

From data to EBVs: Preliminary  
assessment of data gaps and mismatches  
of EBVs from an AP  
perspective.

**From Marine and Coast observation  
perspectives**

Take Yamakita (JAMSTEC)

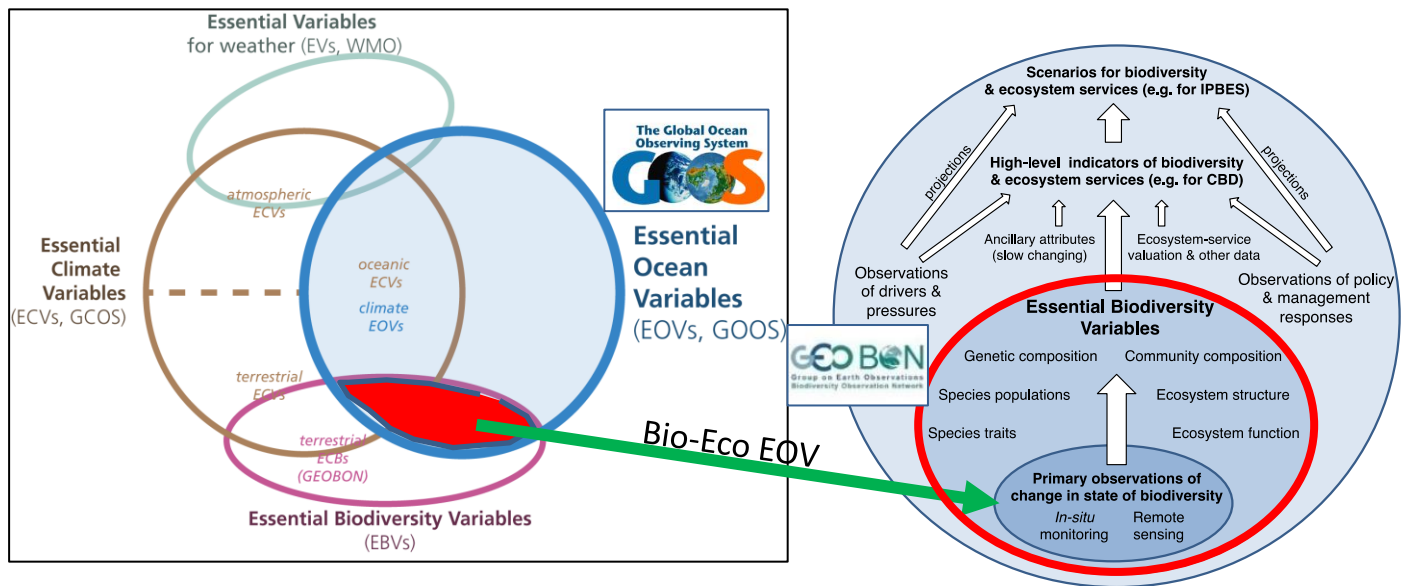
# Marine Biodiversity Observing Network



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>

[https://goosocean.org/index.php?option=com\\_content&view=article&id=14&Itemid=114](https://goosocean.org/index.php?option=com_content&view=article&id=14&Itemid=114)

