Further enhancing the effectiveness of RFMO performance reviews: Possible roles of emerging BBNJ instrument

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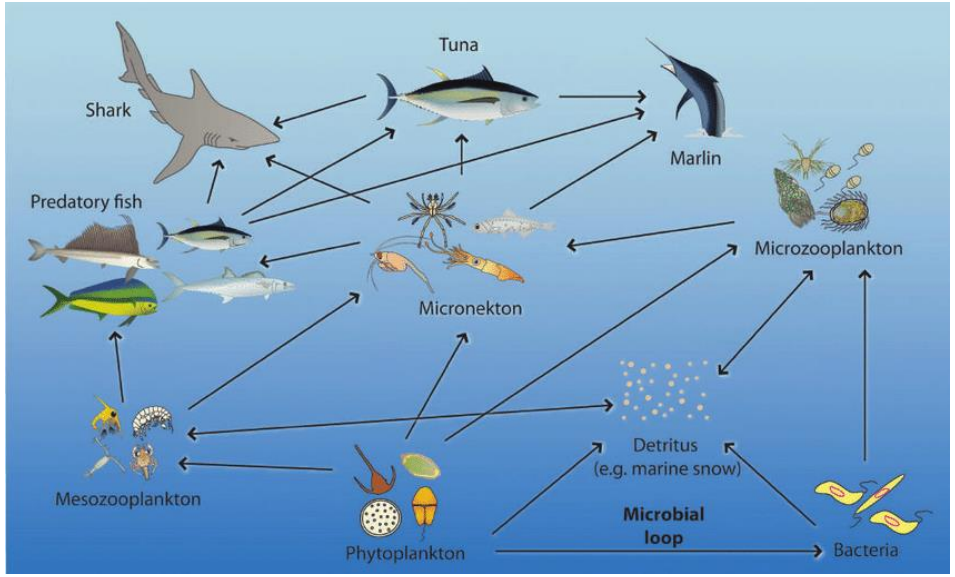
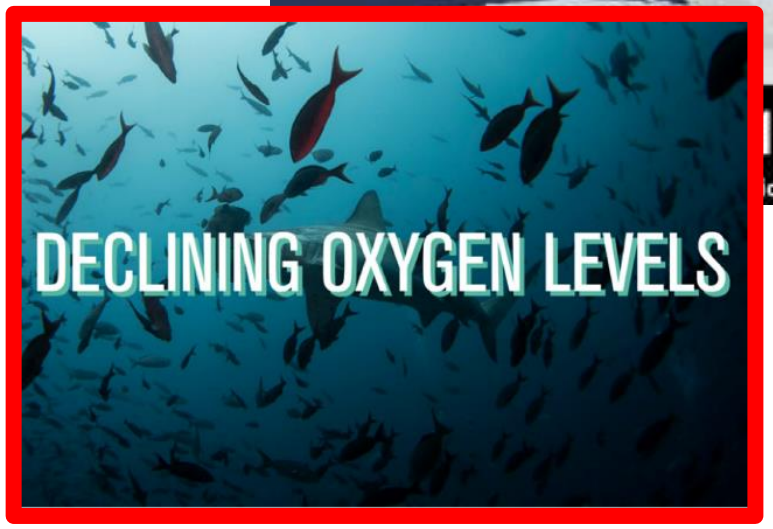
14th Informal Consultation of States Parties to the UN Fish Stocks Agreement
Discussion Panel Segment 4
Friday AM 3 May 2019

Overview



- Rising challenges
- Common concerns
- Possible roles of the emerging UN instrument for marine biodiversity beyond national jurisdiction
- Bringing it all together

Rising CO_2 has created a deadly trio of stressors



http://www.nereusprogram.org/policy-brief-bbnj-climate-change/

Free *et al.*, *Science* **363**, 979–983 (2019) 1 March 2019

FISHERIES

Impacts of historical warming on marine fisheries production

Christopher M. Free[1,2*], James T. Thorson[3,4], Malin L. Pinsky[5], Kiva L. Oken[1,6], John Wiedenmann[5], Olaf P. Jensen[1]

Climate change is altering habitats for marine fishes and invertebrates, but the net effect of these changes on potential food production is unknown. We used temperature-dependent population models to measure the influence of warming on the productivity of 235 populations of 124 species in 38 ecoregions. Some populations responded significantly positively (n = 9 populations) and others responded significantly negatively (n = 19 populations) to warming, with the direction and magnitude of the response explained by ecoregion, taxonomy, life history, and exploitation history. Hindcasts indicate that the maximum sustainable yield of the evaluated populations decreased by 4.1% from 1930 to 2010, with five ecoregions experiencing losses of 15 to 35%. Outcomes of fisheries management—including long-term food provisioning—will be improved by accounting for changing productivity in a warmer ocean.

