

PROTEUS ANNUAL MEETING

13th – 14th June 2019, David Attenborough Building, Cambridge, UK



HORIZON SCAN:

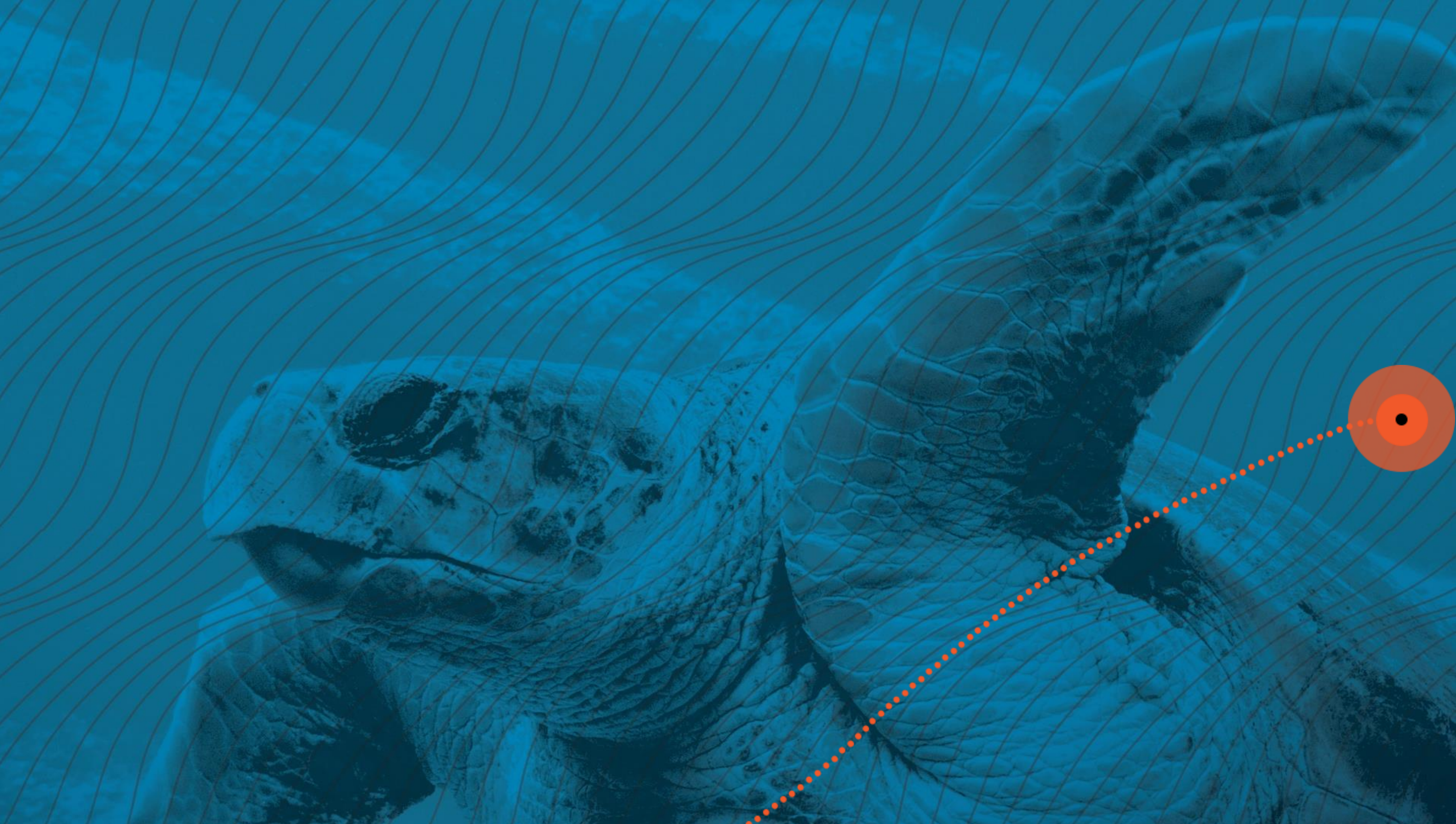
Emerging Issues and Trends In Biodiversity Management and Data

