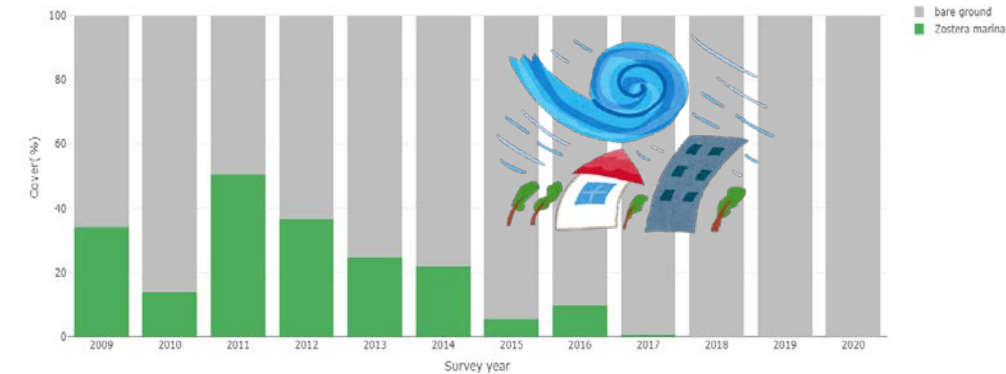




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# NBSAP and Update of marine activities from related with Kunming-Montreal Global Biodiversity Framework(KMGBF)/Indicators



Take Yamakita  
(JAMSTEC)



**AP MBON**

Asia-Pacific Marine Biodiversity  
Observation Network



Sea Urchin Feeding corals  
Slides from N.Yasuda  
Morita et al. 2024 in press



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# NBSAP of Japan

- The Sixth National Biodiversity Strategy "National Biodiversity Strategy 2023-2030" (Cabinet Decision on March 31, 2023)
- In Part 1 (Strategies), 5 basic strategies and state goals (15 total) and action goals (25 total) for each basic strategy to realize Nature Positive in 2030.
- -Five basic strategies
  - (1) Restoration of ecosystem health
  - (2) Solving social issues by utilizing nature
  - (3) Realize a nature-positive economy
  - (4) Recognize the value of biodiversity in daily life and consumer activities and take action
  - (5) Development of infrastructure and promotion of international cooperation to support biodiversity-related initiatives.
- In Part 2 (Action Plan), relevant specific measures (367 measures) of relevant ministries and agencies are organized for each of the 25 action goals set in Part 1.
- Set a set of indicators to evaluate the progress of each state goal and action target (including indicators that also correspond to the headline indicators of the Kunming-Montreal Framework for Biodiversity).



<https://bit.ly/3wpOSp6>

## 生物多様性国家戦略2023-2030において設定する状態目標・行動目標に関する指標

- ・各状態/行動目標に対応する主な指標を掲載。該当する目標を網羅する指標群を設定できていない場合は「検討中」とした。今後も見直しを図り、適宜更新・追加等を行う。
  - ・ヘッドライン指標（※）については対応する状態/行動目標に位置付けて、26種類全てを掲載。さらに、対応する指標の横に掲載しているが、対応する指標を設定できていない場合は斜体で表記。
  - ・アスタリスク(\*)が付いているヘッドライン指標は、方法論が確立されていないとされているもの。
- ※ヘッドライン指標：昆明・モントリオール生物多様性枠組におけるグローバルゴール、グローバルターゲットの進捗を測る指標。全ての国が共通して使用することが求められている。

【基本戦略】	【状態/行動目標】 Target	【主な指標】 Indicator to use	【対応するヘッドライン指標】 注）和訳は暫定
基本戦略 1	生態系の健全性の回復	headline indicator which corresponds	
	状態目標1-1 全体として生態系の規模が増加し、質が向上することで健全性が回復している	・生物多様性及び生態系サービスに関する総合評価（JB0）における生態系の規模及び質に関する評価の傾向 ・代表的な生態系の面積 ・代表的な生態系における生物種数・多様性、生息・生育状況（モニタリングサイトにおける確認種数・個体数、アマモ場・藻場平均被度、干潟の底生生物確認種数・生息密度、サンゴ被度など） Seagrass Macroalgal bed cover, number/density of observed benthic species , coverage of coral reef etc. at the monitoring site ・生態系の連続性・生態系ネットワーク指数	A.2 Extent of natural ecosystems 自然生態系の広がり A.1 Red List of Ecosystems 生態系レッドリスト
	状態目標1-2 種レベルでの絶滅リスクが低減している	・レッドリストインデックス ・レッドリスト掲載種数 ・レッドリスト掲載種のカテゴリーの変化状況	A.3 Red List Index レッドリストインデックス
	状態目標1-3 遺伝的多様性が維持されている	・生物多様性及び生態系サービスに関する総合評価（JB0）における遺伝的多様性に関する評価の傾向	A.4 The proportion of populations within species with an effective population size > 500 有効集団サイズが500を超える種内の個体群の割合
	行動目標1-1 陸域及び海域の30%以上を保護地域及びOECMにより保全するとともに、それら地域の管理の有効性を強化する	・陸域における保護地域及びOECMの面積割合 ・海域における保護地域及びOECMの面積割合 ・OECM面積（陸域、海域） Area of protected areas, OECM in KBA/EBSAs ・保護地域面積（陸域、海域） ・陸域（KBAs）に対する保護地域・OECM該当面積割合 ・海域（EBSAs）に対する保護地域・OECM該当面積割合 ・自然共生サイト認定後に更新されたサイト数 ・前回点検から10年未満で公園区域及び計画の点検を実施した国立公園地域（計画）数 ・前回更新から10年未満で管理運営計画を更新した国立公園地域（管理運営計画区）数 ・国立公園において保全・管理に当たる自然保護官等の人数	3.1 Coverage of protected areas and OECMs 保護地域とOECMの面積割合
		・劣化や再生の定義含め再生割合の計測についての手法を開発[Yes/No] ・公益的機能の一層の発揮のため自然状況等を踏まえて育成複層林に誘導することとされている350万haの育成単層林のうち、育成複層林へ誘導した森林の割合（累計）	2.2 Area under restoration* 再生中の面積*



<https://bit.ly/3wpOSp6>

# How about marine?

The screenshot shows the homepage of the 'Marine biodiversity conservation strategy' website. The header features a blue banner with various sea creatures like a shark, squid, and fish. Below the banner, there are three main navigation buttons: 'What is sea megumi?', 'How to interact with the sea', and 'What we can do'. To the right, there are links for 'Diversity of marine life protects national roads', '関連施策・事業' (Related Policies/Businesses), '[Glossary]', and 'Link'. The main content area is divided into three columns. The first column, 'What is sea megumi?', includes sections like 'We live in a world of diverse life', 'the world of life', 'Is it done now?', and '海のめぐみを活かす要因' (Factors for utilizing the bounty of the sea). The second column, 'How to interact with the sea', includes 'Understand the importance of marine biodiversity', 'have a holistic perspective', 'Adjust to the characteristics of the sea area', and 'Utilizing local knowledge and technology'. The third column, 'What we can do', includes 'National initiatives (1)', 'National efforts (2) Elimination of causes and countermeasures', 'National efforts (3) Methods tailored to the ocean', 'National initiatives (4) Marine protected areas', and 'National initiatives (5)'. A red box highlights the 'what's new' section, which contains the text 'お知らせ' (Notice) and 'In April 2017, we created a language version of the website for the high seas from the perspective of biodiversity.' Below this, there is another 'お知らせ' (Notice) section dated 'April 2016' with the text 'We have announced which cetaceans are most important from the perspective of biodiversity.'

## Marine biodiversity conservation strategy

Blessings of the sea to connect to the future

Japan, where we live, is one of the world's leading maritime countries.

The "Marine Biodiversity Conservation Strategy" is a strategy formulated by the Ministry of the Environment in March 2011 in order to pass on the blessings of the sea that we have received so far to the future.