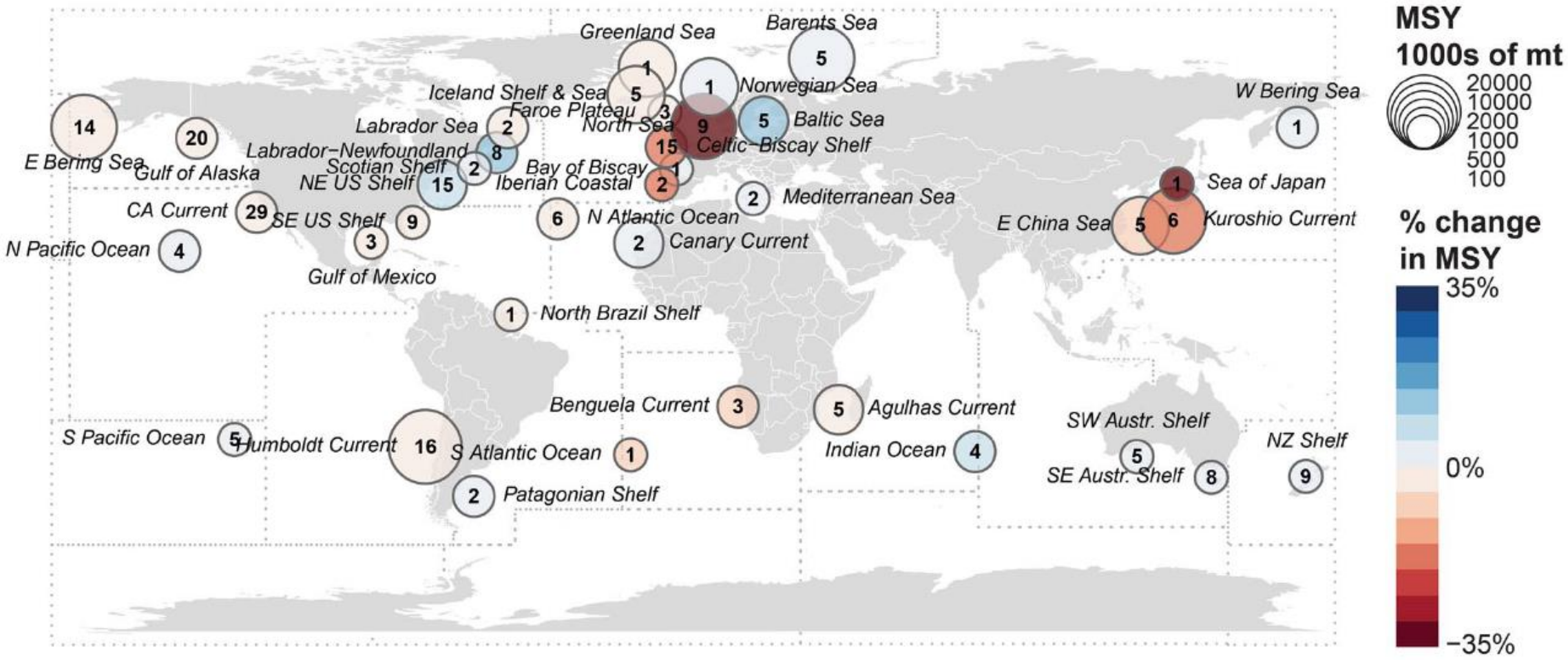
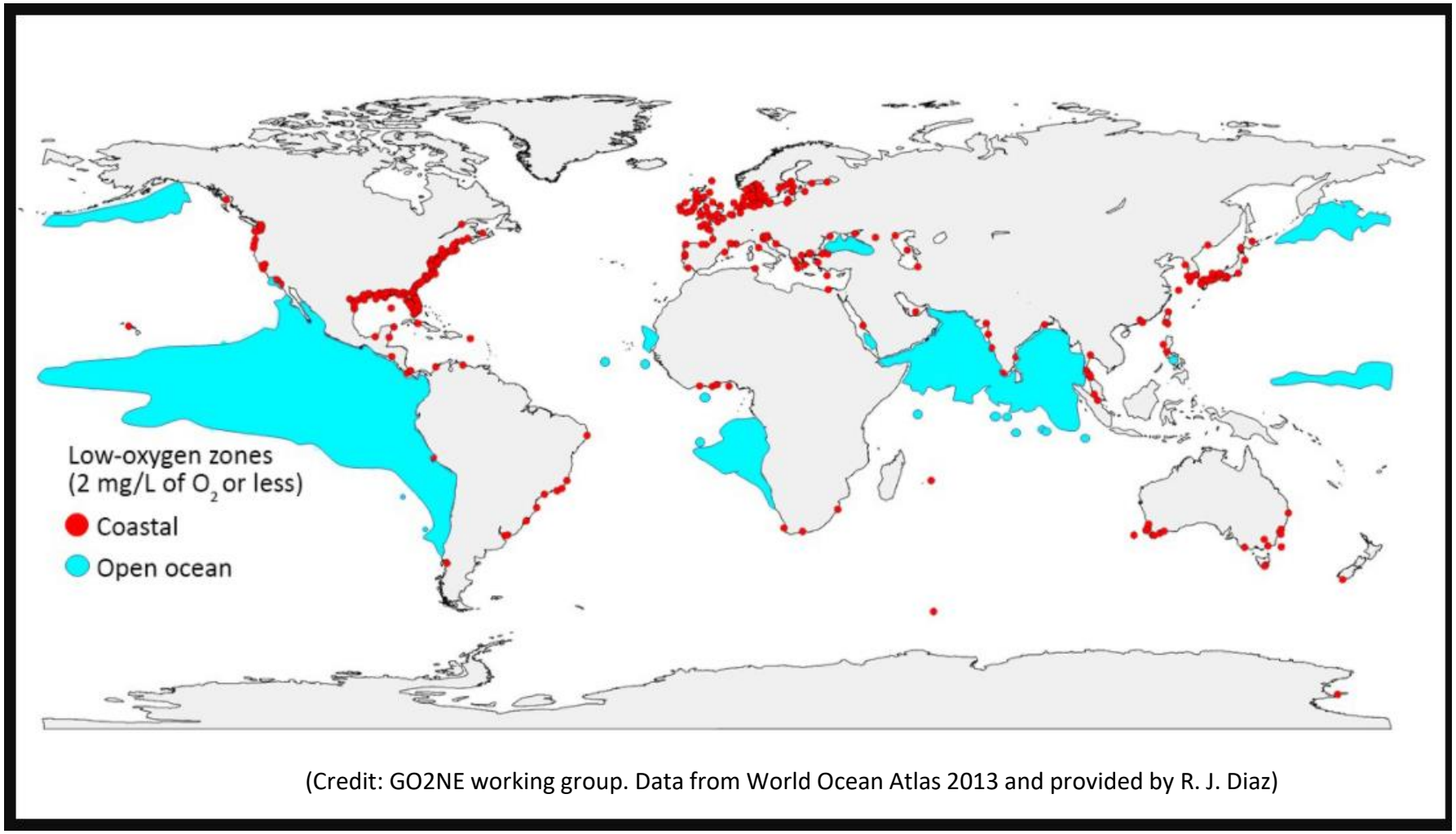


Fig. 4. Percent change in mean MSY between the period from 1930 to 1939 and the period from 2001 to 2010 by ecoregion. Points are scaled to the MSY at average temperature, and the number of populations in each ecoregion is shown inside the point. Dashed lines indicate FAO major fishing areas. Aust., Australian; NZ, New Zealand; mt, metric tons.