Corli Pretorius

@ExploreMiCO

@danielcdunn

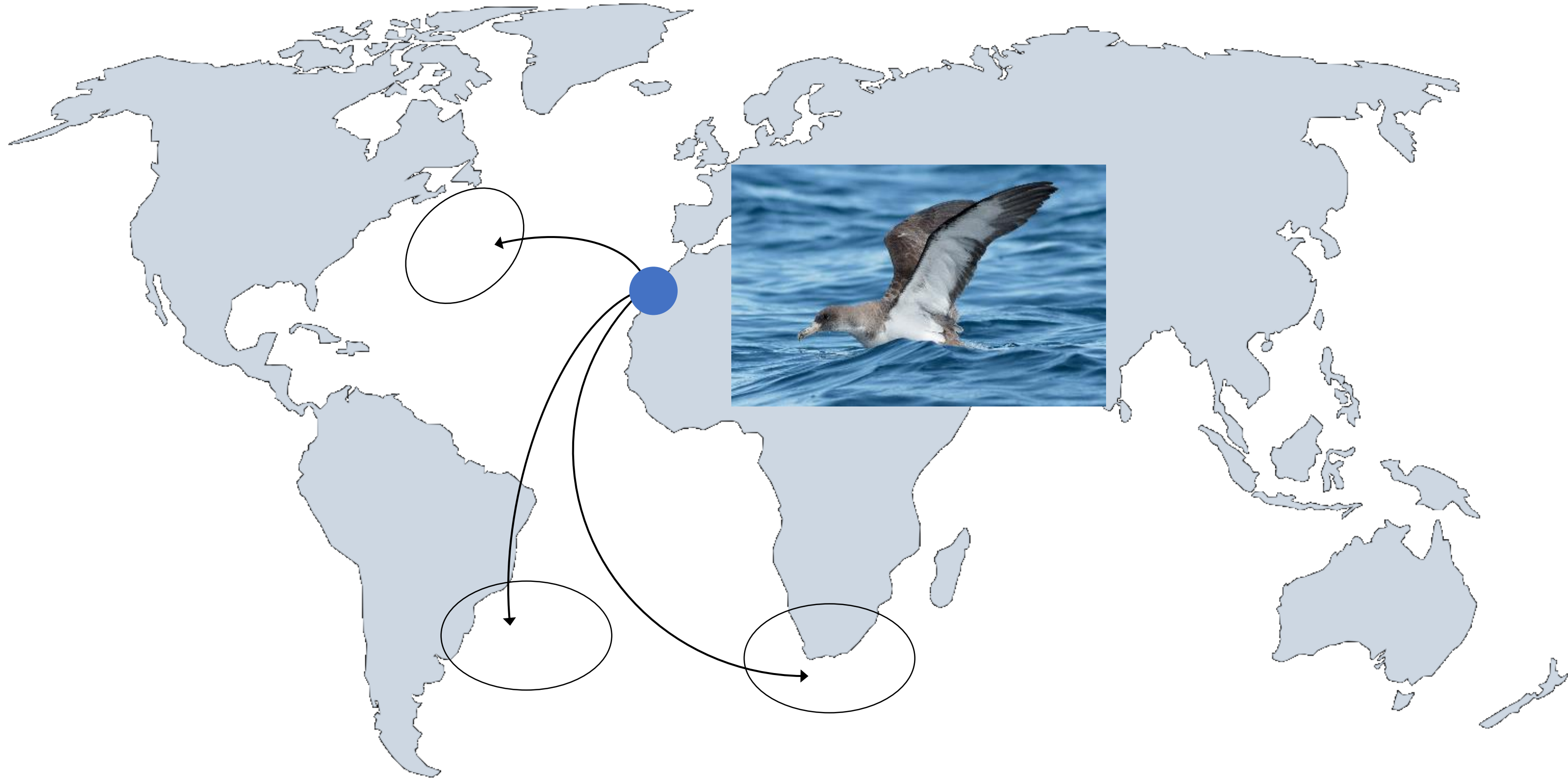
MiCO
Migratory Connectivity
in the Ocean



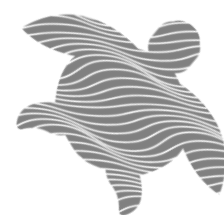
What is Migratory Connectivity?

Migratory connectivity is the geographic linking of individuals & populations between one life cycle stage and another.



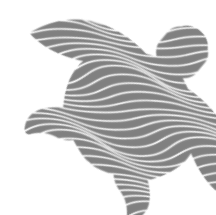


MiCO Migratory
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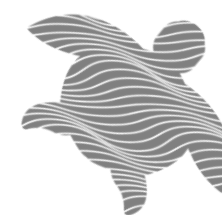


Abundance of publications on migratory species

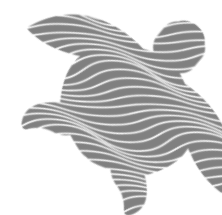
>12,000 papers returned from a search for information on migratory connectivity since 1990

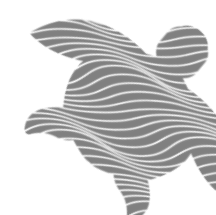
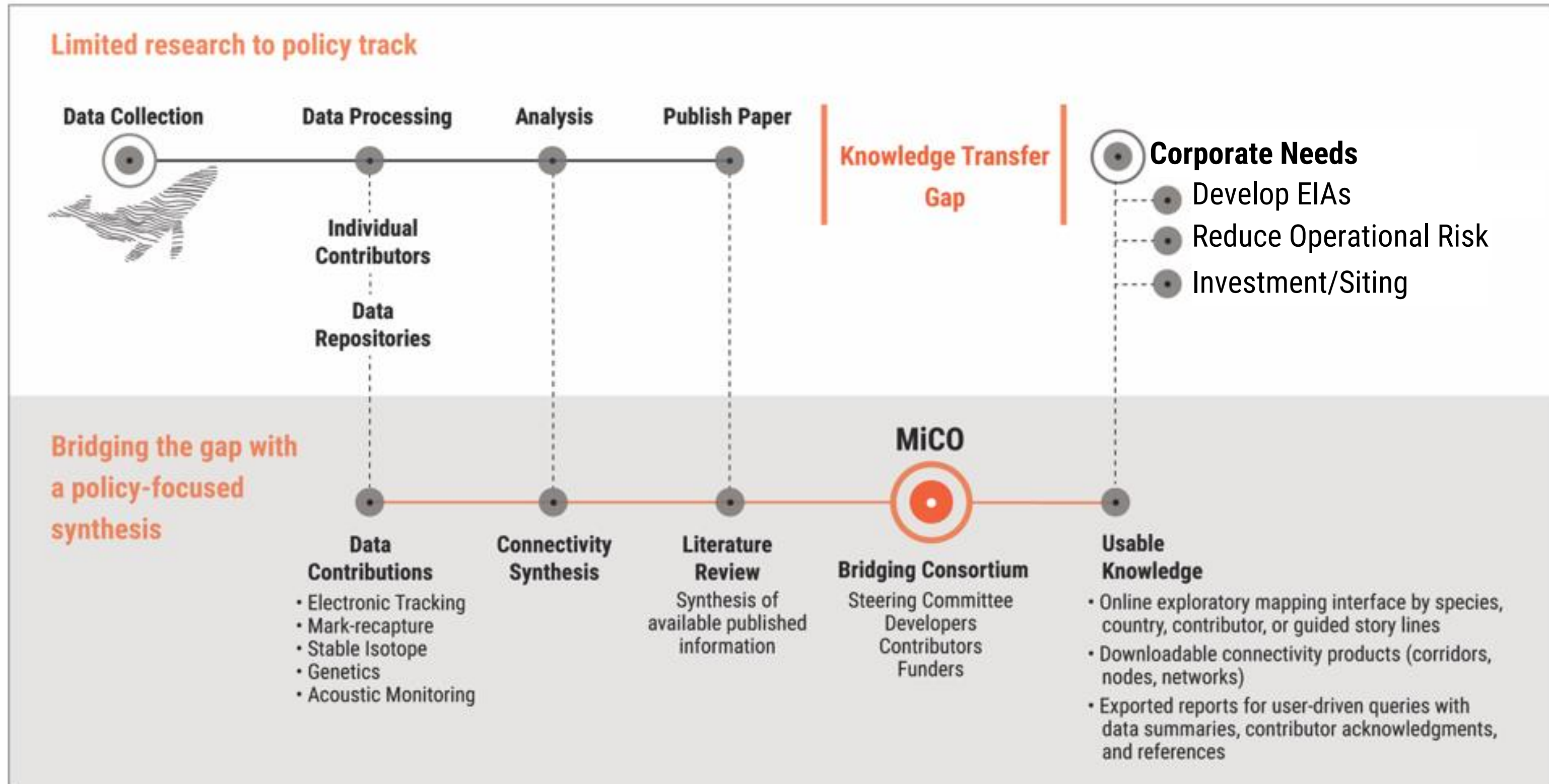


