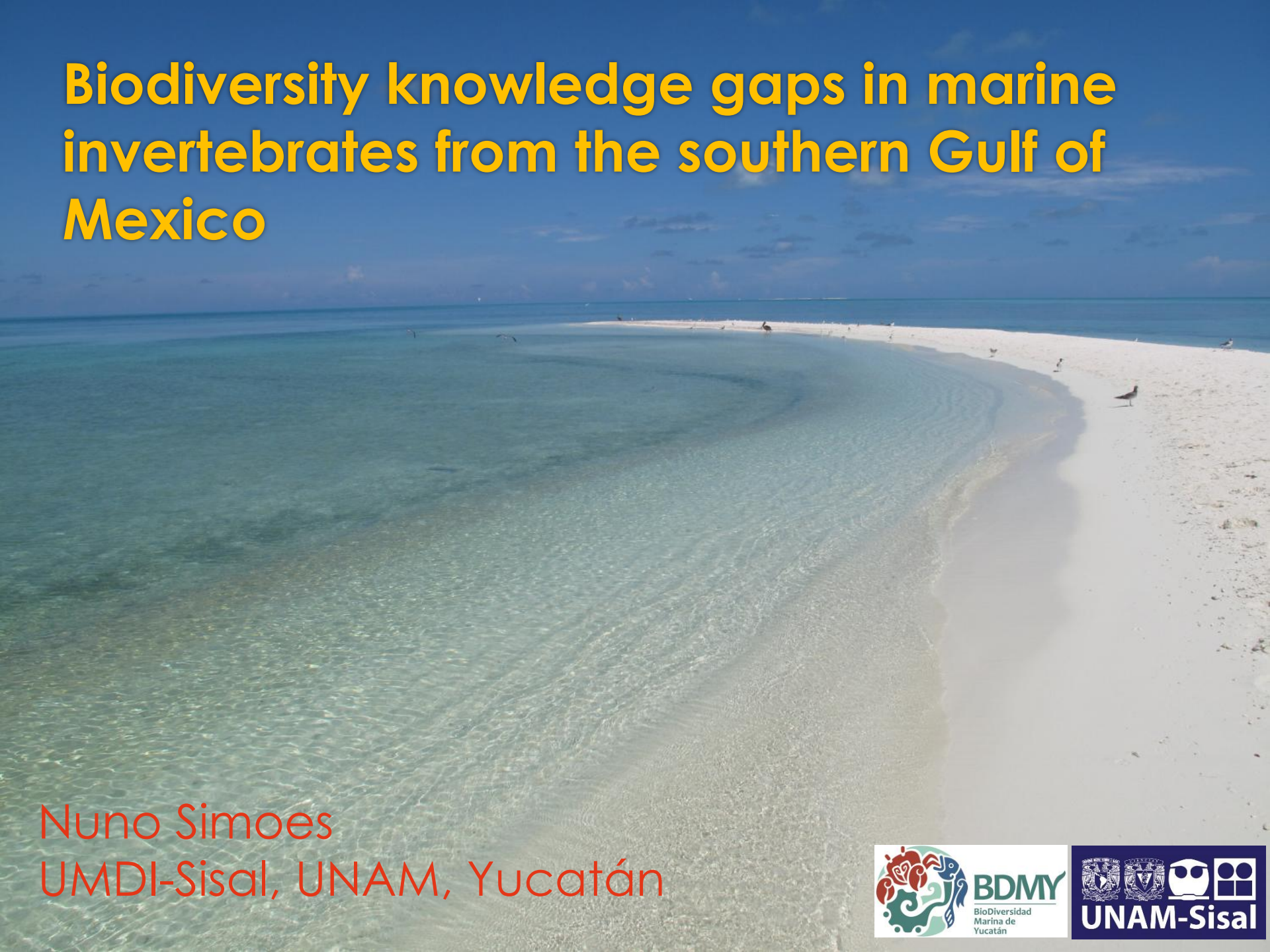
Biodiversity knowledge gaps in marine invertebrates from the southern Gulf of Mexico



Nuno Simoes
UMDI-Sisal, UNAM, Yucatán

BDMY BioDiversidad Marina de Yucatán

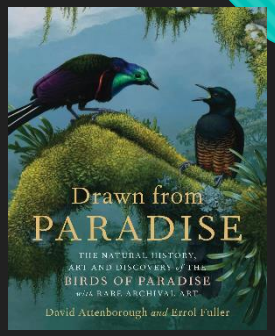
UNAM-Sisal

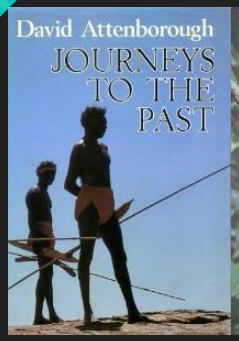
A condensed bit of History

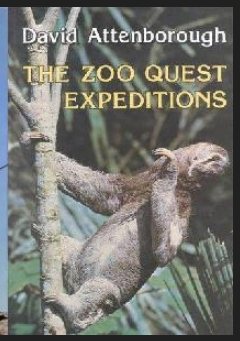
- World population growth
- Increased demand for food and other commodities
- Increased potential for mobility
- More time for recreational activities
- Development of tourism industry
- Increased intensity of use of natural resources

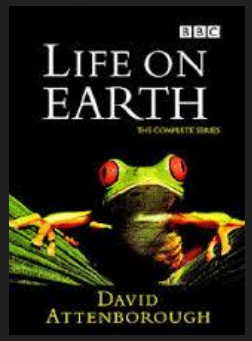
- Need for Regulation

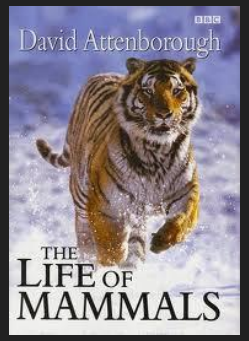
“Anyone who believes in indefinite growth on a physic finite planet is either mad or an economist” David Attenborough



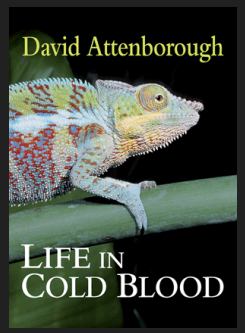


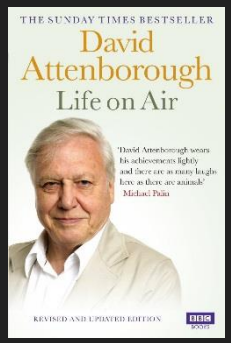


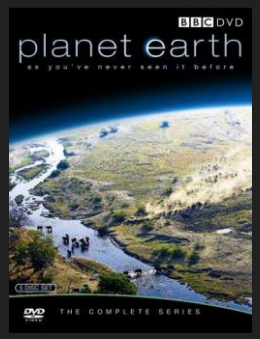


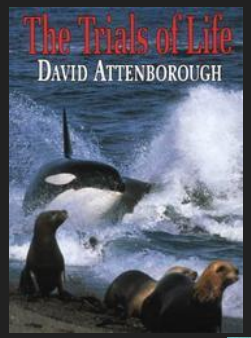


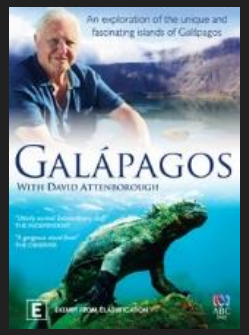
Sir David Attenborough

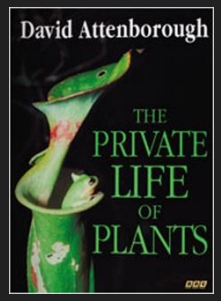


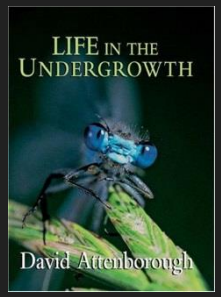


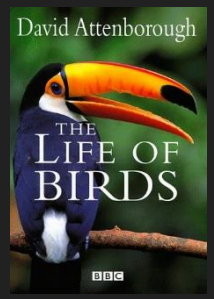


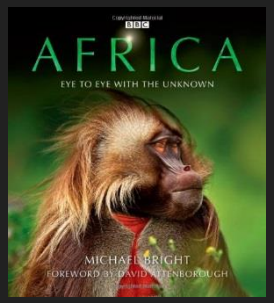


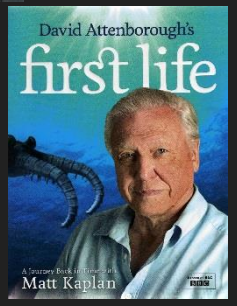












"The study of species in the era of Biodiversity: a tale of stupidity" Ferdinando Boero


Diversity **2010**, *2*, 115-126; doi:10.3390/d2010115

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Communication

The Study of Species in the Era of Biodiversity: A Tale of Stupidity

Ferdinando Boero

The most popular definitions of biodiversity range from genetic to population, species, community, habitat, ecosystem, and landscape diversity.

Species diversity, however, does have a pivotal role in the study and perception of biodiversity.

The key question that triggered concern about biodiversity was: How many species are there on our planet?

Why we need to know how many species?

it provides a metric for how much we do and do not know about life in the land and oceans.

and...

“In the end we will conserve only what we love; we will love only what we understand; and we will understand only what we have been taught.“

Baba Dioum, activist in favour of Conservation, Senegal

Have we done it?

OPEN ACCESS Freely available online

PLOS BIOLOGY

How Many Species Are There on Earth and in the Ocean?

Camilo Mora[1,2*], Derek P. Tittensor[1,3,4], Sina Adl[1], Alastair G. B. Simpson[1], Boris Worm[1]

1 Department of Biology, Dalhousie University, Halifax, Nova Scotia, Canada, 2 Department of Geography, University of Hawaii, Honolulu, Hawaii, United States of America, 3 United Nations Environment Programme World Conservation Monitoring Centre, Cambridge, United Kingdom, 4 Microsoft Research, Cambridge, United Kingdom

2011

Spotlight

CellPress

Global species richness estimates have not converged

M. Julian Caley[1], Rebecca Fisher[1], and Kerrie Mengersen[2]

[1] Australian Institute of Marine Science, PMB 3, Townsville MC, Queensland, Australia
[2] School of Mathematical Sciences, Queensland University of Technology, GPO Box 2434, Brisbane, Qld 4001, Australia

2014

Number of MARINE species described

Current Biology 22, 1–14, December 4, 2012 ©2012 Elsevier Ltd All rights reserved http://dx.doi.org/10.1016/j.cub.2012.09.036

Article

The Magnitude of Global Marine Species Diversity

2012

121 (!) authors

~226,000 eukaryotic marine species described. More species were described in the past decade (~20,000) than in any previous one.

Of these, ~7,600 species belong to Plantae, ~19,500 to Chromista, ~550 to Protozoa, ~1,050 to Fungi, and nearly 200,000 to Animalia.

58,000–72,000 species were collected but not yet described

482,000–741,000 more species have yet to be sampled.

Molecular methods may add tens of thousands of cryptic species.

Number of MARINE species described

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Article

The Magnitude of Global Marine Species Diversity

Thus, there may be 0.7–1.0 million marine species. Past rates of description of new species indicate there may be 0.5 +- 0.2 million marine species.

On average 37% of species in over 100 recent field studies around the world might be new to science.

Conclusions: previous estimates of there being well over one million marine species appear highly unlikely.

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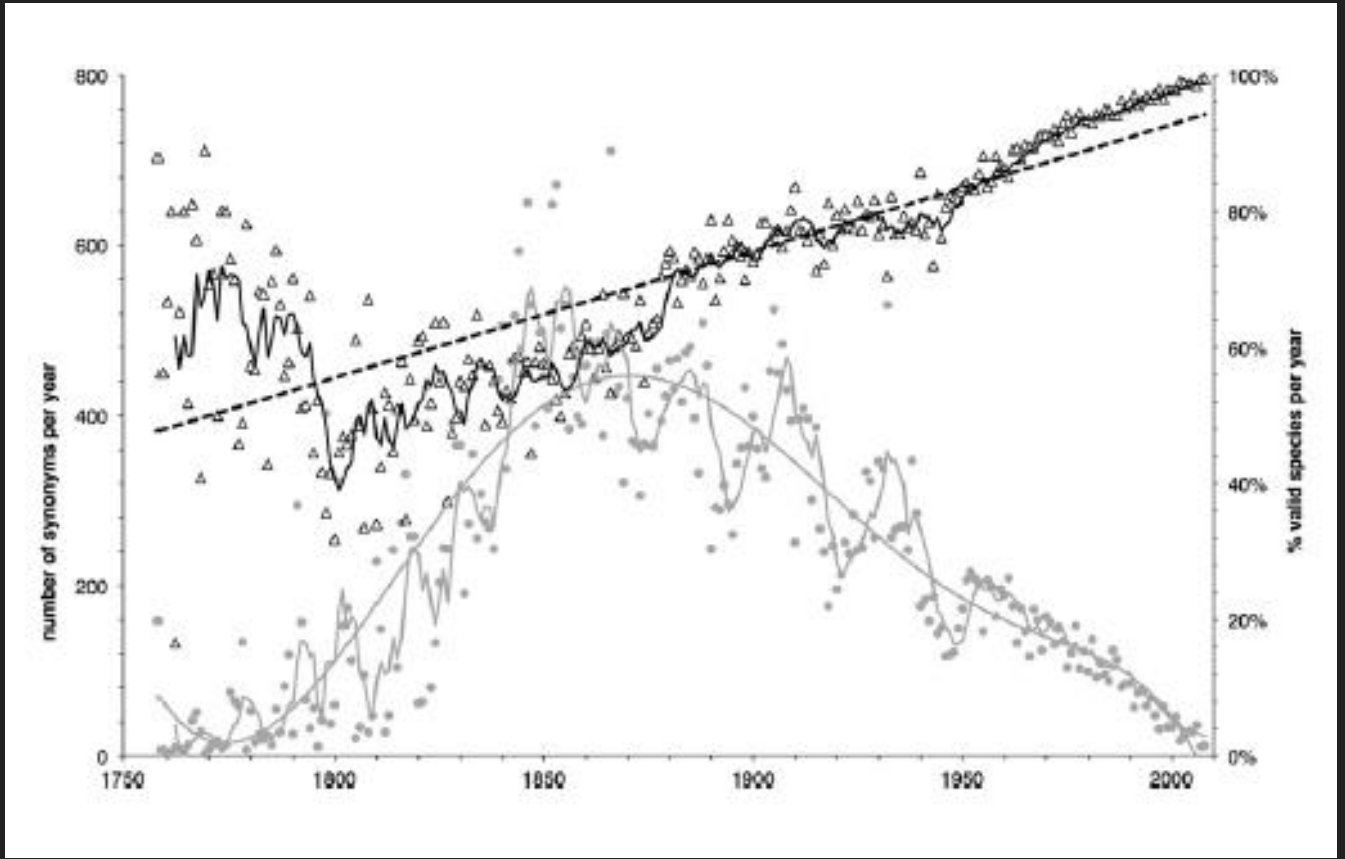
Article

