Ecology & Conservation of Green & Hawksbill Turtles in The Dutch Caribbean

WIDECAST meeting Puerto Rico | 6 March 2015

Jurjan van der Zee | Lisa Becking | Marjolijn Christianen | Per Palsbøll | University of Groningen – The Netherlands

How the project started

Netherlands Organisation for Scientific Research

NWO call for proposals on research Dutch Caribbean

1 PhD & 1 PostDoc – 4 yrs

Introducing the team
Dr Lisa Becking

Coordinator / Supervisor

IMARES, NL (Caribbean marine ecology)

UC Berkely, USA (population genetics)

IMARES
WAGENINGEN UR

Introducing the team
Jurjan van der Zee

PhD student

rijksuniversiteit groningen

Introducing the team
Marjolijn Christianen
Coordinator / Supervisor


Photo: Hans Wolkers

Introducing the team

Per Palsbøll

Supervisor

Professor of Marine Evolution and Conservation, University of Groningen

Population genomics large marine vertebrates

Ecology and conservation of green and hawksbill turtles in the Dutch Caribbean

Key Questions for green & hawksbill turtles in the DC

1. How are turtles **utilizing** the present **foraging** and breeding habitats in the region?
2. Which critical habitats are under **threat?**
3. How **many turtle populations** frequent the region and which of these breed locally?
4. What are the levels of **past and present connectivity** and abundance?

Key Questions for green & hawksbill turtles in the DC

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2. What are the levels of past and present connectivity and abundance?
3. How are turtles utilizing the present foraging and breeding habitats in the region?
4. Which critical habitats are under threat?

Key Questions for green & hawksbill turtles in the DC

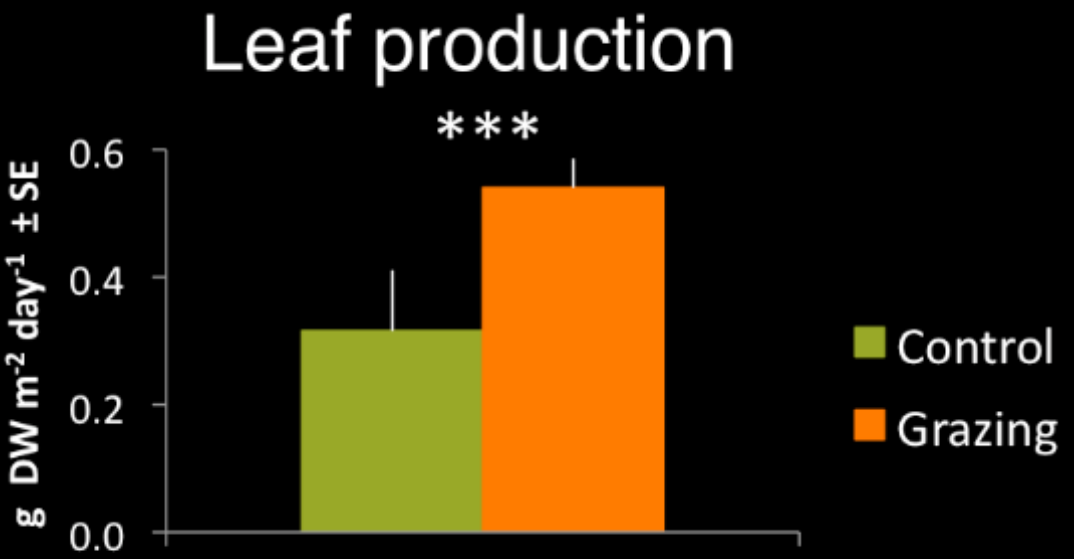
Sub-project 1 (PostDoc – Marjolijn)
Habitat use / tracking

Sub-project 2 (PhD - Jurjan)
Population genetics

Sub-project 1
Habitat use & tracking


Derawan
Indonesia

Sea turtles can change structure and functioning of their own food source…



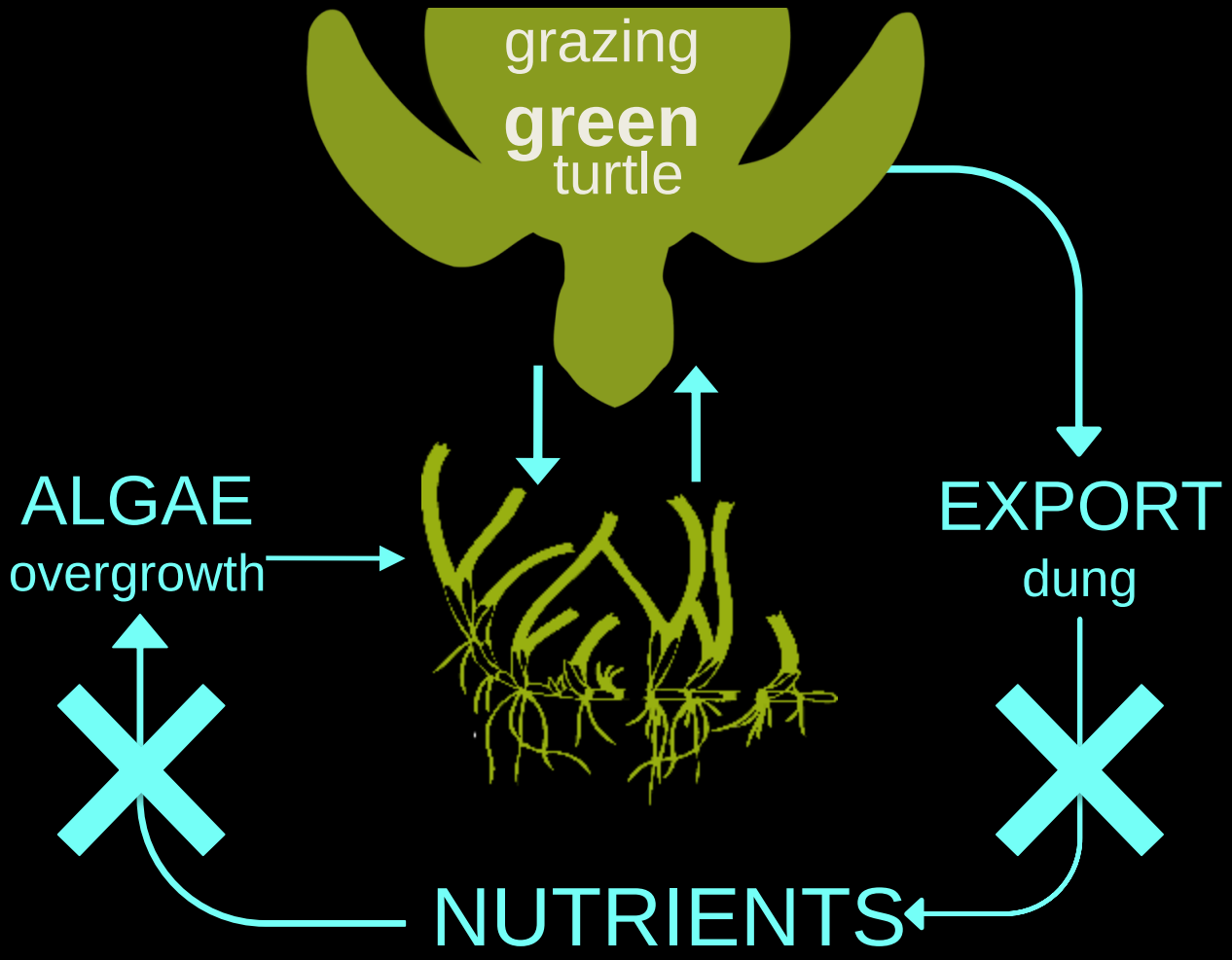
Christianen et al. 2012, Journal of Ecology