Limited research to policy track



Limited research to policy track







The MiCO System

mico.eco/system

On April 1st, 2019 the MiCO System launches at the 2nd Intergovernmental Conference on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ).

[Learn more and explore the system](#)

Leatherback

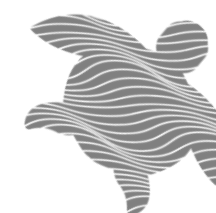
Long, Lat: 3.58178, -7.94489

Node / Corridor						
Common name	Activity	Desc	Sex	Age	Tag	Type
Leatherback	Migrating	Post-nesting Migration	F	A	PTT	Dist.
Leatherback	Migrating	Post-nesting Migration	F	A	PTT	Dist.

@ExploreMiCO

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Supported by:



Federal Ministry for the
Environment, Nature Conservation,
Building and Nuclear Safety

based on a decision of the German Bundestag

GOBI



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MiCO IS A CONSORTIUM

<https://mico.eco/consortium>



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Smithsonian Conservation Biology Institute
Migratory Bird Center



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What is MiCO's progress to date?

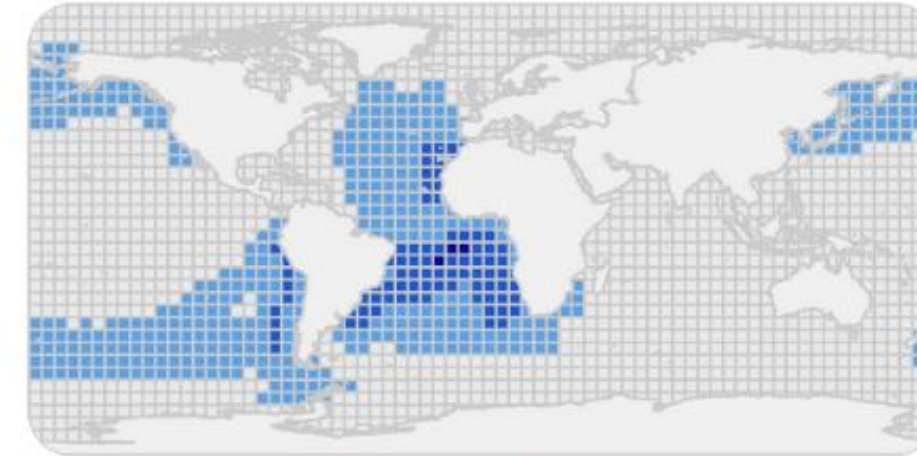
Reviewed **931** references about migratory connectivity data on **79** species
 Analyzed movements of **382** animals based on **95,632** locations
 Produced **23** nodes and **17** corridors for **7** species

		Nodes	Corridors
Humpback Whale	<i>Megaptera novaeangliae</i>	2	1
Ancient Murrelet	<i>Synthliboramphus antiquus</i>	4	4
Chatham Petrel	<i>Pterodroma axillaris</i>	3	2
Cory's Shearwater	<i>Calonectris diomedea</i>	5	6

See "Which migratory species do you want to explore?" below for more details

Assessments were made possible through
62 datasets from **35** contributors

See "Who has contributed?" below for more details



Atlantic-centric | Pacific-centric
 Concentration of species whose area use overlaps at a 5-degree resolution

Which migratory species do you want to explore?

MiCO collects animal tracking data from around the world, analyzes them and produces data products on area use in the form of nodes (e.g. feeding, wintering, breeding, etc.) and corridors. This section lists all migratory species MiCO is working on and overviews of their migrations and other activities. Click the title to start exploring.

How are the national waters (EEZs) of countries used by migratory species?

Nodes and corridors MiCO produced are associated with national waters (EEZs). This section lists countries with EEZs and overviews on how migratory species use these areas. Click the title to start exploring.

Who has contributed?

The development of the MiCO system and products are only possible with the participation of many researchers all over the world. This section lists all contributors and overviews of their contributions. Click the title to start exploring.

What is MiCO's progress to date?

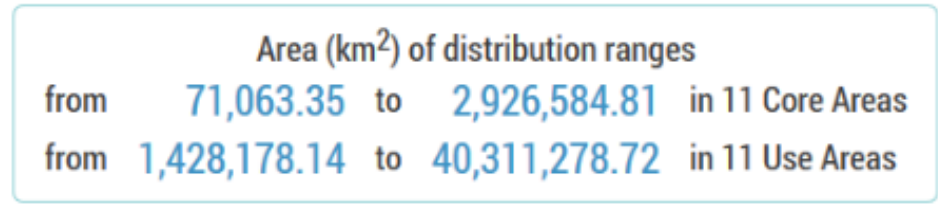
Which migratory species do you want to explore?