The Magnitude of Global Marine Species Diversity

Number of Synonyms per Year of Original Description

Grey – walking avrage (5 years) and polynomial fit 6th order

Black – walking average and linear fit number valid species



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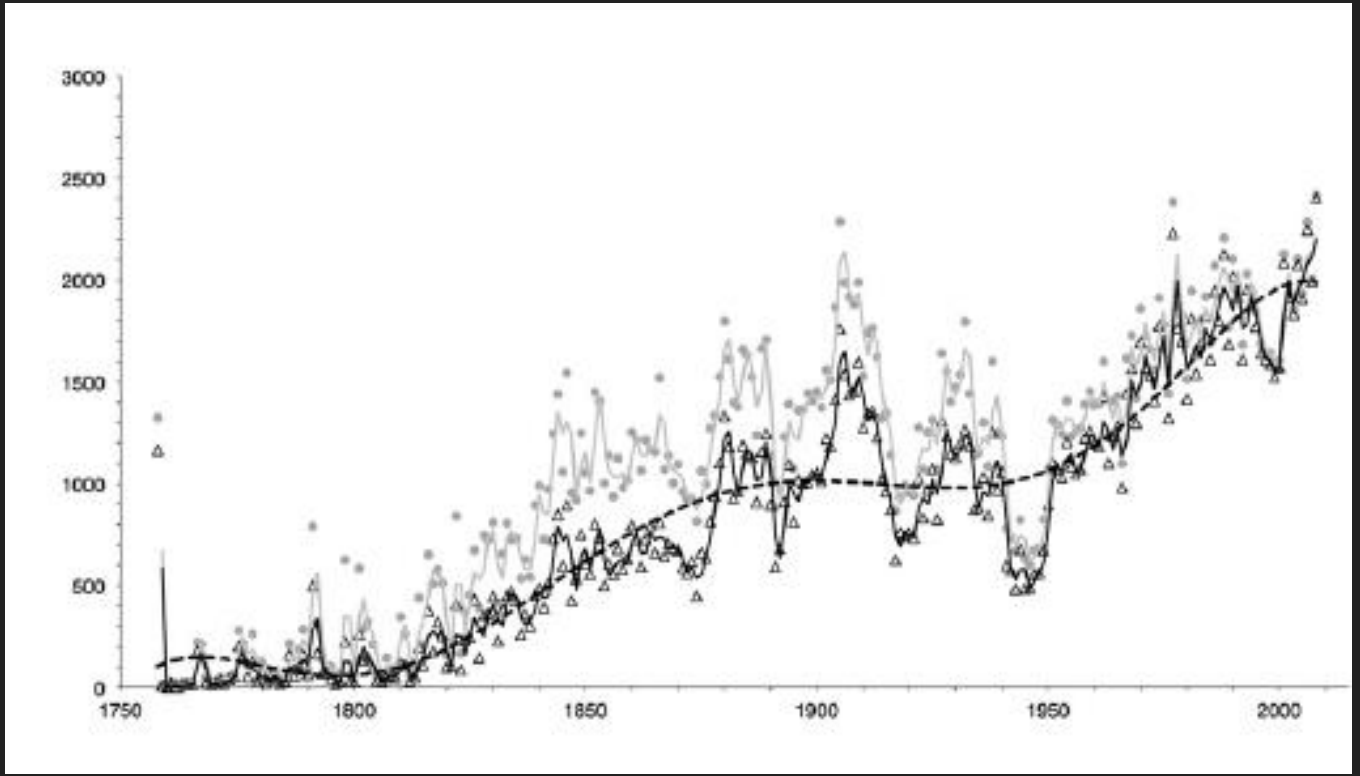
Article

The Magnitude of Global Marine Species Diversity

Number of species described per year (grey) against number of species recognized as valid



However…

A name is just a label

For most species, we only know the phenotype of the adult stage

intra and inter-specific variability?

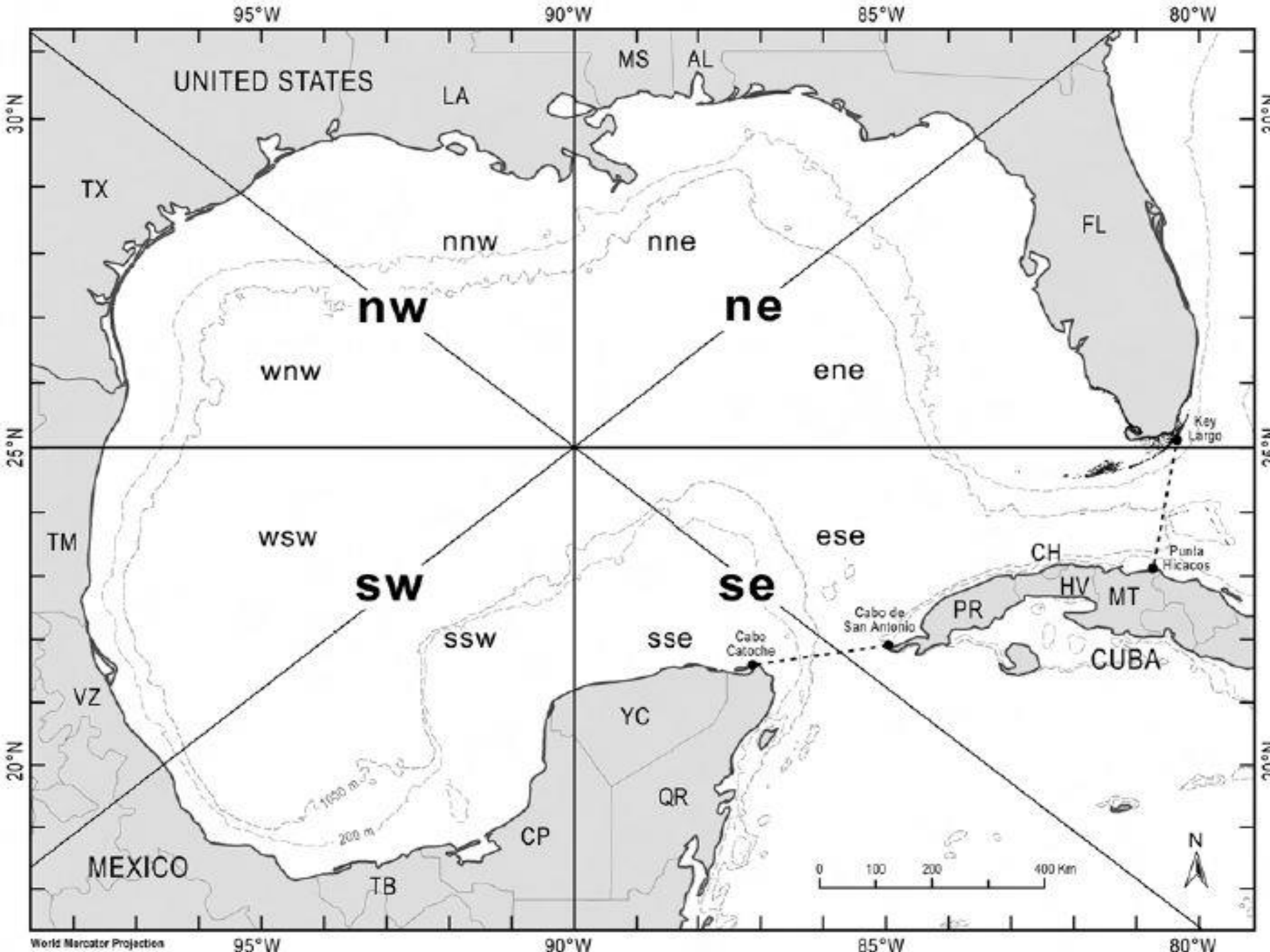
life cycles and components of ecological niches?

Abundance and distribution patterns?

Role in communities and ecosystems?

Marine Species Diversity?

- Bias for terrestrial environments
- In marine zoology, a reporting bias for vertebrates
- Gap between regions where diversity is better known and regions where biodiversity is greatest
- Tradeoff between number of taxonomists trained each year and the need for good information on biodiversity for ecologically sustainable decision-making.
- CONABIO in México, but not sufficient…
- Inventories are far from representing the knowledge of species richness in the region
- The taxonomy should be on the IUCN Red List …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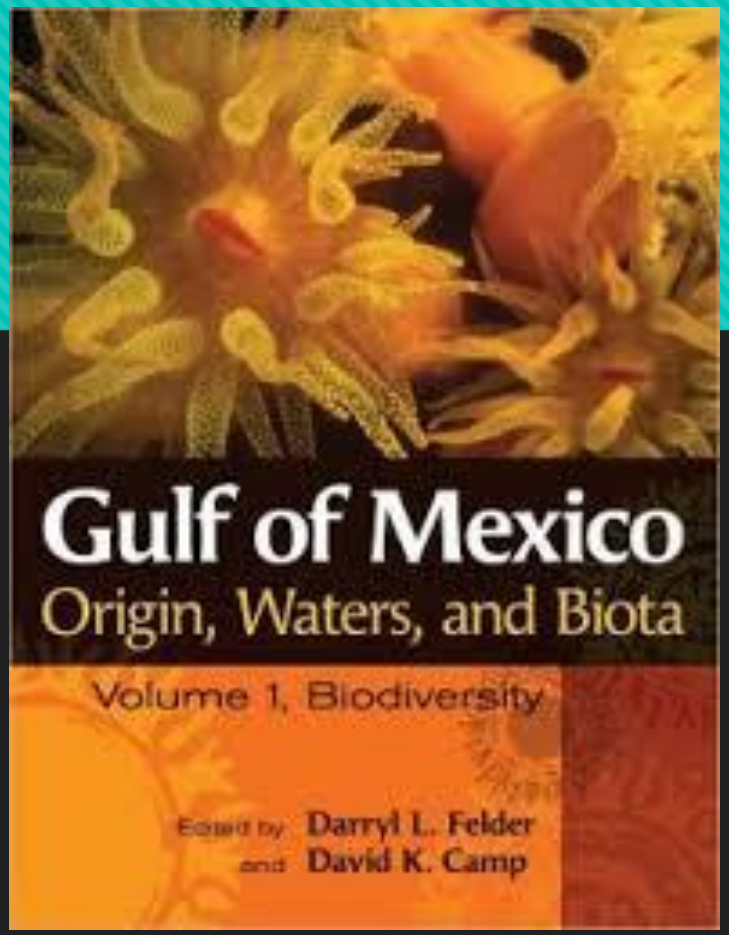
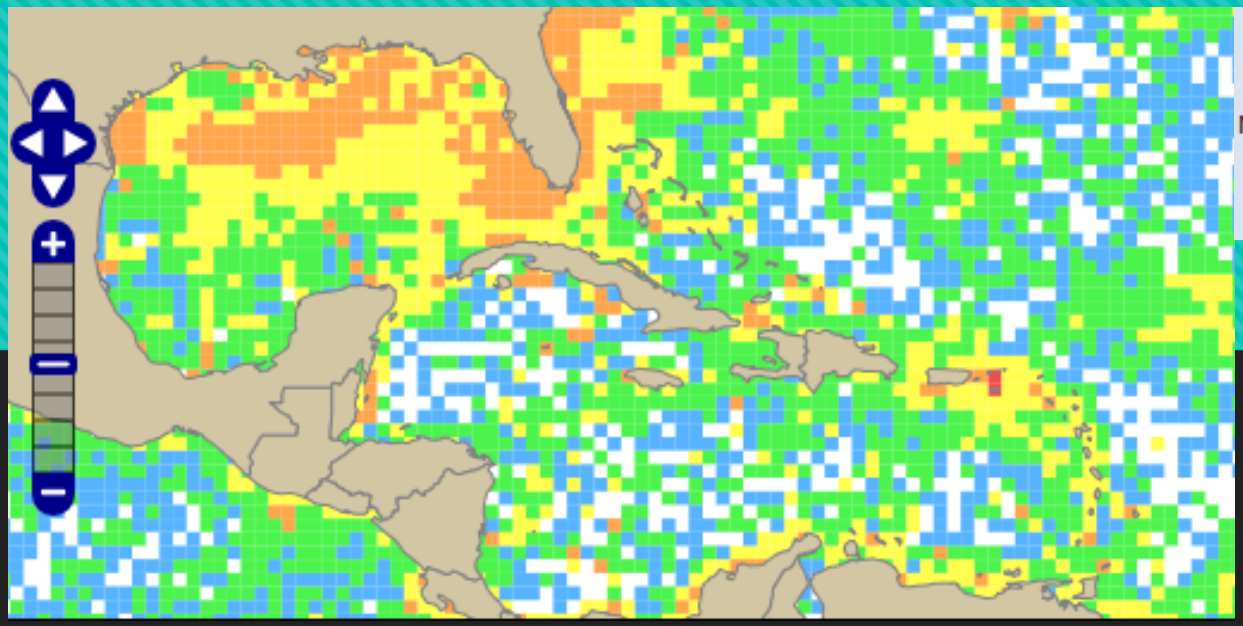
World Mercator Projection