Sea turtles can change structure and functioning of their own food source…

UNGRAZED VS GRAZED

Christianen et al. JEcol 2012, Fourqurean et al. 2010, Lal et al. 2010

…And can protect their habitat against disturbances

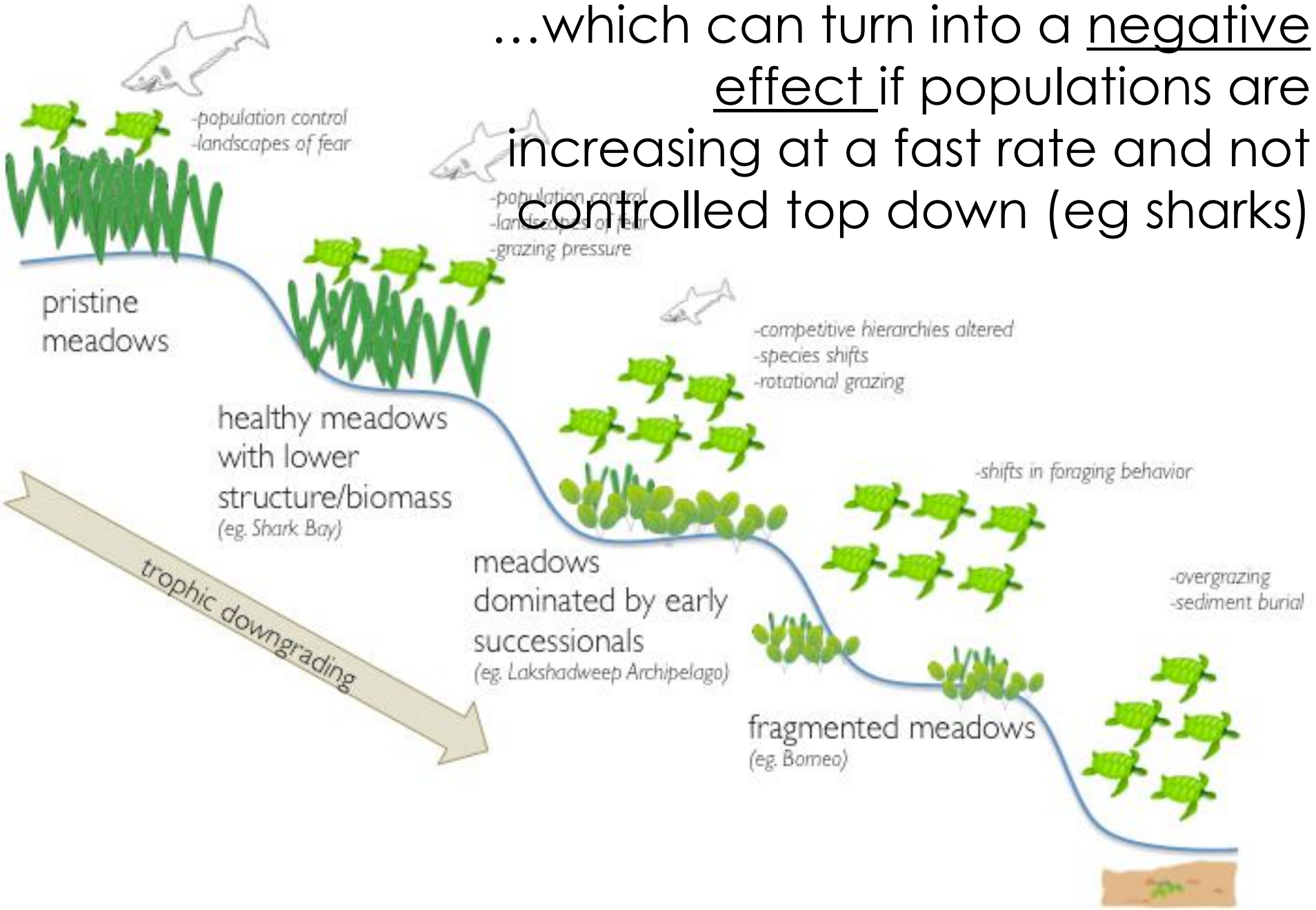


Christianen et al. 2012, Journal of Ecology

…And can protect their habitat against disturbances

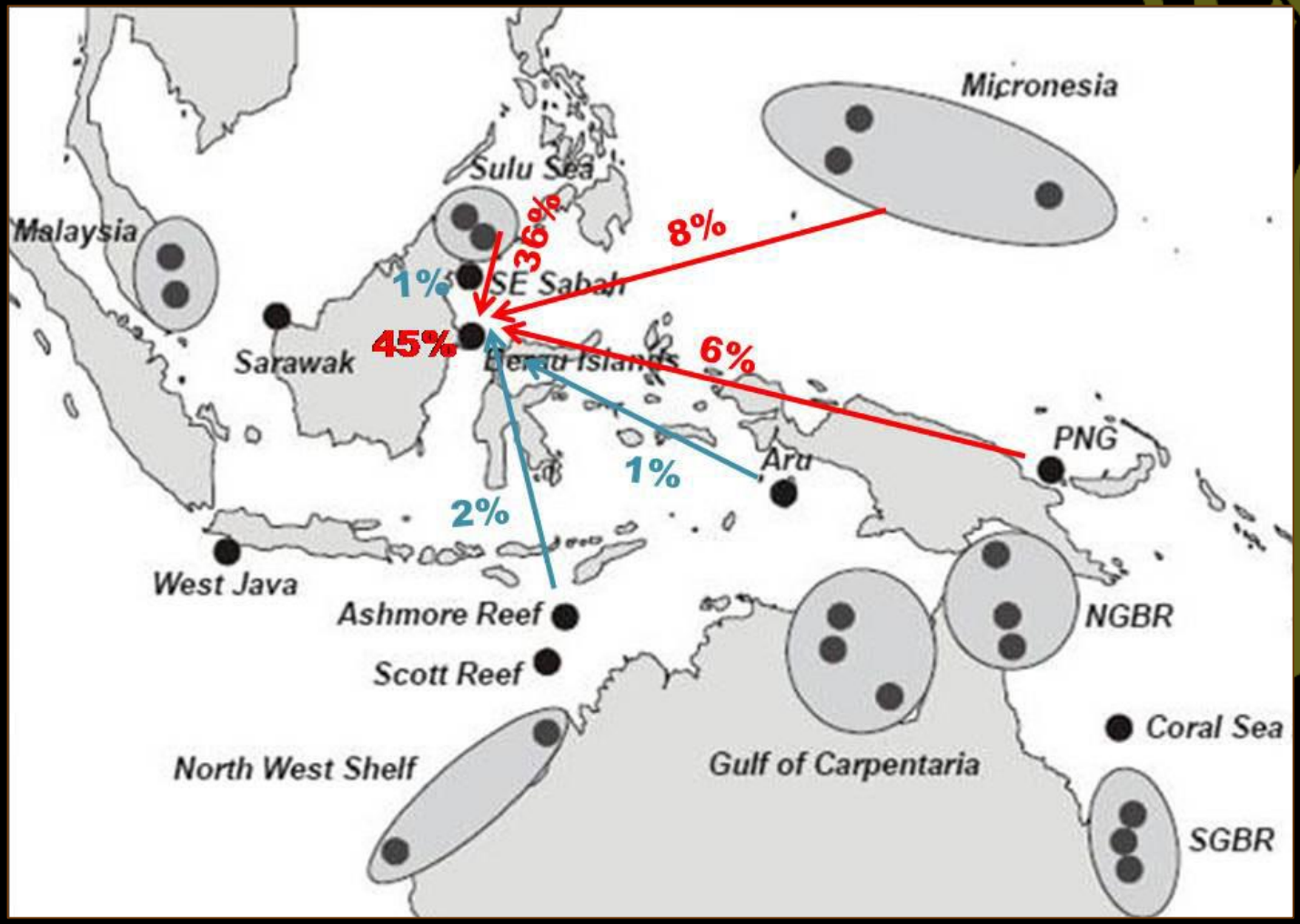
INCREASE RESILIENCE TO EUTROPHICATION!

…which can turn into a negative effect if populations are increasing at a fast rate and not controlled top down (eg sharks)



Heithaus, Christianen et al 2014, Frontiers Marine Science
Christianen et al 2014. Proc. Royal Soceity B

Functioning of turtle habitat is affected by connectivity of turtle populations…



Tracking & habitat use

SUB-PROJECT 1: RESEARCH QUESTIONS & AIMS

Research aim 1

Determine the distribution of foraging and nesting habitats from ***published literature*** *and reports,* ***aerial images****, and* ***in-water monitoring*** *surveys*