## Essential Variables



## Essential Ocean Variables (EOVs)

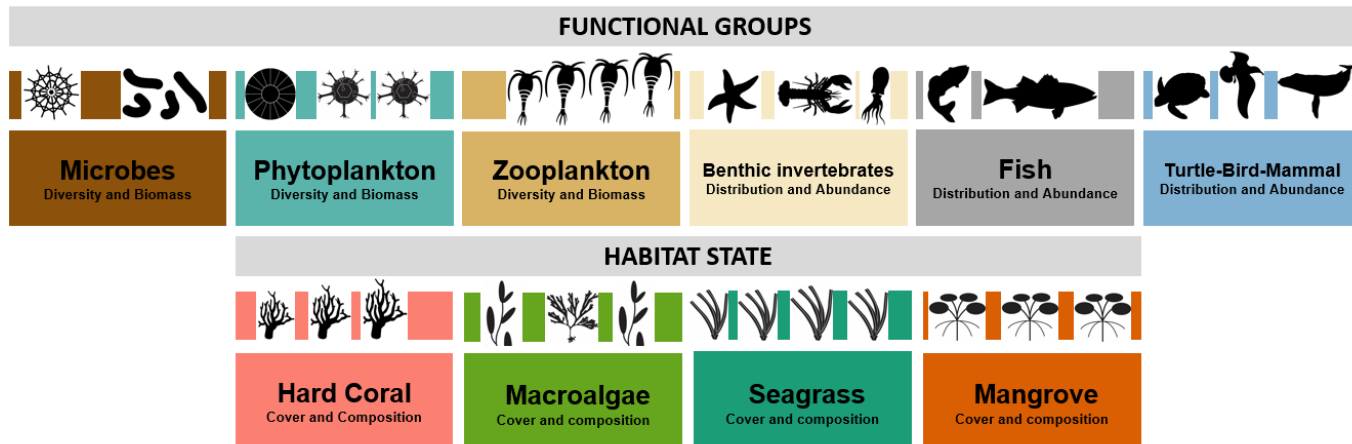
Framework for Ocean Observing (2012)  
<http://www.oceanobs09.net/foo/>









## Essential Biodiversity Variables (EBVs)





GEO BON EBVs  
Pereira et al. (2013)



## Biology and Ecosystem Essential Ocean Variables (EOVs)



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.)
	Benthic Invert. Diversity	Field Obs.
Habitat    	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.
*Not in EOVs	Microbe biomass	-
	Microbe Composition	- (eDNA)
	Deepsea invertebrates cover/abundance	Field Obs.
	Deepsea invertebrates diversity	Field Obs.
	Deepsea fish cover/abundance	-
	Deepsea fish diversity	eDNA

# Variation over 15 years of monitoring site 1000 eelgrass bed survey:

loss of southern limit, earthquake, typhoon impact, decline in shallow water

\*Takehisa YAMAKITA(JAMSTEC, U-Tokyo), Masakazu HORI(FRA), Yoshiyuki TANAKA(Hachinohe Inst.Tech.), Jun HAYAKAWA(U-Tokyo), Ryoko UENO(WIJ), Misuzu AOKI(WIJ), Masahiro NAKAOKA(Hokkaido Univ.)



## summary

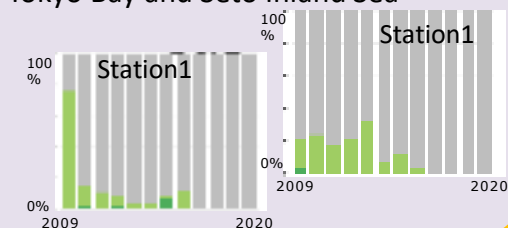
Monitoring of species-specific cover at 6-13 sites in each study area

Trend analysis based on correlation with year and periluminally study using correlation with environmental factors.

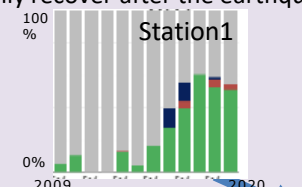
Decreasing trend in shallow southern areas during 15 years, An increasing trend was obtained in the recent 5 years.

Correlation with factors showed that sunshine, precipitation, and water quality were negative, while temperature was positive. In reality, instantaneous changes due to events such as typhoons are significant.

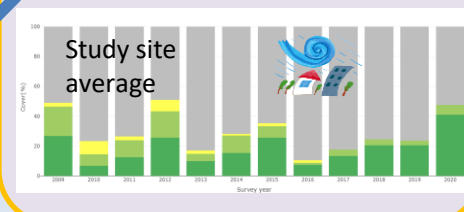
Decreasing in shallow water in Tokyo Bay and Seto Inland Sea



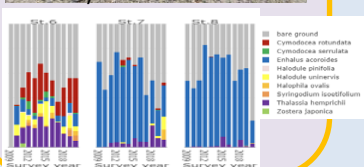
Partially recover after the earthquake



Despite typhoon's northward up slight increase in some locations



Increase Sea Turtle Impacts

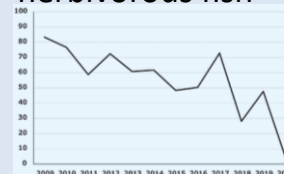


( Ref: Seaweed )

