUSTS
GLOBAL IGBP CHANGE International Geosphere-Biosphere Programme
NOAA
TAT Tokyo University of Agriculture and Technology
DALHOUSIE UNIVERSITY Inspiring Minds
MINISTRY FOR FOREIGN AFFAIRS OF FINLAND
UNEP WCMC
CERMES
PlasticsEurope Association of Plastics Manufacturers
Liberté • Égalité • Fraternité RÉPUBLIQUE FRANÇAISE DÉLÉGATION PERMANENTE DE LA FRANCE AUPRÈS DE L'UNESCO
UBC
SEA AROUND US

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- 2nd International Ocean Research Conference, 17-21 November 2014, Barcelona, Spain
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# Preface

The Global Environment Facility (GEF) approved a Full Size Project (FSP), "A Transboundary Waters Assessment Programme: Aquifers, Lake/Reservoir Basins, River Basins, Large Marine Ecosystems, and Open Ocean to catalyze sound environmental management", in December 2012, following the completion of the Medium Size Project (MSP) "Development of the Methodology and Arrangements for the GEF Transboundary Waters Assessment Programme" in 2011. The TWAP FSP started in 2013, focusing on two major objectives: (1) to carry out the first global-scale assessment of transboundary water systems that will assist the GEF and other international organizations to improve the setting of priorities for funding; and (2) to formalise the partnership with key institutions to ensure that transboundary considerations are incorporated in regular assessment programmes to provide continuing insights on the status and trends of transboundary water systems.

The TWAP FSP was implemented by UNEP as Implementing Agency, UNEP's Division of Early Warning and Assessment (DEWA) as Executing Agency, and the following lead agencies for each of the water system categories: the International Hydrological Programme (IHP) of the United Nations Educational, Scientific and Cultural Organization (UNESCO) for transboundary aquifers including groundwater systems in small island developing states (SIDS); the International Lake Environment Committee Foundation (ILEC) for lake and reservoir basins; the UNEP-DHI Partnership – Centre on Water and Environment (UNEP-DHI) for river basins; and the Intergovernmental Oceanographic Commission (IOC) of UNESCO for large marine ecosystems (LMEs) and the open ocean.

The five water-category specific assessments cover 199 transboundary aquifers and groundwater systems in 43 small island developing states, 206 transboundary lakes and reservoirs, 286 transboundary river basins; 66 large marine ecosystems; and the open ocean, a total of 758 international water systems. The assessment results are organized into five technical reports and a sixth volume that provides a cross-category analysis of status and trends:

Volume 1 – ***Transboundary Aquifers and Groundwater Systems of Small Island Developing States: Status and Trends***
Volume 2 – ***Transboundary Lakes and Reservoirs: Status and Trends***
Volume 3 – ***Transboundary River Basins: Status and Trends***
Volume 4 – ***Large Marine Ecosystems: Status and Trends***
Volume 5 – ***The Open Ocean: Status and Trends***
Volume 6 – ***Transboundary Water Systems: Crosscutting Status and Trends***

A Summary for Policy Makers accompanies each volume.

Volume 4 presents the results of the first global indicator-based, comparative assessment of large marine ecosystems, prepared in partnership with IOC-UNESCO (lead), the US National Oceanic and Atmospheric Administration (NOAA), the University of West Indies (Cave Hill) Centre for Resource Management and Environmental Studies (CERMES), the Center for Marine Assessment and Planning (CMAP) University of California Santa Barbara, Dalhousie University, the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), the International Geosphere-Biosphere Programme (IGBP), the Tokyo University of Agriculture and Technology (TUAT), the University of British Columbia Sea Around Us (UBC SAU), the UNEP World Conservation Monitoring Centre (UNEP WCMC), and a number of independent experts. An assessment of the Western Pacific Warm Pool, based on a sub-set of the indicators, is included.

# Acronyms

| | |
|---|---|
| BOB | Bay of Bengal |
| CBD | Convention on Biological Diversity |
| CCAMLR | Commission for the Conservation of Antarctic Marine Living Resources |
| CHI | Cumulative Human Impacts (Index) |
| CIESIN | Center for International Earth Science Information Network |
| $CO_2$ | carbon dioxide |
| DBEM | Dynamic Bioclimate Envelope Model |
| DDT | dichlorodiphenyltrichloroethane |
| EBM | ecosystem-based management |
| EEZ | exclusive economic zone |
| FAO | Food and Agriculture Organization of the United Nations |
| FiB | Fishing in Balance (Index) |
| GDEM | Global Digital Elevation Model |
| GDP | Gross Domestic Product |
| GEF | Global Environment Facility |
| GIS | geographical information system |
| GIWA | Global International Waters Assessment |
| GIZ | Gesellschaft für Internationale Zusammenarbeit |
| GNI | gross national income |
| HCH | hexachlorocyclohexane |