Photo: Marjolijn Christianen

Patterns of seagrass show health of foraging ground

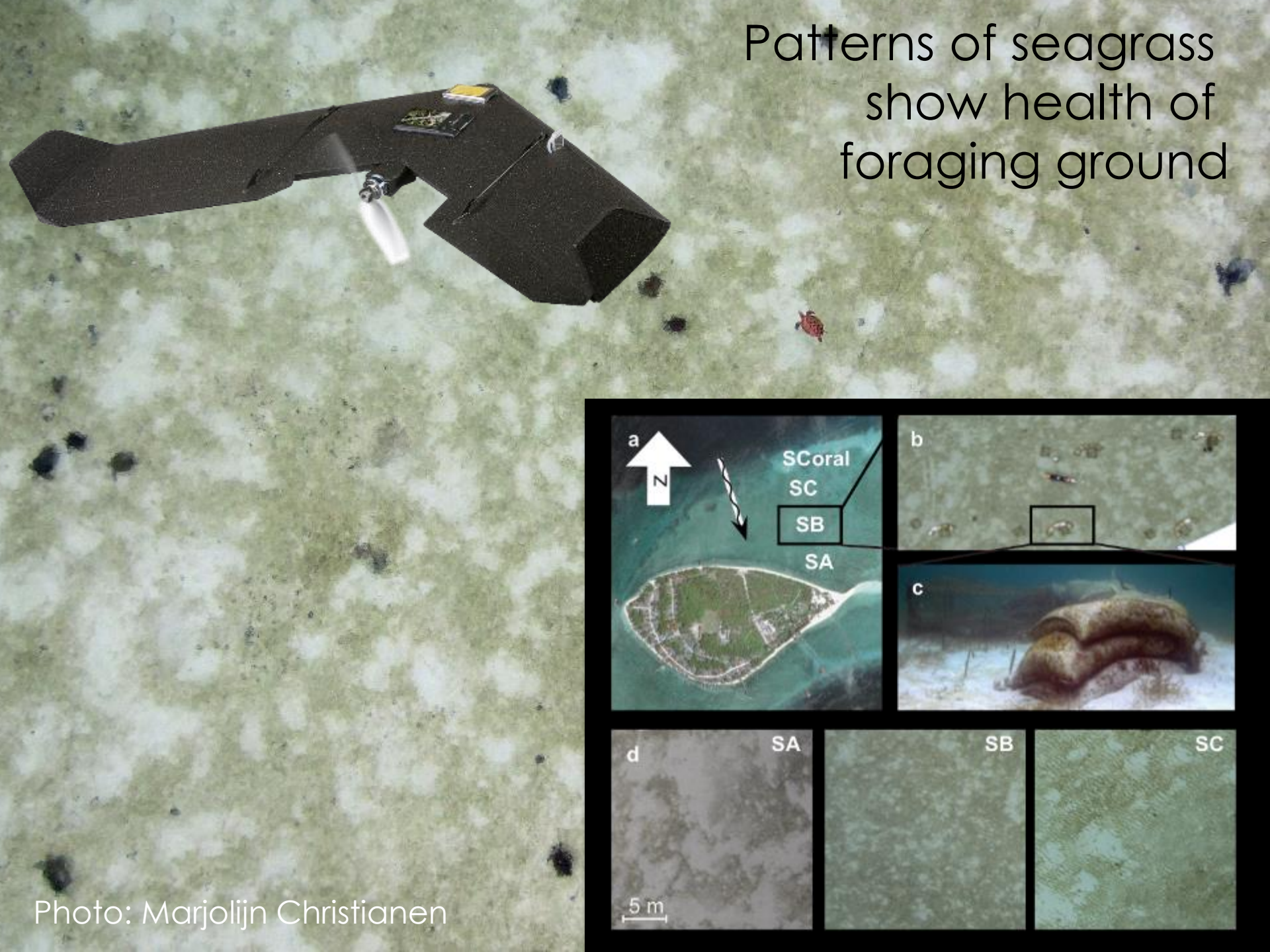
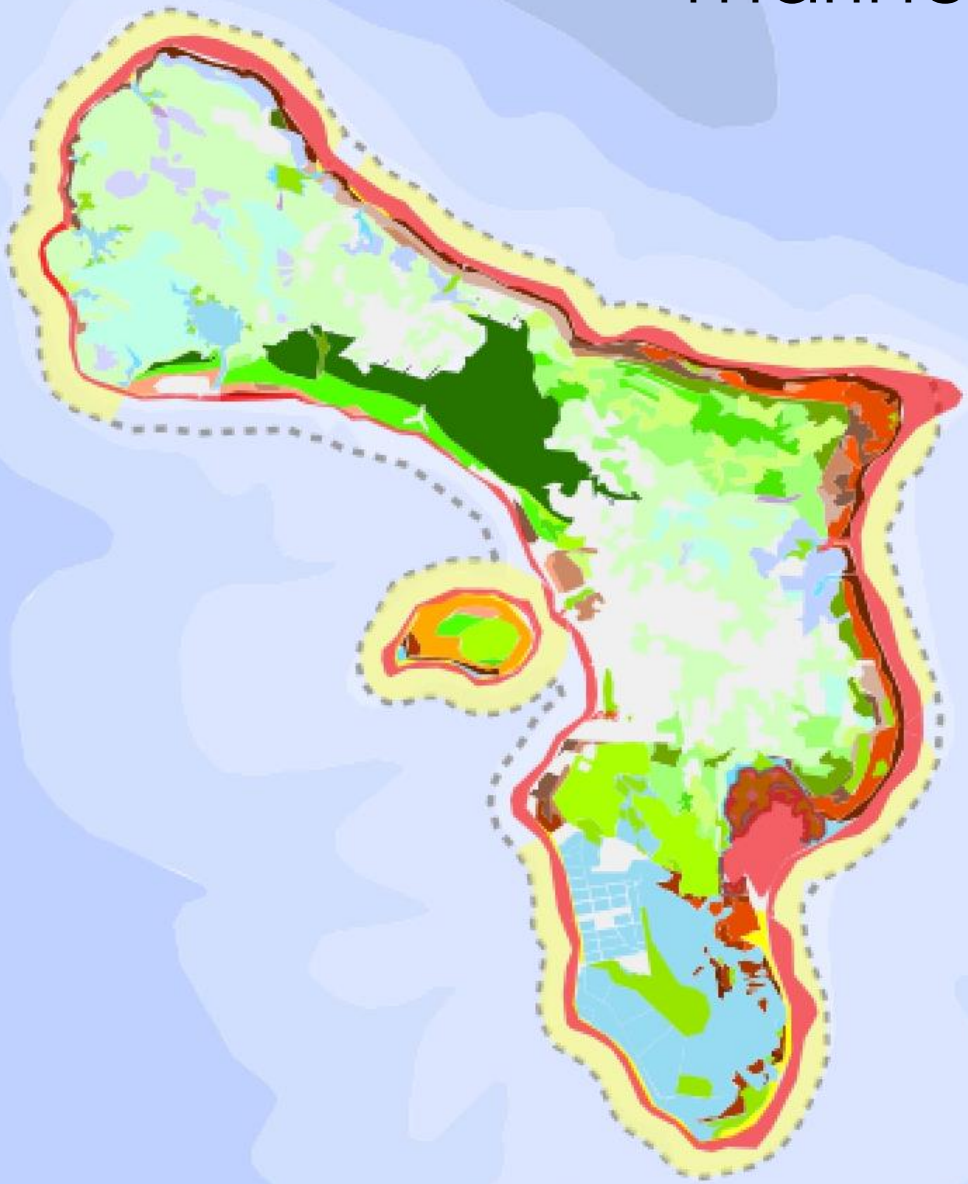


