MiCO IS A CONSORTIUM

Led by

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

Duke UNIVERSITY

Supported by

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

GOBI

based on a decision of the German Bundestag
What is Migratory Connectivity?

Migratory connectivity is the geographical linking of individuals and populations throughout their migratory cycles.
Migratory Marine Megavertebrates

Many of these species are listed as Near Threatened or Threatened by the IUCN, including:

- 95% of albatross
- 87% of assessed migratory sharks
- 63% of sea turtle subpopulations
Who
cares?
International policy arenas that require information describing Migratory Connectivity in the Ocean

- International Whaling Commission
- Regional Fisheries Management Organizations
- International Seabed Authority
- International Maritime Organization
- Biodiversity Conventions & MEAs (e.g., CBD, CMS)
- Assessments (IPBES, Regular Process, etc.)
- Aichi Targets, SDGs, Post-2020 Global Biodiversity Framework
Biodiversity Beyond National Jurisdiction

Structure
  • Role of Coastal States

ABMTs
  • MPA siting
  • Network Assessment
  • Marine Spatial Planning

EIAs
  • Scope
  • Consultation
  • Transboundary EIAs
  • Strategic Environmental Assessments

CD & TT
  • Monitoring
  • Marine Scientific Research
  • Reporting
We’ve written a lot about migratory connectivity in the ocean

>12,000 papers returned from a search for information on marine migratory connectivity since 1990 for just 208 species

~1,300 papers using satellite telemetry tags

<table>
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<td>Seabirds</td>
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<td>Fish</td>
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Cory’s shearwater


Ramos et al. 2012

Gonzalez-Solis, Croxall, Oro, Ruis. 2007

12,000 papers with information on migratory connectivity from 1990-2016

We have a knowledge transfer problem
We know what the problem is...

Limited research to policy track

Data Collection → Data Processing → Analysis → Publish Paper

Knowledge Transfer Gap

Corporate Needs
- Develop EIAs
- Reduce Operational Risk
- Investment/Siting
And it is not just our words that are getting lost…
We have a knowledge transfer problem.
Obstacles:
- Budget
- Capacity
- Time
The sea-change happening *now* is aggregation of...
We also know what the solution is...
New Study on Connectivity

MiCO researchers release a new study on connectivity, with 71 authors led by Daniel Dunn (MGEL/UQ) and Autumn-Lynn Harrison (Smithsonian Migratory Bird Center).

Learn More
Three Pathways to Knowledge Integration

- A comprehensive literature review
- Development of new integrated and synthetic products
- Aggregation of existing derived products
Sampling methods to inform connectivity

- Satellite telemetry or geolocator
- Mark-recapture
- Stable isotope
- Passive acoustic monitoring
- Genetic sampling

Lit review
Literature Review of telemetry studies
Literature Review of telemetry studies
Network models from telemetry literature

Leatherback Sea Turtles

Raw data
- 96 papers
- 397 sites
- 321 connections

Synthesized network
- 133 meta-sites
- 205 meta-connections
Network models from telemetry literature

Leatherback Sea Turtles

Raw data
- 96 papers
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Synthesized network
- 133 meta-sites
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Usable Knowledge for Industry

**Connectivity for Humpback Whales in the Caribbean & North Atlantic**
Derived from publications utilising telemetry data between 1990 & 2015

**Connectivity for Humpback Whales in the South Atlantic**
Derived from publications utilising telemetry data between 1990 & 2015

**MiCO** Migratory Connectivity in the Ocean (MiCO) System. 2020.
Network models from telemetry literature
A lot of information and a lot more to incorporate

Currently:
- synthesized >30 species * region networks
- Should have 80+ species by May
- Only looking at telemetry papers, more info in papers using mark/recapture, stable isotope, genetic and acoustic sampling methods
- Hundreds more species to be addressed

<table>
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<th>Fish (35)</th>
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MiCO: Migratory Connectivity in the Ocean
Area-use models

Current methods described at mico.eco/methods
Key aspects of MiCO

- Does not disseminate contributor data
- Aggregate, develop and freely disseminate standardized, summary products
- Designed to be modular & incorporate multiple sampling methods
- Tracks product use & reports to contributors
- Transparent (data, methods, attribution)
The MiCO 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 →
Next Steps

System:
- Incorporate network models from the literature review
- Download feature for network models
- Add more area-use models
- Multi-method network models
- Better describe uncertainty

Research Partners:
- Collaborate on proposals to integrate datasets
- Collaborate on analyses of this new dataset

Industry and Policy Partners:
- Identify preferred product formats
- Pilot projects to integrate MiCO output into existing processes (e.g., EIAs or MSP)
- Co-develop proposals for industry-academia collaborations
How, can I join the fun?

MiCO development has or is being undertaken by:
- 1 Undergrad Honours student
- 8 HDR (7 Masters + 1 PhD)
- 9 Research Staff
- 50+ MiCO partners

Ongoing opportunities:
- Hiring a 2-year Post-Doc at UQ in next 3-6 months
- PhD research scholarships at UQ, or TA scholarships at Duke
- Masters projects
  - generating models and case studies of the implications of connectivity for governance of migratory species
Thanks!

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MiCO
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