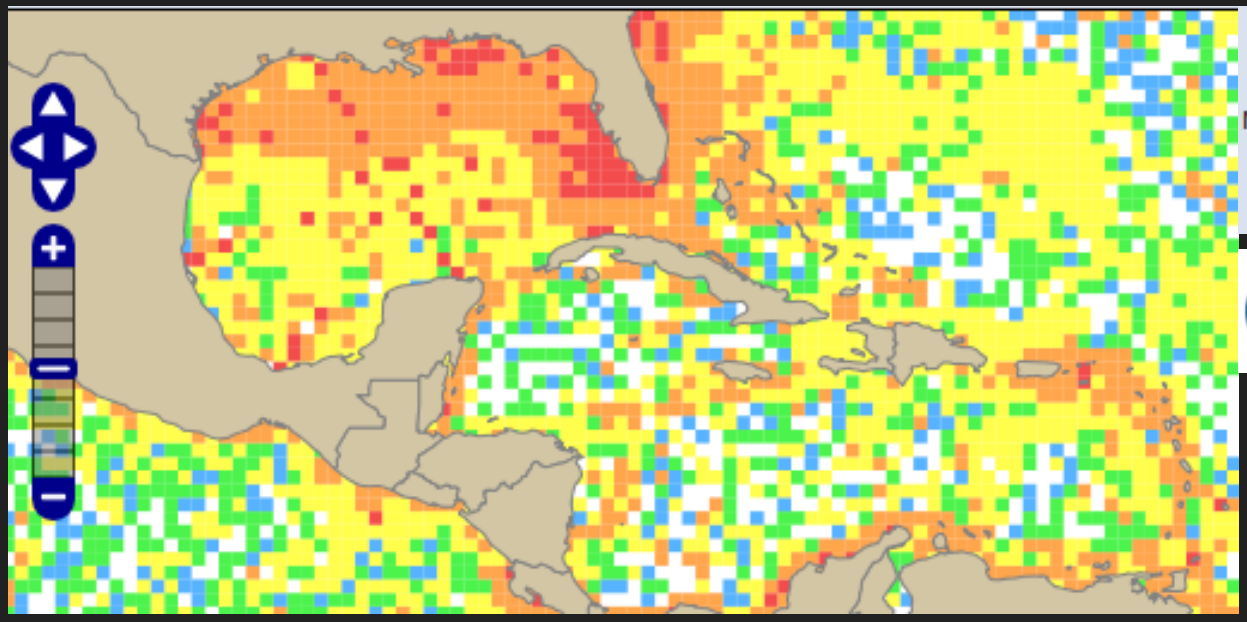


2009

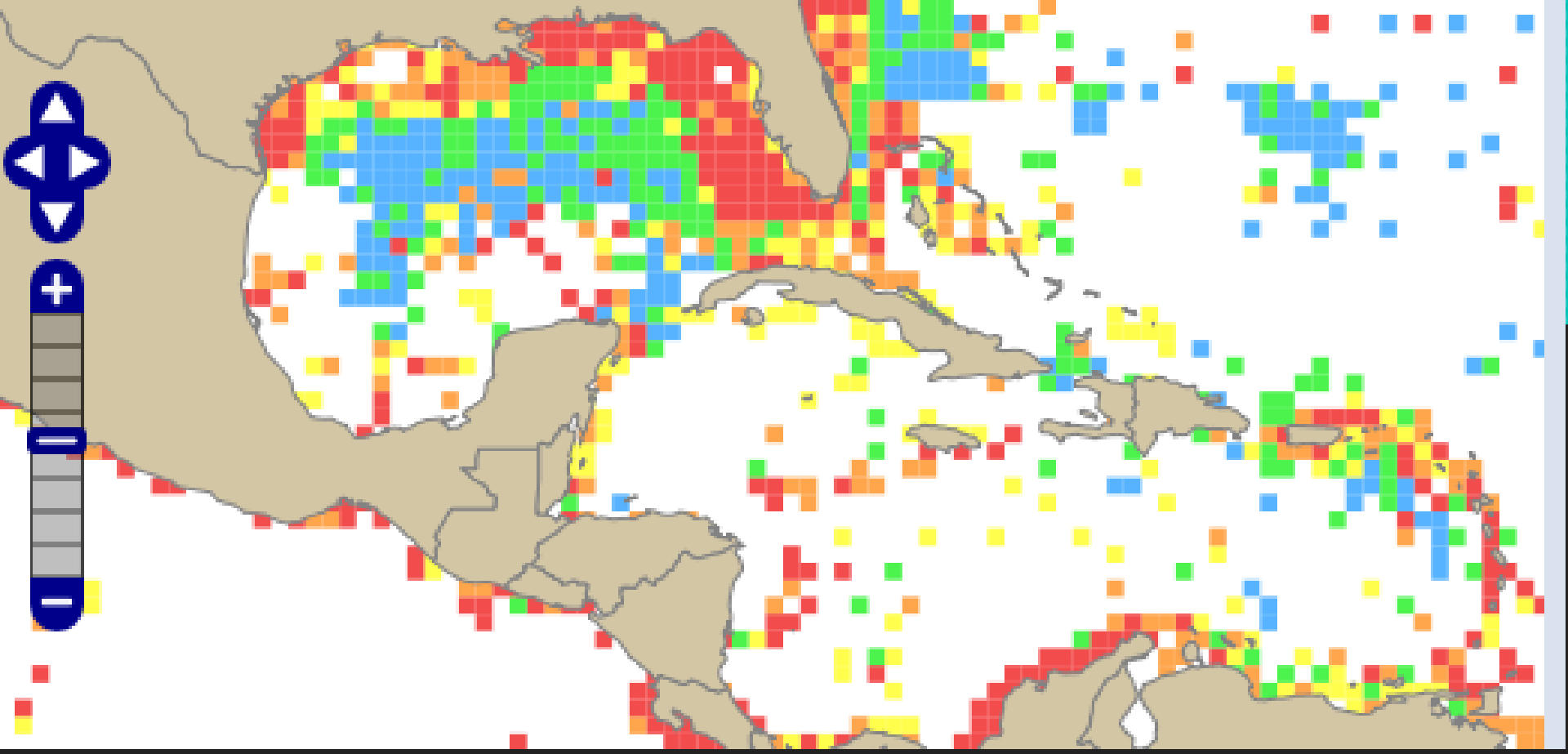
Group / taxa	Spp N	endm	%
vertebrates (fish)	1541		
cnidarians	792	62	7.8
sponges	339	109	32.2
crustaceans	2579	388	15.0
moluscs	2455	257	10.5
anelids	866	120	13.9
equinoderms	522	31	5.9
platelmints	705	191	27.1
briozoans	266	55	20.7
Tunicates	78	5	6.4

7834 species of invertebrates

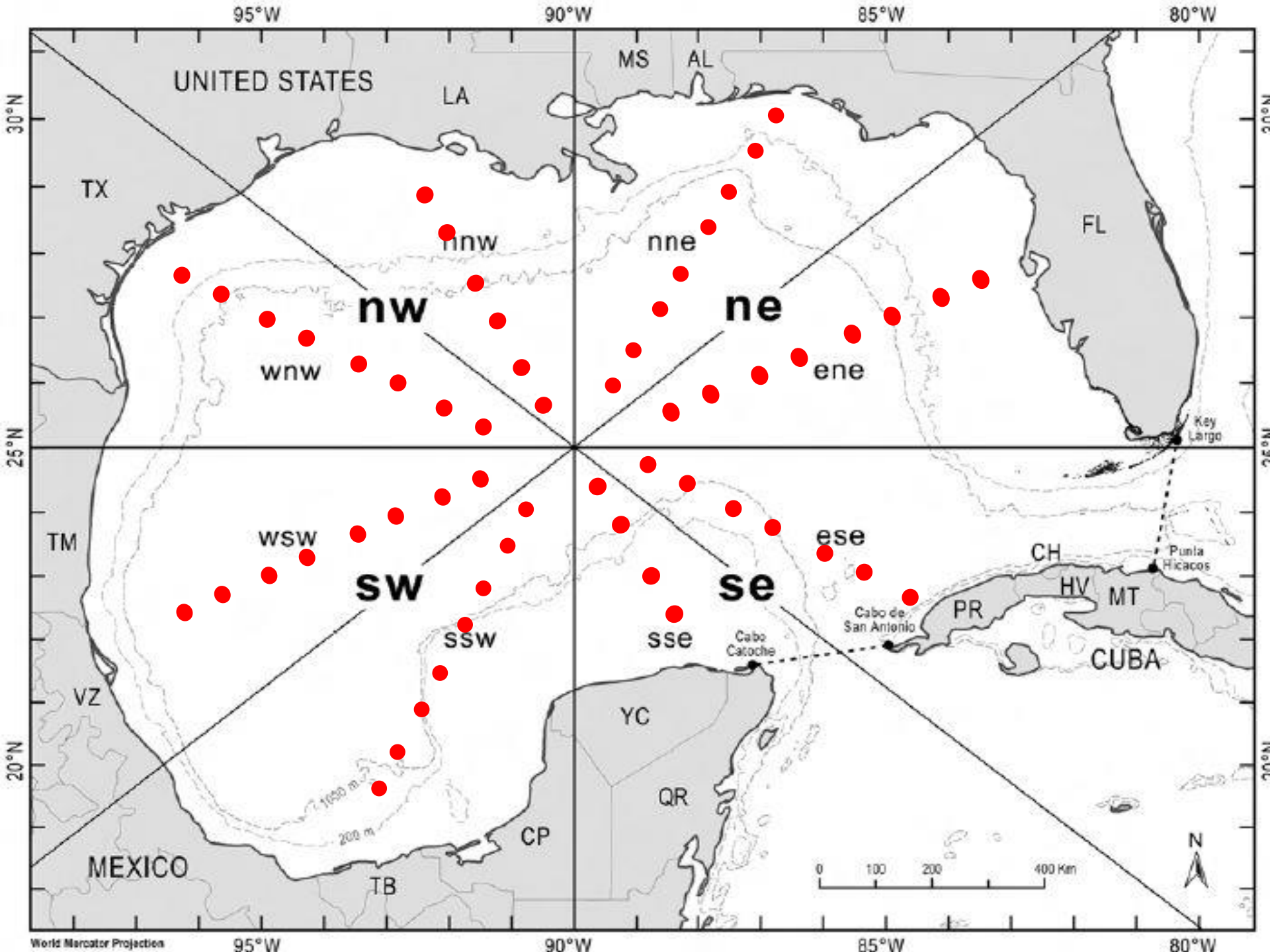




Intergovernmental Oceanographic Commission (IOC) of UNESCO. The Ocean Biogeographic Information System. http://www.iobis.org. (Consulted on 08/10/2013)



- The Hurlberts Index of Biodiversity (also known as ES for expected number of Species) is one of a series of statistics calculated from the OBIS data holdings on a regular basis. The Hurlbert Index is the expected number of species for a given number of specimens (in this case 50), and is a sample-size independent proxy for species richness. Red colours represent high values, blue colours represent low values. Grid cells with less than 50 records were left blank.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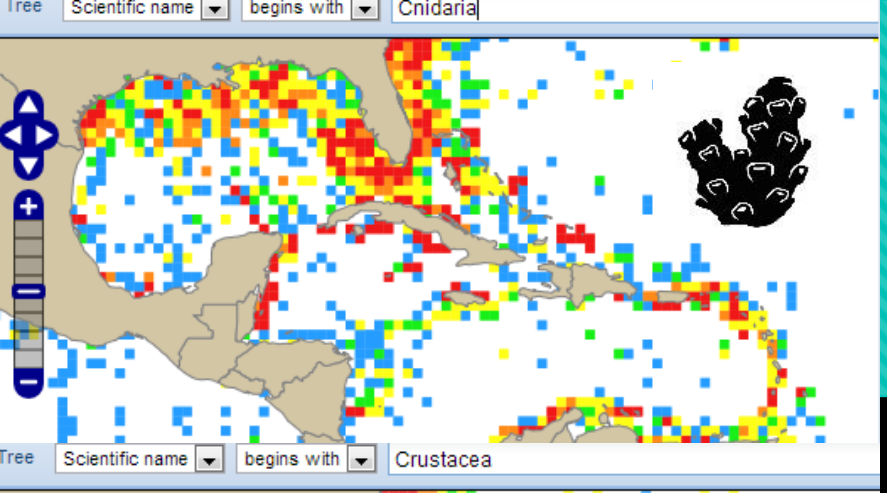
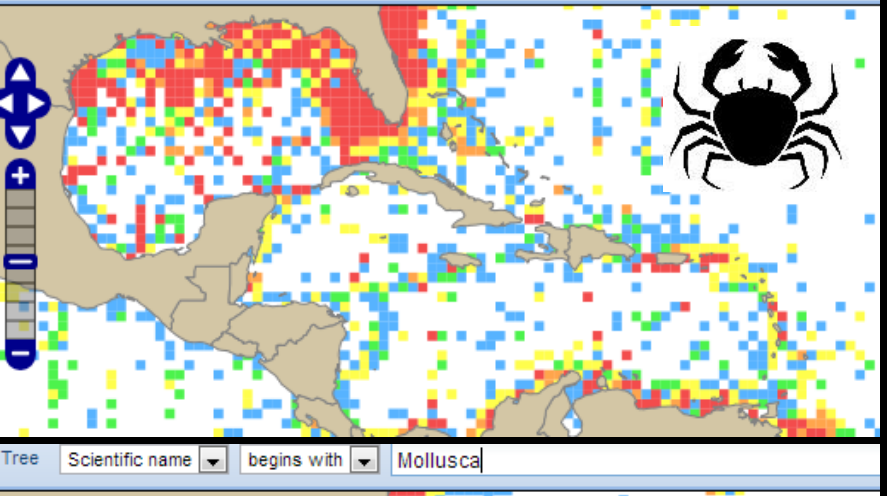
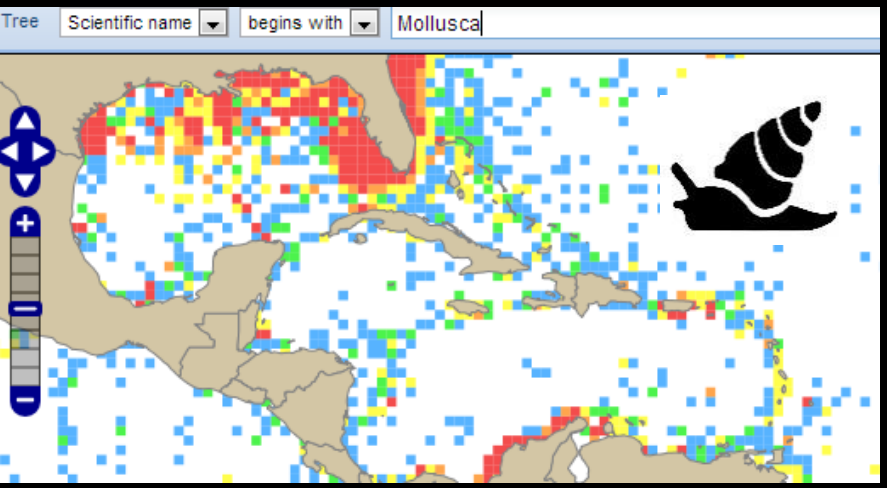
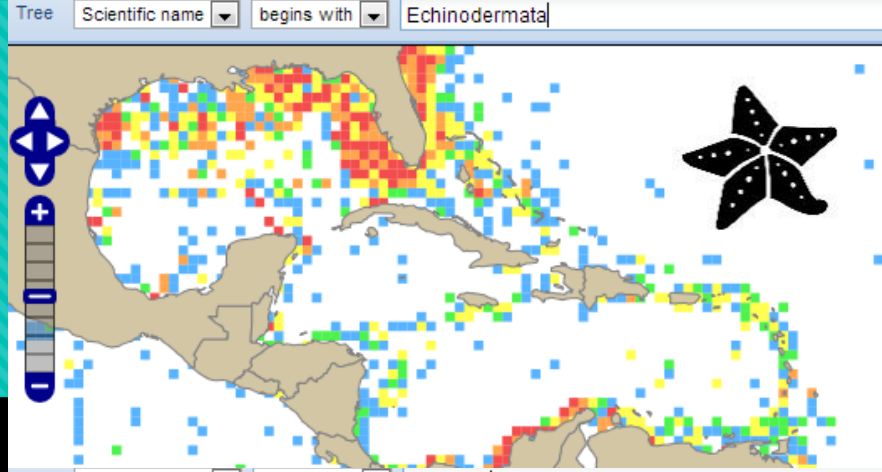
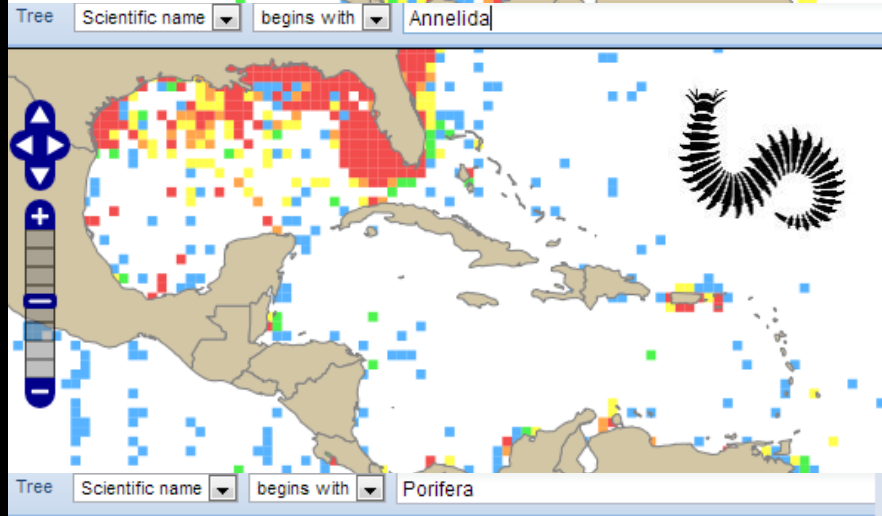
World Mercator Projection