Photo: Marjolijn Christianen

And.. add color to the Caribbean Sea marine habitat maps

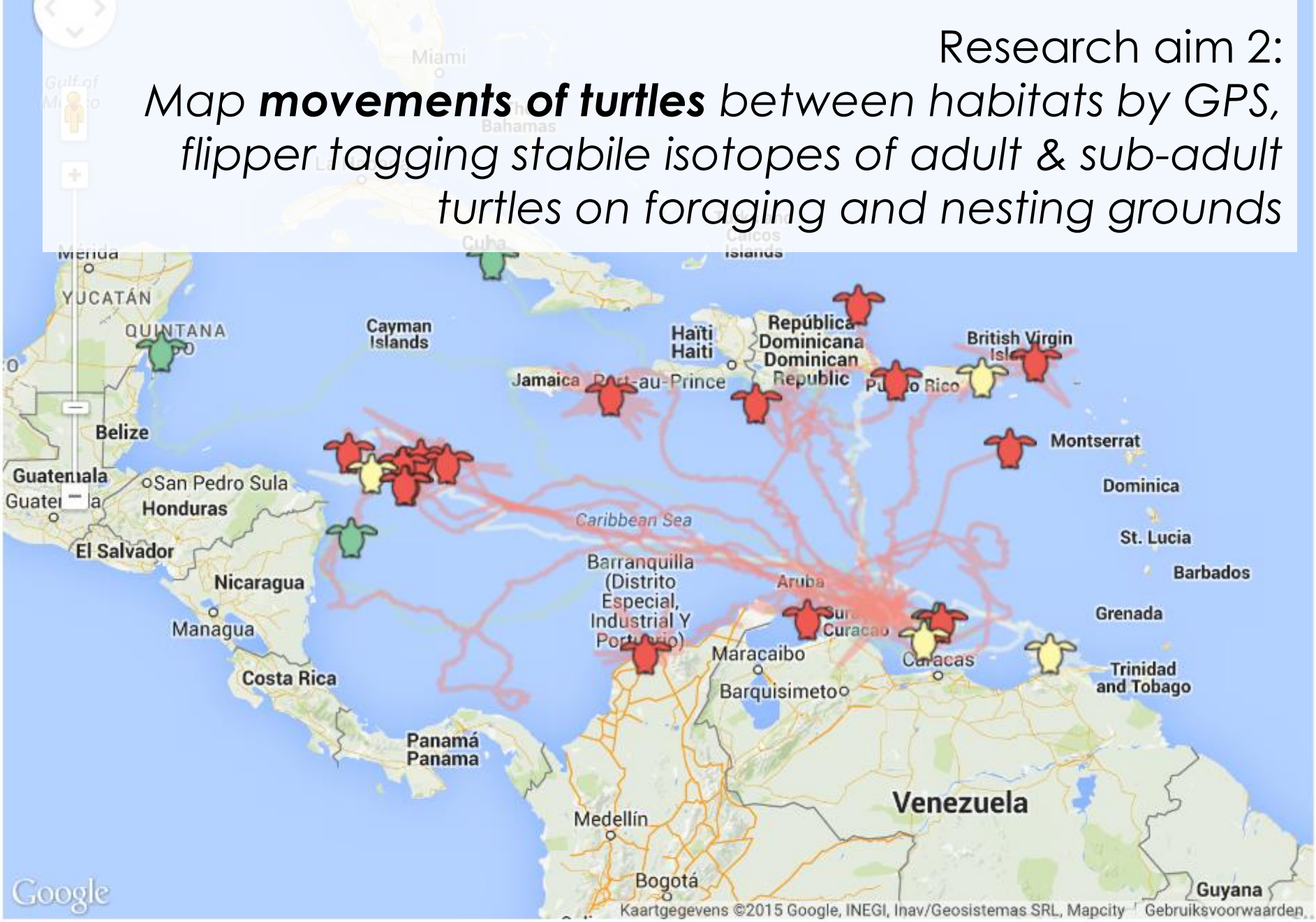


Legend

Dcbd.nl

Research aim 2:

*Map **movements of turtles** between habitats by GPS, flipper tagging stabile isotopes of adult & sub-adult turtles on foraging and nesting grounds*