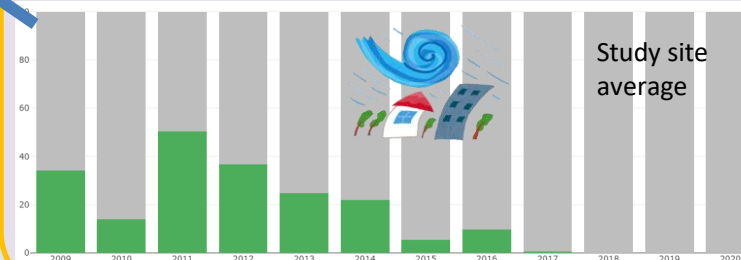
Very much influenced by herbivorous fish
















































Seaweed cover (from Moni 1000 seaweed bed report)






At the southern limit of eelgrass, the entire bay population disappears (typhoons, erosion, water temperature)











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



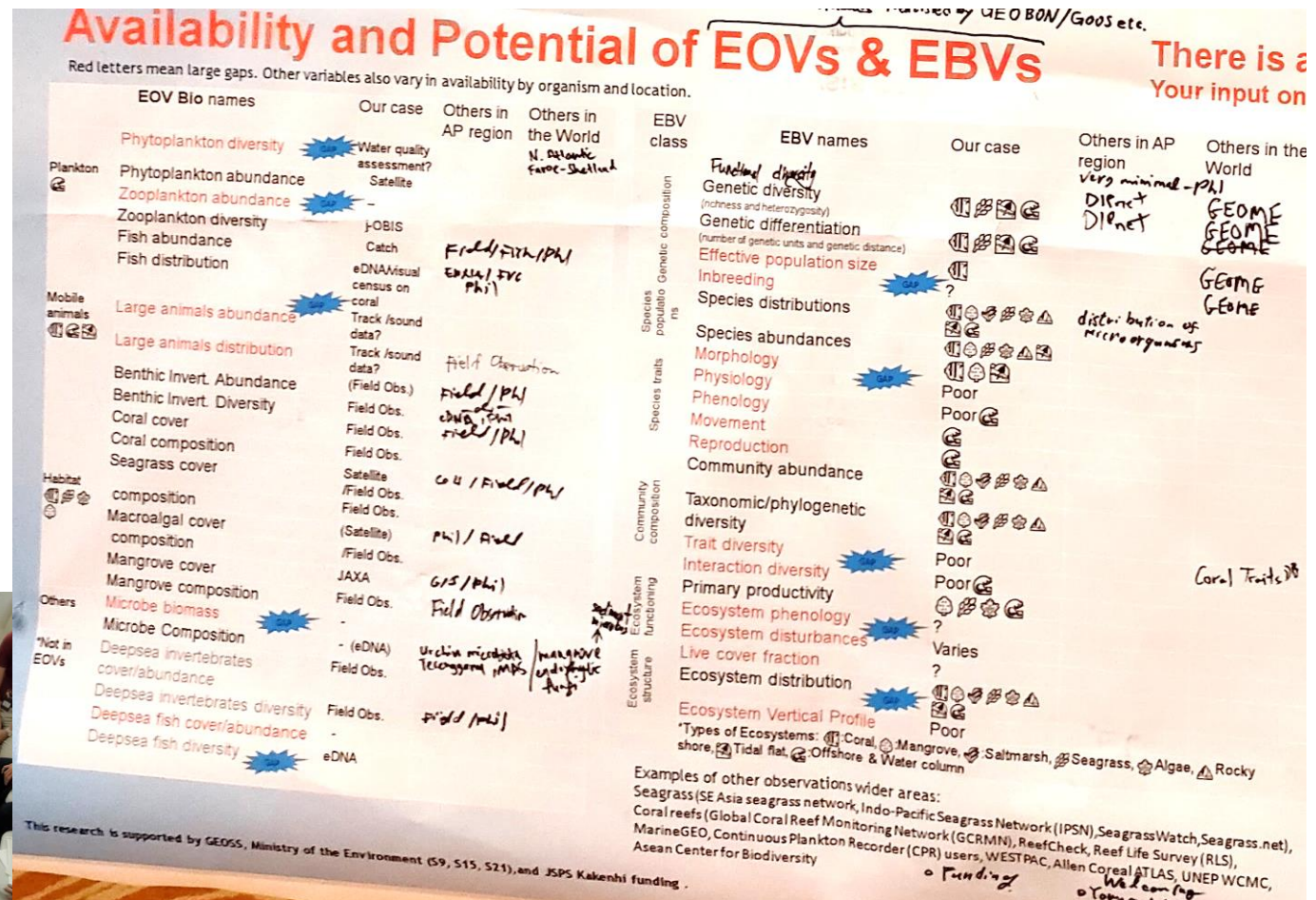
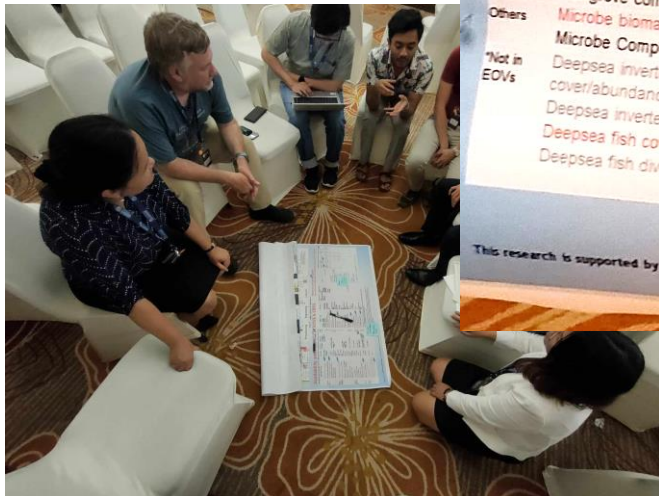
# Comparison