- Fish (29)
- Marine mammals (27)
- Seabirds (16)
- Sea turtles (7)

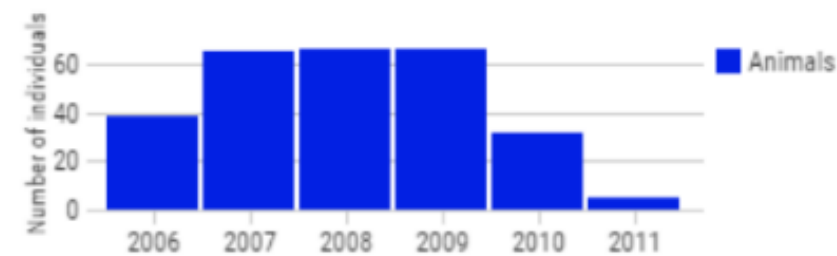
animals crossing countries

Cory's Shearwater *Calonectris diomedea*

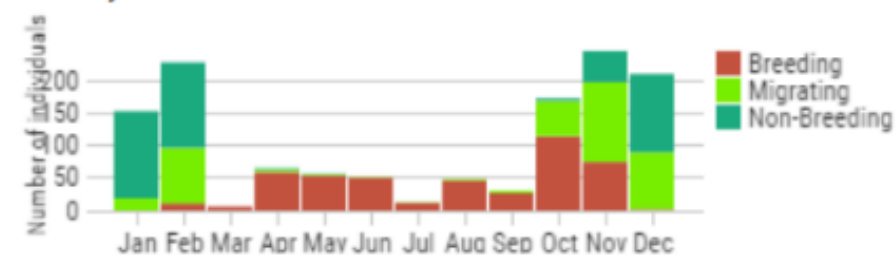
138 animals crossing 29 countries
5 nodes and 6 corridors



Data Contributions



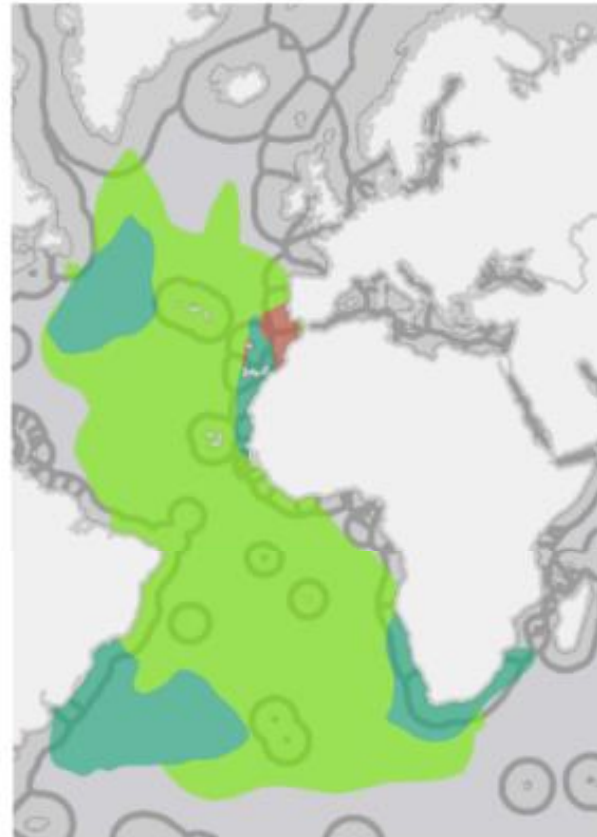
Monthly Activities



Which migratory species do you want to explore?

- Fish (29)
- Marine mammals (27)
- Seabirds (16)
- Sea turtles (7)

Map View



- Explore Stories with MiCO Mapping Tool**
- All Migratory and Area-use Information →
 - Migrating vs. Non-migrating Strategies →
 - Alternative Migration Strategies →