### What is sea megumi?

生き物多様性・生態 service

We live in a world of diverse life

the world of life

Is it done now?

海のめぐみを活かす要因

our japan

### How to interact with the sea

保全・利用の基本の考え方

Understand the importance of marine biodiversity

have a holistic perspective

Adjust to the characteristics of the sea area

Utilizing local knowledge and technology

Protect it in a marine reserve

### What we can do

施策の概要

National initiatives (1)

National efforts (2) Elimination of causes and countermeasures

National efforts (3) Methods tailored to the ocean

National initiatives (4) Marine protected areas

National initiatives (5)

What we can do

#### what's new

お知らせ

In April 2017, we created a language version of the website for the high seas from the perspective of biodiversity.

お知らせ

April 2016

We have announced which cetaceans are most important from the perspective of biodiversity.



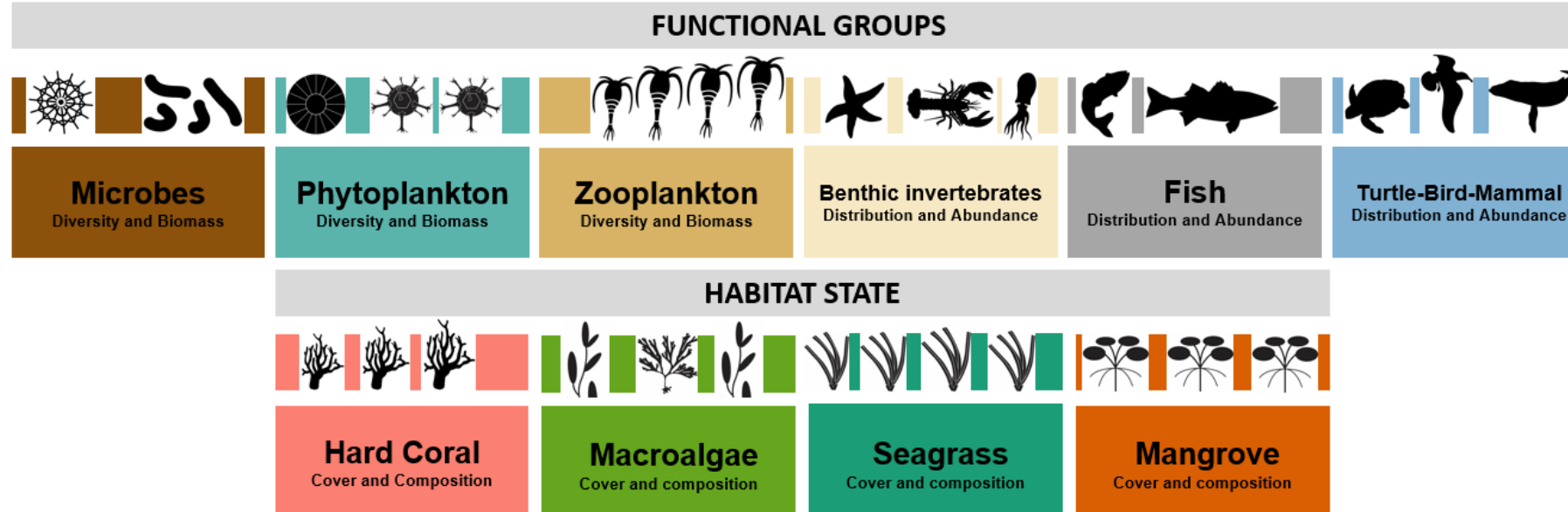


## Essential Ocean Variables (EOVs)

Framework for Ocean  
Observing (2012)  
<http://www.oceanobs09.net/foo/>

Physics	Biochemistry	Biology and Ecosystems
<ul style="list-style-type: none"> <li>• <a href="#">Sea state</a></li> <li>• <a href="#">Ocean surface stress</a></li> <li>• <a href="#">Sea ice</a></li> <li>• <a href="#">Sea surface height</a></li> <li>• <a href="#">Sea surface temperature</a></li> <li>• <a href="#">Subsurface temperature</a></li> <li>• <a href="#">Surface currents</a></li> <li>• <a href="#">Subsurface currents</a></li> <li>• <a href="#">Sea surface salinity</a></li> <li>• <a href="#">Subsurface salinity</a></li> <li>• <a href="#">Ocean surface heat flux</a></li> <li>• <a href="#">Ocean bottom pressure</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Oxygen</a></li> <li>• <a href="#">Nutrients</a></li> <li>• <a href="#">Inorganic carbon</a></li> <li>• <a href="#">Transient tracers</a></li> <li>• <a href="#">Particulate matter</a></li> <li>• <a href="#">Nitrous oxide</a></li> <li>• <a href="#">Stable carbon isotopes</a></li> <li>• <a href="#">Dissolved organic carbon</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Phytoplankton biomass and diversity</a></li> <li>• <a href="#">Zooplankton biomass and diversity</a></li> <li>• <a href="#">Fish abundance and distribution</a></li> <li>• <a href="#">Marine turtle abundance and distribution</a></li> <li>• <a href="#">Seabird abundance and distribution</a></li> <li>• <a href="#">Marine mammal abundance and distribution</a></li> <li>• <a href="#">Hard coral cover and composition</a></li> <li>• <a href="#">Seagrass cover and composition</a></li> <li>• <a href="#">Macroalgal canopy cover and composition</a></li> <li>• <a href="#">Mangrove cover and composition</a></li> <li>• Microbe biomass and diversity (*emerging)</li> <li>• Invertebrate abundance and distribution (*emerging)</li> </ul>
Cross-disciplinary (including human impact)		
	<ul style="list-style-type: none"> <li>• <a href="#">Ocean colour</a></li> <li>• <a href="#">Marine debris</a> (*emerging)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Ocean sound</a></li> </ul>

# Biology and Ecosystem Essential Ocean Variables (EOVs)



**Table 1 EOVS Information (definitions of terms in glossary)**

<b>Name of EOVS</b>	Seagrass cover and composition
<b>Sub-Variables</b>	Shoot density/cover Canopy height Seagrass diversity (species) Areal extent of seagrass meadows Photosynthetic efficiency (measure)
<b>Derived products</b>	Primary and secondary production Global and regional seagrass distribution Contributions to blue carbon stocks Essential fish habitat extent Seagrass habitat fragmentation
<b>Supporting Variables</b>	Water clarity / turbidity Temperature Salinity Epiphytic algae and fouling load
<b>Complementary variables</b>	Seagrass biomass Seagrass disease prevalence Algal abundance/biomass Epifaunal abundance Fish abundance and species composition Invertebrate abundance and species composition Inorganic macronutrients (nitrate, phosphate, silicate)




## Ecosystems and Indicators


Ecosystem		Sites	Main survey items	Surveyor
Marine shore	Sandy shore	41	Vegetation, Sea turtle egg-laying	Citizen
	Rocky shore	6	Benthos	Scientist
	Tidal flat	144 (10)	Benthos, Sand grains, Shorebirds	Scientist / Citizen
	Eelgrass bed	6	Eelgrass vegetation, Benthos	Scientist
	Seaweed bed	6	Seaweed vegetation, Benthos	Scientist
	Coral reef	24	Coral coverage, Crown-of-thorns starfish, Bleaching, substratum turbidity	Scientist
	Small island	30	Vegetation, Seabirds	Scientist

Modified from N.Sakaguchi [https://www.restec.or.jp/geoss\\_ap2/pdf/0415/wg3/biodiversity/03.pdf](https://www.restec.or.jp/geoss_ap2/pdf/0415/wg3/biodiversity/03.pdf)



























Program **planning to monitor over 100 years** conducted by the Ministry of the Env. of Japan





















- Assessing the impact of global climate changes
- Early detecting the degradation of regional natural environments
- providing more concrete information to take policy for the conservation and sustainable resource use







EOV class	EOV Bio names	In Japan
Plankton 	Phytoplankton diversity	Water quality assessment?
	Phytoplankton abundance	Satellite
	Zooplankton abundance	--
	Zooplankton diversity	j-OBIS
Mobile animals 	Fish abundance	Catch
	Fish distribution	eDNA/visual census on coral
	Large animals abundance	Track /sound data?
	Large animals distribution	Track /sound data?
	Benthic Invert. Abundance	(Field Obs.)
Habitat 	Benthic Invert. Diversity	Field Obs.
	Coral cover	Field Obs.
	Coral composition	Field Obs.

