





# **OUT OF THE BLUE**

THE VALUE OF SEAGRASSES TO THE ENVIRONMENT AND TO PEOPLE

WORLD () SEAGRASS ASSOCIATION

#### Copyright © 2020 United Nations Environment Programme

#### **ISBN:** 978-92-807-3780-6 **Job number:** DEP/2278/NA

This publication may be reproduced in whole or in part and in any form for educational or non-profit services without special permission from the copyright holder, provided acknowledgement of the source is made. United Nations Environment Programme would appreciate receiving a copy of any publication that uses this publication as a source.

No use of this publication may be made for resale or any other commercial purpose whatsoever without prior permission in writing from the United Nations Environment Programme. Applications for such permission, with a statement of the purpose and extent of the reproduction, should be addressed to the Director, Communication Division, United Nations Environment Programme, P. O. Box 30552, Nairobi 00100, Kenya.

**Suggested citation:** United Nations Environment Programme (2020). *Out of the blue: The value of seagrasses to the environment and to people.* UNEP, Nairobi.

#### Disclaimers

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of United Nations Environment Programme concerning the legal status of any country, territory or city or its authorities, or concerning the delimitation of its frontiers or boundaries. For general guidance on matters relating to the use of maps in publications please go to http:// www.un.org/Depts/Cartographic/english/htmain.htm

Mention of a commercial company or product in this document does not imply endorsement by the United Nations Environment Programme or the authors. The use of information from this document for publicity or advertising is not permitted. Trademark names and symbols are used in an editorial fashion with no intention on infringement of trademark or copyright laws.

The views expressed in this publication are those of the authors and do not necessarily reflect the views of the United Nations Environment Programme. We regret any errors or omissions that may have been unwittingly made.

## **OUT OF THE BLUE**

## THE VALUE OF SEAGRASSES TO THE ENVIRONMENT AND TO PEOPLE

Editor-in-chief: Maria Potouroglou (GRID-Arendal)

Editorial Team: Gabriel Grimsditch (UNEP), Lauren Weatherdon (UNEP-WCMC), Steven Lutz (GRID-Arendal)

**Steering Committee:** Emmett Duffy (Tennenbaum Marine Observatories Network, Smithsonian Institution), Jane Glavan (Abu Dhabi Global Environmental Data Initiative), Jared Bosire (UNEP), Jessie Jarvis (University of North Carolina Wilmington), Takehiro Nakamura (UNEP)

#### **Coordinating Lead Authors:**

#### **Chapters:**

- Seagrass ecosystem services: Assessment and scale of benefits Carmen B. de los Santos (Centre of Marine Sciences, University of Algarve)
- Threats to seagrasses and ecosystem resilience Rod Connolly (Griffith University)
- Seagrass mapping and monitoring Dimosthenis Traganos (German Aerospace Center) and Dimitris Poursanidis (Foundation for Research and Technology – Hellas)
- Transforming conservation and understanding of seagrass ecosystems through the use of citizen science Richard K.F. Unsworth (Swansea University)
- Policy and management options Miguel Fortes (University of the Philippines)
- Financial incentives Mark Huxham (Edinburgh Napier University) and Mat Vanderklift (CSIRO)

#### Special boxes:

- Moving towards just seagrass conservation practices Maricela de la Torre-Castro (Stockholm University)
- Seagrass in the blue economy Christopher J. Brown (Griffith University)

#### Main Technical Lead: GRID-Arendal

Cartography: Levi Westerveld (GRID-Arendal) and Hisham Ashkar

Layout: GRID-Arendal

Copy editing and translations: Strategic Agenda

Cover and separator paintings: Nedret Andre

#### Acknowledgements

We would like to express our gratitude to the following experts for supporting this report as contributing authors and reviewers, through the provision of text, case studies, photos, external peer review and guidance. We thank them for providing their valuable time, knowledge and expertise, continuous trust and exemplary collaboration and professionalism.

Contributing Authors: Abbi Scott (James Cook University), Anchana Prathep (Prince of Songkla University), Ariane Arias-Ortiz (Institute of Environmental Science and Technology, Autonomous University of Barcelona), Benjamin Jones (Stockholm University), Catherine Collier (James Cook University), Genki Terauchi (NOWPAP CEARAC), Fanny Kerninon (University of Western Brittany), Hilary Kennedy (Bangor University), Inés Mazarrasa (University of Cantabria), Janmanee Panyawai (Prince of Songkla University), Jennifer O'Leary (The Nature Conservancy), Joel Creed (Rio de Janeiro State University), Laura Griffiths (Griffith University), Len McKenzie (James Cook University and Seagrass-Watch), Lina Mtwana Nordlund (Uppsala University), Milica Stankovic (Prince of Songkla University), Patricia Arenas González (GRID-Arendal), Peter Macreadie (Deakin University), Rohani Ambo-Rappe (Hasanuddin University), Salomão Bandeira (Eduardo Mondlane University), Tantely Tianarisoa (Wildlife Conservation Society, Madagascar), Tatsuyuki Sagawa (Remote Sensing Technology Center of Japan), Teruhisa Komatsu (Yokohama College of Commerce), Wawan Kiswara (Indonesian Seagrass Foundation).