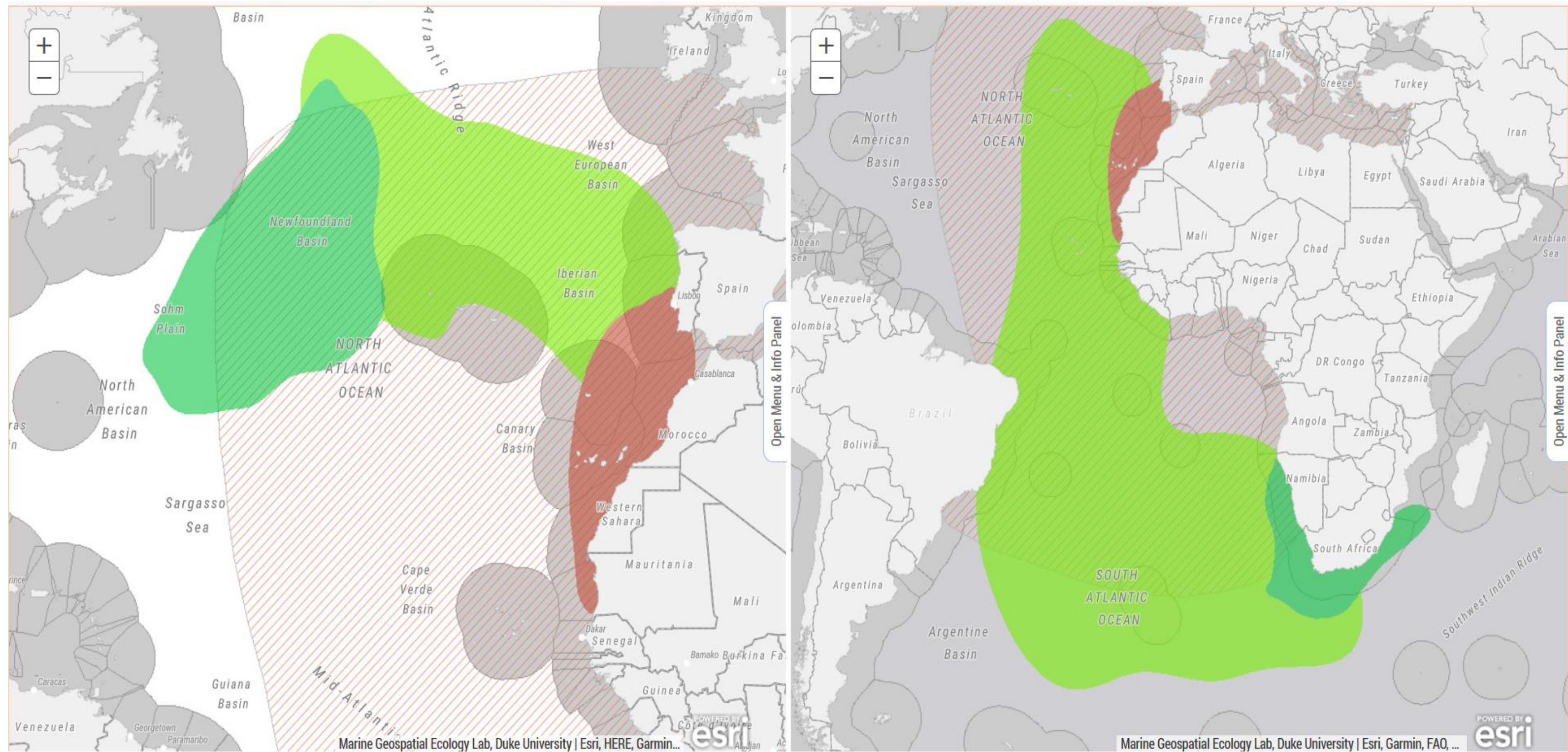
Countries (EEZs) and ABNJ*

	Area beyond EEZs (%)	
	Use Area	Core Area
ABNJ	78.6	70.7

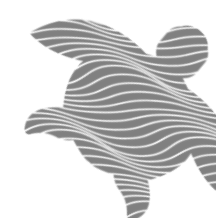
*ABNJ: Areas Beyond National Jurisdiction

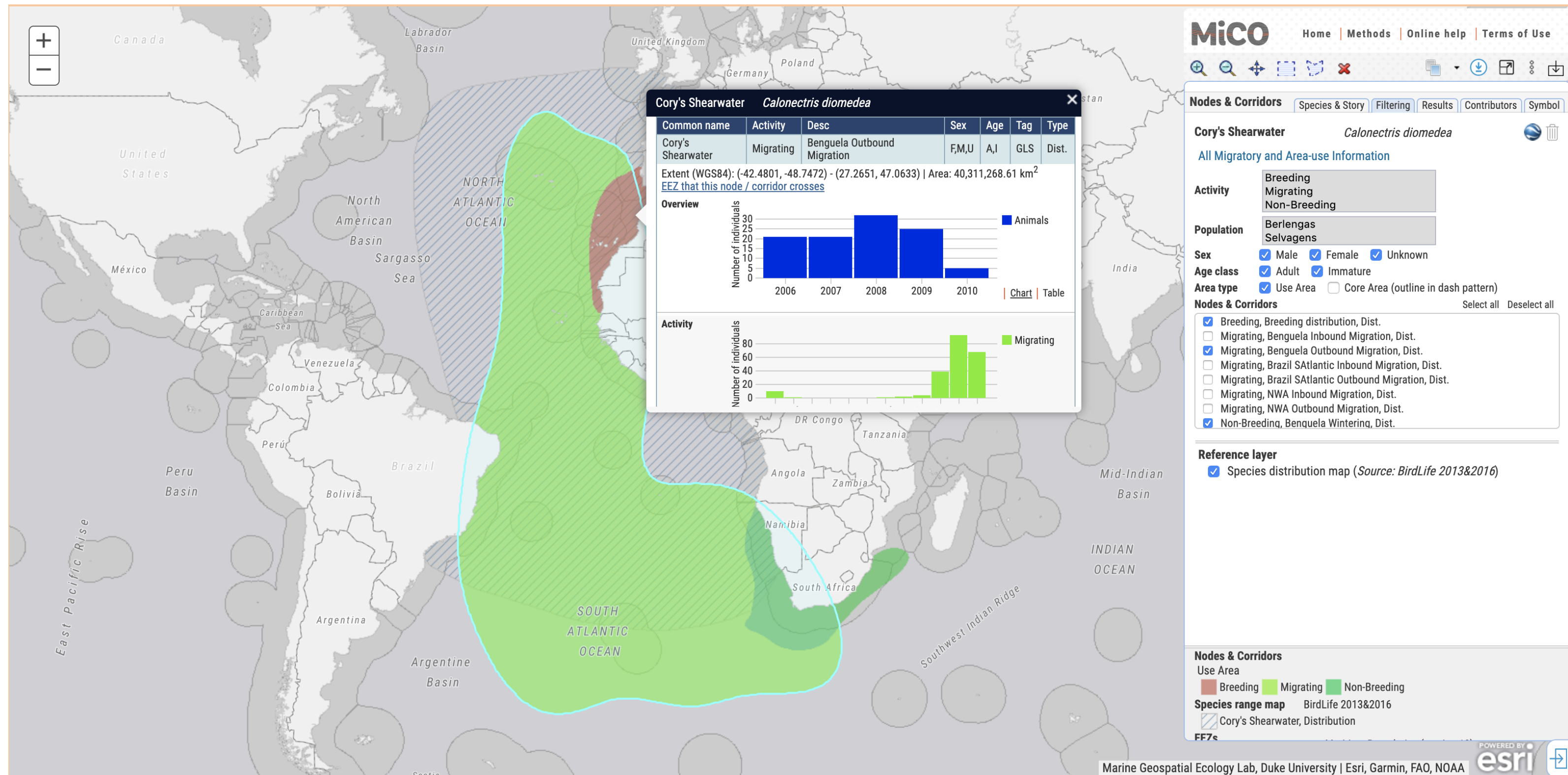
Country	Area (%) of			
	EEZ covered by species		Species covered by EEZ	
	Use	Core	Use	Core
Angola	45.8		0.4	
Argentina	11.0		0.3	
Ascension	100.0		0.7	
Azores	100.0	54.6	2.0	7.4
Brazil	87.1	1.8	4.7	0.7
Canada	0.5		0.1	
Canary Islands	99.9	35.6	0.8	2.0
Cape Verde	100.0	21.6	1.3	2.0
Gambia	99.0	99.0	0.0	0.3
Ghana	13.2		0.0	
Greenland	1.3		0.2	
Guinea	99.2	54.4	0.2	0.6
Guinea-Bissau	99.0	99.0	0.2	1.2
Ivory Coast	91.2		0.3	
Liberia	99.9		0.4	
Madeira	100.0	25.2	0.9	1.5
Mauritania	99.7	99.7	0.3	2.0
Morocco	88.6	6.6	0.5	0.2
Mozambique	20.6		0.2	
Namibia	99.9	20.6	1.0	1.4
Portugal	99.9		0.6	
Saint Helena	100.0	70.6	0.8	3.7
Senegal	99.3	99.3	0.3	1.8
Sierra Leone	99.7	1.5	0.3	0.0
South Africa	92.6	14.3	1.9	2.0
Spain	26.6		0.3	
Trindade	100.0	43.8	0.8	2.5
Tristan da Cunha	100.0		1.6	
Uruguay	92.3		0.3	