	EOV Bio names	In Japan
Habitat 	Seagrass cover	Satellite /Field Obs.
	composition	Field Obs.
	Macroalgal cover	(Satellite)
	composition	/Field Obs.
Others	Mangrove cover	JAXA
	Mangrove composition	Field Obs.
	Microbe biomass	-
	Microbe Composition	- (eDNA)
	Deepsea invertebrates cover/abundance	Field Obs.
*Not in EOVs	Deepsea invertebrates diversity	Field Obs.
	Deepsea fish cover/abundance	-
	Deepsea fish diversity	eDNA



EBV class	EBV names	In Japan
Genetic composition	Genetic diversity (richness and heterozygosity)	   
	Genetic differentiation (number of genetic units and genetic distance)	   
	Effective population size	
	Inbreeding	?
Species populations	Species distributions	    
	Species abundances	     
Species traits	Morphology	  
	Physiology	Poor
	Phenology	Poor 
	Movement	
	Reproduction	

EBV class	EBV names	In Japan
Community composition	Community abundance	    
	Taxonomic/phylogenetic diversity	    
	Trait diversity	Poor
	Interaction diversity	Poor 
Ecosystem functioning	Primary productivity	   
	Ecosystem phenology	?
	Ecosystem disturbances	Varies
Ecosystem structure	Live cover fraction	?
	Ecosystem distribution	    
	Ecosystem Vertical Profile	Poor

\*Types of Ecosystems: :Coral, :Mangrove, :Saltmarsh, :Seagrass, :Algae, :Rocky shore, :Tidal flat, :Offshore & Water column

# Monitoring 1000 of Japan by MoE and other surveys at southern area



Monitor the distribution or presence of species at the same location annually for 15 years.



Seagrass

Shore birds

Tidal flat

Rocky shore

Algal bed

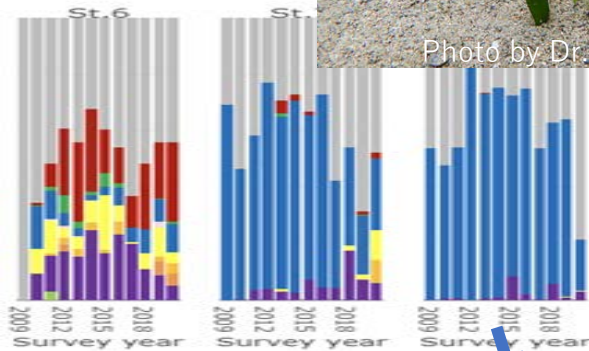
Impact of herbivore fish are very severe



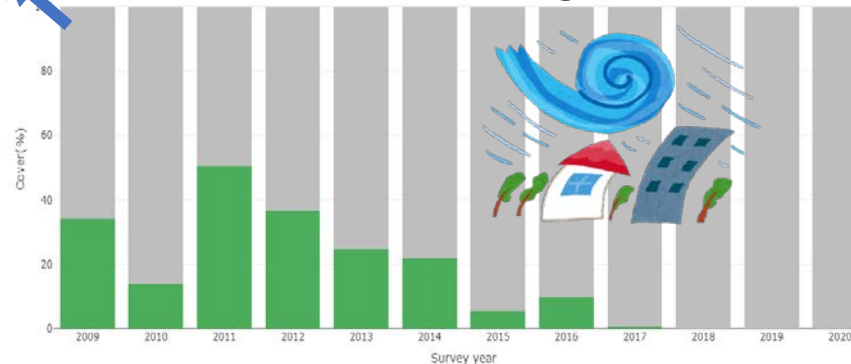
Impact of sea turtles are getting severe



- bare ground
- *Cymodocea rotundata*
- *Cymodocea serrulata*
- *Enhalus acoroides*
- *Halodule pinifolia*
- *Halodule uninervis*
- *Halophila ovalis*
- *Syringodium isoetifolium*
- *Thalassia hemprichii*
- *Zostera japonica*

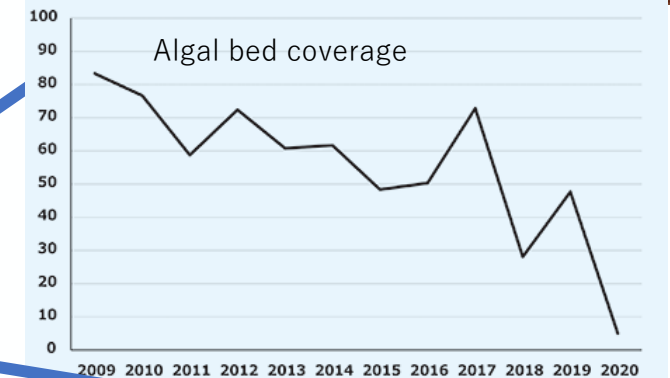


Disappearance of whole bay populations at the southern limit of eelgrass was observed.



Even corals that once increased are decreased by sea urchins

Morita et al. 2024 in press



Heatwave in 2010 caused even the global invasive mussel to decline. (Kubota 2018, 2007)



*Mytilus galloprovincialis* population

site	2006	2017
1...9	1-5	0
10...4	30-100	0
11...3	30-100	0

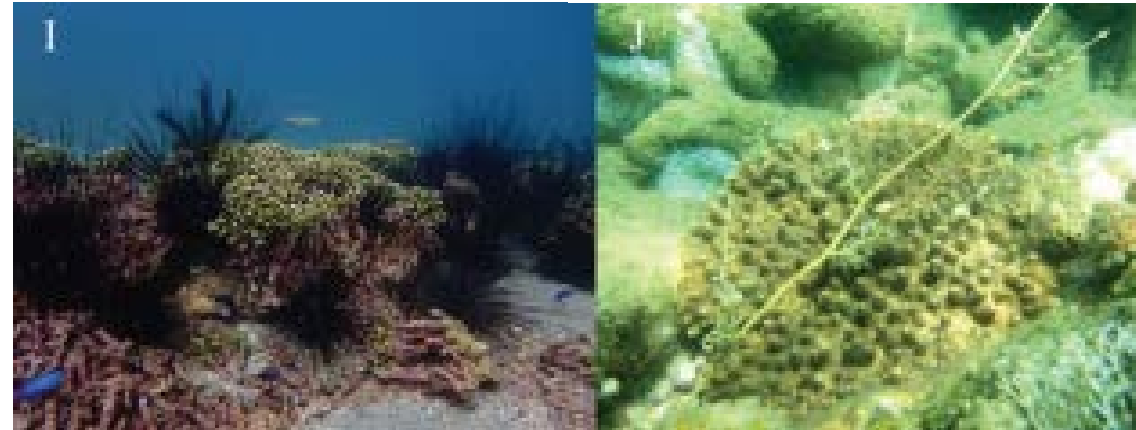




## Regime shift in the northernmost coral ecosystem over 14 years (Suruga Bay, Numazu, in Japan)

*Diadema setosum*  
feeding on *A. pruinosa*

New northward migration record of  
*Acropora japonica*



While subtropical corals are generally migrating north and expanding in temperate areas of Japan, temperate corals (*A. pruinosa*), which used to be the foundation species, have disappeared at many locations in Suruga Bay due to grazing by sea urchins *Diadema setosum*.



Slides from N.Yasuda  
Morita et al. 2024 in press

# Species Distribution Modelling

Estimated suitable distribution sites for any of the species based on environmental DNA records of the major herbivorous fish species (White-spotted parrotfish, Rabbitfish, Brassy chub, Largescale blackfish, Japanese black porgy, Black scraper, Thread-sail filefish) from 2019 to 2022.