Low oxygen zones are spreading around the globe



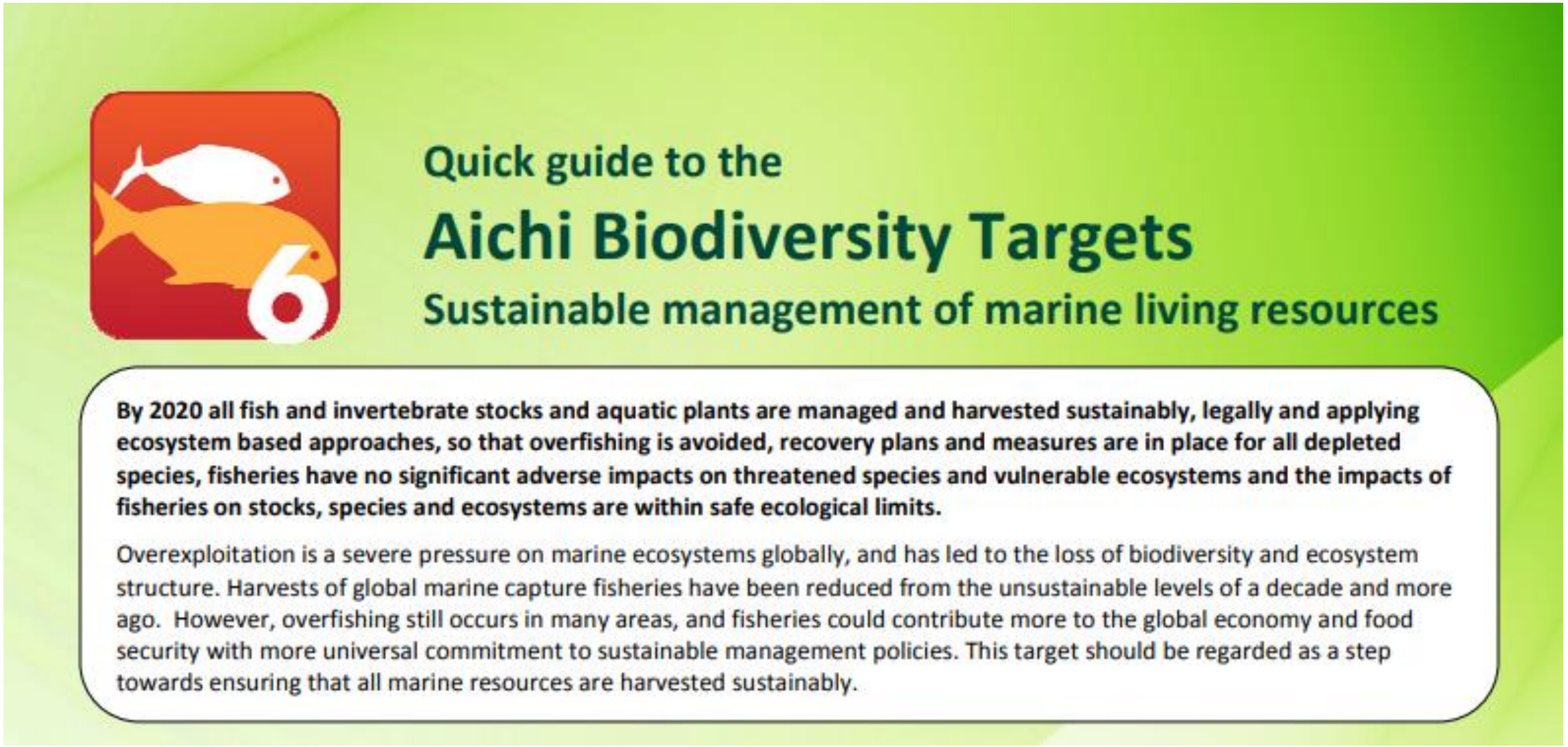
(Credit: GO2NE working group. Data from World Ocean Atlas 2013 and provided by R. J. Diaz)

Red and blue = O2 @ 2 milligrams per liter or less

D. Breitburg et al., Science 359, eaam7240 (2018). DOI: 10.1126/science.aam7240

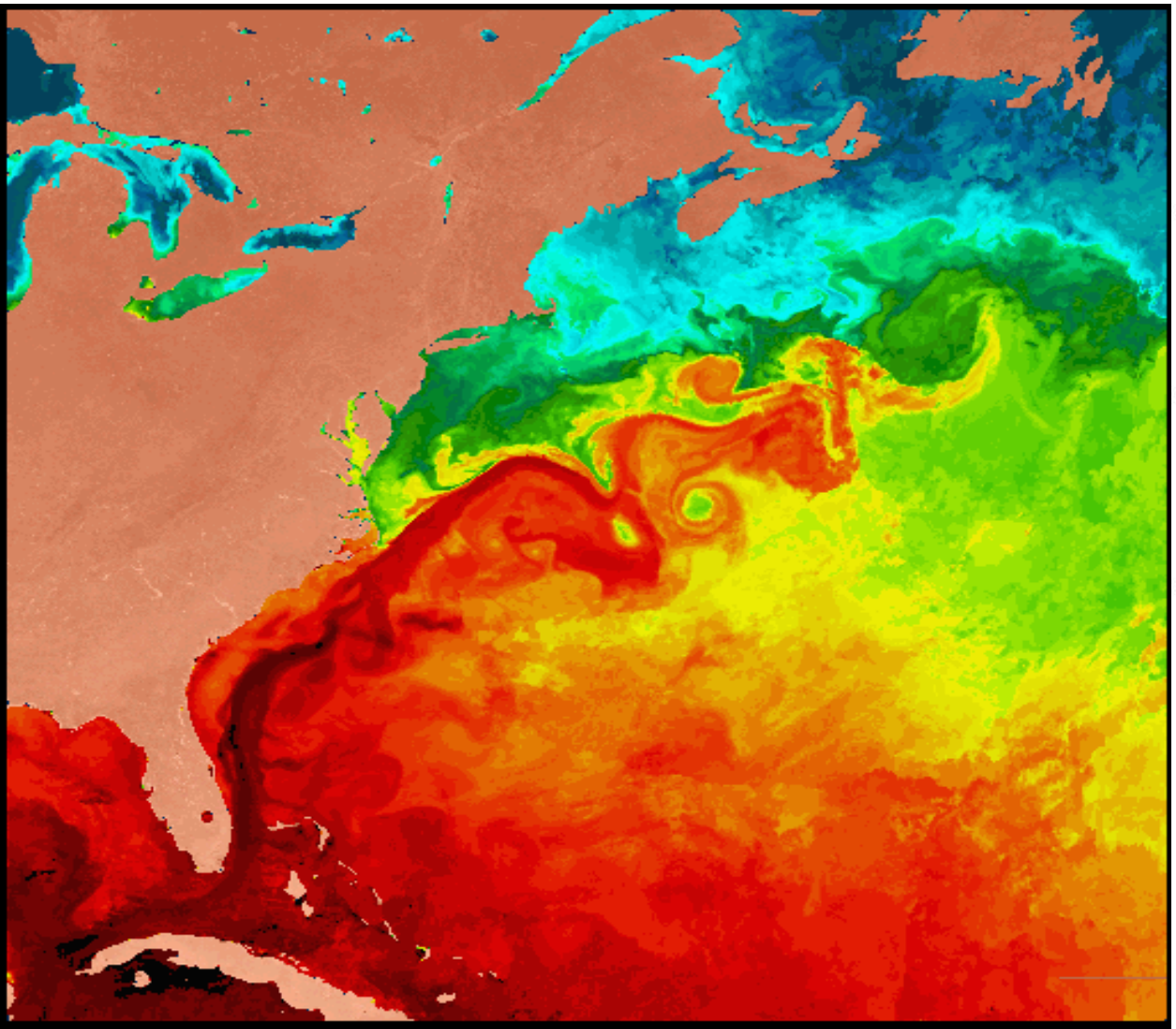
Deoxygenation affects nearly all biogeochemical and biological processes in the ocean, including structure, function and ecosystem services