Tree
Scientific name
begins with
Cnidaria

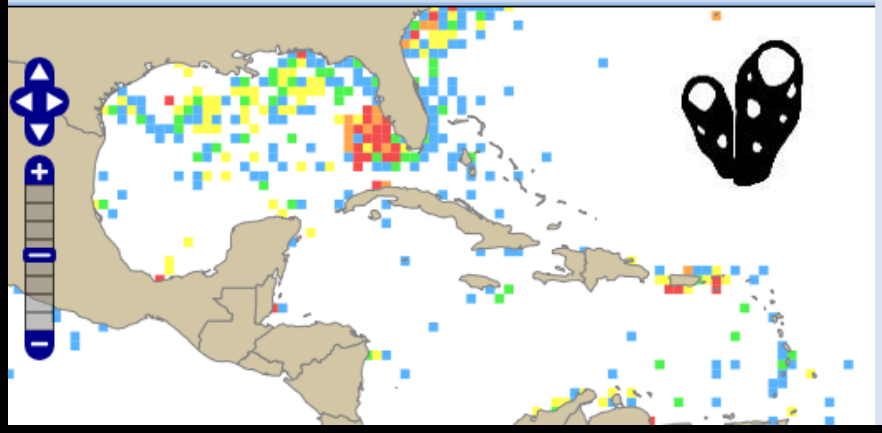

Tree
Scientific name
begins with
Crustacea


Tree
Scientific name
begins with
Mollusca


Tree
Scientific name
begins with
Echinodermata

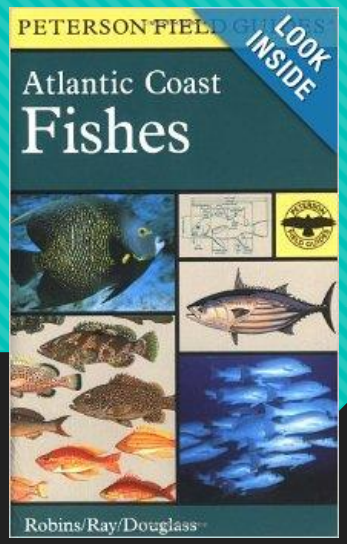

Tree
Scientific name
begins with
Annelida

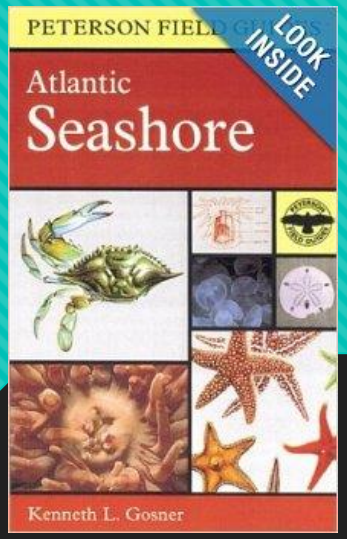
Tree
Scientific name
begins with
Porifera

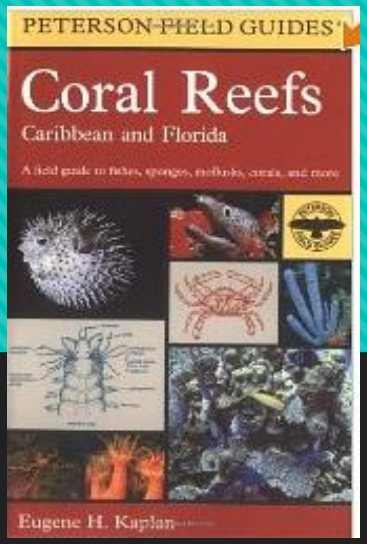


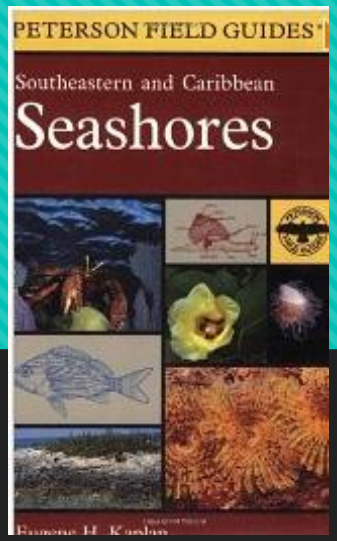
Why less studied taxa?

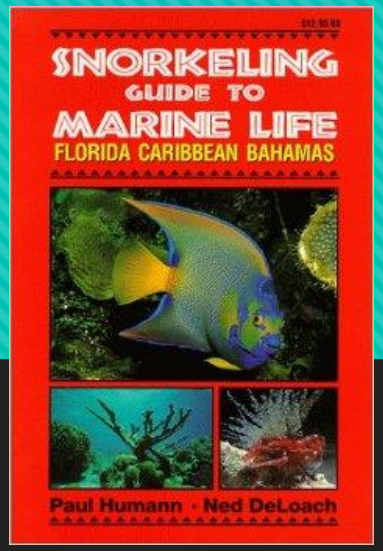
- Cryptic species
  - Reduced size
  - Nocturnal habits
  - Distribution below SCUBA limits
  - Infauna
  - Rare
  - Need for destructive sampling
- Lack of Specialists
- Few active Biological Reference Colections
- Lack of “light” non-specialised literature

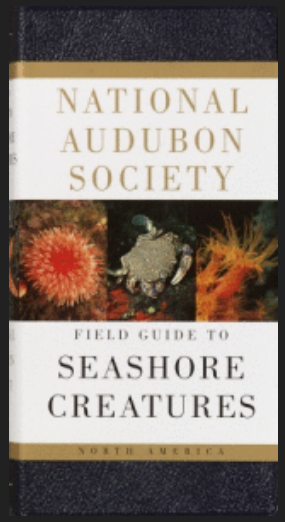

PETERSON FIELD GUIDES
LOOK INSIDE
Atlantic Coast
Fishes
Robins/Ray/Douglass


PETERSON FIELD GUIDES
LOOK INSIDE
Atlantic
Seashore
Kenneth L. Gosner


PETERSON FIELD GUIDES
Coral Reefs
Caribbean and Florida
Eugene H. Kaplan


PETERSON FIELD GUIDES
Southeastern and Caribbean
Seashores


SNORKELING
GUIDE TO
MARINE LIFE
FLORIDA CARIBBEAN BAHAMAS
Paul Humann · Ned DeLoach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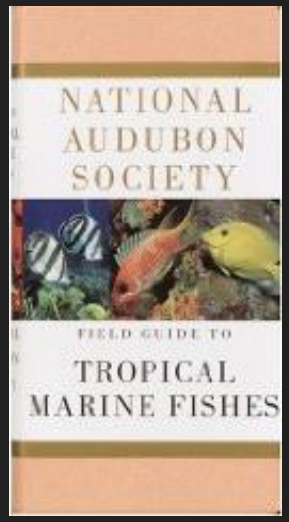
AUDUBON
SOCIETY
FIELD GUIDE TO
SEASHORE
CREATURES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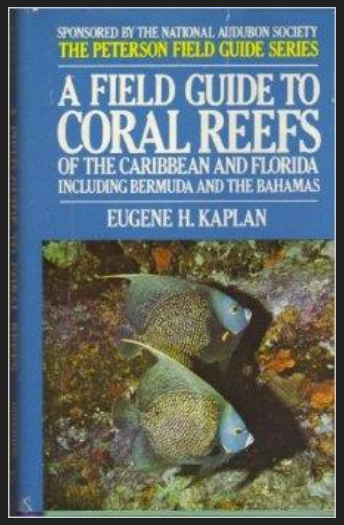
FIELD GUIDE TO
TROPICAL
MARINE FISHES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THE PETERSON FIELD GUIDE SERIES
A FIELD GUIDE TO
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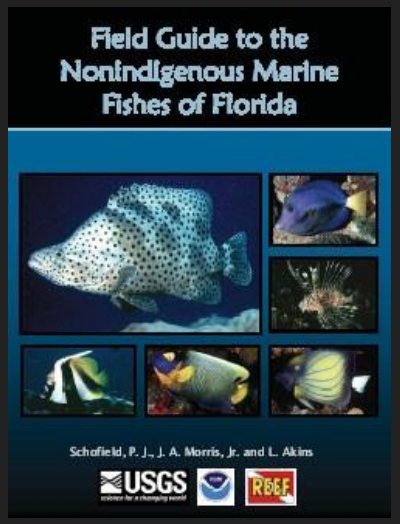
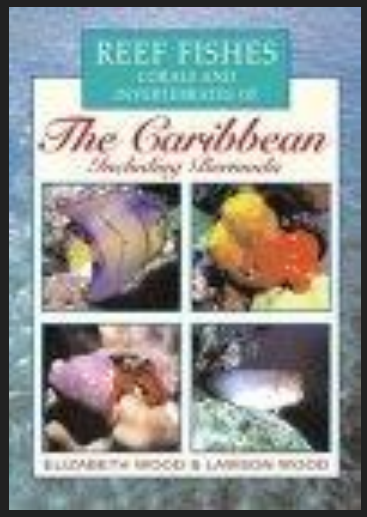
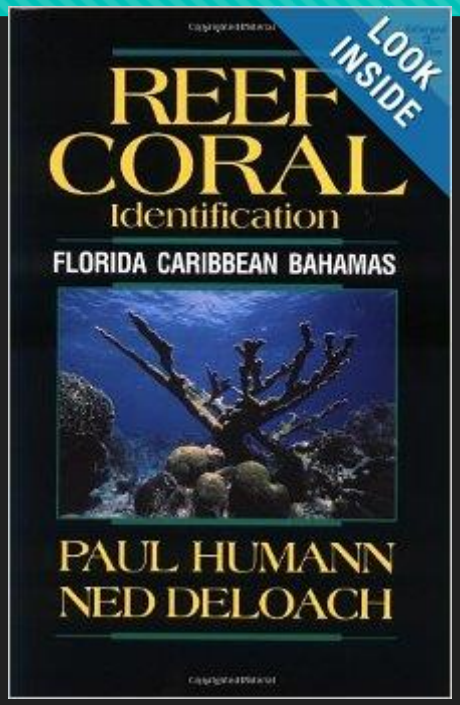
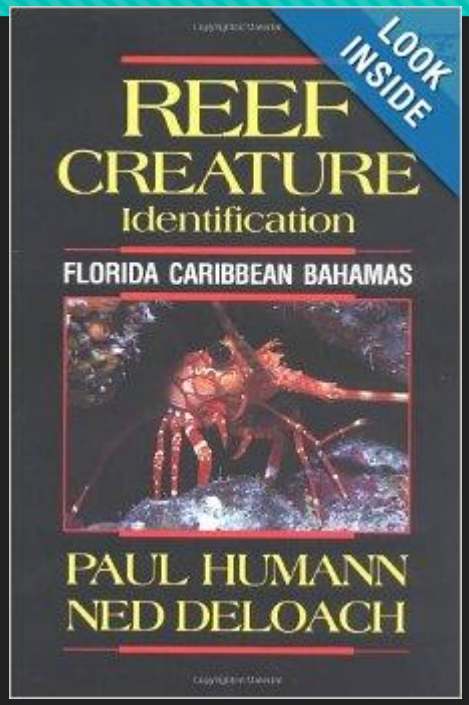
OF THE CARIBBEAN AND FLORIDA
INCLUDING BERMUDA AND THE BAHAMAS
EUGENE H. KAPLAN

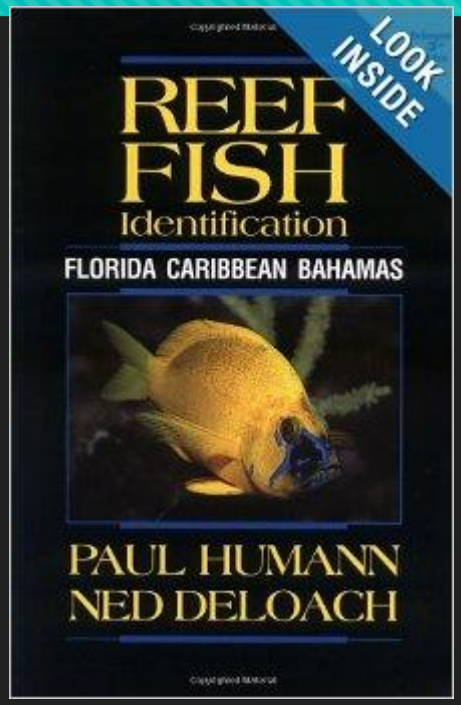

Field Guide to the
Nonindigenous Marine
Fishes of Florida
Schofield, P. J., J. A. Morris, Jr. and L. Akins
USGS
REEF

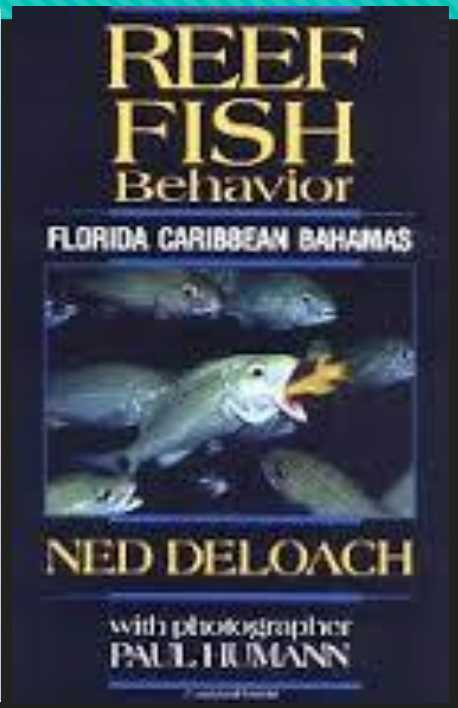

REEF FISHES
The Caribbean

Perhaps one of the known Guides?