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	Reproduction	

# How is the other countries in AP region?

- Workshops at the WCMB (World Conference of Marine Diversity )in Penang, Jul. 2023



## The global extent of biodiversity offset implementation under no net loss policies

Joseph William Bull  & Niels Strange

*Nature Sustainability* **1**, 790–798 (2018) | [Cite this article](#)

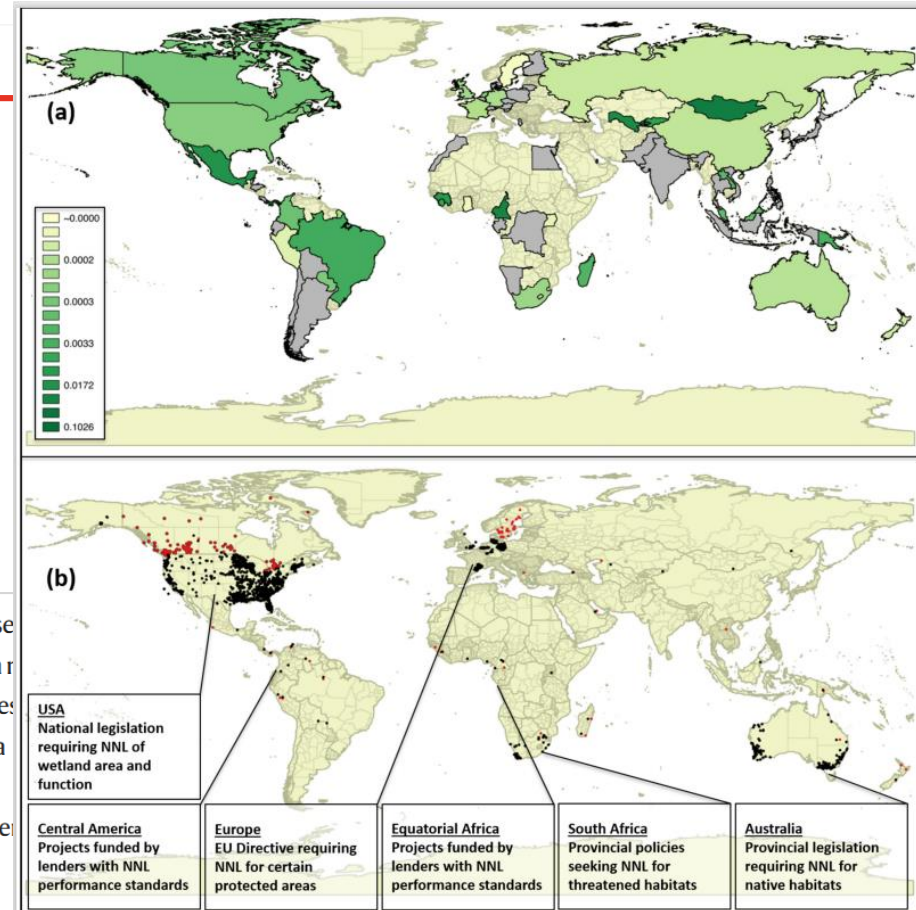
3370 Accesses | 118 Citations | 106 Altmetric | [Metrics](#)