EEZ covered by species: Percentage of EEZ area covered by species Use Area or Core Area.
Species covered by EEZ: Percentage of species Use Area or Core Area covered by EEZ.

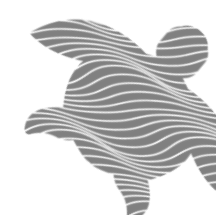


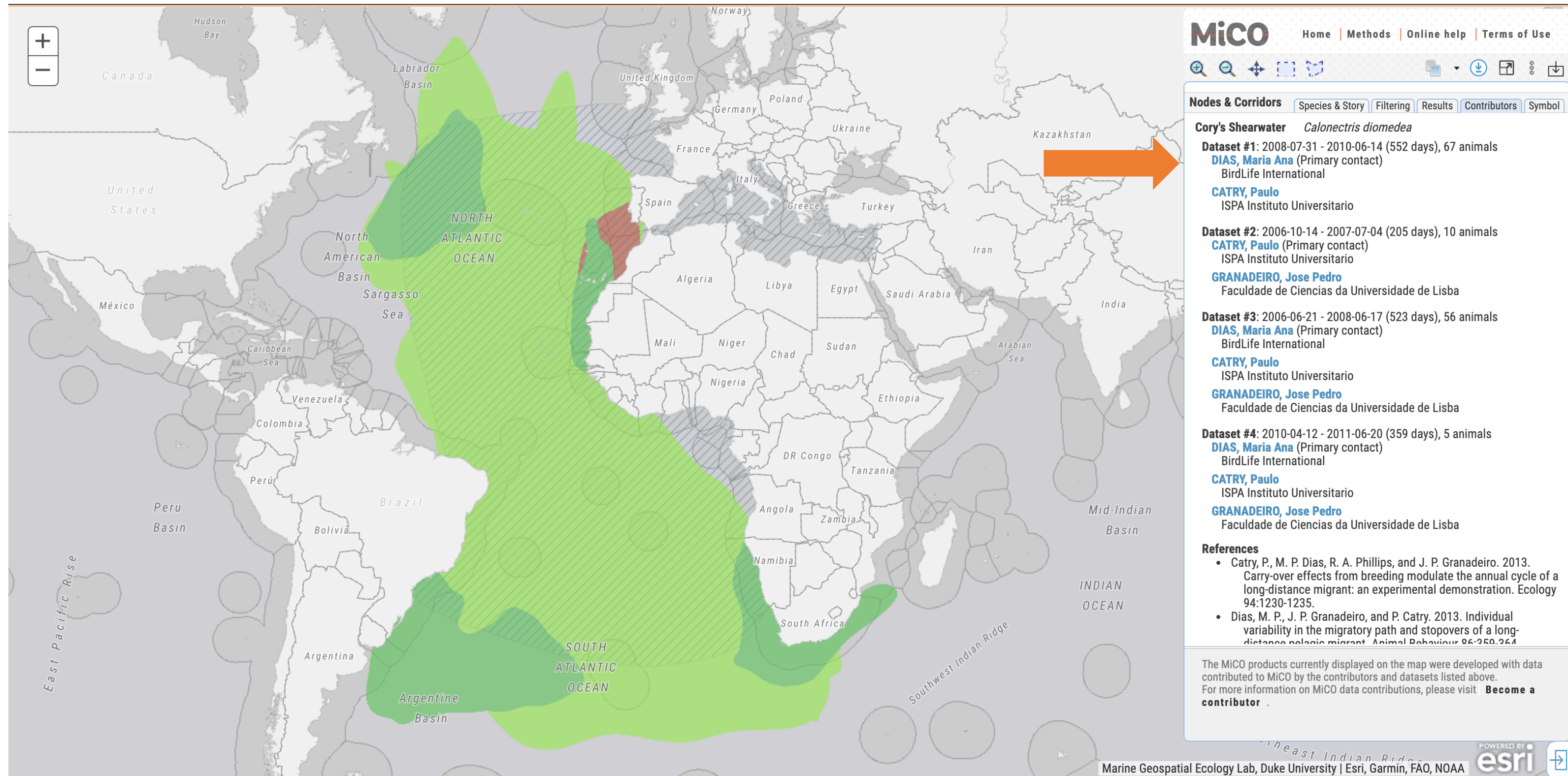
Migratory Connectivity in the Ocean (MiCO). Highly migratory marine species nodes and corridors, developed with data contributed to MiCO. Available from the MiCO System Version 1.0. MiCO. <https://mico.eco>. Accessed June 9 2019.