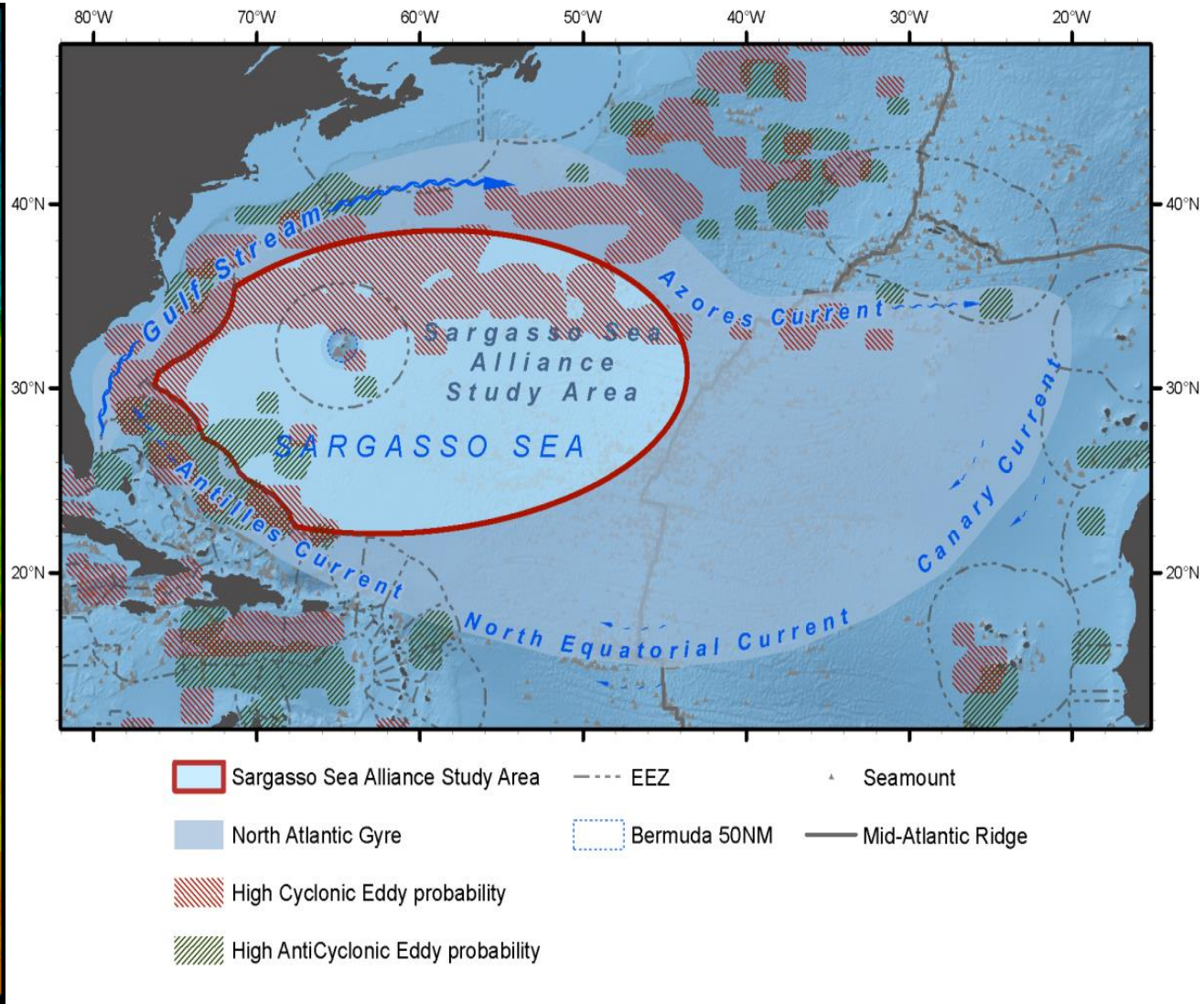
Common Concerns



https://www.cbd.int/doc/strategic-plan/targets/T6-quick-guide-en.pdf

Moving towards an ecosystem-based approach in a changing ocean





Received: 1 July 2016 | Accepted: 24 September 2017

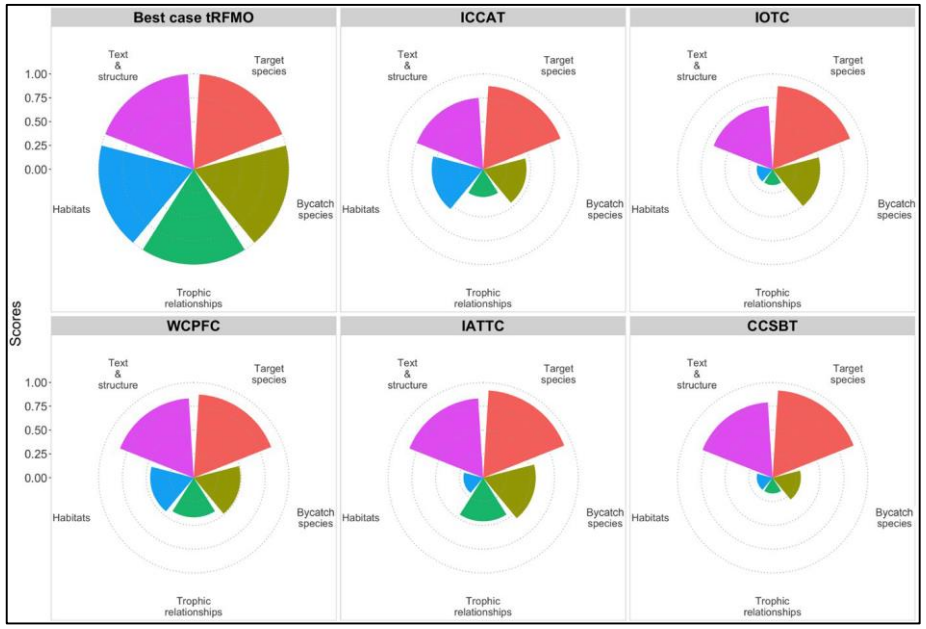
DOI: 10.1111/faf.12256

ORIGINAL ARTICLE

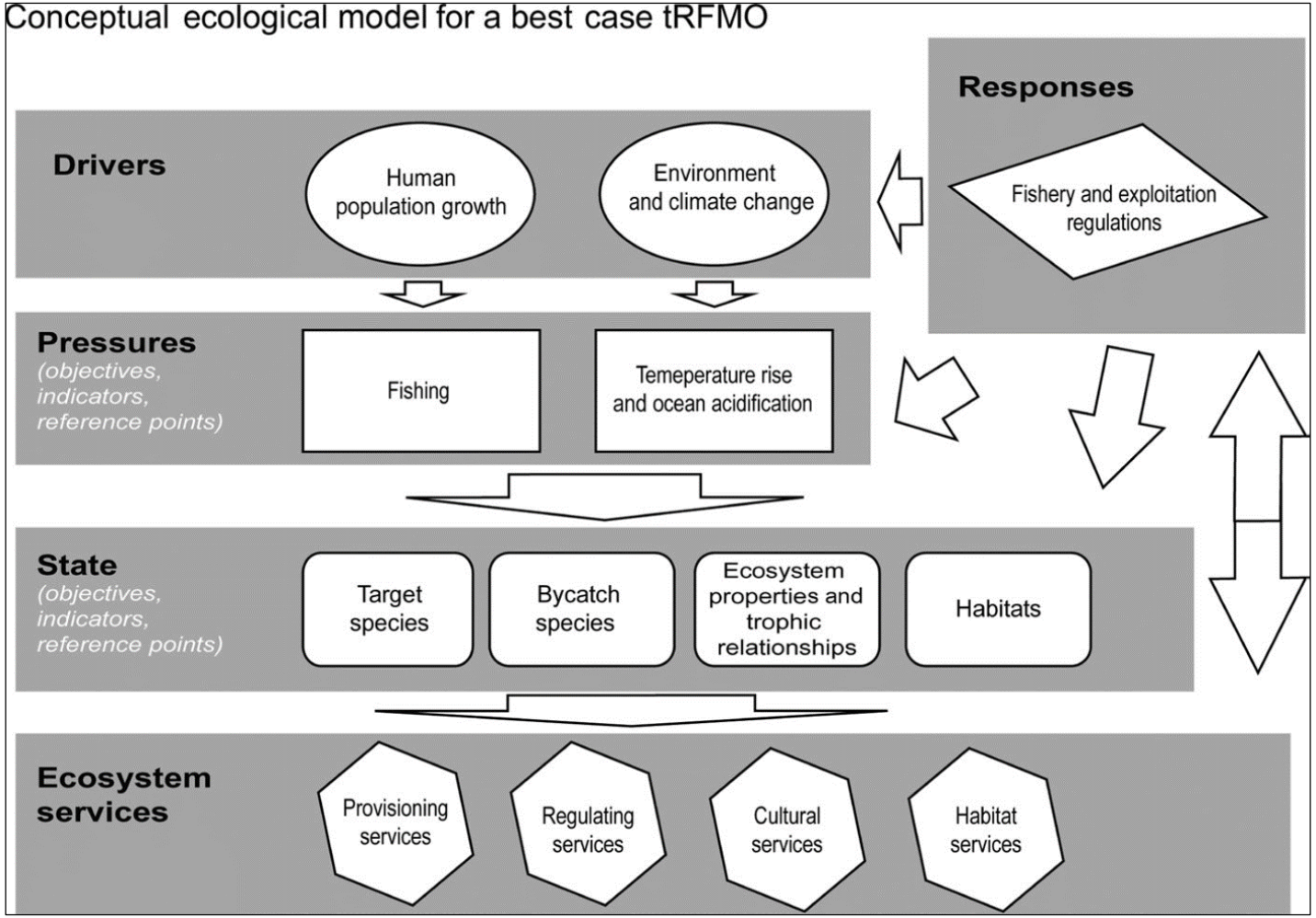
WILEY FISH and FISHERIES

Report card on ecosystem-based fisheries management in tuna regional fisheries management organizations

Maria José Juan-Jordá[1] | Hilario Murua[1] | Haritz Arrizabalaga[1] | Nicholas K Dulvy[2] | Victor Restrepo[3]



F I G U R E 6 Progress of tRFMOs in implementing each of the ecological components of EBFM against the best case tRFMO