GREEN HAWKSBILL LEATHERBACK LOGGERHEAD

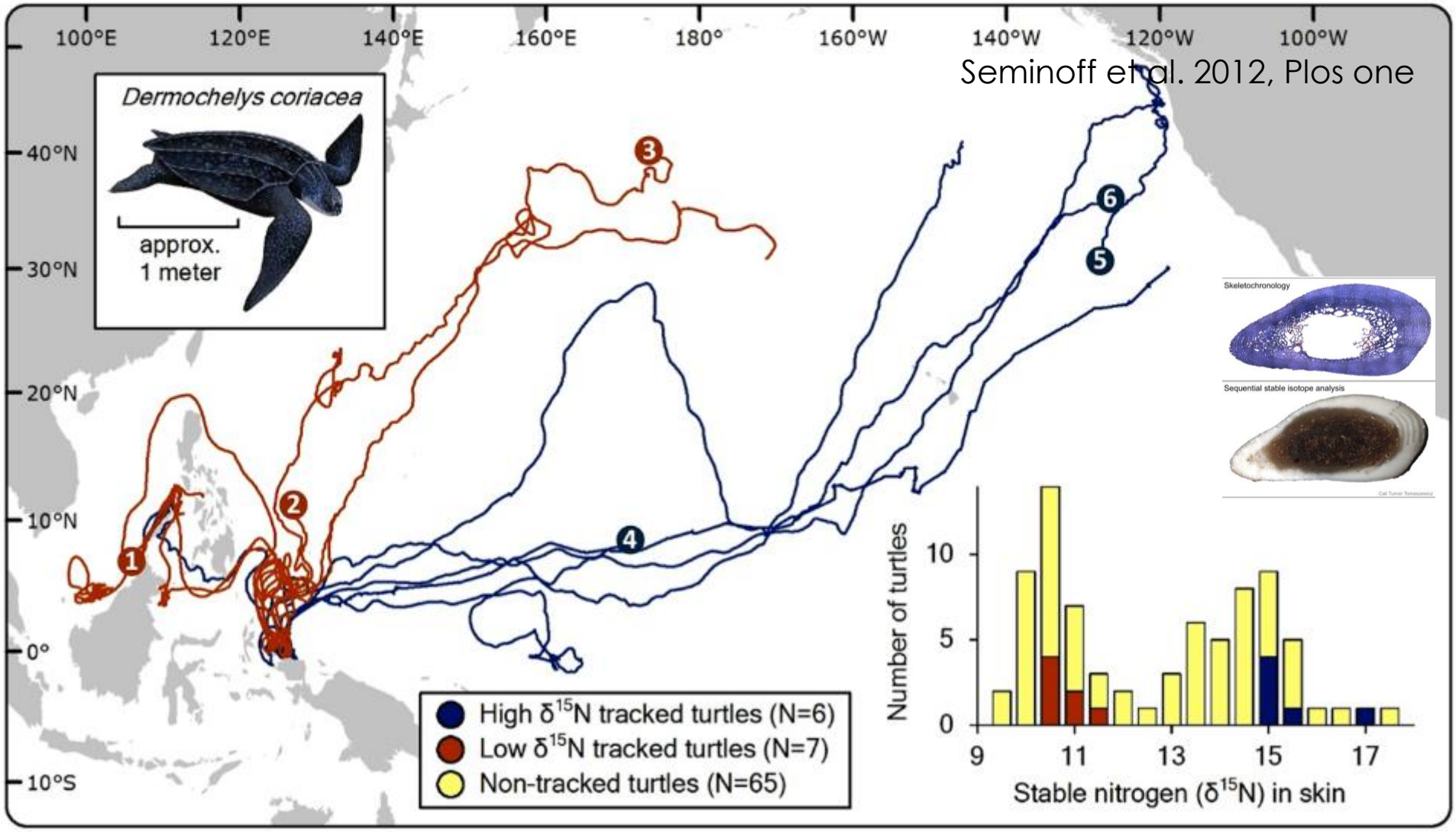
Bonaireturtles.org

Using traditional tags…

Happy after recapturing a turtle tagged 4 yr ago

Photos: Marjolijn Christianen

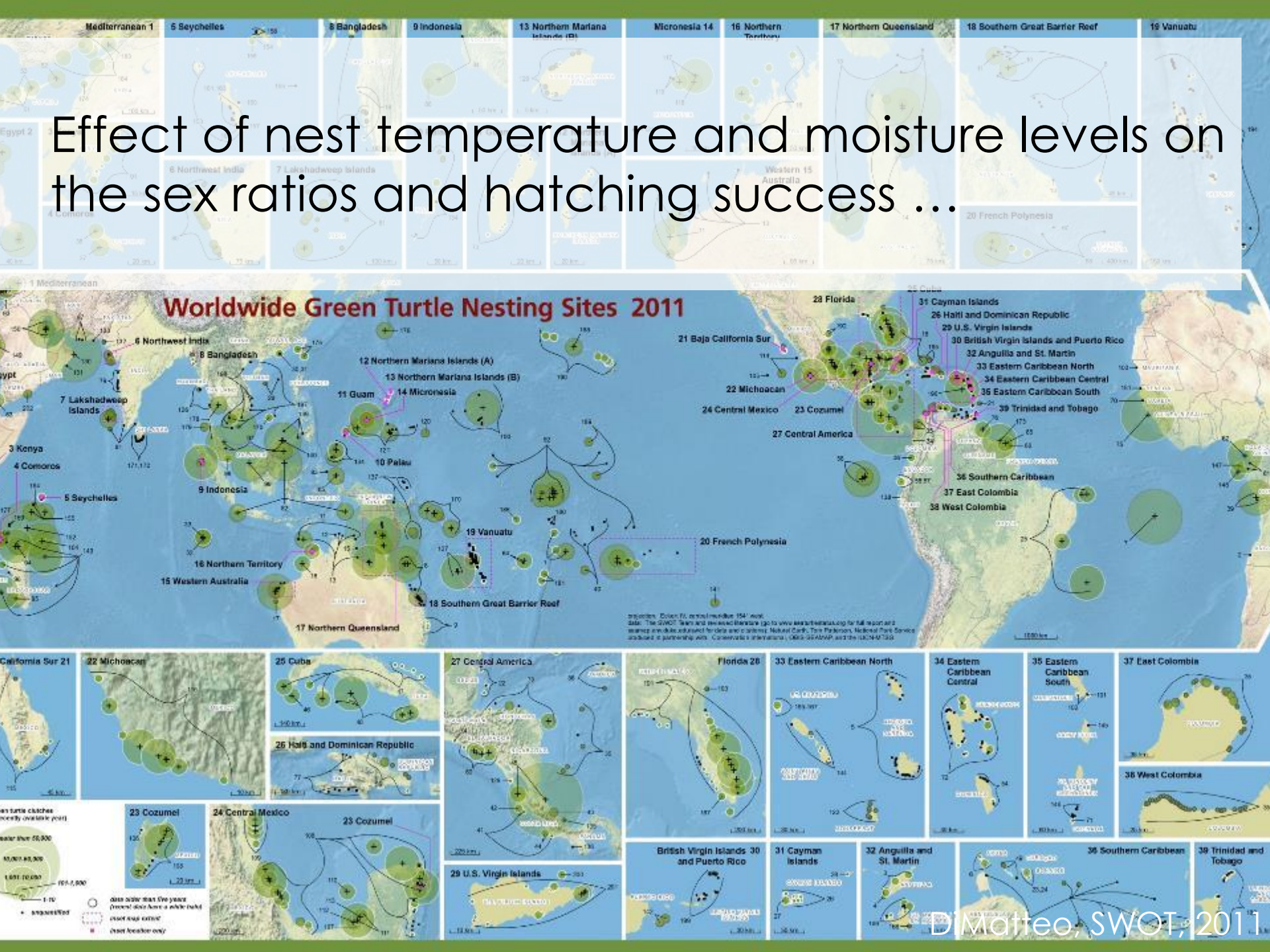
And less traditional ones..
Isotopes also tell migration routes



Research aim 3:
Determine "health" of nesting beaches and foraging grounds (seagrass meadows), and the habitat use, e.g. effect of foraging on habitat.

photo: Marjolijn Christianen

Effect of nest temperature and moisture levels on the sex ratios and hatching success …