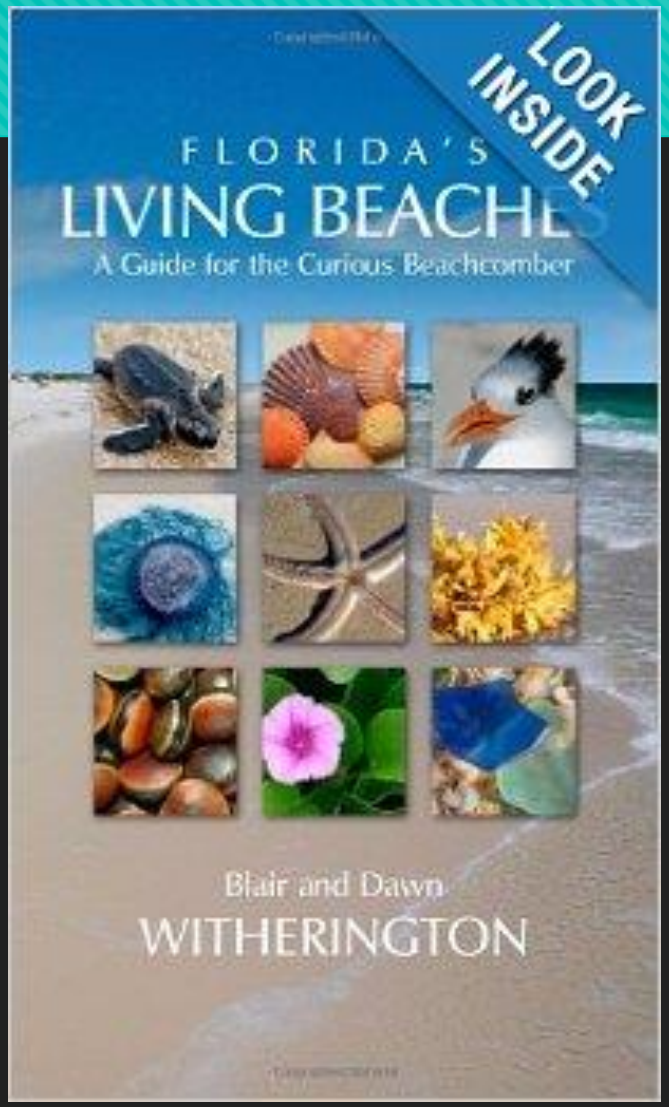


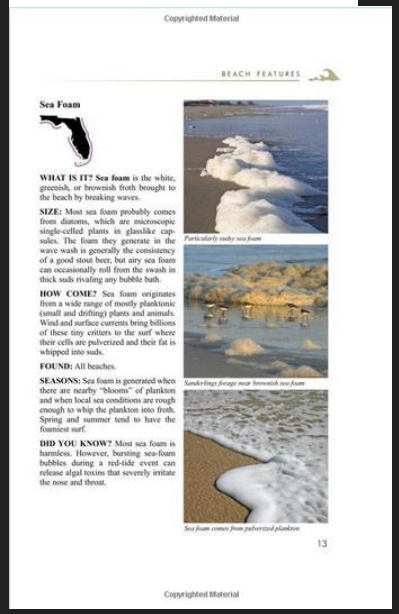


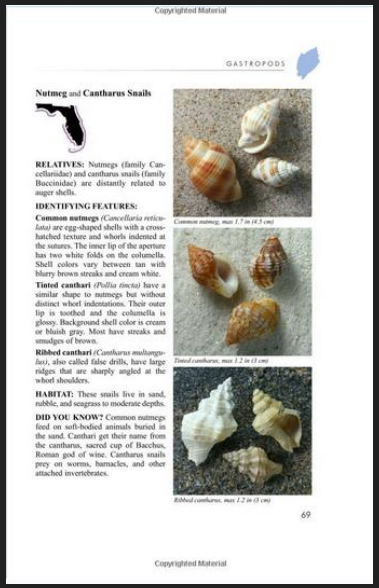


In english and not specific to México…

Recent Guide on the SeaShore



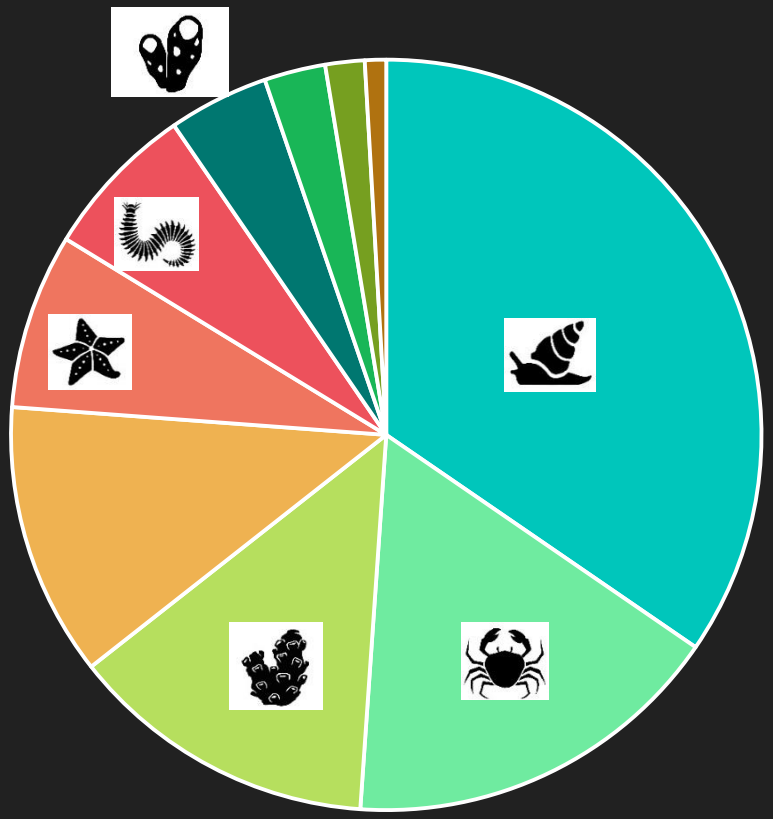




Field Guide species Numbers

Book or Filed Guide	Author(s)	year	pages	Species N
Reef Creature	Humann & Deloach	2003	420	499
Reef Coral	Humann & Deloach	2003	278	122
Reef fishes corals and invertebrates	Wood & Wood	2003	144	266
Florida's Seashells	Blair & Dawn	2012	84	252
Field guide to seashore creatures	Audubon	1981	813	310
Atlantic Seashore	Kenneth L. Gosner	1978	329	106
Southeastern and Caribbean seashore	Eugene Kaplan	1988	397	599
Guide Britain and Northern Europe	Andrew Campbell	2011	328	746
Seashore animals of the southeats	Ruppert & Fox	1988	407	319
Florida's living beaches	Blair & Dawn	2012	314	318
TOTALs				**353.7**

Field Guide covered taxa



Why less information for México?

2007

Divulgación

Iniciativa mexicana en taxonomía: biota marina y costera

Sergio I. Salazar-Vallejo *, Elva Escobar-Briones **, Norma Emilia González *, Eduardo Suárez-Morales *, Fernando Álvarez ***, Jesús Ángel de León-González **** & Michel E. Hendrickx *****

Revista Mexicana de Biodiversidad, Supl. 85: S1-S9, 2014
DOI: 10.7550/rmb.43248

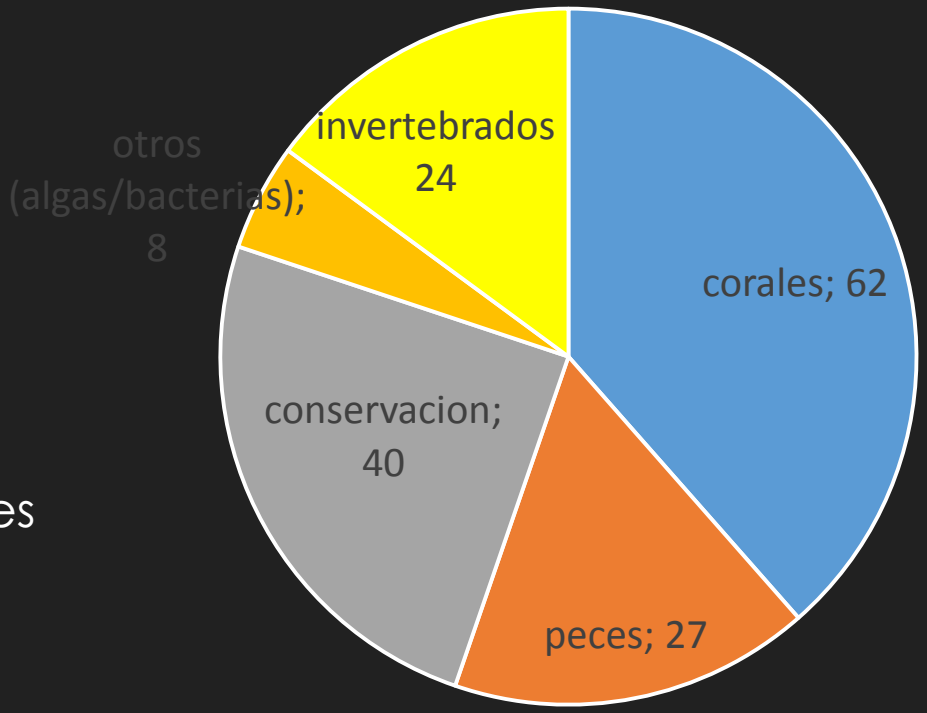
El estudio de la biodiversidad en México: ¿una ruta con dirección?

The study of the biodiversity in Mexico: a route with a course?

Enrique Martínez-Meyer[1], Javier Enrique Sosa-Escalante[2] y Fernando Álvarez[3]✉

2014

Brief statistics from Pan-American Coral Reefs Congress, october 2013, Merida, Yucatan, México



Coral Reefs and Corals… 161 studies

But are Corals species that diverse?

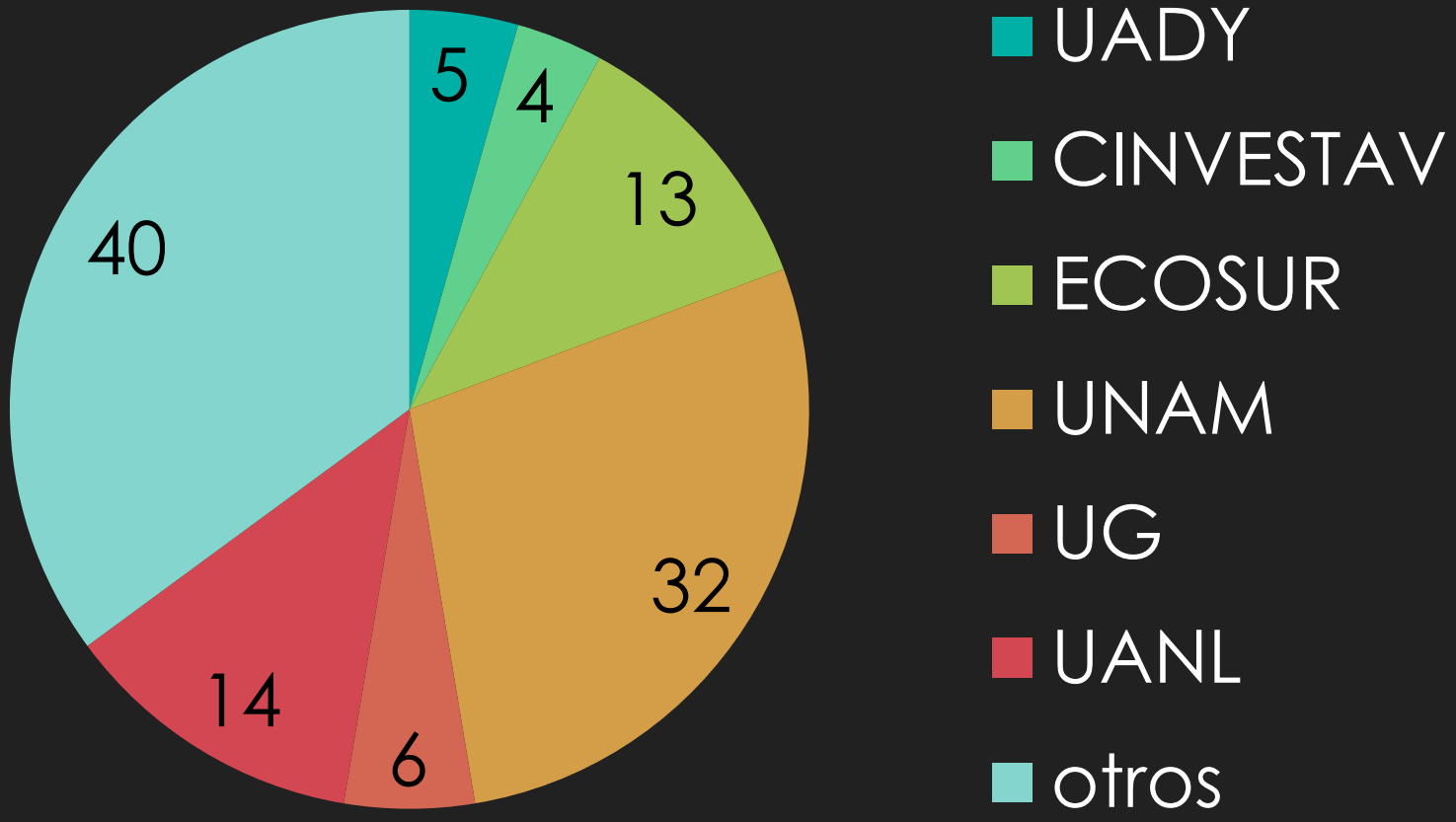
Cumulative number of talks on corals and fish?

N species described for the GMx

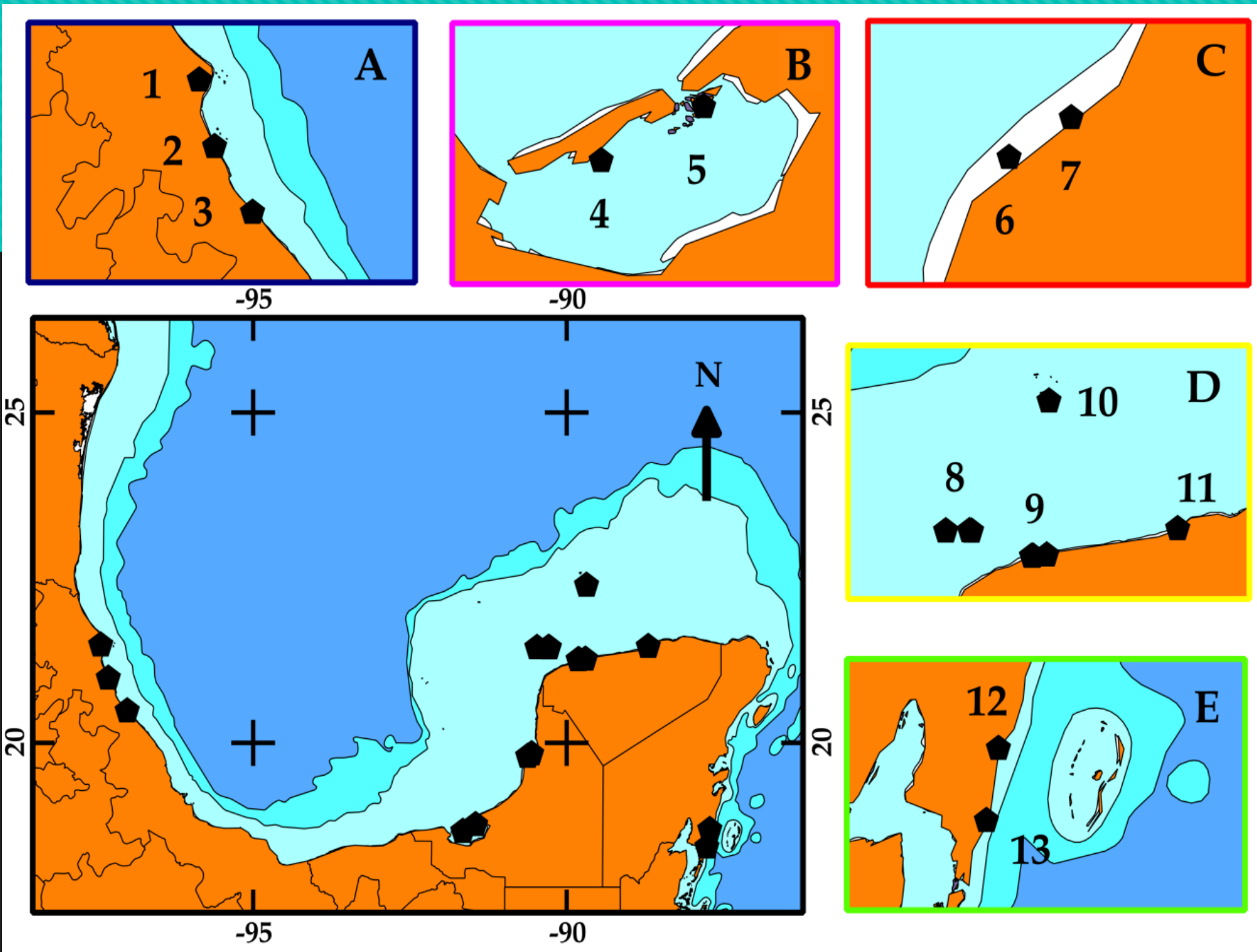
Biological Colections National Statistics (Zoology, CONABIO)