[The global extent of biodiversity offset implementation under no net loss policies](#) | *Nature Sustainability*

[https://kar.kent.ac.uk/69615/1/1095\\_4\\_merged\\_1539012765.pdf](https://kar.kent.ac.uk/69615/1/1095_4_merged_1539012765.pdf)

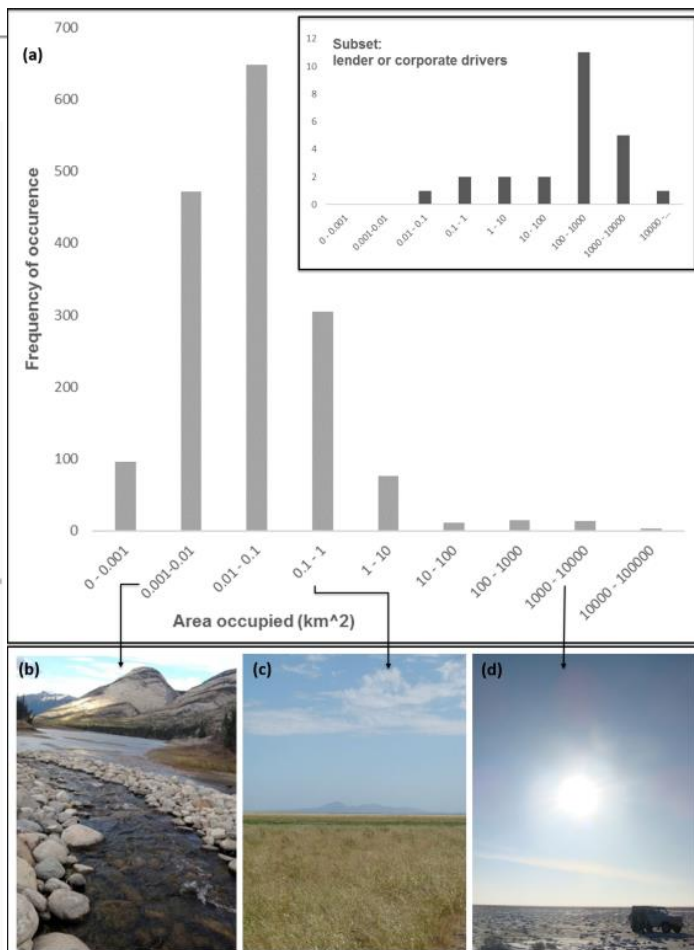
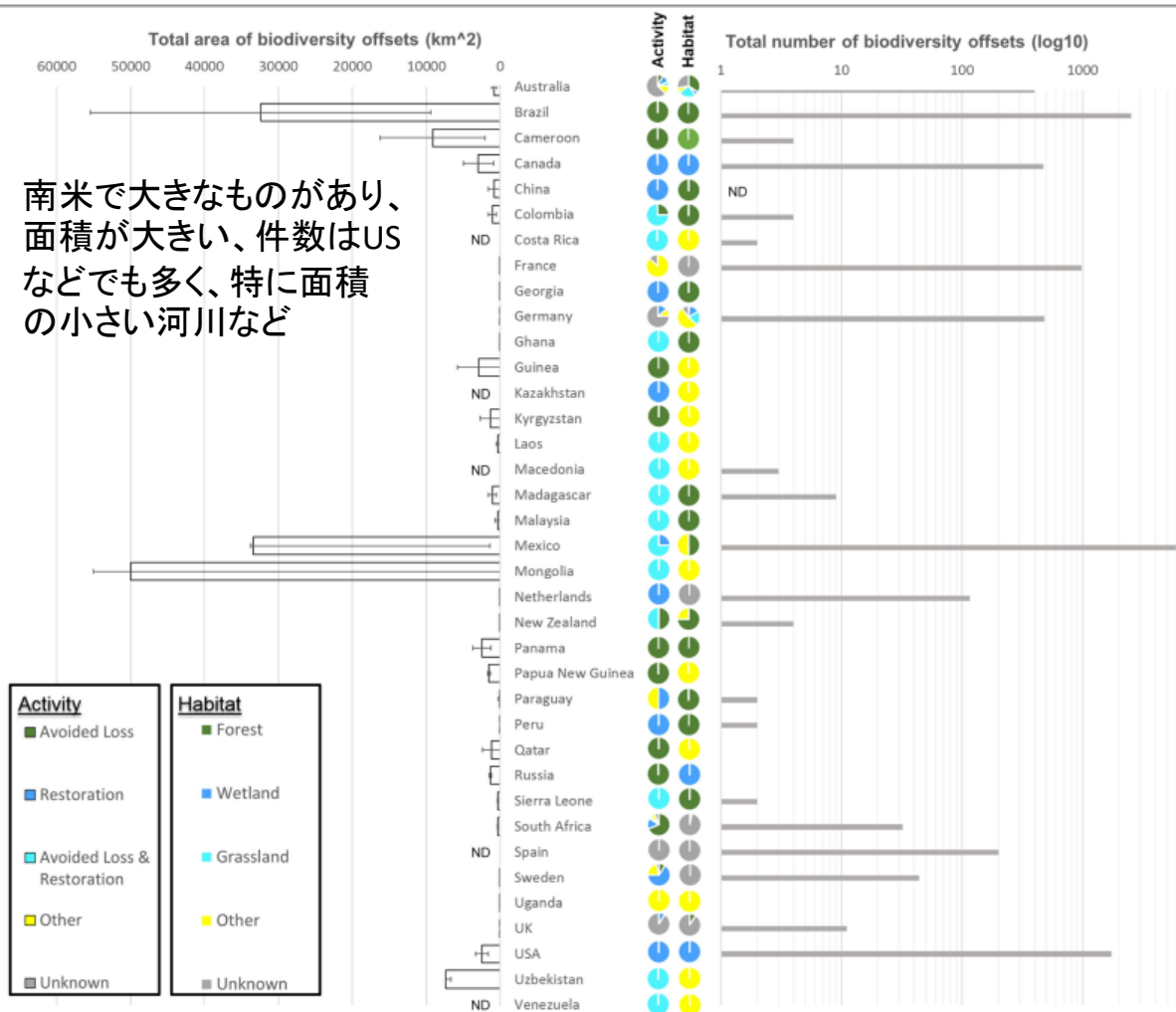
### Abstract

‘No net loss’ (NNL) biodiversity policies, which seek to neutralize ongoing biodiversity losses caused by economic development activities, are applicable worldwide. Yet, there has been no global assessment concerning practical measures actually implemented under NNL policies. Here, we systematically map the global implementation of biodiversity offsets (‘offsets’)—a crucial yet controversial NNL practice. We find, first, that offsets occupy an area up to two orders of magnitude larger than previously suggested: 12,983 offset projects extending over  $153,679^{+25,013}$  km<sup>2</sup> across 37 countries. Second, offsets are far from homogeneous in





南米で大きなものがあり、面積が大きい、件数はUSなどでも多く、特に面積の小さい河川など



# Messages

- Most EOVs can be implemented in Asia
- But most EBVs are need large effort. Even species are not identified in many cases.
- At an ecosystem level data of the deeper part and species level info. are lower by using satellite.
- There are also limitation by policy of data especially for government research.
- We better to have shared platform to put data for EOVs such as BioTime OBIS considering application in TCFD&TNFD.