Cooperation: ANEMONE Database  
Kondo Laboratory, Tohoku University

Current Climate

2100 CMIP5 RCP8.5 MIROC

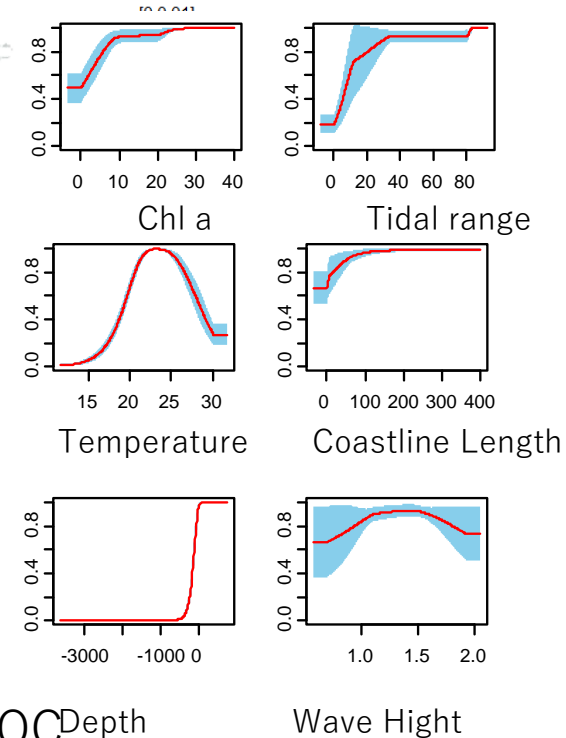
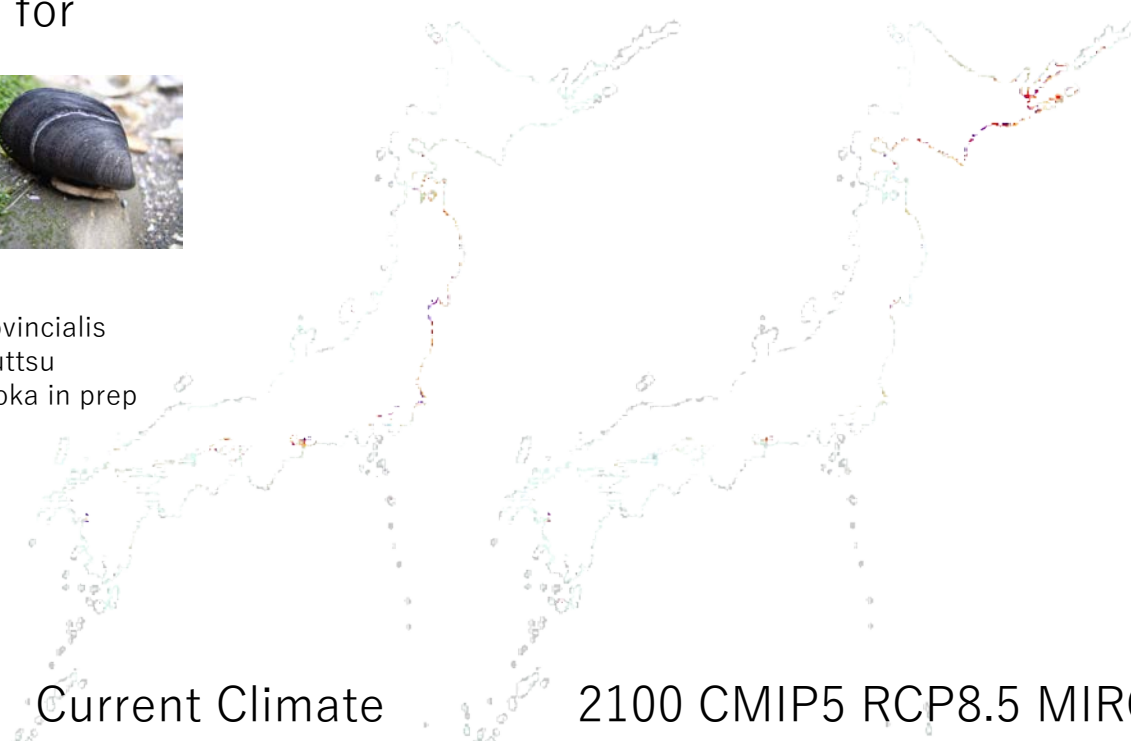


Estimated suitable distribution sites for the exotic Mediterranean mussel.

2 0 0 4      2 0 0 6



Decrease of  
*Mytilus galloprovincialis*  
at Tokyo Bay Futtsu  
Yamakita Nakaoka in prep



■ *Mytilus*+Seagrass; ■ *Mytilus*; *Z. Marina*+*Z. Japonica*;  
■ *Z. marina*; ■ *Z. japonica*; ■ Bare sand  
□ No observation

# Headline indicators

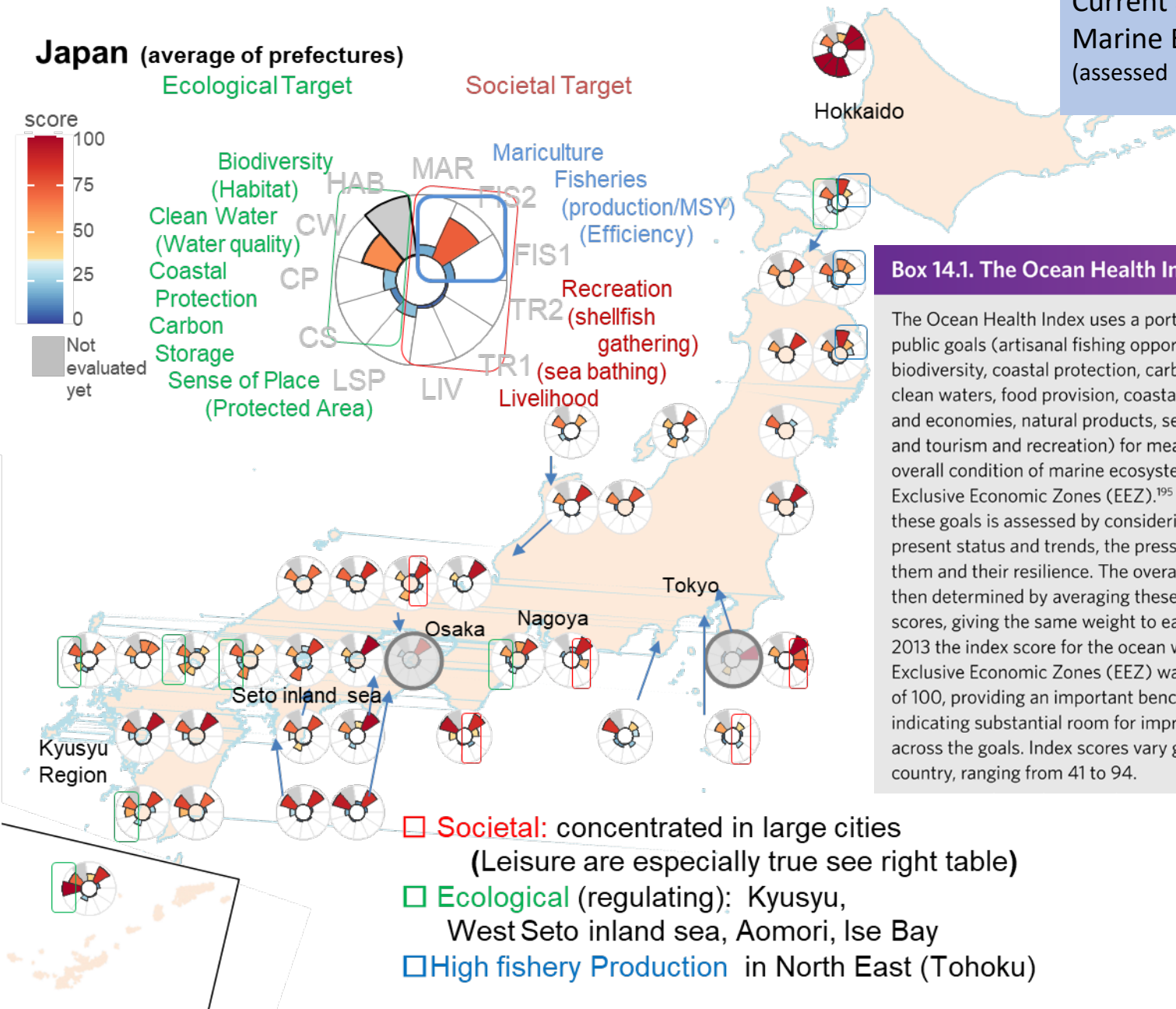
Indicator name	Availability In JP Marne
A.1 Red List of Ecosystems*	Need criteria
A.2 Extent of natural ecosystems*	Yes but some are old
A.3 Red List Index	Can be but Imperfect red list
A.4 The proportion of populations within species with an effective population size > 500*	Limited info shorebird can
B.1 Services provided by ecosystems*	Partly yes
C.1 Indicator on monetary benefits received*	Only WTP
C.2 Indicator on non-monetary benefits*	Partly yes
<b>D.1 International public funding, including official development assistance (ODA) for conservation and sustainable use of biodiversity and ecosystems</b>	Need to identify
<b>D.2 Domestic public funding on conservation and sustainable use of biodiversity and ecosystems*</b>	?How to identify
<b>D.3 Private funding (domestic and international) on conservation and sustainable use of biodiversity and ecosystems*</b>	?How to collect?.
A.1	
A.2	
<b>1.1 Percent of land and seas covered by biodiversity-inclusive spatial plans*</b>	Need data
<b>2.2 Area under restoration*</b>	Need data
3.1 Coverage of protected areas and OECMS	Available

