

State of the World's Sea Turtles (SWOT) Program

Presented to the 2015 WIDECAST annual meeting



Connie Kot
Duke University



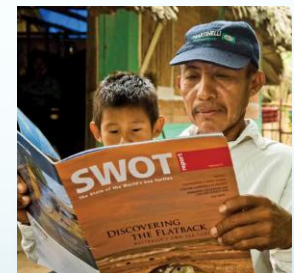
SWOT Team

- Rod Mast, Brian Hutchinson, Bryan Wallace
- Connie Kot, Andrew DiMatteo, Ei Fujioka, Pat Halpin
- Global partners and data providers (i.e., WIDECAST)

Thank you!

SWOT Program

- Global collaboration to understand and monitor the status of sea turtles
 - Distribute small grants annually
 - Networking and outreach materials
 - Compile and publish global sea turtle data
- Annual SWOT Reports and online mapping application for nesting and telemetry data



Global Sea Turtle Nesting Abundance and Distribution

Tagged/unique
females



Clutches/nests
("true" crawls)

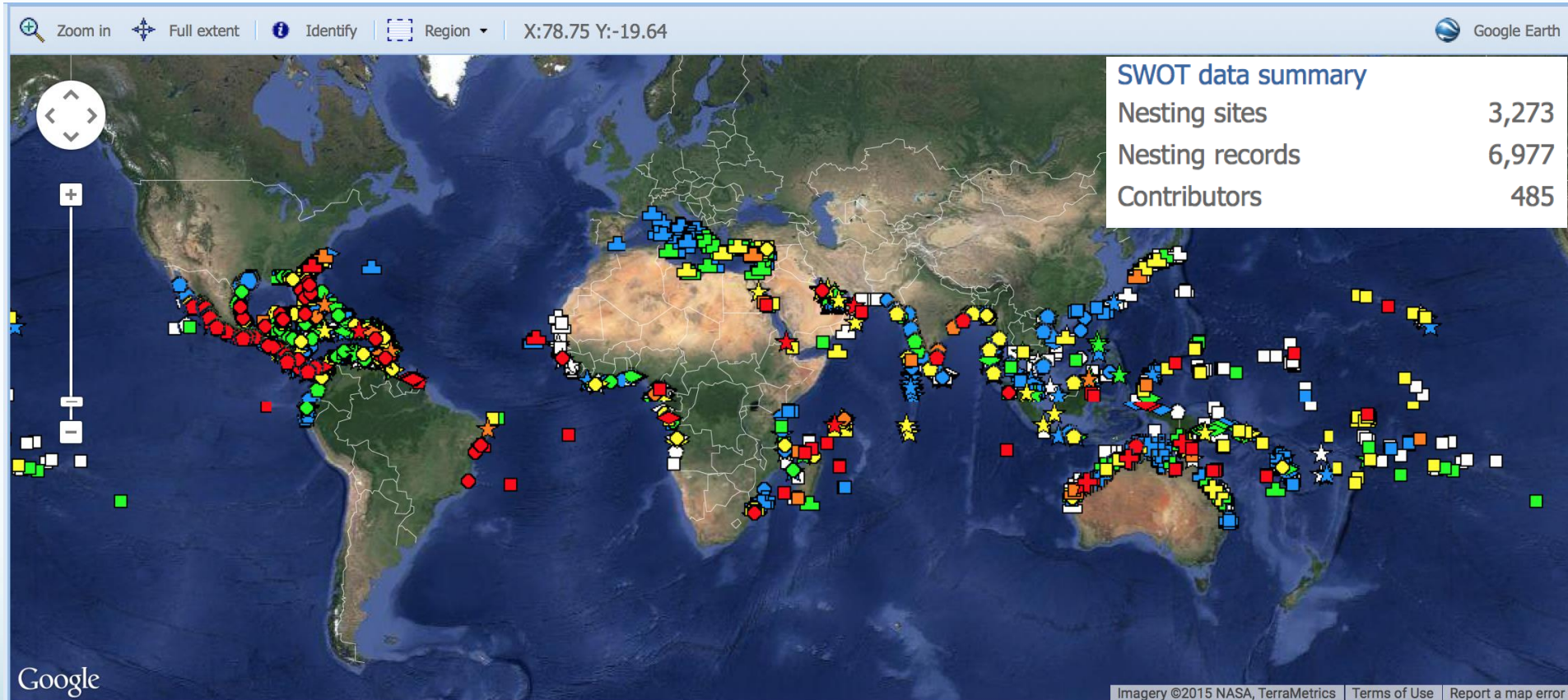


Crawls
(including false crawls)



SWOT Online Nesting Database

<http://seamap.env.duke.edu/swot>



SWOT
The State of the World's Sea Turtles

WIDECAST
Wider Caribbean Sea Turtle Conservation Network



CONSERVATION
INTERNATIONAL

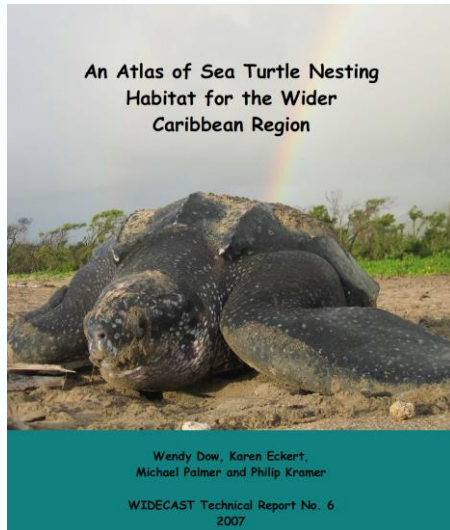


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Count type	Colony size
☒ Clutches	☒ > 1,000
☐ Females	☒ 500-1,000
☐ Crawls	☒ 100-500
	☒ 25-100
	☒ < 25
	☒ Unquantified
	☒ No nesting

WIDECAST Sea Turtle Nesting Atlas

<http://seamap.env.duke.edu/widecast>



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ENDANGERED SPECIES RESEARCH
Biology Species Box

Published online November 18



Sea turtle nesting habitat in the Wider Caribbean Region

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ABSTRACT: Incomplete baseline data on population demographics and patterns of habitat use and the urgent need for international coordination of conservation actions are among the challenges inherent in promoting the recovery of endangered, migratory marine species. Working with local scientists, government officials and conservationists we developed a comprehensive atlas of all known sea turtle nesting grounds ($n = 1211$ discrete sites), including colony size and population