DiMatteo, SWOT, 2011

Seagrass experiments under different grazing regimes in cages

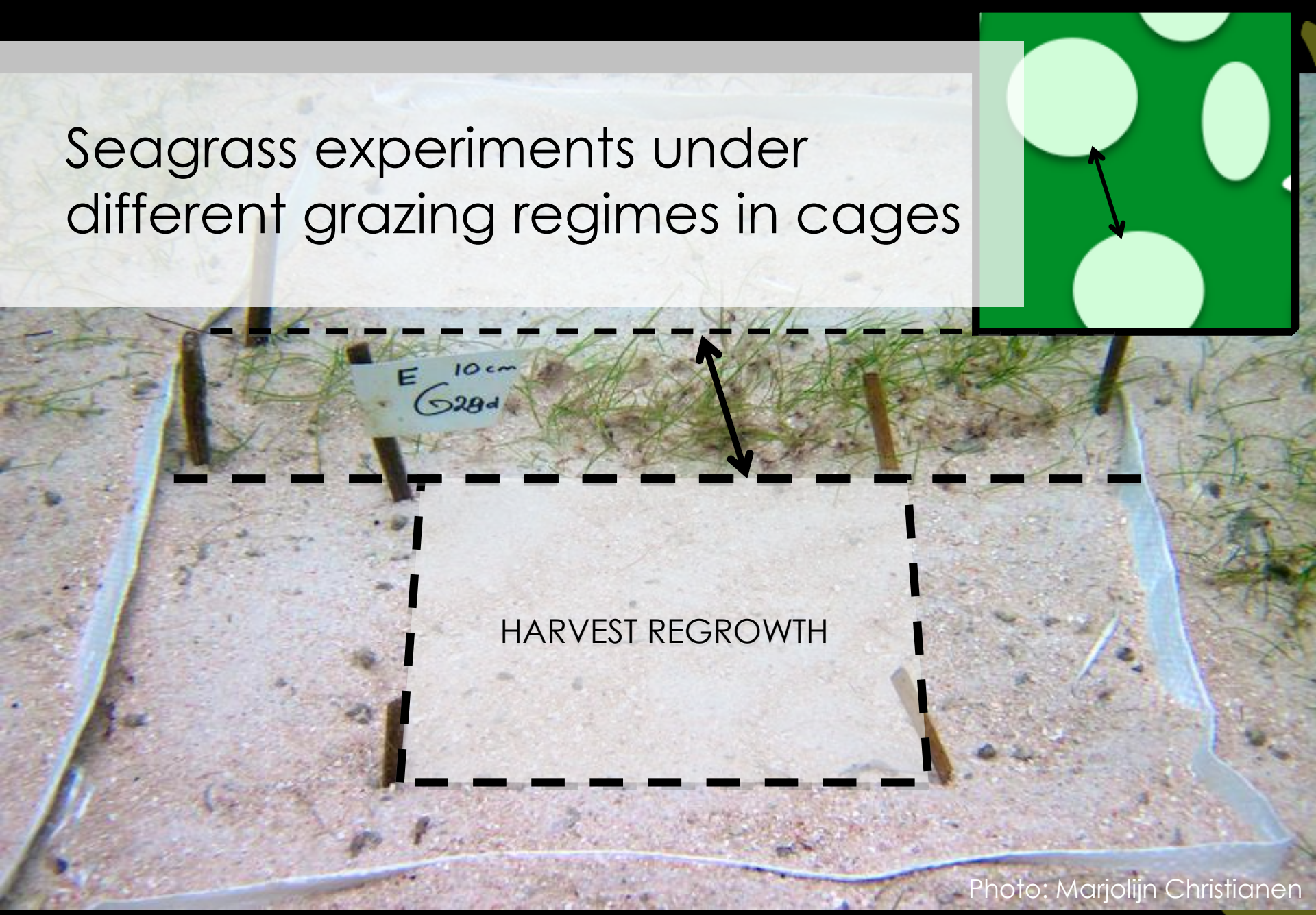


Photo: Marjolijn Christianen

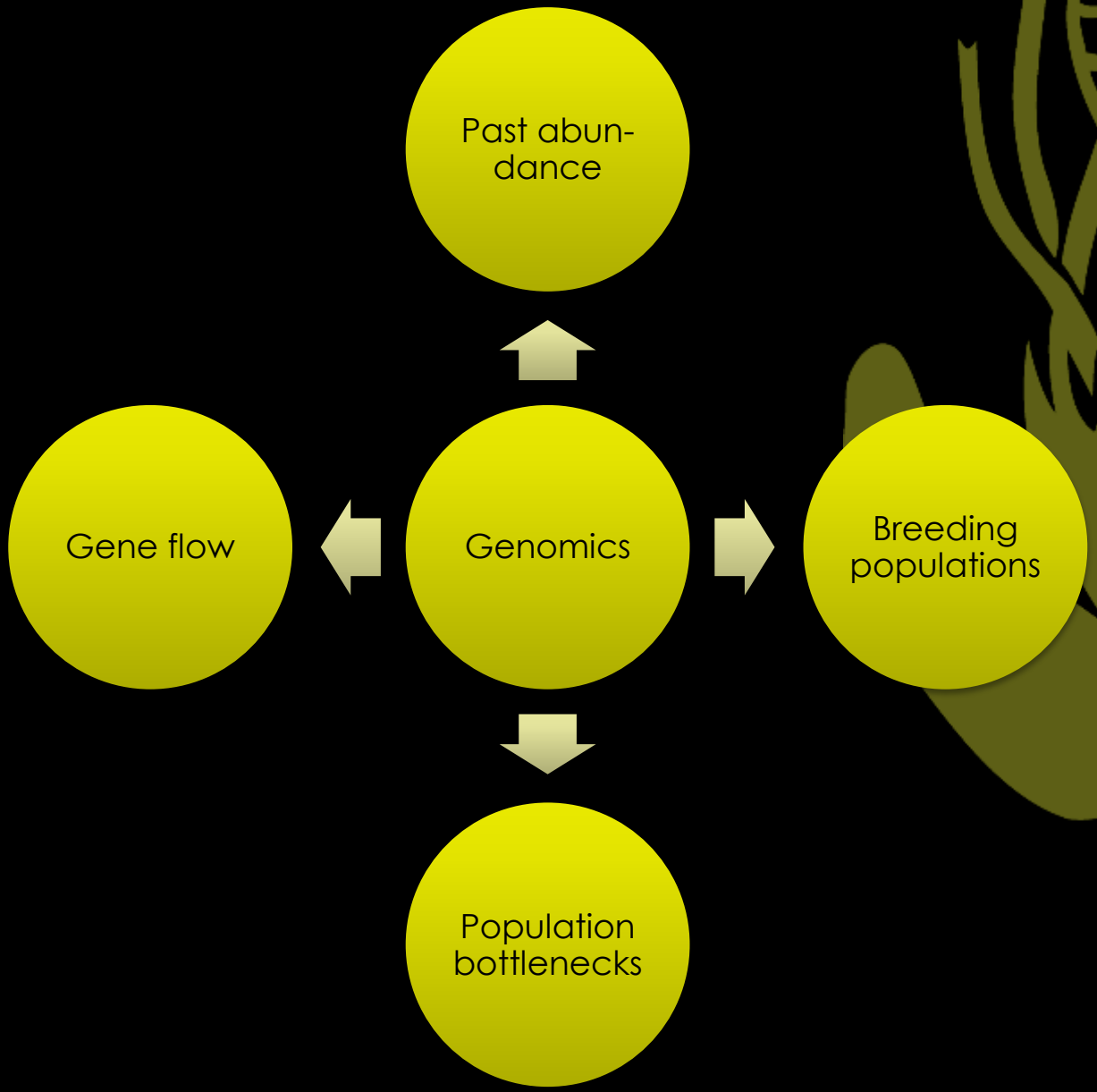
Feeding preferences

Photo: Tineke van Bussel

Population genetics

SUB-PROJECT 2: RESEARCH QUESTIONS & AIMS

Sea turtle population genomics



Sampling

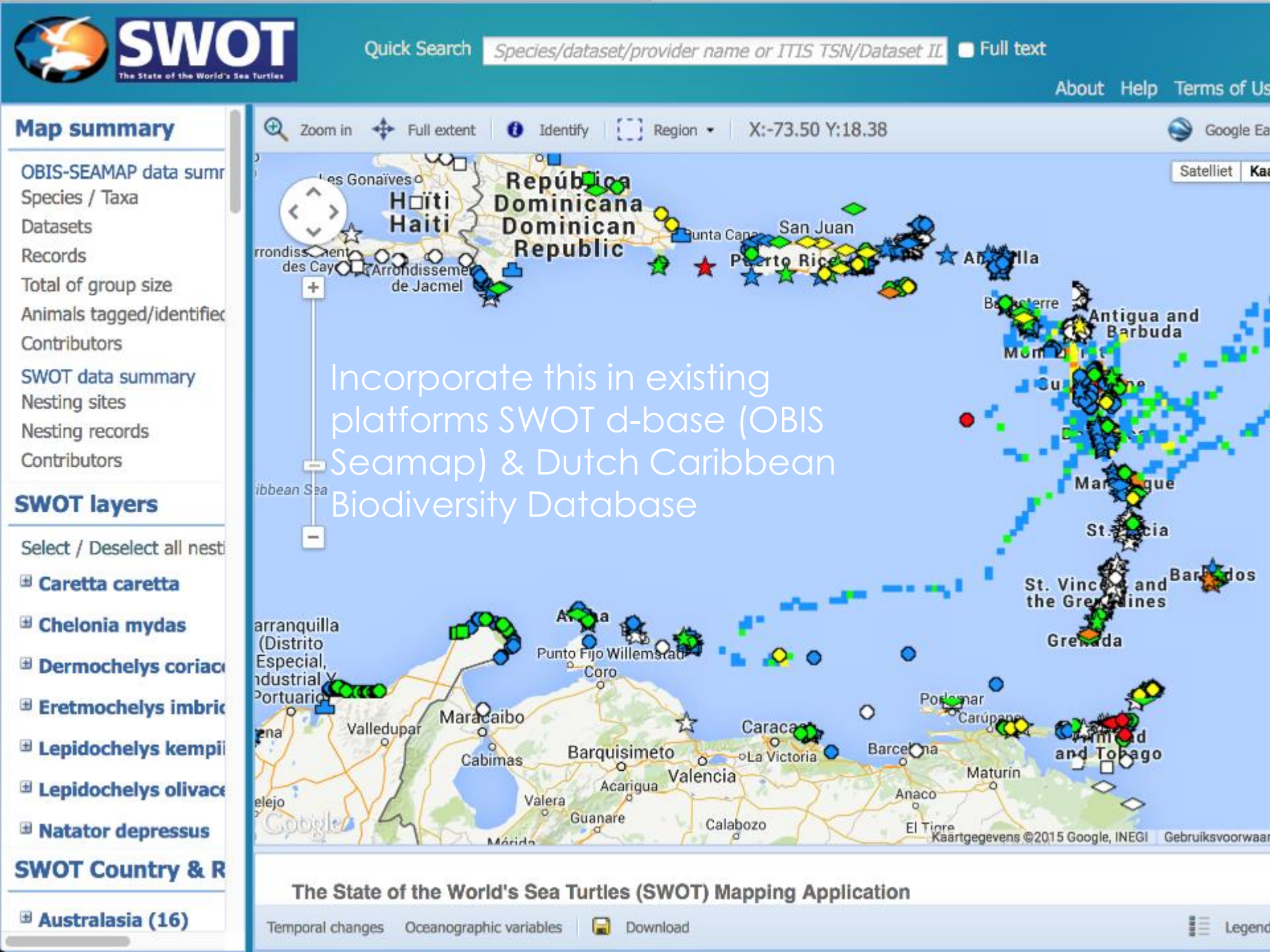
Foraging ground:

- Males & Female
- Sub-adults & Adults

Nesting ground

- Adult females
- Hatchlings

LINKED TO: health turtles, isotope, toxicology health of habitats


SWOT
The State of the World's Sea Turtles
Quick Search
Species/dataset/provider name or ITIS TSN/Dataset ID
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OBIS-SEAMAP data summary
Species / Taxa
Datasets
Records
Total of group size
Animals tagged/identified
Contributors
SWOT data summary
Nesting sites
Nesting records
Contributors
SWOT layers
Select / Deselect all nesting
Caretta caretta
Chelonia mydas
Dermochelys coriacea
Eretmochelys imbricata
Lepidochelys kempii
Lepidochelys olivacea
Natator depressus
SWOT Country & Region
Australasia (16)
Zoom in
Full extent
Identify
Region
X:-73.50 Y:18.38
Google Earth
Satelliet
Haïti
Haiti
República Dominicana
Dominican Republic
San Juan
Puerto Rico
Antigua and Barbuda