F I G U R E 3 A conceptual ecological model for a best case tRFMO based on the Driver-Pressure- State- Ecosystem services-Response (DPSER) framework (Kelble et al., 2013)

Three ways the new instrument could further enhance the effectiveness of RFMO performance reviews

Principles, standards and obligations

Conference of Parties

Global scientific advisory body

Principles, standards and obligations

Objectives: Ecosystem-based management

Environmental assessments

Area-based management tools

Sectoral and cross-sectoral strategies and action plans

Conference of Parties

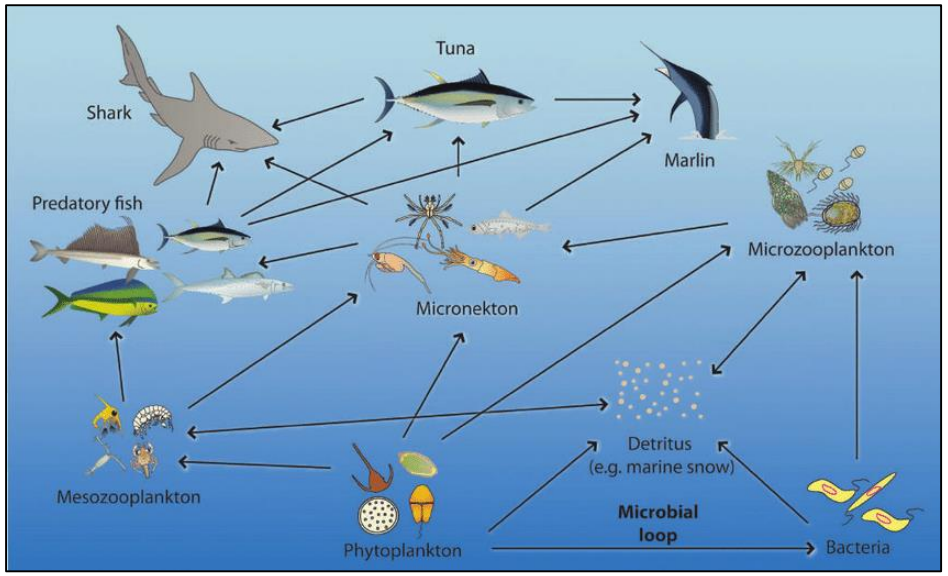
- Discuss shared challenges
- Look at how competent bodies, including RFMOs, could improve implementation of biodiversity objectives
- Develop and implement joint solutions
- Proactively protect marine biodiversity and reduce cumulative and sector-related impacts