frameworks, in the 43 nations and territories in the Wider Caribbean Region (WCR). The majority of sites listed extremely small colonies characterized by <25 nesting events yr⁻¹ per species. Large nesting colonies were rare. Sites with >500 nesting events yr⁻¹ comprised between 1 and 6% of species-specific nesting site totals. We identified information gaps, including sites whose nesting was known to occur but data were insufficient to categorize nesting colony size. The database allows users to identify and rank critical habitat, fill data gaps, inform policy-making, promote the implementation of regional agreements, and strengthen national and international conservation planning and research. This research highlights the value of international network and data sharing, the benefits of collecting baseline information on the distribution and abundance of populations, and the usefulness of long-term, systematic monitoring of sea turtle nesting grounds.

KEY WORDS: Sea turtle · Caribbean · Nesting · Nesting habitat · Endangered species · Migratory marine species

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INTRODUCTION

Data on species distribution and range are fundamental to priority setting exercises aimed at evaluating the status and trends of migratory populations over time (Cramer & Hines 2006, NEC 2010), but such data are rarely assembled in sufficient detail at large marine ecosystems (LME) scales (Shuman et al. 1993, Shuman & Hines 2009). In the Caribbean Sea, 1 of 64 LMEs (Richardson & Bolnick 1992), the development, implementation, and evaluation of management plans designed to achieve sea turtle population recovery objectives has been hampered by a lack of baseline data on present and historic pat-

terns of habitat use, population size and trend, and threats to survival at all life stages. Sea turtles range across multiple geopolitical boundaries and may traverse ocean basins on an annual basis, further complicating management by engaging a complex landscape of decision and often contradictory regulatory regimes.