Punto Fijo
Willemstad
Coro
Maracaibo
Valledupar
Barranquilla
Caracas
Barquisimeto
Cabimas
Valencia
La Victoria
Maturín
Anaco
Acarigua
Valera
Guanare
Calabozo
Carúpano
Trinidad and Tobago
Grenada
Barbados
Kaartgegevens ©2015 Google, INEGI
Gebruiksvoorwaarden
Incorporate this in existing platforms SWOT d-base (OBIS Seamap) & Dutch Caribbean Biodiversity Database
The State of the World's Sea Turtles (SWOT) Mapping Application
Temporal changes
Oceanographic variables
Download
Legend

DUTCH CARIBBEAN
BIODIVERSITY DATABASE

monitoring maps resources

The Maps section of the Dutch Caribbean Biodiversity Database contains a GIS-based map viewer containing the most accurate and up-to-date geographic nature data for the Dutch Caribbean. This allows nature managers to visualize their cause and builds public support for conservation by allowing the world to interact with Dutch Caribbean maps such as vegetation, geology, soil, land use, protected areas and zoning plans. These base layers are projected in an interactive central map where data collectors can also view in their monitoring data.
To download GIS data please visit our GeoServer

about disclaimer log in

This as input to advise Dutch Caribbean nature management plans

Summary of our successful pre-WIDECAST meeting!

Thank you!