**Reviewers:** Andi Rusandi (Ministry of Marine Affairs and Fisheries, Indonesia), Erin Satterthwaite (NCEAS and Future Earth), Firdaus Agung (Ministry of Marine Affairs and Fisheries, Indonesia), Helena Rodriguez (London School of Economics), Katelyn Theuerkauf (The Pew Charitable Trusts), Katia Ballorain (CEDTM), Kristin Jinks (Griffith University), Lars Lindström (Stockholm University), Margot Hessing-Lewis (Hakai Institute), Michael Njoroge Githaiga (University of Embu), Mike van Keulen (Murdoch University), Mohamed Ahmed (UNEP), Mohamed Ahmed Sidi Cheikh (Caisse des Dépôts et de Développement, Mauritania), Novi Susetyo Adi (Ministry of Marine Affairs and Fisheries, Indonesia), Nurul Dhewani Mirah Sjafrie (Ministry of Marine Affairs and Fisheries, Indonesia), Stacy Baez (The Pew Charitable Trusts), Tibor Vegh (Duke University).

This report was funded by the Norwegian Government.

## **OUT OF THE BLUE**

#### THE VALUE OF SEAGRASSES TO THE ENVIRONMENT AND TO PEOPLE

Foreword	7
Preface: Seagrasses – their health, our wealth	
A note from the World Seagrass Association	
Summary for Policymakers	11
Introduction	14
PART 1 _ SCIENTIFIC EVIDENCE	19
Seagrass ecosystem services: Assessment and scale	-
of benefits	
Threats to seagrasses and ecosystem resilience	36
Seagrass mapping and monitoring	48
Transforming conservation and understanding of seagrass	
ecosystems through the use of citizen science	56
PART 2 _ POLICY AND MANAGEMENT OPTIONS	61
PART 3 _ FINANCIAL INCENTIVES	_ 71
Recommended actions	
References	86
Appendix	



### Foreword

Seagrasses are one of the most valuable coastal and marine ecosystems on the planet, providing a range of critical environmental, economic and social benefits.

They provide food and livelihoods to hundreds of millions of people, and they support rich biodiversity, with their sediments constituting one of the planet's most efficient stores of carbon.

However coastal development and population growth, rising pollution and climate change, are threatening the survival of this vital ecosystem. This global synthesis report, which is the first of its kind, aims to improve our understanding of the value of seagrasses and provide recommendations to protect and manage them. One billion people live within 100km of seagrass meadows and 20 per cent of the world largest fisheries depend on these ecosystems. Emissions from loss of seagrass are estimated to contribute up to 299 Tg carbon to the atmosphere per year.

At a time of climate emergency, the worrying decline of global seagrass area, estimated to be about 30 per cent since the late nineteenth century, requires a range of actions and policies that recognize the multiple benefits of seagrass ecosystems.

Maintaining the health of seagrass ecosystems is important for healthy marine life and for healthy people around the world. In doing so, they represent powerful nature-based solutions to the climate challenge and sustainable development.



Inger Andersen

Executive Director United Nations Environment Programme

### Preface: Seagrasses - their health, our wealth

Seagrasses are the forgotten ecosystem, despite being ubiquitous along coastlines worldwide and found in 159 countries on six continents, covering an area over 300,000 km<sup>2</sup>. Swaying gently beneath the surface of the ocean, seagrasses are too often out of sight and out of mind, overshadowed by colourful coral reefs and mighty mangroves. When seagrasses are noticed, they are sometimes regarded as a nuisance, though in fact they offer huge value to humankind.

Seagrass meadows are of fundamental importance to nature and people. For some 100 million years, they have protected coastal waters, the creatures that live there, and more recently us, humans. Seagrasses are among the most productive natural habitats on land or sea: they purify water, they protect us from storms, they provide food to hundreds of millions of people, and they support rich biodiversity, with their sediments constituting one of the planet's most efficient stores of carbon.

In light of everything seagrasses do for people and nature, protecting and restoring them is vital. Seagrass ecosystems can help us fulfil many of the international environmental commitments that are necessary to save our planet, from the Sustainable Development Goals to the Paris Agreement to the Convention on Biological Diversity.

It is time to boost the profile of this underappreciated marine ecosystem and shine a spotlight on the many ways that seagrasses can help us solve our biggest environmental challenges.



**Ronald Jumeau** Permanent Representative to the United Nations and Ambassador for Climate Change, Republic of Seychelles

## 预览已结束, 完整报告链接和二维码如下:

https://www.yunbaogao.cn/report/index/report?reportId=5\_13884