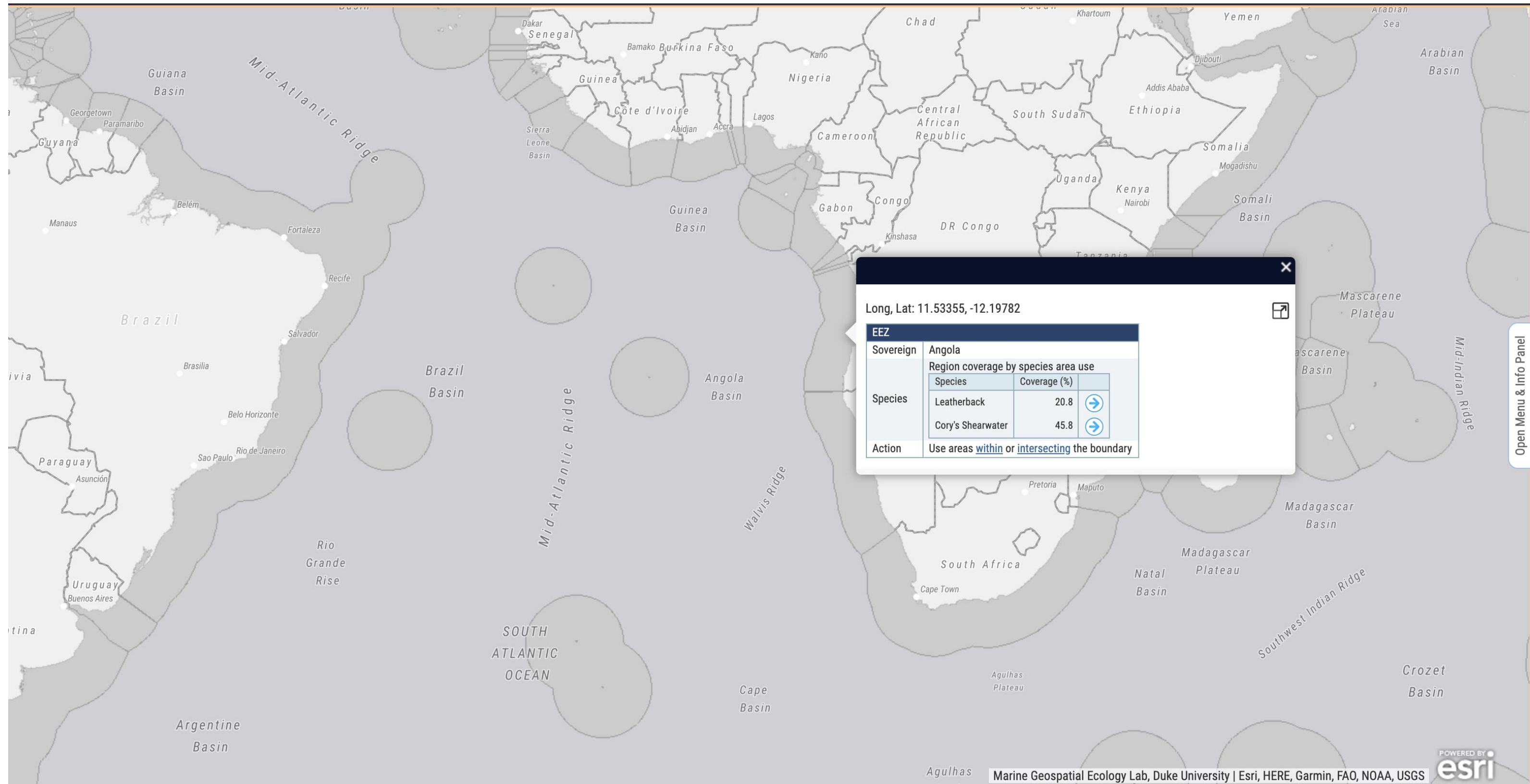
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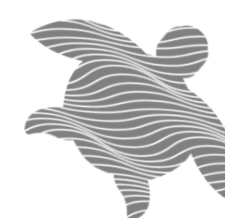


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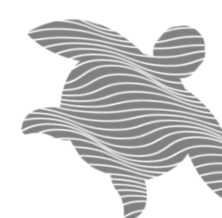
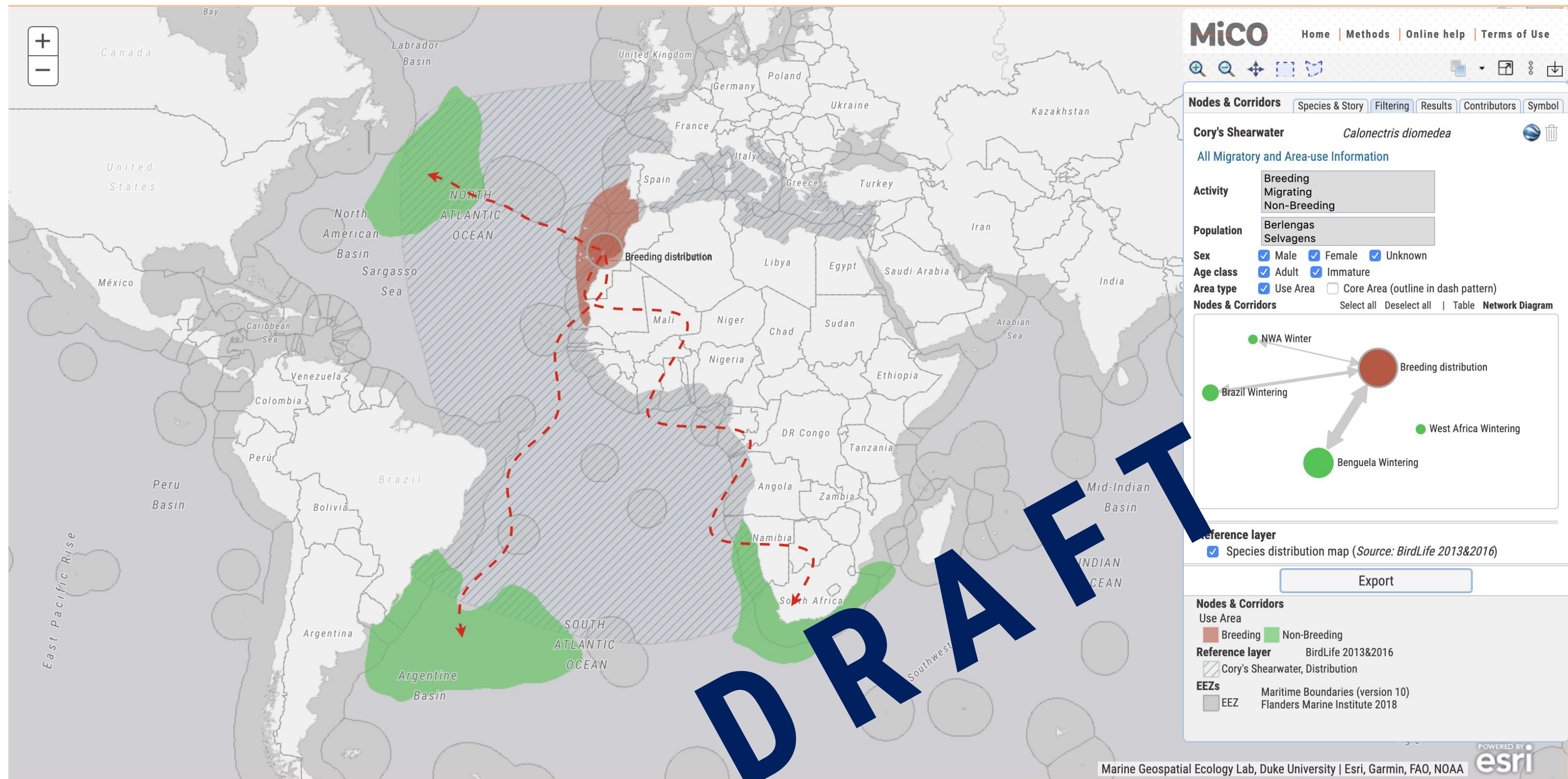