A.3	
A.4	Estimate needed
5.1 Proportion of fish stocks within biologically sustainable levels	Estimation needed
6.1 Rate of invasive alien species establishment*	Data needed
7.1 Index of coastal eutrophication potential	Available
<b>7.2 Pesticide environment concentration*</b>	No information
8.In devel.*	In devel.
<b>9.1 Benefits from the sustainable use of wild species*</b>	OHI?/WTP?
<b>9.2 Percentage of the population in traditional employment*</b>	Fishery stat?
10.1 Proportion of agricultural area under productive and sustainable agriculture	-
10.2 Progress towards sustainable forest management	-
11.1 Services provided by ecosystems*	OHI?WTP?
<b>12.1 Average share of the built-up area of cities that is green/blue space for public use for all</b>	Need to collect data
C.1 Indicator on monetary benefits received*	OHI/WTP.
<b>C.2 Indicator on non-monetary benefits*</b>	OHI/WTP
13. In devel.*	In devel.

14. In devel.*	In devel.
<b>15.1 Number of companies reporting on disclosures of risks, dependencies and impacts on biodiversity*</b>	Expect it In devel.
16. In devel.*	In devel.
17. In devel.*	In devel.
<b>18.1 Positive incentives in place to promote biodiversity conservation and sustainable use</b>	Need to collect info
<b>18.2 Value of subsidies and other incentives harmful to biodiversity, that have been eliminated, phased out or reformed*</b>	Need to collect info
19.D.1	
<b>D.2</b>	
<b>D.3</b>	
20. In devel.*	
21.1 Indicator on biodiversity information for monitoring the global biodiversity framework*	In general yes
22. In devel.*	
23. In devel.*	



# Current and Near-Future Status of Marine Ecosystem Services by OHI (Halpern et al. 2012) (assessed using modified Ocean Health Index for Coastal area)



## Box 14.1. The Ocean Health Index

The Ocean Health Index uses a portfolio of ten public goals (artisanal fishing opportunities, biodiversity, coastal protection, carbon storage, clean waters, food provision, coastal livelihoods and economies, natural products, sense of place and tourism and recreation) for measuring the overall condition of marine ecosystems within Exclusive Economic Zones (EEZ).<sup>195</sup> Each of these goals is assessed by considering their present status and trends, the pressures on them and their resilience. The overall index is then determined by averaging these different scores, giving the same weight to each. In 2013 the index score for the ocean within Exclusive Economic Zones (EEZ) was 65 out of 100, providing an important benchmark and indicating substantial room for improvement across the goals. Index scores vary greatly by country, ranging from 41 to 94.

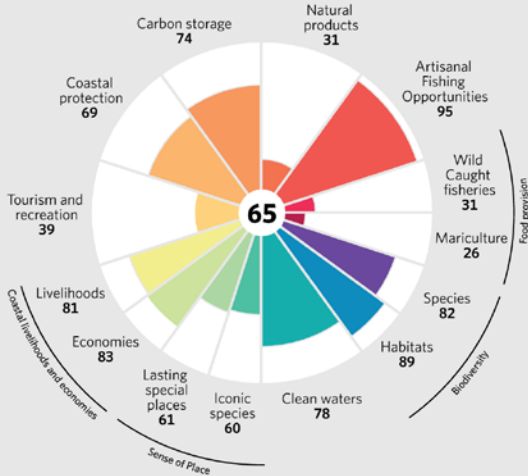


Figure 14.1. The Ocean Health Index score (inner circle) and individual goal scores (coloured petals) for global area-weighted average of all countries.<sup>196</sup>



<https://bit.ly/3wpOSp6>



1



2



3



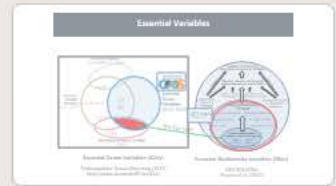
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5



6



7



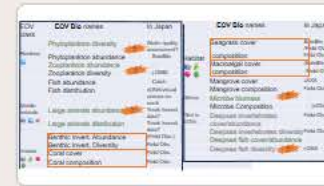
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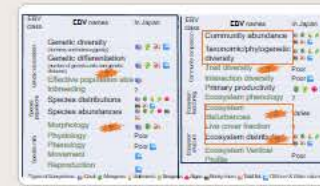
9



10



11



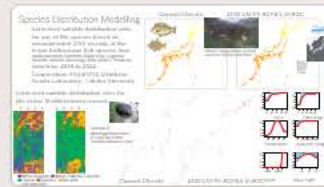
12



13



14



15



16



17



18





# The Kunming-Montreal Global Biodiversity Framework

## Goal A

Ecosystems maintained, enhanced, or restored, extinctions are halted, extinction rate reduced tenfold and genetic diversity is maintained

## Goal B

Biodiversity is sustainably used and its contributions to people are maintained, enhanced or restored

## Goal C

Benefits from the use of genetic resources are shared and sustainably increased

## Goal D

The biodiversity funding gap of 700 billion USD is closed by ensuring adequate means of implementation are available.

<https://unfccc.int/sites/default/files/resource/CBD%20GGA6%20Monitoring%20and%20reporting%20under%20the%20Kunming-Montreal%20%E2%80%8BGBF%202023.06.04.pdf>



# The Kunming-Montreal Global Biodiversity Framework



## I. Reducing threats to biodiversity

1. Spatial planning and effective management  
2. Ecosystems & restoration 
3. Protected areas & OECMs  
4. Threatened species 
5. Sustainable use 
6. Invasive alien species 
7. Pollution 
8. Climate change 

## II. Meeting people's needs through sustainable use & benefit-sharing

9. Wild species 
10. Agriculture, aquaculture, fisheries and forestry 
11. Nature's contributions to people  
12. Urban areas 
13. Access and benefit-sharing  

## III. Tools and solutions for implementation and mainstreaming

14. Sectoral planning  
15. Private sector 
16. Sustainable consumption  
17. Biosafety  
18. Negative incentives  
19. Financial resources  
20. Capacity-building and development  
21. Data & knowledge  
22. Participation  
23. Gender equality  

<https://unfccc.int/sites/default/files/resource/CBD%20GGA6%20Monitoring%20and%20reporting%20under%20the%20Kunming-Montreal%20%E2%80%8BGBF%202023.06.04.pdf>

# monitoring framework

- Adopted in decision 15/5 and composed of:
  - i. Headline indicators
  - ii. Binary (yes/no) responses in national reports
  - iii. Component indicators
  - iv. Complementary indicators
- Parties will use the headline indicators in their national reports, supported by the others.