- 32 States, only 22 have zoologicl colections
- 124 “oficial” biological colections
- 30 are marine-specific or have marine specimens
- 10 fish colections (vertebrates)
- 20 invertebrate colections
- Yucatán península (Campeche, Yucatán, Quintana-Roo and Chiapas) - 25 zoological colections, 7 marine, 4 marine invertebrates
- Yucatan State, 7 zoology colections, 4 with marine specimens and from those, 3 are invertebrates

National Biological Colections (120)



Marine Biodiversity Expeditions 2006 - 2012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ALIEN WORKSHOP
PUMA
Riviera Maya, Mexico

Riqueza Específica de Peces Crípticos del Parque Nacional Arrecife Alacranes; Yucatán, México

Merino-Mendoza R.[1*], C. González Salas[1], R. Bernárdez-Medina[1], A. Gallardo Torres[1], Nuno Simões[2]

LISTADO DE OFIUROIDEOS (ECHINODERMATA: OPHIUROIDEA) DEL ARRECIFE ALACRANES: RESULTADOS PRELIMINARES

Yoalli Quetzalli Hernández Díaz (*)[1,2], Francisco A. Solís Marín[2] y Nuno Simões[3]

Mud and ghost shrimps (Decapoda: Axiidea, Gebiidea) of Mexican Atlantic Coast

Omar González-Escorcia[1*], Nuno Simões[2]

Pinnotherid crabs (Brachyura: Pinnotheridae) from shallow waters of the Mexican Atlantic

Maritza MARTÍNEZ GARCÍA[1], Nuno SIMÕES[1], Ernesto CAMPOS[1]

REVISIÓN BIBLIOGRÁFICA DE OPISTOBRANQUIOS DEL GOLFO DE MÉXICO Y NUEVOS REGISTROS PARA YUCATÁN

Jazmín D. Ortigosa Gutiérrez[1*], Nuno Simões[2] y Gonzalo Calado[3]

Anémonas (Actiniaria, Corallimorpharia, Ceriantharia y Zoanthidea) del Parque Nacional Arrecife Alacranes, Yucatán, México

González Muñoz Ricardo[1*], Alejandro Cordova Morales[2] y Nuno Simões[3]

Camarones Alfeidos del Arrecife Alacranes, Yucatán, Golfo de México

(Crustacea: Decapoda: Alpheidae): Revisión Bibliográfica y Resultados Preliminares

Julio Duarte-Gutiérrez[1*], Reina Ortegón-Aznar[1], Nuno Simões[2], Arthur Anker[3]

"An update on the caridean shrimps (excluding the family Alpheidae) from the shallow waters of the South-eastern Coast of the Gulf of México: new records"

Santana-Moreno, Luis Daniel[1], De Grave, Sammy[2] and Simões, Nuno[1]

THALASSAS

Thalassas, 29(1) · January 2013: 59-75
An International Journal of Marine Sciences

SEASLUGS (Mollusca: Opisthobranchia) FROM CAMPECHE BANK, YUCATAN PENINSULA, MEXICO

DENEB ORTIGOSA[1,*], NUNO SIMÕES[1] & GONÇALO CALADO[2]

Nauplius 21(2): 179-194, 2013 179

Intertidal and shallow water amphipods (Amphipoda: Gammaridea and Corophiidea) from Isla Pérez, Alacranes Reef, southern Gulf of Mexico

Carlos E. Paz-Ríos, Nuno Simões and Pedro-Luis Ardisson

Biodiversity Data Journal 2: e1100
doi: 10.3897/BDJ.2.e1100

open access

Taxonomic paper

Checklist of Fishes from Madagascar Reef, Campeche Bank, México

Salvador Zarco Perello[†,‡], Rigoberto Moreno Mendoza[§], Nuno Simões[‡]

Marine Biodiversity Records, page 1 of 4. © Marine Biological Association of the United Kingdom, 2011
doi:10.1017/S1755267211000212; Vol. 4; e25; 2011 Published online

First record of the white-eye goby, *Bollmannia boqueronensis* (Teleostei: Perciformes: Gobiidae) along the coast of the Yucatan Peninsula (Gulf of Mexico)

RIGOBERTO MORENO-MENDOZA[1,2], CARLOS GONZALEZ-SALAS[1], ALFONSO AGUILAR-PERERA[1], ALFREDO GALLARDO-TORRES[2] AND NUNO SIMOES[2]

Marine Biodiversity Records, page 1 of 16. © Marine Biological Association of the United Kingdom, 2013
doi:10.1017/S175526721300064X; Vol. 6; e90; 2013 Published online

Records and observations of amphipods (Amphipoda: Gammaridea and Corophiidea) from fouling assemblages in the Alacranes Reef, southern Gulf of Mexico

CARLOS E. PAZ-RÍOS[1], NUNO SIMÕES[2] AND PEDRO-LUIS ARDISSON[1]

Zootaxa 3556: 1–38 (2012)
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

urn:lsid:zoobank.org:pub:8B77DBA6-C74C-49DF-BC5F-1907FB374B90

First Inventory of Sea Anemones (Cnidaria: Actiniaria) of the Mexican Caribbean

RICARDO GONZALEZ-MUÑOZ [1, 2], NUNO SIMÕES [1], JUDITH SANCHEZ-RODRIGUEZ [3], ESTEFANIA RODRIGUEZ [4] & LOURDES SEGURA-PUERTAS [3†]

ZooKeys 341: 77–106 (2013)
doi: 10.3897/zookeys.341.5816
www.zookeys.org

RESEARCH ARTICLE

A peer-reviewed open-access journal
ZooKeys
Launched to accelerate biodiversity research

Sea anemones (Cnidaria, Anthozoa, Actiniaria) from coral reefs in the southern Gulf of Mexico

Ricardo González-Muñoz[1,2], Nuno Simões[1], José Luis Tello-Musi[3], Estefanía Rodríguez[4]

Revista Mexicana de Biodiversidad 84: 676-681, 2013
DOI: 10.7550/rmb.30737

Research note

First record of *Ophioderma ensiferum* (Echinodermata: Ophiuroidea) from the southeastern continental shelf of the Gulf of Mexico and from an anchialine cave

Primer registro de *Ophioderma ensiferum* (Echinodermata: Ophiuroidea) del sureste de la plataforma continental del golfo de México y de una cueva anquialina

Yoalli Quetzalli Hernández-Díaz[1✉], Francisco A. Solís-Marín[2], Nuno Simões[3] and Laura Sanvicente-Añorve[4]

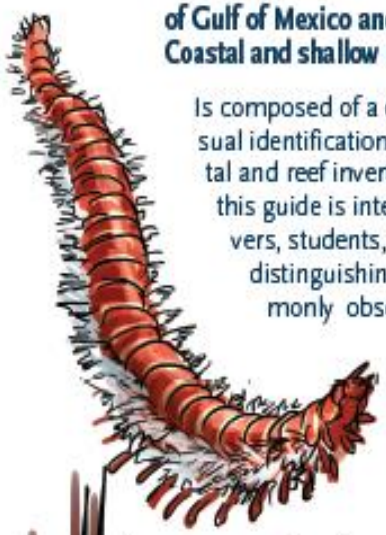
Nuevos registros de alfeidos (in press)
Chitones de Alacranes (sometido)
Nuevos registros de esponjas (sometido)

Nuno Simões, Ricardo González-Muñoz, José Luis Tello-Musi

Invertebrate Macrofauna

of Gulf of Mexico and Caribbean Sea Coastal and shallow reef environments

Is composed of a catalog of images to support the visual identification of the major groups of marine, coastal and reef invertebrates. With over 3000 illustrations, this guide is intended to support both recreational divers, students, and scientist, and its designed to aid distinguishing the main species that can be commonly observed in coastal, marine and reef areas in the Gulf of Mexico and the Mexican Caribbean Sea



Invertebrate Macrofauna

of Gulf of Mexico and Caribbean Sea Coastal and shallow reef environments

Nuno Simões, Ricardo González-Muñoz, José Luis Tello-Musi

Macrofauna de Invertebrados

del Golfo de México y Mar Caribe
Zonas Costeras y Arrecifales Someras

Está compuesto por un catálogo de imágenes para el apoyo a la identificación visual de los principales grupos de invertebrados marinos, costeros y arrecifales. Con más de 3,000 ilustraciones, esta guía está dirigida para el apoyo tanto de buceadores recreativos, estudiantes y científicos, y diseñada para la ayuda en la distinción de las principales especies que pueden ser observadas comúnmente en las zonas costeras, marinas y arrecifales del Golfo de México y el Mar Caribe Mexicano.

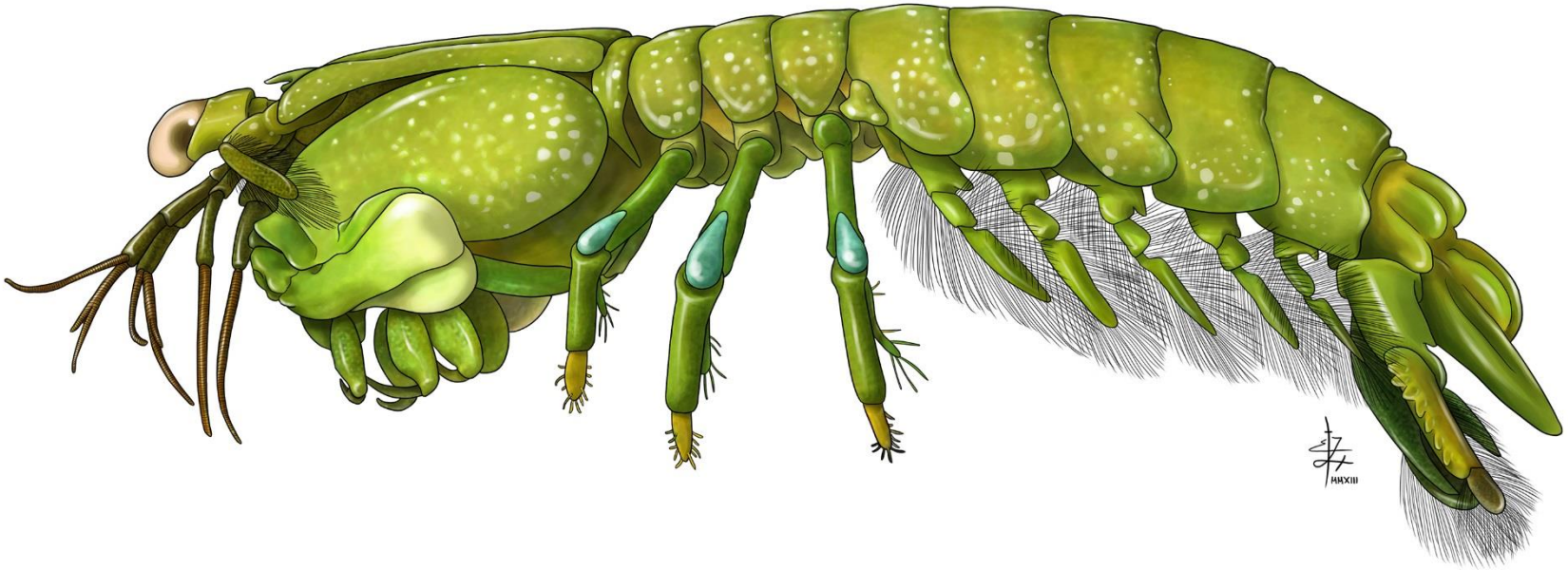
Macrofauna de Invertebrados
del Golfo de México y Mar Caribe
Zonas Costeras y Arrecifales Someras

High Quality Scientific illustrations based on good macro photography

BDMY
BioDiversidad Marina de Yucatán

Neogonodactylus bredini
Manning, 1969

High Quality Scientific illustrations based on good macro photography



BDMY
BioDiversidad Marina de Yucatán

Neogonodactylus bredini
Manning, 1969

Ilustrador: Miriam Pérez
Ilustración basada en fotografía de: Nuno Simões

Stomatopod shrimps

Kingdom Animalia – Phylum Arthropoda – Subphylum Crustacea – Class Malacostraca – Subclass Eumalacostraca – Superorder Eucarida – Order Decapoda – Suborder Pleocyemata – Infraorder Caridea

Neogonodactylus bredini (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Neogonodactylus bredini (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly. Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Superfamilia PALAEMONOIDEA – Familia PALAEMONIDAE – Subfamilia PONTONIINAE

Nannosquilla candidensis (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Lysiosquillina gabriuscula (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Neogonodactylus oerstedii (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Neogonodactylus curacaoensis (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Pinoterid crabs

Austinixa gorei (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

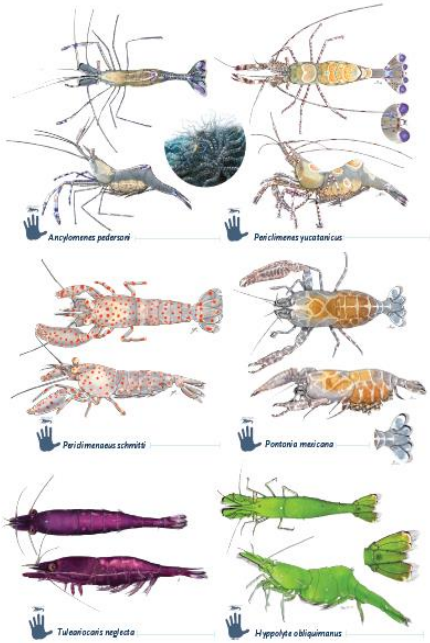
Austinixa behrae (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly. Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Superfamilia PALAEMONOIDEA – Familia PALAEMONIDAE – Subfamilia PONTONIINAE

Clypeasterophilus rugatus (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Pinixa chaetopterana (Chace, 1958) APhIA ID: 514488 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Tumidotheres sp. (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly. Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.