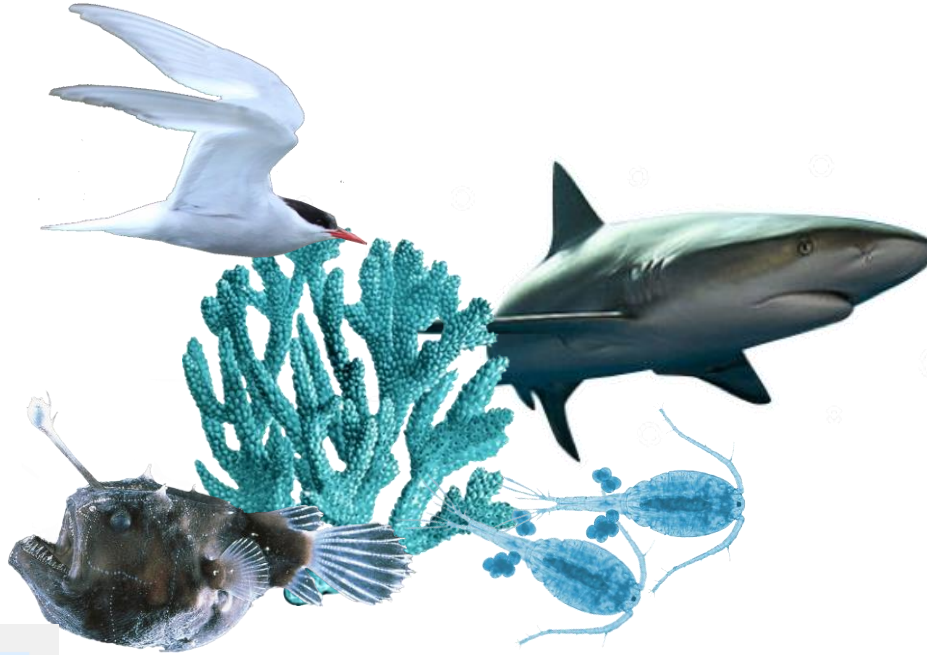
Global scientific advisory body

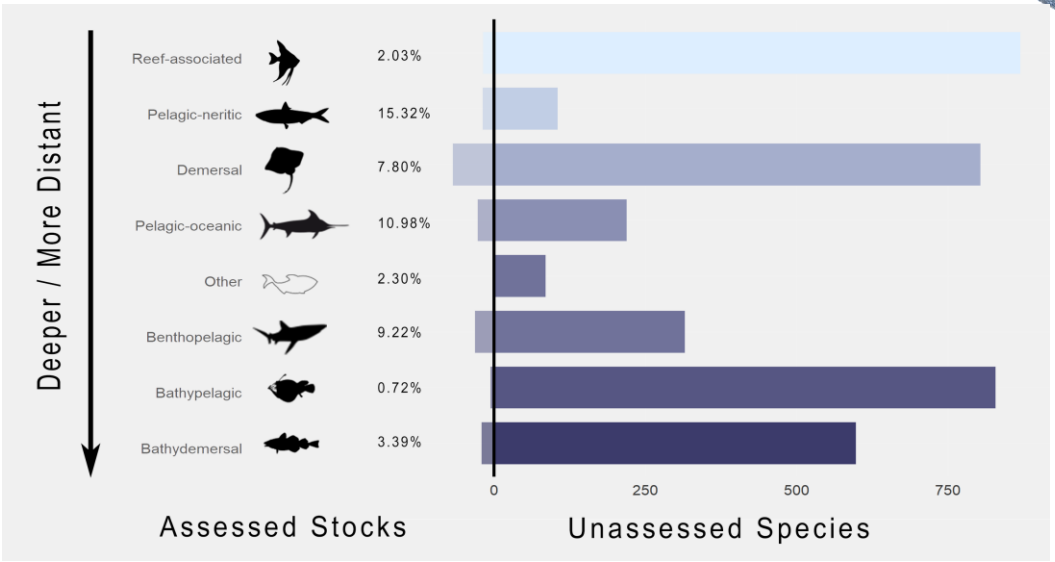
- Enhance multi-disciplinary and cross-sectoral cooperation
  - share data and knowledge
  - build research capacity
  - develop and transfer technologies.
- Ensure equal access to tools and technologies
  - understand, predict and respond
  - impacts of global ocean change on marine biodiversity and ecosystems

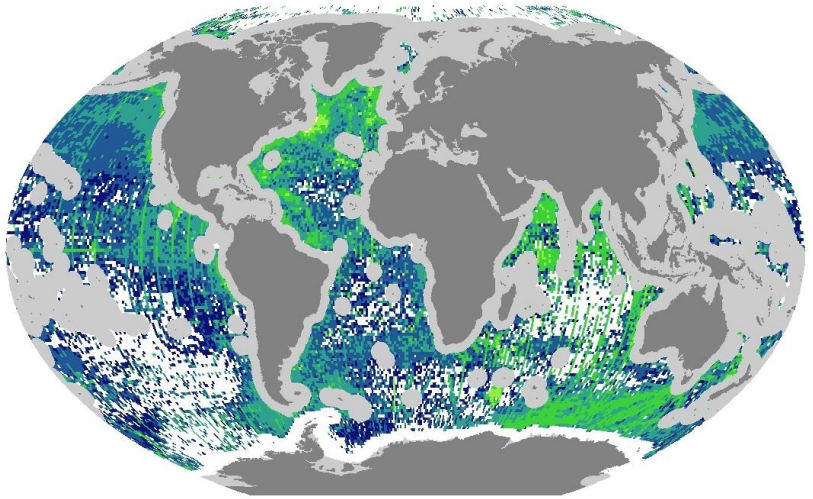
Areas of particular interest to ecologists:

- Characterize the ecological **composition and distribution** of BBNJ
- Identify natural and anthropogenic stressors on BBNJ
- **Identify and address** spatial or taxonomic gaps









G. O., Crespo, D. C., Dunn, M., Gianni, K., Gjerde, G., Wright & P. N., Halpin. (2019). High seas fish biodiversity is slipping through the governance net. *Nature ecology & evolution* ***[In Review]***

Slide courtesy G.O Crespo

Marine Geospatial Ecology Lab

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frontiers in Marine Science

EDITORIAL
published: 19 March 2019
doi: 10.3389/fmars.2019.00100

Editorial: Seasonal-to-Decadal Prediction of Marine Ecosystems: Opportunities, Approaches, and Applications

Mark R. Payne[1]*, *Alistair J. Hobday*[2], *Brian R. MacKenzie*[1] and *Desiree Tommasi*[3]

[1] Centre for Ocean Life, National Institute of Aquatic Resources (DTU-Aqua), Technical University of Denmark, Lyngby, Denmark, [2] CSIRO Oceans and Atmosphere, Hobart, TAS, Australia, [3] Southwest Fisheries Science Center, Institute of Marine Sciences, University of California Santa Cruz and NOAA National Marine Fisheries Service, La Jolla, CA, United States

Keywords: living marine resources, forecasting, prediction, fish, fisheries, seasonal to decadal prediction, climate services

Credit: Getty Images

A quiet revolution is taking place in marine science. Like a caterpillar entering its chrysalis, marine biology is metamorphosing into something new. Leaving its empirical origins behind, the first signs of the predictive skill that characterizes sciences such as physics and chemistry are now also emerging in biology. Climate scientists and oceanographers, taking advantage of the tremendous advances in observational technology, scientific understanding, and computing power in recent years, can now make skilful forecasts of the state of the ocean seasons, years, and in some cases up to a decade into the future (Doblas-Reyes et al., 2013; Meehl et al., 2014). Such forecasts are an exciting opportunity for marine ecologists and fisheries scientists, who finally may be able to realize the dream of predictive skill present at the very birth of their field (e.g., Helland-Hansen and Nansen, 1909). The first such pioneering products have already been operational for some years now (e.g., Hobday et al., 2011; Eveson et al., 2015), and a second wave of products, inspired by the successes of the first, is now building. A revolution is indeed, underway.