<https://unfccc.int/sites/default/files/resource/CBD%20GGA6%20Monitoring%20and%20reporting%20under%20the%20Kunming-Montreal%E2%80%8BGBF%202023.06.04.pdf>



# Headline indicators

Indicator name	Availability
A.1 Red List of Ecosystems*	Available
A.2 Extent of natural ecosystems*	In devel.
A.3 Red List Index	Available
A.4 The proportion of populations within species with an effective population size > 500*	Available
B.1 Services provided by ecosystems*	In devel.
C.1 Indicator on monetary benefits received*	In devel.
C.2 Indicator on non-monetary benefits*	In devel.
D.1 International public funding, including official development assistance (ODA) for conservation and sustainable use of biodiversity and ecosystems	Available
D.2 Domestic public funding on conservation and sustainable use of biodiversity and ecosystems*	In devel.
D.3 Private funding (domestic and international) on conservation and sustainable use of biodiversity and ecosystems*	In devel.
1. A.1 Red List of Ecosystems*	Available
1. A.2 Extent of natural ecosystems*	In devel.
1.1 Percent of land and seas covered by biodiversity-inclusive spatial plans*	In devel.
2.2 Area under restoration*	In devel.
3.1 Coverage of protected areas and OECMS	Available

A.3 Red List index	Available
A.4 The proportion of populations within species with a genetically effective population size > 500*	In devel.
5.1 Proportion of fish stocks within biologically sustainable levels	Available
6.1 Rate of invasive alien species establishment*	Data pending
7.1 Index of coastal eutrophication potential	Available
7.2 Pesticide environment concentration*	In devel.
8.In devel.*	In devel.
9.1 Benefits from the sustainable use of wild species*	In devel.
9.2 Percentage of the population in traditional employment*	Data pending
10.1 Proportion of agricultural area under productive and sustainable agriculture	Available
10.2 Progress towards sustainable forest management	Available
11.1 Services provided by ecosystems*	In devel.
12.1 Average share of the built-up area of cities that is green/blue space for public use for all	Available
C.1 Indicator on monetary benefits received*	In devel.
C.2 Indicator on non-monetary benefits*	In devel.
13. In devel.*	In devel.

C.1 Indicator on monetary benefits received*	In devel.
C.2 Indicator on non-monetary benefits*	In devel.
14. In devel.*	In devel.
15.1 Number of companies reporting on disclosures of risks, dependencies and impacts on biodiversity*	In devel.
16. In devel.*	In devel.
17. In devel.*	In devel.
18.1 Positive incentives in place to promote biodiversity conservation and sustainable use	Available
18.2 Value of subsidies and other incentives harmful to biodiversity, that have been eliminated, phased out or reformed*	Data pending
19.D.1 International public funding, including official development assistance (ODA) for conservation and sustainable use of biodiversity and ecosystems	Available
D.2 Domestic public funding on conservation and sustainable use of biodiversity and ecosystems*	In devel.
D.3 Private funding (domestic and international) on conservation and sustainable use of biodiversity and ecosystems*	In devel.
20. In devel.*	In devel.
21.1 Indicator on biodiversity information for monitoring the global biodiversity framework*	In devel.
22. In devel.*	In devel.
23. In devel.*	In devel.

# Component indicators

Goal A	Ecosystem Intactness Index	Target 1	Priority retention of intact / wilderness areas
Goal A	Ecosystem Integrity Index	Target 2	Extent of natural ecosystems by type
Goal A	Species habitat Index	Target 2	Maintenance and restoration of connectivity of natural ecosystems
Goal A	Biodiversity Habitat Index	Target 3	Protected area coverage of key biodiversity areas
Goal A	Protected Connected (Protconn) index	Target 3	Protected Area Management Effectiveness (PAME)
Goal A	Protected Area Connectedness Index (PARC-Connectedness)	Target 3	Protconn
Goal A	Evolutionarily Distinct and Globally Endangered (EDGE)	Target 3	Protected Area Connectedness Index (PARC-Connectedness)
Goal A	Living Planet Index	Target 3	Red List of Ecosystems
Goal A	Change in the extent of water-related ecosystems over time	Target 3	Connectivity Indicator (in development)
Goal B	Red List Index (for utilized species)	Target 3	The number of protected areas that have completed a site-level assessment of governance and equity (SAGE)
Goal B	Living Planet Index (for used species)	Target 3	Species Protection Index
Goal C	None adopted	Target 4	Living Planet Index
Goal D	None adopted	Target 4	Number of plant and animal genetic resources secured in medium or long-term conservation facilities
		Target 4	Trends in effective and sustainable management of human-wildlife conflict and coexistence

Target 4	Green Status of Species Index
Target 4	Conservation status of species listed in the CITES Appendices has stabilized or improved
Target 5	Red List Index for used species
Target 5	Living Planet Index for used species
Target 5	Sustainable use of Wild Species
Target 6	Rate of invasive species impact and rate of impact
Target 6	Rate of invasive alien species spread
Target 6	Number of invasive alien species introduction events
Target 7	Fertilizer use
Target 7	Proportion of domestic and industrial wastewater flow safely treated
Target 7	Floating plastic debris density [by micro and macro plastics]
Target 7	Red List Index (impact of pollution)

Target 8	Total climate regulation services provided by ecosystems by ecosystem type (System of Environmental Economic Accounts)
Target 8	Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030 which include biodiversity
Target 8	National greenhouse inventories from land use and land use change
Target 8	Bioclimatic Ecosystem Resilience Index (BERI)

Target 9	Number of people using wild resources for energy, food or culture (including firewood collection, hunting and fishing, gathering, medicinal use, craft making, etc.)
Target 9	Red List Index (species used for food and medicine)
Target 9	Living Planet Index (for used species)
Target 10	Area of forest under sustainable management: total forest management certification by Forest Stewardship Council and Programme for the Endorsement of Forest Certification
Target 10	Average income of small-scale food producers, by sex and indigenous status
Target 11	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Target 11	Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)
Target 11	Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities
Target 11	Proportion of bodies of water with good ambient water quality
Target 11	Level of water stress
Target 12	Recreation and cultural ecosystem services provided

Target 13	Number of permits or their equivalents for genetic resources (including those related to traditional knowledge) by type of permit
Target 14	Number of countries with Implementation of the System of Environmental Economic Accounting
Target 15	Indicator based on Task Force for Nature-related Financial Disclosures
Target 16	Food waste index
Target 16	Material footprint per capita
Target 16	Global environmental impacts of consumption
Target 16	Ecological footprint
Target 17	None adopted
Target 18	Value of subsidies and other incentives harmful to biodiversity, that are redirected, repurposed or eliminated

Target 19	None adopted
Target 20	None adopted
Target 21	Species status index
Target 21	Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in: (a) national education policies, (b) curricula, (c) teacher education and (d) student assessments
Target 22	Proportion of total adult population with secure tenure rights to land, (a) with legally recognized documentation, and (b) who perceive their rights to land as secure, by sex and type of tenure
Target 23	Proportion of seats held by women in (a) national parliaments and (b) local governments
Target 23	Indicator on national implementation of the gender plan of action
Target 23	Proportion of total adult population with secure tenure rights to land, (a) with legally recognized documentation, and (b) who perceive their rights to land as secure, by sex and type of tenure