Caribbean sea turtle species—leatherhead *Carotte carolinensis*, green *Chelonia mydas*, hawksbill *Eretmochelys imbricata*, loggerhead *Caretta caretta*, and Kemp's ridley *Lepidochelys kempii*—are classified by the International Union for the Conservation of Nature's Red List of Threatened Species as Criti-

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 OBIS SEAMAP

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Information & Actions

Summary & Search across Countries

Atlas of Sea Turtle Nesting Habitat

Map on Google Earth

Wider Caribbean Sea Turtle Nesting Sites

OBIS-SEAMAP ID 415

of Nesting Sites 1312 sites in 43 countries/territories

Last updated 2007-06-27 16:51:28

Database compiler  **WIDECAST**
Wider Caribbean Sea Turtle Conservation Network

Sponsored by  **The Nature Conservancy**
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Countries/territories covered

Anguilla (UK)	Antigua & Barbuda	Aruba (NL)	Bahamas
Barbados	Belize	Bermuda (NL)	Bonaire (NL-AN)
Brazil	British Virgin Islands (UK)	Cayman Islands (UK)	Colombia
Costa Rica	Cuba	Curacao (NL-AN)	Dominica
Dominican Republic	French Guiana (FR)	Grenada	Guadeloupe (FR)
Guatemala	Guyana	Haiti	Honduras
Jamaica	Martinique (FR)	Mexico	Montserrat (UK)
Nicaragua	Panama	Puerto Rico (US)	Saba (NL-AN)
Saint Kitts & Nevis	Saint Lucia	Saint Vincent & the Grenadines	Sint Eustatius (NL-AN)
Sint Maarten (NL-AN)	Suriname	Trinidad & Tobago	Turks & Caicos Islands (UK)
US States	US Virgin Islands (US)		



Global Sea Turtle Tracking Initiative

Identify important areas for sea turtles in the ocean using GPS/satellite tracked sea turtles



SWOT Online Mapping Application

<http://seamap.env.duke.edu/swot>

SWOT
The State of the World's Sea Turtles

Quick Search Full text

Map summary

OBIS-SEAMAP data summary

Species / Taxa	9 / 9
Datasets	56
Records	201,451
Total of group size	472
Animals tagged/identified	472
Contributors	39

SWOT data summary

Nesting sites	3,271
Nesting records	6,899
Contributors	483

SWOT layers

Select / Deselect all nesting layers

- ☒ **Caretta caretta**
- ☒ **Chelonia mydas**
- ☒ **Dermochelys coriacea**
- ☒ **Eretmochelys imbricata**
- ☒ **Lepidochelys kempii**
- ☒ **Lepidochelys olivacea**
- ☒ **Natator depressus**

SWOT Country & Region

- ☒ **Australasia (16)**
- ☒ **East Atlantic (18)**
- ☒ **East Pacific (10)**
- ☒ **Mediterranean (12)**
- ☒ **Middle East (8)**
- ☒ **North Atlantic (2)**
- ☒ **Northwest Pacific (3)**
- ☒ **Pacific Islands (14)**
- ☒ **South Asia (5)**
- ☒ **Southwest Atlantic (2)**
- ☒ **West Indian (11)**
- ☒ **Wider Caribbean (40)**

SWOT Options

Map controls: Zoom in, Full extent, Identify, Region, X:157.32 Y:-29.38

Google

Database

SWOT
The State of the World's Sea Turtles

WIDECAST
Wider Caribbean Sea Turtle Conservation Network

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IUCN

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SWOT Online Mapping Application

<http://seamap.env.duke.edu/swot>

The screenshot displays the SWOT Online Mapping Application interface. The top navigation bar includes the SWOT logo, a search bar, and links for About, Help, and Terms of Use. The main map area shows the Caribbean Sea and surrounding landmasses, with various data points plotted. The left sidebar contains a 'Map summary' section with statistics and a 'SWOT layers' section for selecting data layers.