Bringing it all together

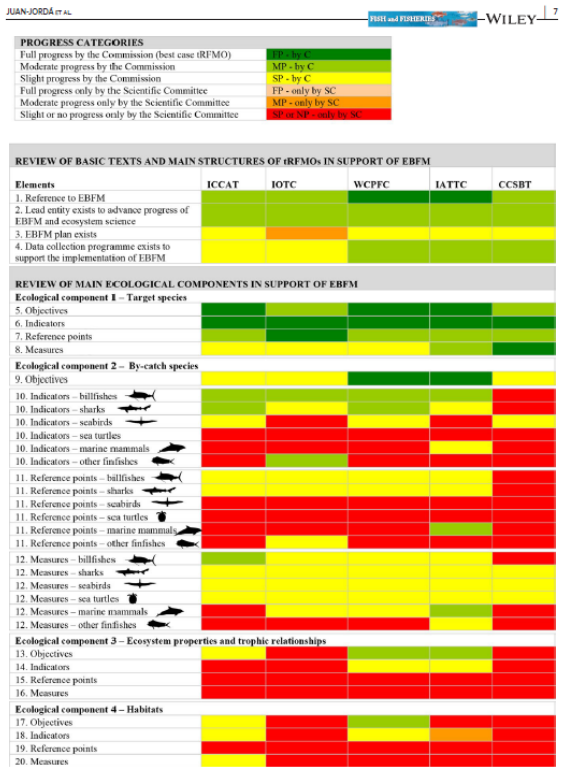
Shared principles and obligations

Global Conference of Parties

Global scientific advisory body

→ foster greater resilience in a face of accelerating climate risks

→ support long-term conservation and sustainable use



JUAN-JORDÁ ET AL. — FISH and FISHERIES — WILEY — 7

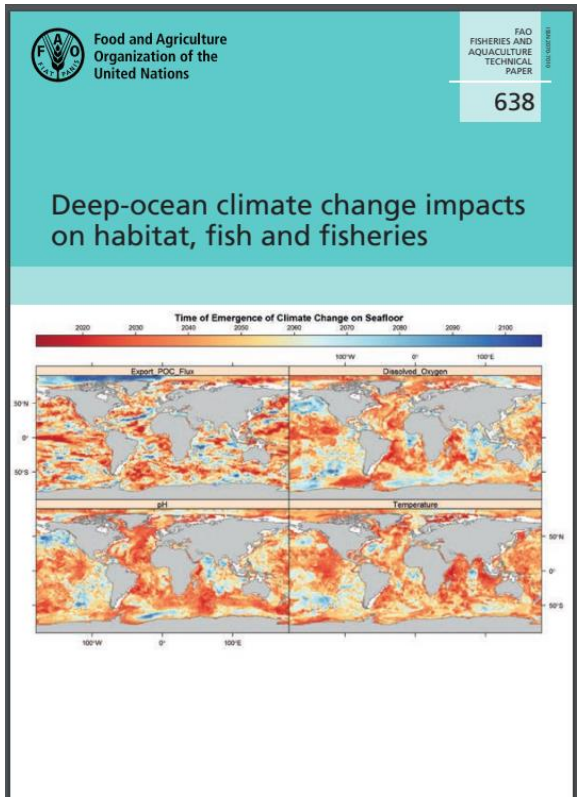
PROGRESS CATEGORIES	
Full progress by the Commission (best case tRFMO)	FP - by C
Moderate progress by the Commission	MP - by C
Slight progress by the Commission	SP - by C
Full progress only by the Scientific Committee	FP - only by SC
Moderate progress only by the Scientific Committee	MP - only by SC
Slight or no progress only by the Scientific Committee	SP or NP - only by SC

REVIEW OF BASIC TEXTS AND MAIN STRUCTURES OF tRFMOs IN SUPPORT OF EBFM

Elements	ICCAT	IOTC	WCPFC	IATTC	CCSBT
1. Reference to EBFM					
2. Lead entity exists to advance progress of EBFM and ecosystem science					
3. EBFM plan exists					
4. Data collection programme exists to support the implementation of EBFM					

REVIEW OF MAIN ECOLOGICAL COMPONENTS IN SUPPORT OF EBFM

Ecological component 1 – Target species					
5. Objectives					
6. Indicators					
7. Reference points					
8. Measures					
Ecological component 2 – By-catch species					
9. Objectives					
10. Indicators – billfishes					
10. Indicators – sharks					
10. Indicators – seabirds					
10. Indicators – sea turtles					
10. Indicators – marine mammals					
10. Indicators – other finfishes					
11. Reference points – billfishes					
11. Reference points – sharks					
11. Reference points – seabirds					
11. Reference points – sea turtles					
11. Reference points – marine mammals					
11. Reference points – other finfishes					
12. Measures – billfishes					
12. Measures – sharks					
12. Measures – seabirds					
12. Measures – sea turtles					
12. Measures – marine mammals					
12. Measures – other finfishes					
Ecological component 3 – Ecosystem properties and trophic relationships					
13. Objectives					
14. Indicators					
15. Reference points					
16. Measures					
Ecological component 4 – Habitats					
17. Objectives					
18. Indicators					
19. Reference points					
20. Measures					