# Complementary indicators

Goal A& Target1 Only

Goal A	Forest area as a proportion of total land area	Goal A	Wetland Extent Trends Index	Goal A	Changes in plankton biomass and abundance	Target 1	Number of countries using natural capital accounts in planning processes
Goal A	Forest distribution	Goal A	Change in the extent of inland water ecosystems over time	Goal A	Fish abundance and biomass	Target 1	Percentage of spatial plans utilizing information on key biodiversity areas
Goal A	Tree cover loss	Goal A	Forest Fragmentation Index	Goal A	Genetic scorecard for wild species		Habitat patches located within marine protected areas or integrated coastal zone management (ICZM)
Goal A	Grassland and savannah extent	Goal A	Forest Landscape Integrity Index	Goal A	Species richness/Changes in local terrestrial diversity (PREDICTS)	Target 1	Other spatial management plans (not captured as ICZM or marine spatial planning in 14.2.1)
Goal A	Mountain Green Cover Index	Goal A	Biomass of selected natural ecosystems	Goal A	Marine species richness	Target 1	Number of countries using ocean accounts in planning processes
Goal A	Peatland extent and condition	Goal A	Biodiversity Habitat Index	Goal A	Comprehensiveness of conservation of socioeconomically as well as culturally valuable species.	Target 1	Proportion of transboundary basin area with an operational arrangement for water cooperation
Goal A	Permafrost thickness, depth and extent	Goal A	Global Vegetation Health Products	Goal A	Number of plant and animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities	Target 1	Percent of total land area that is under cultivation
Goal A	Continuous Global Mangrove Forest Cover	Goal A	Bioclimatic Ecosystem Resilience Index (BERI)	Goal A	Proportion of local breeds classified as being at risk extinction	Target 1	Extent of natural ecosystems by type
Goal A	Trends in mangrove forest fragmentation	Goal A	Relative Magnitude of Fragmentation (RMF)	Goal A	Red List Index (wild relatives of domesticated animals)		Number of countries implementing national legislation, policies or other measures regarding FPIC related to conservation would work here for IPs (not necessarily LCs), if spatial planning was substituted for conservation.
Goal A	Trends in mangrove extent	Goal A	Ecosystem Intactness Index	Goal A	CMS Connectivity Indicator	Target 1	Ecosystem Integrity Index
Goal A	Live coral cover	Goal A	Biodiversity Intactness Index	Goal A	Species Status Index		
Goal A	Hard coral cover and composition	<b>Goal A</b>	<b>Ocean Health Index</b>	Goal A	Intact Wilderness		
Goal A	<b>Global coral reef extent</b>		Extent of physical damage indicator to predominant seafloor habitats physical damage	Goal A	Expected Loss of Phylogenetic diversity		
Goal A	<b>Global Seagrass Extent (Seagrass Cover and composition)</b>	Goal A	River Fragmentation Index	Goal A	Proportion of populations maintained within species		
Goal A	Global saltmarsh extent	Goal A	Percentage of threatened species that are improving in status according to the Red List	Goal A	Free flowing rivers		
Goal A	<b>Macroalgal Canopy Cover and Composition</b>	Goal A	Number of threatened species by species group				
Goal A	Cover of key benthic groups	Goal A	Wild bird index				
Goal A	Fleshy algae cover	Goal A	Mean Species Abundance (MSA)				
		Goal A	Species Protection Index				



## 2050年ゴール

### A

- ・生態系の健全性、連結性、レジリエンスの維持・強化・回復。自然生態系の面積増加
- ・人による絶滅の阻止、絶滅率とリスクの削減。在来野生種の個体数の増加
- ・遺伝的多様性の維持、適応能力の保護

### B

生物多様性が持続可能に利用され、自然の寄与（NCP）が評価・維持・強化

### C

遺伝資源、デジタル配列情報（DSI）、遺伝資源に関連する伝統的知識の利用による利益の公正かつ衡平な配分と2050年までの大幅な増加により、生物多様性保全と持続可能な利用に貢献

### D

年間7,000億ドルの生物多様性の資金ギャップを徐々に縮小し、枠組実施のための十分な実施手段を確保

### (1) 生物多様性への脅威の縮小

- 1: 空間計画
- 2: 自然再生
- 3: 30by30
- 4: 種・遺伝子の保全
- 5: 生物採取
- 6: 外来種対策
- 7: 汚染
- 8: 気候変動

### (2) 人々の需要が満たされる

- 9: 野生種の利用
- 10: 農林漁業
- 11: 自然の調整機能
- 12: 緑地親水空間
- 13: 遺伝資源へのアクセスと利益配分（ABS）

### (3) 実施・主流化のツールと解決策

- 14: 生物多様性の主流化
- 15: ビジネス
- 16: 持続可能な消費
- 17: バイオセーフティー
- 18: 有害補助金
- 19: 資金
- 20: 能力構築、技術移転
- 21: 知識へのアクセス
- 22: 先住民、女性及び若者
- 23: ジェンダー

（出典）環境省 令和4年度 第2回「OECM の設定 管理の推進に関する検討会」 第3回「30by30 に係る経済的インセンティブ等検討会」 資料より SOMPO インスティテュート・プラス一部加工

<https://www.sompo-ri.co.jp/2023/03/31/7554/>



# ヘッドライン指数

Goad/Target	Name
Goal A	A.1 生態系*のレッドリスト
Goal A	A.2 自然生態系*の広がり
Goal A	A.3 レッドリスト指数
Goal A	A.4 有効集団サイズが500を超える種内の個体群の割合*。
Goal B	B.1 生態系が提供するサービス
Goal C	C.1 受領した金銭的利益*に関する指標
Goal C	C.2 非金銭的利益*に関する指標
Goal D	D.1 生物多様性および生態系の保全と持続可能な利用に関する政府開発援助（ODA）を含む国際的な公的資金供与
Goal D	D.2 生物多様性および生態系の保全と持続可能な利用に関する国内の公的資金*。
Goal D	D.3 生物多様性および生態系の保全と持続可能な利用に関する民間資金（国内および国際的なもの）*
Target 1	A.1 生態系*のレッドリスト
Target 1	A.2 自然生態系*の広がり
Target 1	1.1 生物多様性保全のための空間計画に含まれる陸域および海域の割合* 2.2 再生中の面積* 3.1 生物多様性保全のための空間計画に含まれる陸域および海域の割合*
Target 2	2.2 再生中の面積
Target 3	3.1 保護地域とOECMSの面積割合

Target 4	A.3 レッドリスト指標
Target 4	A.4 有効集団サイズが500を超える種内の個体群の割合*。
Target 5	5.1 生物学的に持続可能な水準にある魚類資源の割合
Target 6	6.1 侵略的外来種の定着率*。
Target 7	7.1 沿岸の富栄養化ポテンシャルの指標
Target 7	7.2 農業環境濃度
Target 8	開発中
Target 9	9.1 野生種の持続可能な利用による利益*。
Target 9	9.2 伝統的な職業に従事する人口の割合*。
Target 10	10.1 生産かつ持続可能な農業が行われている農地面積の割合
Target 10	10.2 持続可能な森林管理への進展
Target 11	11.1 生態系が提供するサービス
Target 12	12.1 すべての人が利用できる緑地・親水地がある都市の建築面積の平均割り当て
Target 13	C.1 受領した金銭的利益*に関する指標

Target 13	C.2 非金銭的利益*に関する指標
Target 14	開発中
Target 15	15.1 リスク、依存、および生物多様性への影響の開示について報告している企業の数*。
Target 16	開発中
Target 17	開発中
Target 18	18.1 生物多様性の保全と持続可能な利用を促進するための積極的なインセンティブ
Target 18	18.2 生物多様性に有害な補助金およびその他の奨励策で、廃止、段階的廃止、または改革されたものの金額*。
Target 19	D.1 生物多様性および生態系の保全と持続可能な利用に関する政府開発援助（ODA）を含む国際的な公的資金供与
Target 19	D.2 生物多様性および生態系の保全と持続可能な利用に関する国内の公的資金*。
Target 19	D.3 生物多様性および生態系の保全と持続可能な利用に関する民間資金（国内および国際的なもの）*
Target 20	開発中
Target 21	21.1 生物多様性枠組のモニタリングのための生物多様性情報指標
Target 22	開発中
Target 23	開発中