Map summary

- OBIS-SEAMAP data summary
- Species / Taxa: 9 / 9
- Datasets: 57
- Records: 206,250
- Total of group size: 1,146,941
- Animals tagged/identified: 472
- Contributors: 40
- SWOT data summary
- Nesting sites: 3,273
- Nesting records: 6,977
- Contributors: 485

SWOT layers

Select / Deselect all nesting layers

- Caretta caretta**
 - ☒ Nesting beaches
 - ☒ Distribution
 - ☐ RMUs
 - ☐ mtDNA
 - ☐ nDNA
 - ☐ Habitat Suitability
- Chelonia mydas**
 - ☒ Nesting beaches
 - ☐ Distribution
 - ☐ RMUs
 - ☐ mtDNA
 - ☐ nDNA
 - ☐ Habitat Suitability
- Dermochelys coriacea**
 - ☒ Nesting beaches
 - ☐ Distribution
 - ☐ RMUs
 - ☐ mtDNA
 - ☐ nDNA
 - ☐ Habitat Suitability
- Eretmochelys imbricata**
 - ☒ Nesting beaches
 - ☐ Distribution
 - ☐ RMUs
 - ☐ mtDNA
 - ☐ nDNA
 - ☐ Habitat Suitability

Database

Partnership / Supporters

SWOT: The State of the World's Sea Turtles

WIDECAST: Wider Caribbean Sea Turtle Conservation Network

CONSERVATION INTERNATIONAL

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The Nature Conservancy: Protecting nature. Preserving life.

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Legends

SWOT Online Mapping Application

<http://seamap.env.duke.edu/swot>

The screenshot displays the SWOT Online Mapping Application interface. The top header includes the SWOT logo, a search bar with the text "Species/dataset/provider name or ITIS TSN/Dataset ID", and links for "About", "Help", and "Terms of Use".

Map summary

- OBIS-SEAMAP data summary
- Species / Taxa: 0 / 0
- Datasets: 0
- Records: 0
- Total of group size: 0
- Contributors: 0
- SWOT data summary
- Nesting sites: 0
- Nesting records: 0
- Contributors: 0

SWOT layers

Select / Deselect all nesting layers

- ☐ **Caretta caretta**
 - ☐ Nesting beaches
 - ☐ Distribution
 - ☒ RMUs
 - ☒ mtDNA
 - ☒ nDNA
 - ☐ Habitat Suitability
- ☐ **Chelonia mydas**
- ☐ **Dermochelys coriacea**
- ☐ **Eretmochelys imbricata**
- ☐ **Lepidochelys kempi**
- ☐ **Lepidochelys olivacea**
- ☐ **Natator depressus**

SWOT Country & Region

- ☐ Australasia (16)
- ☐ East Atlantic (18)
- ☐ East Pacific (10)
- ☐ Mediterranean (12)
- ☐ Middle East (8)
- ☐ North Atlantic (2)
- ☐ Northwest Pacific (3)
- ☐ Pacific Islands (14)
- ☐ South Asia (5)
- ☐ Southwest Atlantic (2)
- ☐ West Indian (11)
- ☐ Wider Caribbean (40)

SWOT Options

The main map area shows a satellite view of the Caribbean and surrounding landmasses. The map includes labels for "United States", "Mexico", "Cuba", "Guatemala", "Honduras", "Nicaragua", "Costa Rica", "Panama", "Venezuela", "Colombia", "Ecuador", "Peru", "Bolivia", "Brazil", "Ghana", "French Guiana", "Suriname", and "Paraguay". The map is overlaid with a blue grid pattern. Navigation tools include "Zoom in", "Full extent", "Identify", "Select", "Region", and coordinates "X:-119.31 Y:-3.21".