Food and Agriculture Organization of the United Nations

FAO FISHERIES AND AQUACULTURE TECHNICAL PAPER

638

Deep-ocean climate change impacts on habitat, fish and fisheries

Time of Emergence of Climate Change on Seafloor

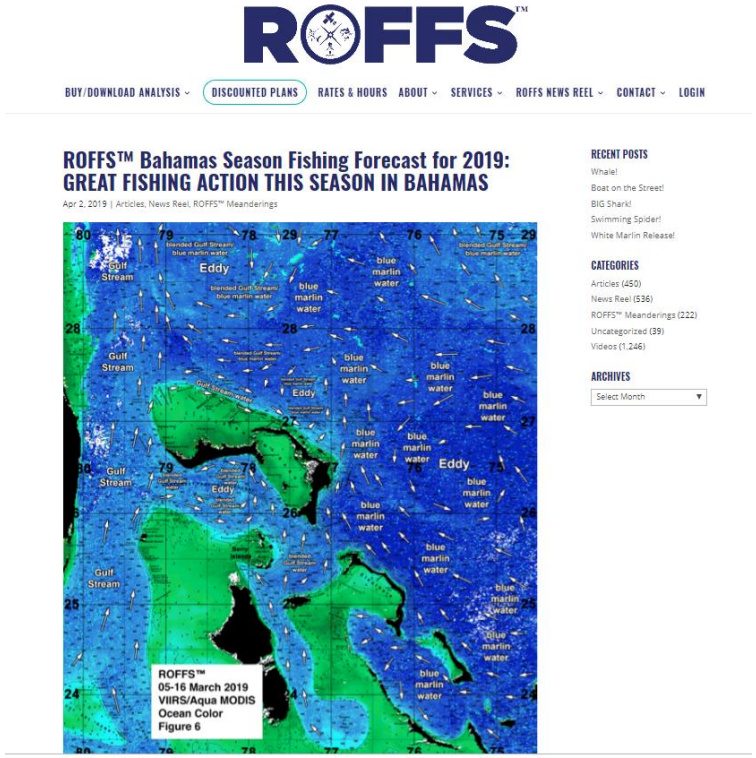
2020 2030 2040 2050 2060 2070 2080 2090 2100

Export_POC_Flux

Dissolved_Oxygen

pH

Temperature



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ROFFS™ Bahamas Season Fishing Forecast for 2019: GREAT FISHING ACTION THIS SEASON IN BAHAMAS

Apr 2, 2019 | Articles, News Reel, ROFFS™ Meanderings

Gulf Stream

Eddy

blue marlin water

ROFFS™
05-16 March 2019
VIIRS/Aqua MODIS
Ocean Color
Figure 6

RECENT POSTS

Whale!
Boat on the Street!
BIG Shark!
Swimming Spider!
White Marlin Release!

CATEGORIES

Articles (450)
News Reel (536)
ROFFS™ Meanderings (222)
Uncategorized (39)
Videos (1,246)

ARCHIVES

Select Month

Additional information

Some progress, but often slow

16-23 MISC

RESOLUTION BY ICCAT ON ECOSYSTEMS THAT ARE IMPORTANT AND UNIQUE FOR ICCAT SPECIES

RECALLING the *Resolution by ICCAT on Pelagic Sargassum* [Res. 05-11] which called upon the Standing Committee on Research and Statistics (SCRS) to examine the available and accessible information and data on the status of pelagic *Sargassum* and its ecological importance to tuna and tuna-like species; 2011

ALSO RECALLING the *Resolution by ICCAT on the Sargasso Sea* [Res. 12-12] which called upon the Standing Committee on Research and Statistics (SCRS) to examine the available data and information concerning the Sargasso Sea and its ecological importance to tuna and tuna-like species and ecologically associated species; 2012

RECOGNISING that a report on the findings of this work was presented to the Commission in 2015; 2015

ALSO RECOGNIZING that, in its 2015 report, the SCRS noted that the Sargasso Sea is an important and unique ecosystem for some ICCAT species, and at the same time it was acknowledged that there are other ecosystems in the Atlantic Ocean that are also important and unique for ICCAT species;

FURTHER RECOGNIZING that in 2013 the SCRS noted that the basic biological and ecological data provided for the Sargasso Sea offers a useful foundation for adopting this region as a basis for a case study in implementing the Ecosystem Based Fisheries Management (EBFM) approach within ICCAT; 2013

NOTING that the United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks calls for the protection of biodiversity in the marine environment and refers to the need to take ecosystem considerations into account; 1995

RECALLING the *Resolution by ICCAT Concerning the Application of an Ecosystem Approach to Fisheries Management* [Res. 15-11] which called upon the Commission to apply an ecosystem-based approach to fisheries management when making recommendations pursuant to Article VIII of the Convention;

THE INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS RESOLVES THAT:

1. As part of advancing the work of Ecosystem Based Fisheries Management, the SCRS will examine the available information on the trophic ecology of pelagic ecosystems that are important and unique for ICCAT species in the Convention area.

2. The SCRS will provide an update on the progress of this work in 2018 and report back to the Commission with available findings in 2019, if possible. 2019?

Received: 1 July 2016 | Accepted: 24 September 2017
DOI: 10.1111/faf.12256

ORIGINAL ARTICLE

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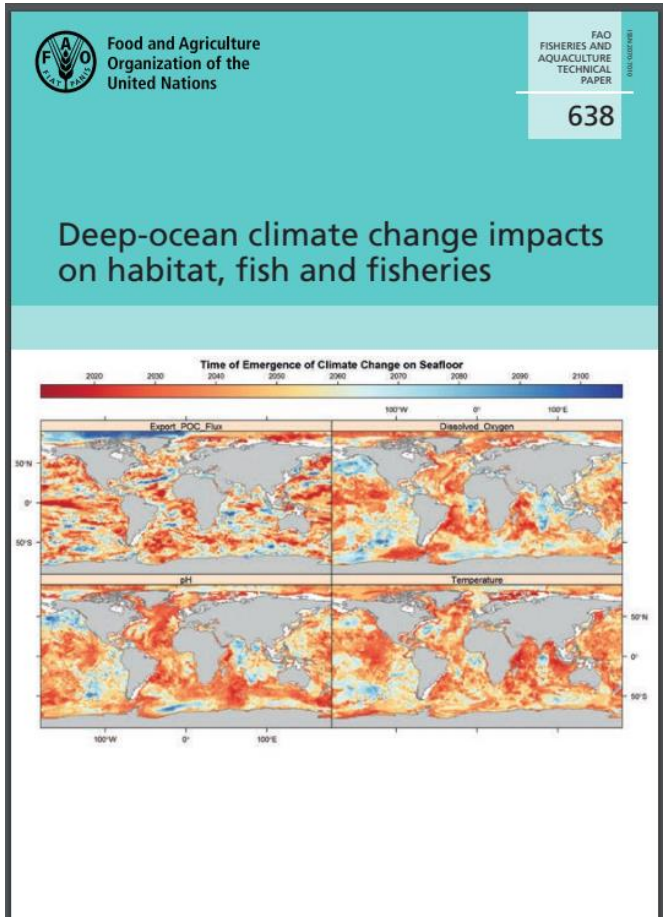
Overall, tRFMOs have made considerable progress monitoring the impacts of fisheries on target species, moderate progress for bycatch species, and little progress for ecosystem properties and trophic relationships and habitats. The tRFMOs appear to be halfway towards implementing the ecological component of EBFM, yet it is clear that the "low-hanging fruit" has been plucked and the more difficult, but surmountable, issues remain, notably the sustainable management of bycatch. All tRFMOs share the same challenge of developing a formal mechanism to better integrate ecosystem science and advice into management decisions. We hope to further discussion across the tRFMOs to inform the development of operational EBFM plans.



http://www.fao.org/3/ca2528en/ca2528en.pdf