Stomatpod shrimps

Neogonodactylus bredini (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Neogonodactylus bredini (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Superfamily PALAEMONOIDEA – Family PALAEMONIDAE – Subfamily PONTONIINAE

Neogonodactylus oerstedii (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Pseudosquillisma oculata (Chace, 1958) APhIA ID: 514493 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly. Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Caridean shrimps

Kingdom Animalia – Phylum Arthropoda – Subphylum Crustacea – Class Malacostraca – Subclass Eumalacostraca – Superorder Eucarida – Order Decapoda – Suborder Pleocyemata – Infraorder Caridea

Superfamily PALAEMONOIDEA – Family PALAEMONIDAE – Subfamily PONTONIINAE

Ancylomenes pedersoni (Chace, 1958) APhIA ID: 514488 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Periclimenes yucatanicus (Wes, 1891) APhIA ID: 421713 | Spotted cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

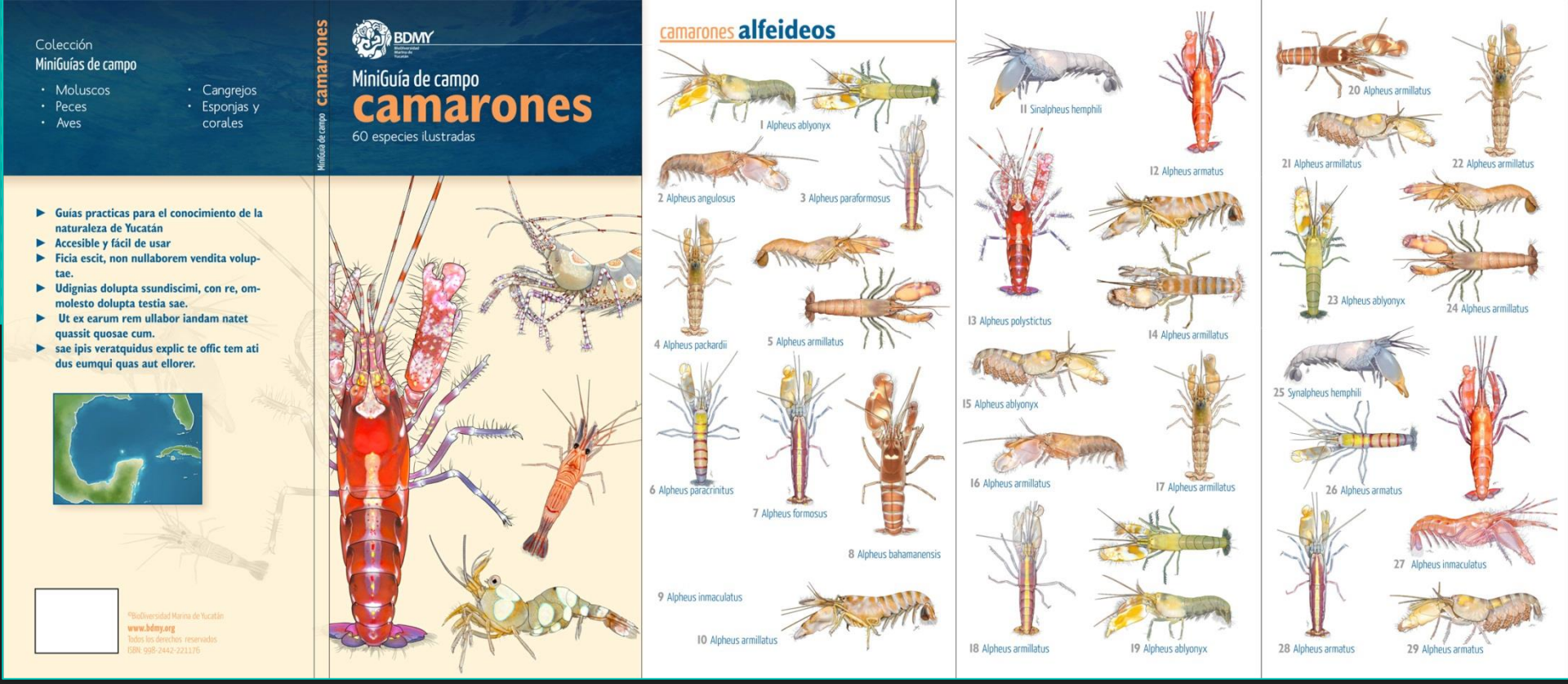
Periclimenaeus schmitti Holthuis, 1951 APhIA ID: 427702 | Tortugas bigclaw
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

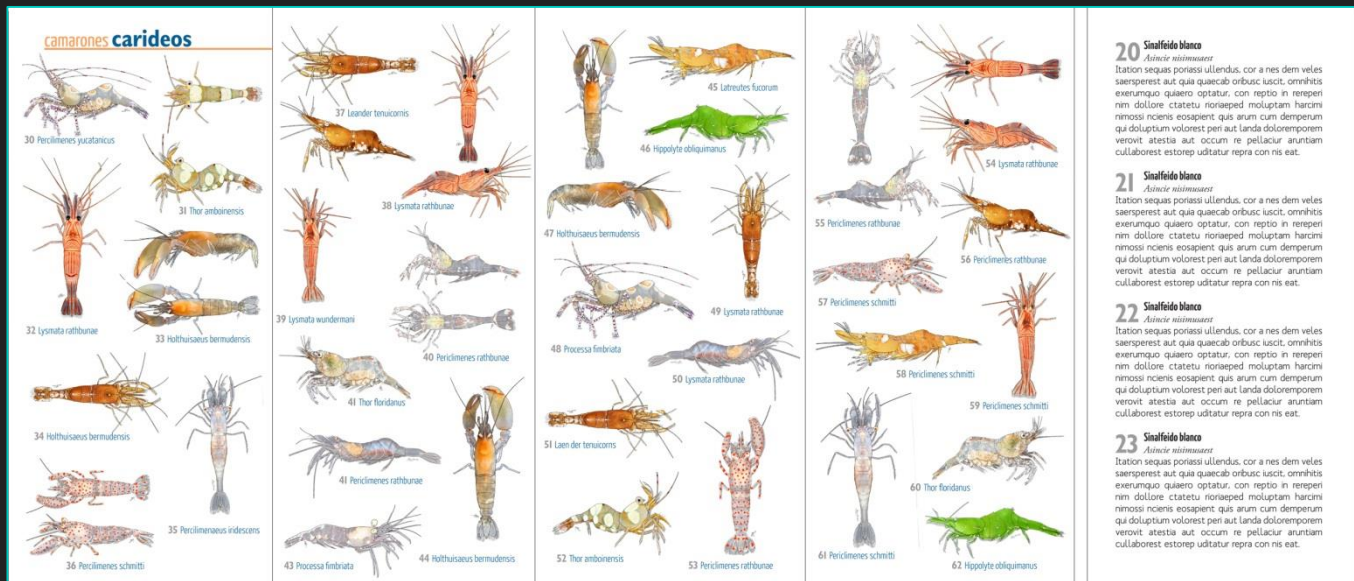
Pontonia mexicana Guérin-Méneville, 1855 APhIA ID: 421714 | Caribbean pen shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Tuleariocaris neglecta Chace, 1869 APhIA ID: 107638 | Black-urchin shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.

Superfamily ALPHEOIDEA – Family HYPPOLYTIDAE

Hyppolyte obliquimanus Dana, 1852 APhIA ID: 421777 | Pederson cleaner shrimp
Transparent body and legs covered with purple to lavender spots. Two pairs of long, white, hair-like antennae. Rows of pinkish eggs occasionally attached to belly.





General Public Field Guides

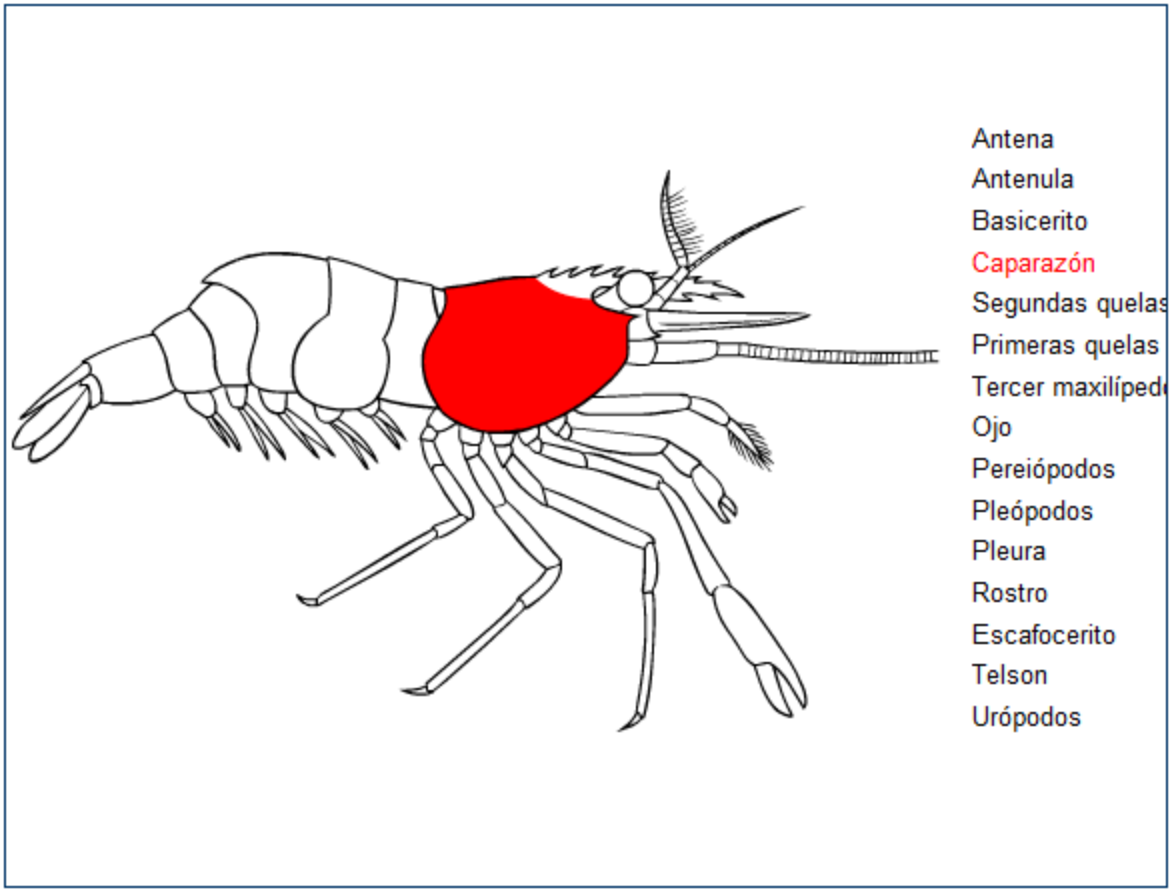
BDMY BioDiversidad Marina de Yucatán

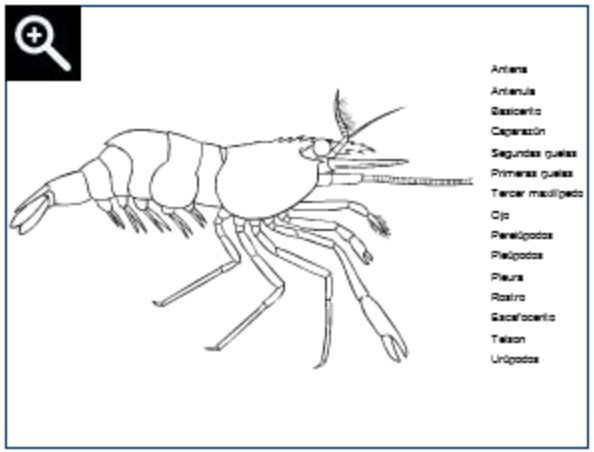
BioDiversidad Marina de Yucatán

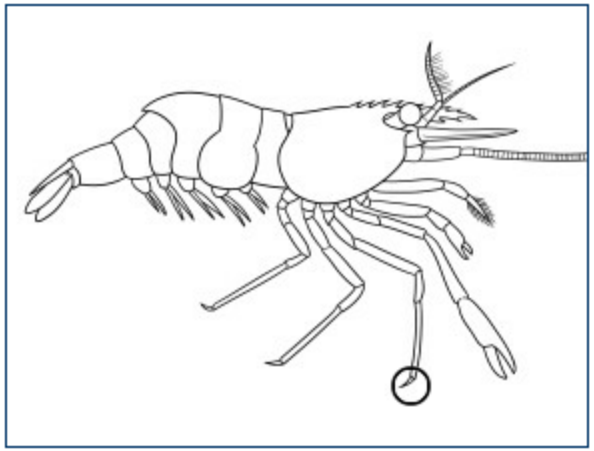
UNAM-Sisal

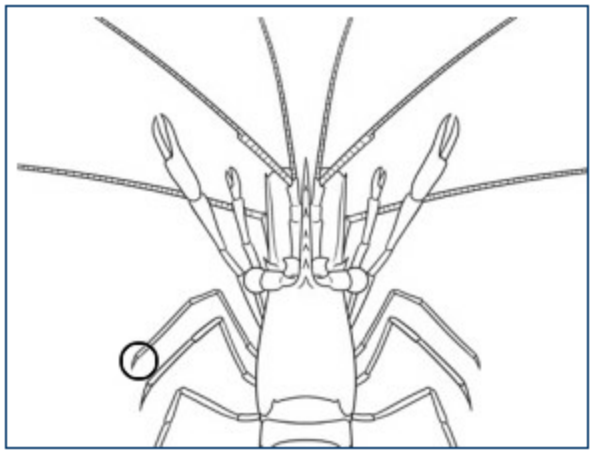
Texto de introducción a claves

Titulo de la clave





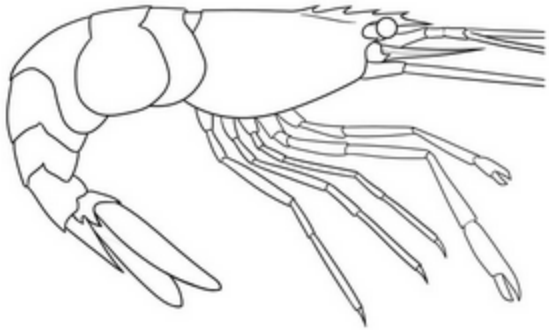




Paso 1

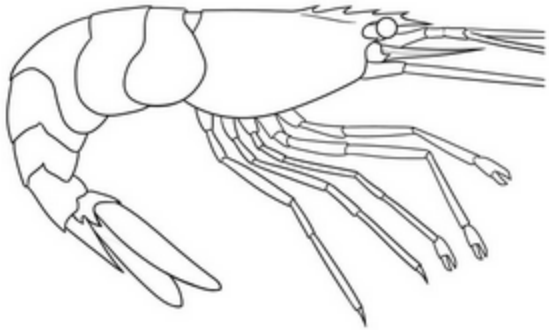
Sin quela en el tercer pereiopodo; pleura del segundo somito abdominal sobrelapada en el primer y tercer segmento (reducida en Glyphocrangonidae)