Database

Partnership / Supporters

- SWOT: The State of the World's Sea Turtles
- WIDECAST: Wider Caribbean Sea Turtle Conservation Network
- CONSERVATION INTERNATIONAL
- IUCN
- The Nature Conservancy: Protecting nature. Preserving life.

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SWOT Online Mapping Application

<http://seamap.env.duke.edu/swot>

The screenshot displays the SWOT Online Mapping Application interface. The top header features the SWOT logo, a search bar with the text "Species/dataset/provider name or ITIS TSN/Dataset ID", and links for "About", "Help", and "Terms of Use".

The left sidebar contains several sections:

- Map summary**: A table showing counts for various data categories.

Category	Count
OBIS-SEAMAP data summary	
Species / Taxa	0 / 0
Datasets	0
Records	0
Total of group size	0
Contributors	0
SWOT data summary	
Nesting sites	0
Nesting records	0
Contributors	0
- SWOT layers**: A list of layers to be displayed on the map, including "Caretta caretta", "Chelonia mydas", "Dermochelys coriacea", "Eretmochelys imbricata", "Lepidochelys kempii", "Lepidochelys olivacea", "Natator depressus", and "Habitat Suitability".
- SWOT Country & Region**: A list of countries and regions, including "Australasia (16)", "East Atlantic (18)", "East Pacific (10)", "Mediterranean (12)", "Middle East (8)", "North Atlantic (2)", "Northwest Pacific (3)", "Pacific Islands (14)", "South Asia (5)", "Southwest Atlantic (2)", "West Indian (11)", and "Wider Caribbean (40)".
- SWOT Options**: A section for additional mapping options.

The main map area shows a satellite view of the Caribbean and surrounding landmasses. The map is overlaid with various data layers, including nesting sites (red dots) and distribution areas (yellow and blue outlines). The map includes a search bar, zoom controls, and a "Full extent" button. The bottom of the map shows the Google logo and map data attribution.

The bottom section of the interface contains a "Database" section with the SWOT logo and a "Partnership / Supporters" section with logos for Conservation International, IUCN, The Nature Conservancy, and WIDECAST.

OBIS-SEAMAP

<http://seamap.env.duke.edu>

 OBIS SEAMAP

Quick Search ☐ Full text

Help Terms of Use

Map summary

Species / Taxa	640 / 797
Datasets	762
Records	4,490,800
Total of group size	65,591,484
Animals tagged/identified	2,927
Contributors	335