# 構成指数

・・・具体的な生態系の定量データによる評価結果が多い？

Goal A	生態系保全指数	Target 3	連結性指標（開発中）	Target 8	土地利用および土地利用の変化による温室効果ガスの国家インベントリ	Target 15	自然関連財務情報開示タスクフォースに基づく指標
Goal A	生態系の完全性指数		サイトレベルでのガバナンスと衡平性の評価（SAGE）を完了した保護地域の数	Target 8	生物気候生態系レジリエンス指数（BERI）	Target 16	食品廃棄物指数
Goal A	種の生息地指数	Target 3	種の保護指数		エネルギー、食料、文化のために野生資源を利用している人の数（薪集め、狩猟、漁業、採集、薬用利用、工芸品製作などを含む）	Target 16	一人当たりのマテリアルフットプリント
Goal A	生物多様性生息地指数	Target 3	種の保護指数	Target 9	レッドリスト指数（食用や薬として利用される種）	Target 16	消費による地球環境への影響
Goal A	保護地域連結度指数（PARC-Connectedness）	Target 4	生きている地球指標	Target 9	リビングブラネット指数（利用されている種）	Target 16	エコロジカルフットプリント
Goal A	保護地域連結度指数（PARC-Connectedness）	Target 4	中長期的な保全施設に確保された動植物の遺伝資源の数	Target 9	リビングブラネット指数（利用されている種）	Target 17	採用なし
Goal A	進化的に区別され、世界的に絶滅危惧（EDGE）指数	Target 4	人間と野生生物の紛争と共存の効果的かつ持続可能な管理の傾向	Target 9	持続可能な管理が行われている森林の面積：森林管理協議会（FSC）および森林認証プログラム（Programme for the Endorsement of Forest Certification）による森林管理認証の総面積	Target 18	生物多様性に有害な補助金およびその他の優遇措置のうち、方向転換、再利用または廃止されたものの価値
Goal A	生きている惑星指数	Target 4	種のグリーン・ステータス指数	Target 10	小規模食料生産者の平均収入（男女別、先住民の地位別）	Target 19	採用なし
Goal A	水関連生態系の面積の経年変化	Target 4	ワシントン条約付属書に記載されている種の保全状態が安定または改善した使用種のレッドリスト指数	Target 10	人口10万人当たりの災害による死者数、行方不明者数、直接被災者数	Target 20	採用なし
Goal B	レッドリスト指数（利用種）	Target 5	使用種のレッドリスト指数	Target 11	安全でない水、安全でない衛生設備、衛生不足に起因する死亡率（安全でない「万人のための水と衛生（WASH）」サービスへの曝露）	Target 21	生物多様性指標
Goal B	リビングブラネット指数（利用種）	Target 5	使用種のリビングブラネット指数	Target 11	都市における微小粒子状物質（PM2.5やPM10など）の年間平均レベル		(a)国の教育政策、(b)教育課程、(c)教員教育、(d)生徒の評価において、(i)地球市民教育、(ii)ジェンダー平等と人権を含む持続可能な開発のための教育が、あらゆるレベルで主流となっている度合い
Goal C	採用なし	Target 6	野生種の持続可能な利用	Target 11	環境状態が良好な水域の割合	Target 22	土地に対する確実な所有権を有し、(a)法的に認められた文書があり、(b)土地に対する権利が確実であると認識している成人人口の割合（男女別、所有権の種類別）
Goal D	採用なし	Target 6	侵略的外来種の影響率と影響率	Target 11	水ストレスのレベル	Target 23	(a)国会および(b)地方自治体における女性の議席比率
Target 1	原生地域の優先的保持	Target 6	侵略的外来種の拡散率	Target 12	レクリエーションおよび文化的生態系サービスの提供	Target 23	ジェンダー行動計画の国内実施に関する指標
Target 2	自然生態系の種類の面積	Target 6	侵略的外来種の拡散率	Target 13	遺伝資源（伝統的知識に関するものを含む）に関する許可またはそれに相当するものの種類別件数	Target 23	(a)法的に認められた文書があり、(b)土地に対する権利が確実であると認識している、土地に対する確実な保有権を有する成人人口の割合（男女別、保有権の種類別）
Target 2	自然生態系の連結性の維持・回復	Target 7	肥料の使用	Target 14	環境経済会計システムの実施国数		
Target 3	主要な生物多様性地域の保護地域カバー率	Target 7	安全に処理された生活排水および産業排水の割合				
Target 3	保護地域管理の有効性（PAME）	Target 7	浮遊プラスチック破片密度（マイクロ・マクロプラスチック別）				
Target 3	保護地域	Target 7	レッドリスト指数（汚染の影響）				
Target 3	保護地域の連結性指標（PARC-Connectedness）	Target 8	生態系が提供する気候調節サービスの生態系タイプ別合計（環境経済計算システム）				
Target 3	生態系のレッドリスト	Target 8	生物多様性を含む仙台防災枠組2015-2030に沿った国家防災戦略を採択し、実施する国の数				

# 補完的指数の例（GoalAのみ）

・・・生データの積算に近いものや特定の指数？

Goal A	総面積に占める森林面積の割合	Goal A	森林断片化指数	Goal A	プランクトンの生物量と存在量の変化
Goal A	森林の分布	Goal A	森林景観完全性指標	Goal A	魚類の資源量とバイオマス
Goal A	樹木被覆の損失	Goal A	特定の自然生態系のバイオマス	Goal A	野生種の遺伝子スコアカード
Goal A	草地とサバンナの広がり	Goal A	生物多様性生息地指数	Goal A	種の豊かさ／地域の陸上多様性の変化（PREDICTS）
Goal A	山岳緑被指数	Goal A	世界植生健全性製品	Goal A	海洋種の豊かさ
Goal A	泥炭地の広がり状態	Goal A	生物気候生態系回復力指数（BERI）	Goal A	社会経済的および文化的に価値のある種の保全の包括性。
Goal A	永久凍土の厚さ、深さ、範囲	Goal A	断片化の相対的大きさ（RMF）	Goal A	食料と農業のための動植物の遺伝資源が、中長期的な保全施設に確保されている数
Goal A	連続的な世界のマングローブ林被覆	Goal A	生態系保全指数	Goal A	絶滅危惧種に分類される地域品種の割合
Goal A	マングローブ林の断片化の傾向	Goal A	生物多様性保全指数	Goal A	レッドリスト指標（家畜化された動物の野生近縁種）
Goal A	マングローブ林の面積の推移	Goal A	海洋の健全性指標	Goal A	CMS連結性指標
Goal A	生きたサンゴの被度	Goal A	主な海底生息地に対する物理的損傷指標 物理的損傷の程度	Goal A	種のステータス指標
Goal A	硬質サンゴの被度と組成	Goal A	河川断片化指数	Goal A	手つかずの原生地域
Goal A	世界のサンゴ礁面積	Goal A	樹枝状連結性指標	Goal A	予想される系統多様性の損失
Goal A	世界の海草の広がり（海草の被度と組成）	Goal A	レッドリストに従って状態が改善している絶滅危惧種の割合	Goal A	種内で維持されている個体群の割合
Goal A	世界の塩性湿地面積	Goal A	種群別の絶滅危惧種数	Goal A	自由に流れる河川
Goal A	ケルプキャノピーの広がり	Goal A	野鳥指数		
Goal A	大型藻類の被度と組成	Goal A	平均種数（MSA）		
Goal A	主要底生生物群の被度	Goal A	種の保護指数		
Goal A	肉質藻類の被度				
Goal A	湿地の広がり傾向指数				
Goal A	内水生態系の面積の経年変化				