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Abstract network diagrams from data



Abstract network diagrams from literature

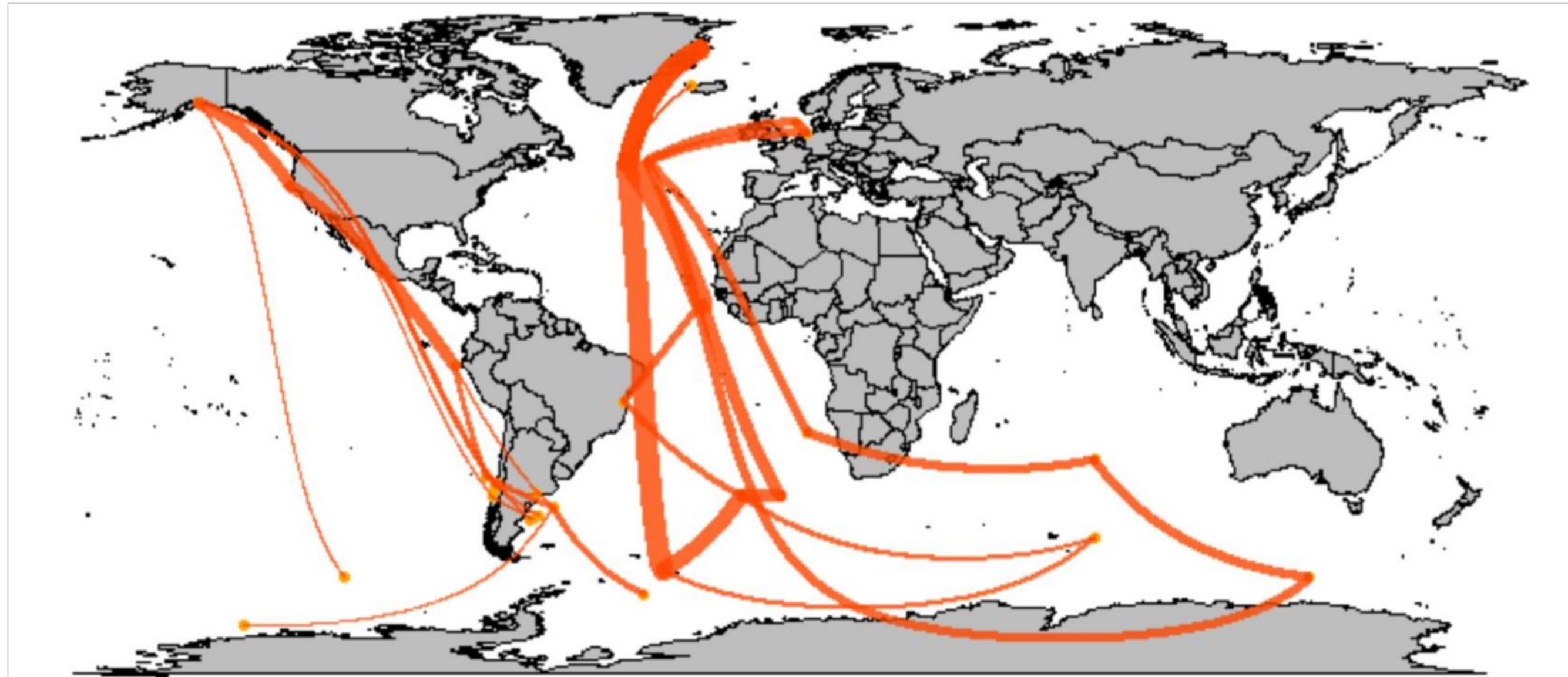
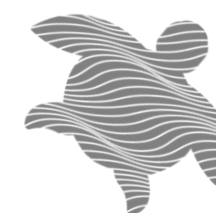


Figure 11. Arctic tern connectivity model in the West Indian and Southeast Pacific (33 sites; 36 routes).

Kot*, C.Y., S. DeLand*, S. Poulin*, M. Whitten*, E. Fujioka, C. Curtice, D.C. Dunn. 2019. Migratory connectivity of marine megafauna in the Western Indian Ocean and Southeast Pacific. *Migratory Connectivity in the Ocean (MiCO)*.



#WeCanMakeChange