Species selection

☒ All species

Dataset selection

☒ All datasets

Layer selection

☒ Summary

☐ Points

☐ Survey tracks

☐ Animal tracks

☐ Species range map

Zoning

Environment

Other data centers

Zoom in

Full extent

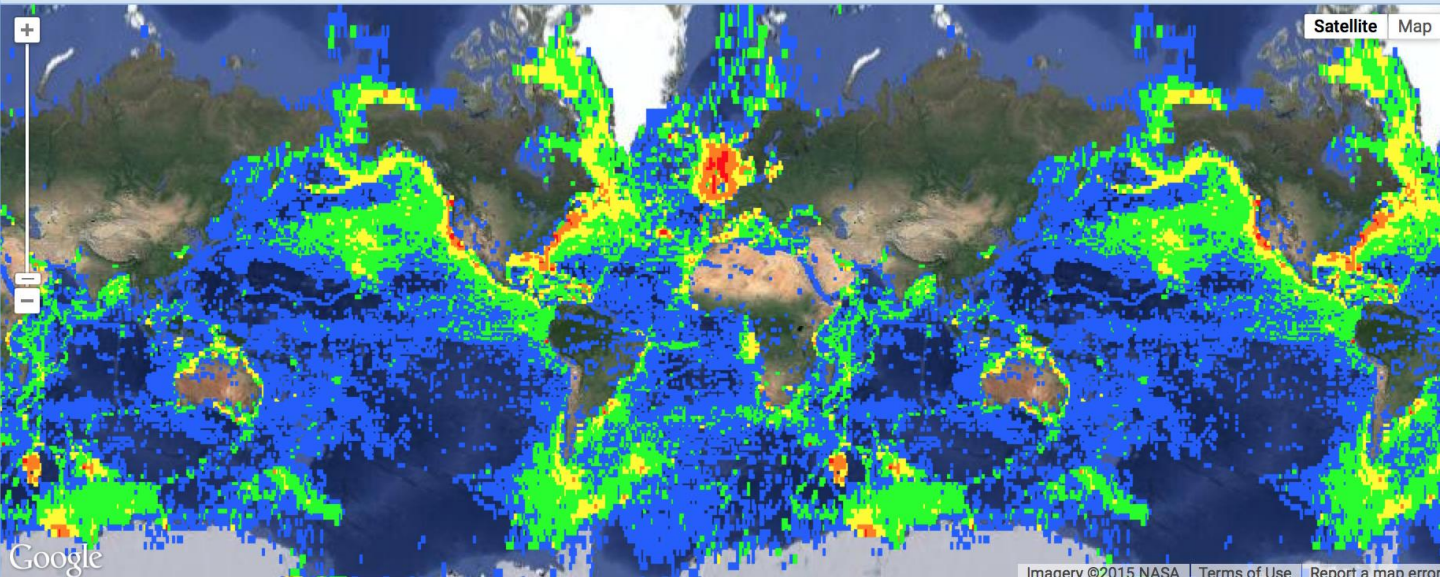
Identify

Region

X:80.86 Y:-73.43

Google Earth

Satellite Map



Google Imagery ©2015 NASA Terms of Use Report a map error

original data provider.

1. To cite the data provider.
2. To cite both the data provider and OBIS-SEAMAP appropriately after approval of use is obtained.

Example citation for a dataset:
Read, A.J. & A.J. Westgate. 1997. Monitoring the movements of harbour porpoises (Phocoena phocoena) with satellite telemetry. Marine Biology, 130: 315-322.

Citation for OBIS-SEAMAP:
Halpin, P.N., A.J. Read, E. Fujioka, B.D. Best, B. Donnelly, L.J. Hazen, C. Kot, K. Urian, E. LaBrecque, A. Dimatteo, J. Cleary, C. Good, L.B. Crowder, and K.D. Hyrenbach. 2009. OBIS-SEAMAP: The world data center for marine mammal, sea bird, and sea turtle distributions. Oceanography 22(2):104-115

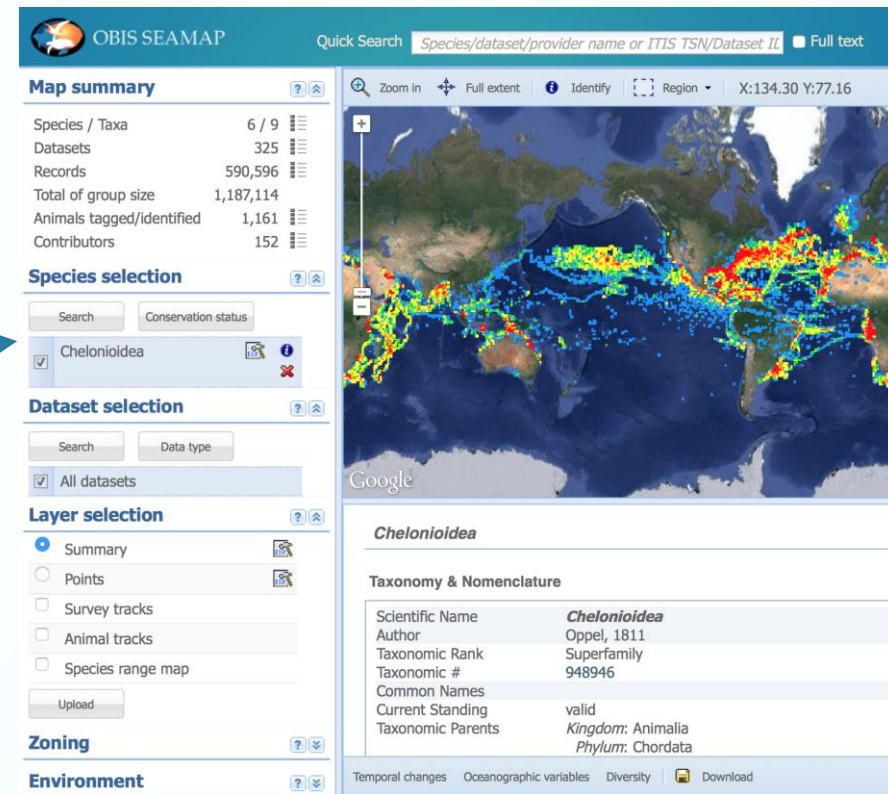
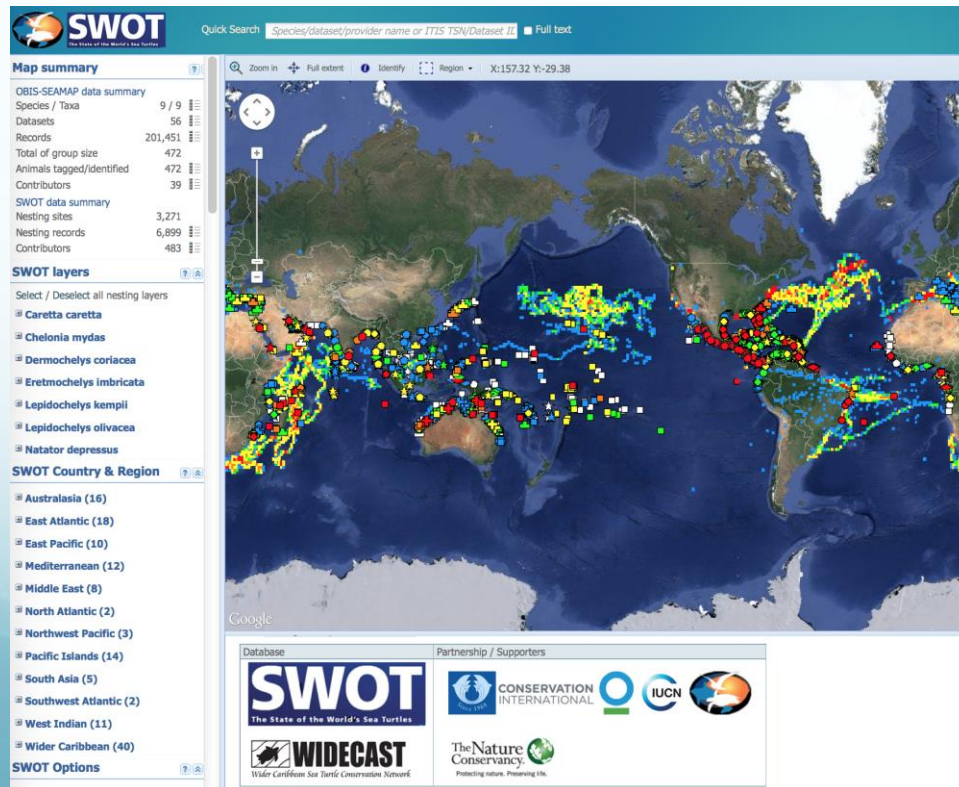
3. To forward the citation of any publication / report that made use of the data / tools provided by OBIS-SEAMAP for inclusion in our list of references.
4. Not to hold OBIS-SEAMAP or the original data providers liable for errors in the data. While we have made every effort to ensure the

Temporal changes Oceanographic variables Diversity

Legends

Explore data:

- Different taxa
- Multiple platforms
- With oceanographic layers



- Higher visibility
- Offsite archive
- Data dissemination

More information

E-mail: swotdata@gmail.com

SWOT Program:

<http://www.seaturtlestatus.org>

SWOT data:

<http://seamap.env.duke.edu/swot>

OBIS-SEAMAP data:

<http://seamap.env.duke.edu>