Seleccionar esta opción



Quela presente en el tercer par de pereiopodos, ocacionalmente pequeña; pleura del segundo somito abdominal no sobrelapando en el primer segmento

Seleccionar esta opción




Biodiversidad Marina de Yucatán: Anémonas
UNAM Sisal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Ofiorideos y Estrellas de Mar
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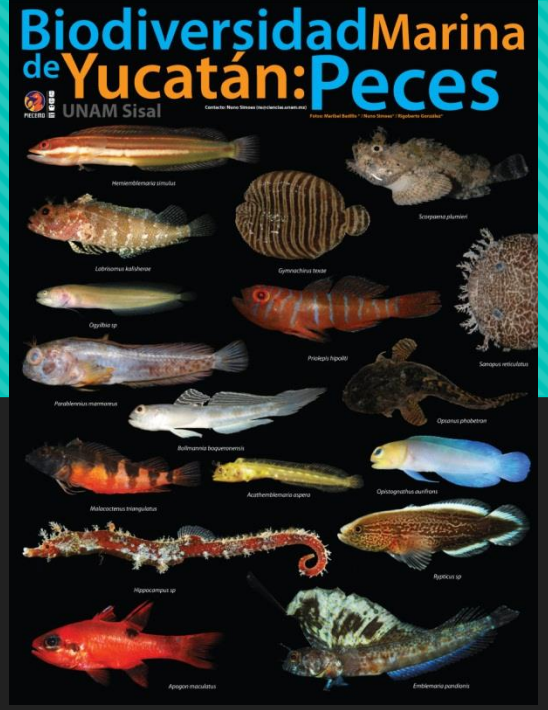

Biodiversidad Marina de Yucatán: Peces
UNAM Sisal


Biodiversidad Marina de Yucatán: Camarones
UNAM Sisal


Biodiversidad de la Flora de Yucatán
UNAM-Sisal
Fotos: Luis Salinas Peba

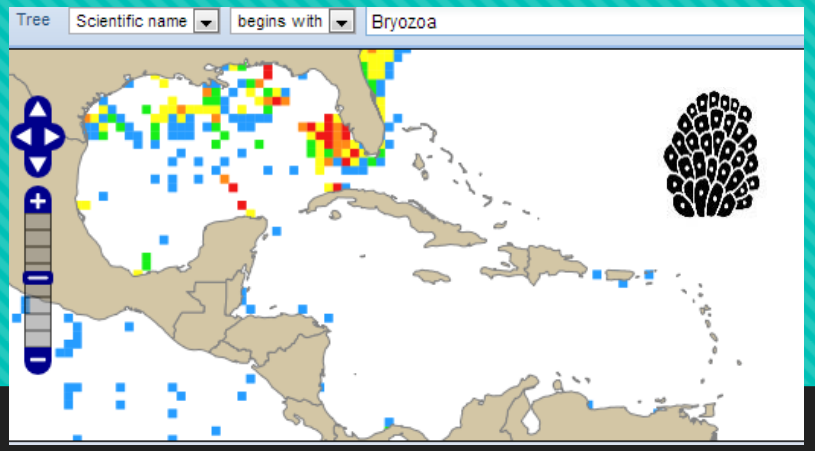

Biodiversidad Marina de Yucatán: Crustáceos
PIECEMO
UNAM Sisal

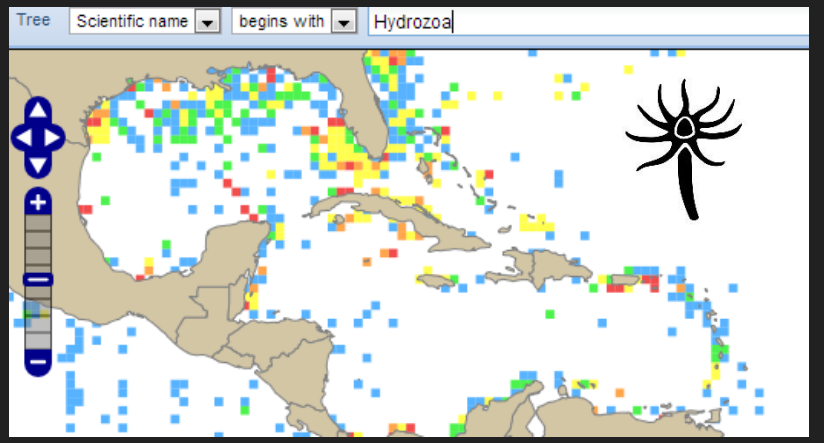
Contributions to the knowledge of marine species diversity in the GMx

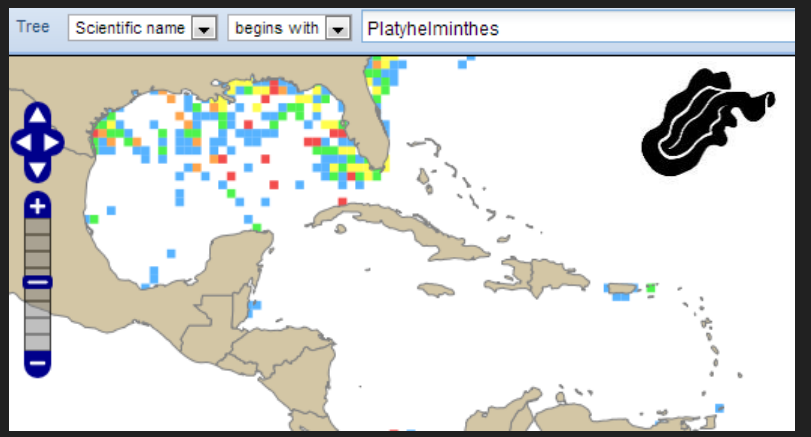
taxa	New species	New records Mexico	New records Yucatan	invasives
Fish	0	5	7	1
Molluscs	2	29	58	1
Crustacenas	5	29	92	2
Anemones	4	16	14	0
Sponges	4	15	28	0
Equinoderms	0	7	32	0
TOTALS	15	101	251	3

What needs to be done?

- Briozoans
- Hidrozoans
- Platelmynths



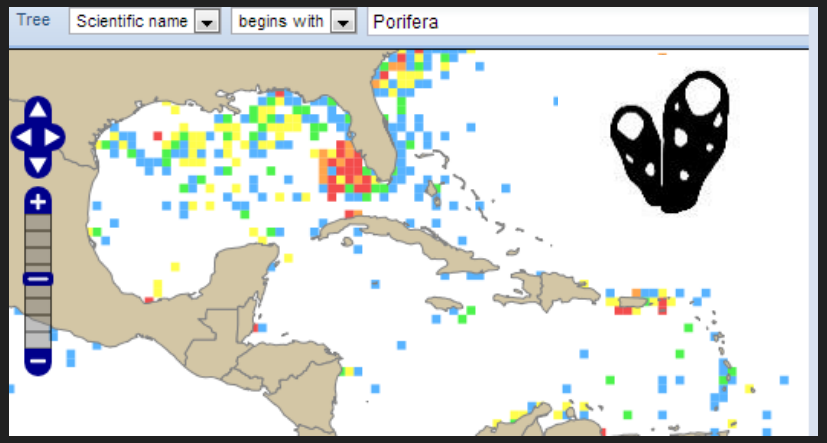


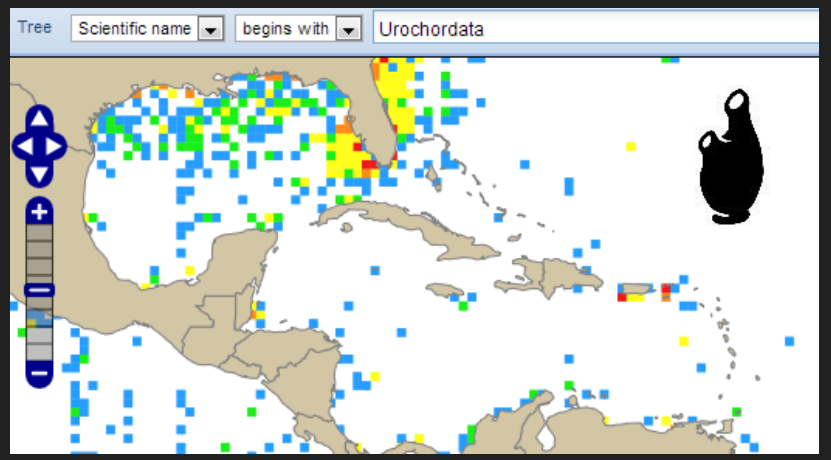


OBIS OCEAN BIOGEOGRAPHIC INFORMATION SYSTEM

What needs to be done?

- Sponges
- Tunicates





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PLOS | ONE

Sponge Communities on Caribbean Coral Reefs Are Structured by Factors That Are Top-Down, Not Bottom-Up

Joseph R. Pawlik*, Tse-Lynn Loh, Steven E. McMurray, Christopher M. Finelli

Mayo 2013

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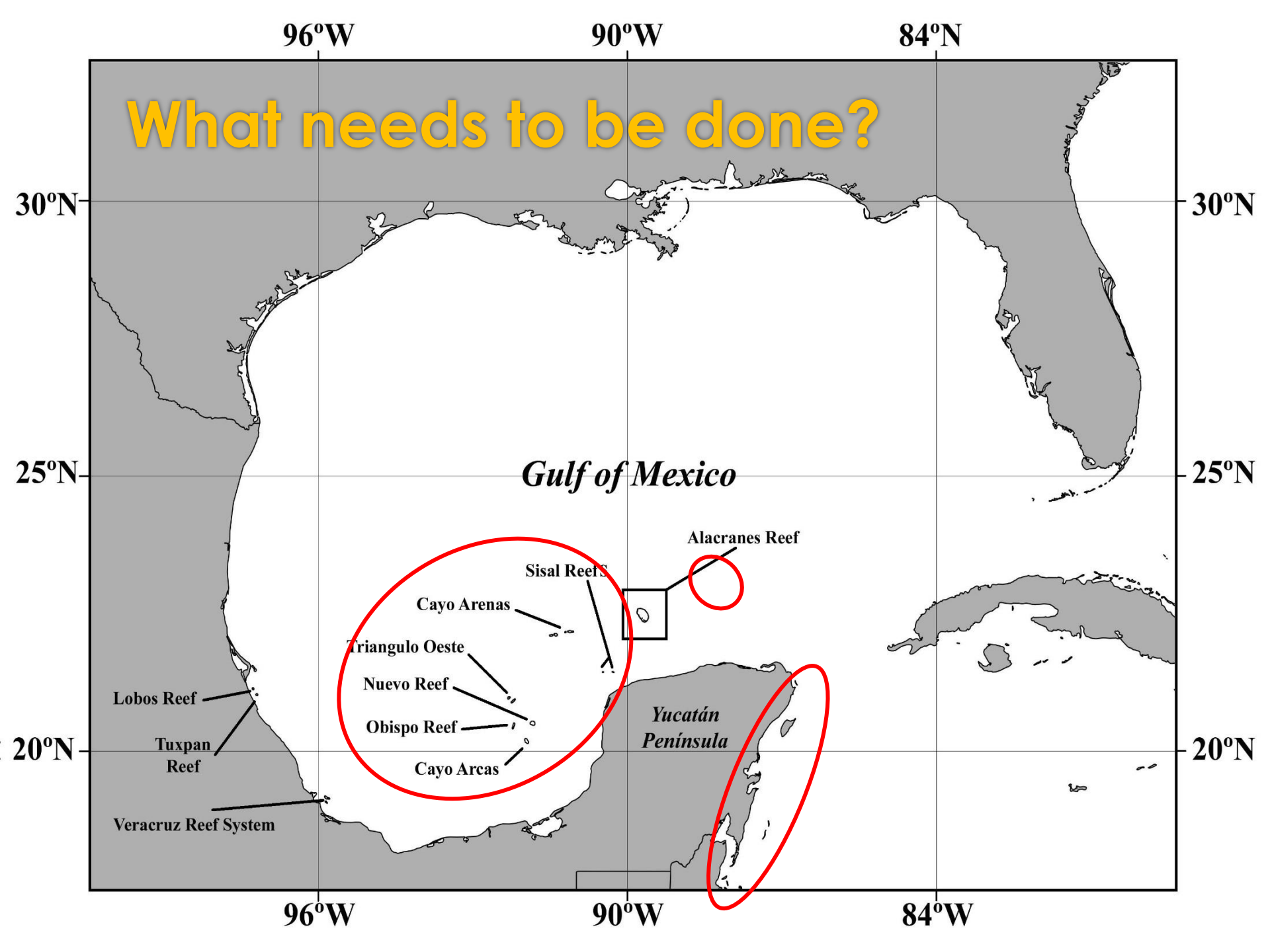
What needs to be done?
96°W
90°W
84°N
30°N
25°N
20°N
Gulf of Mexico
Alacranes Reef
Sisal Reefs
Cayo Arenas
Triangulo Oeste
Nuevo Reef
Obispo Reef
Cayo Arcas
Lobos Reef
Tuxpan Reef
Veracruz Reef System
Yucatán Península

Thank you for your time

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ns@ciencias.unam.mx

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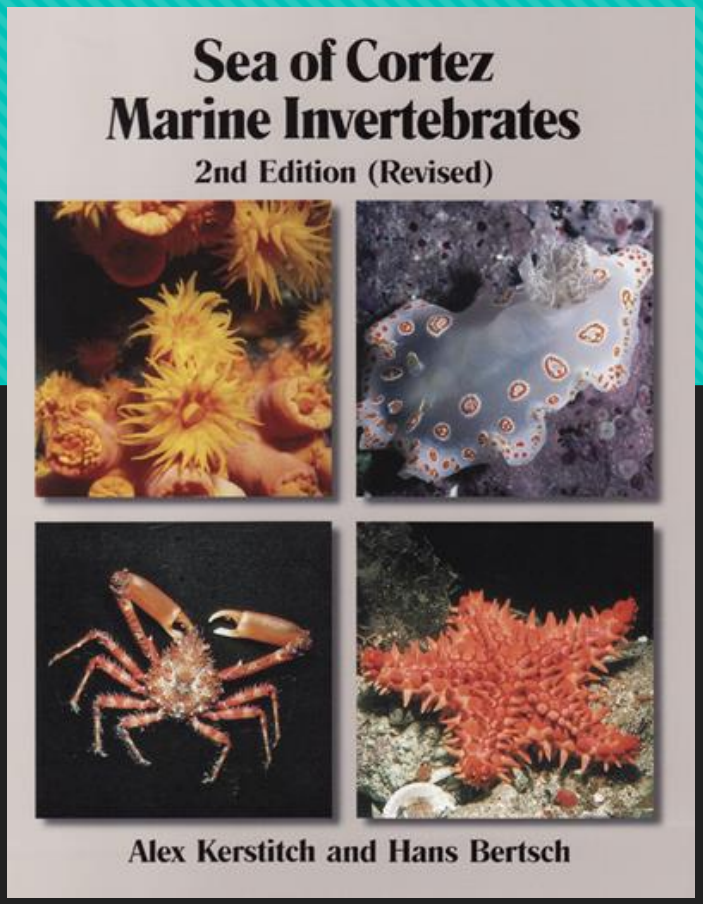
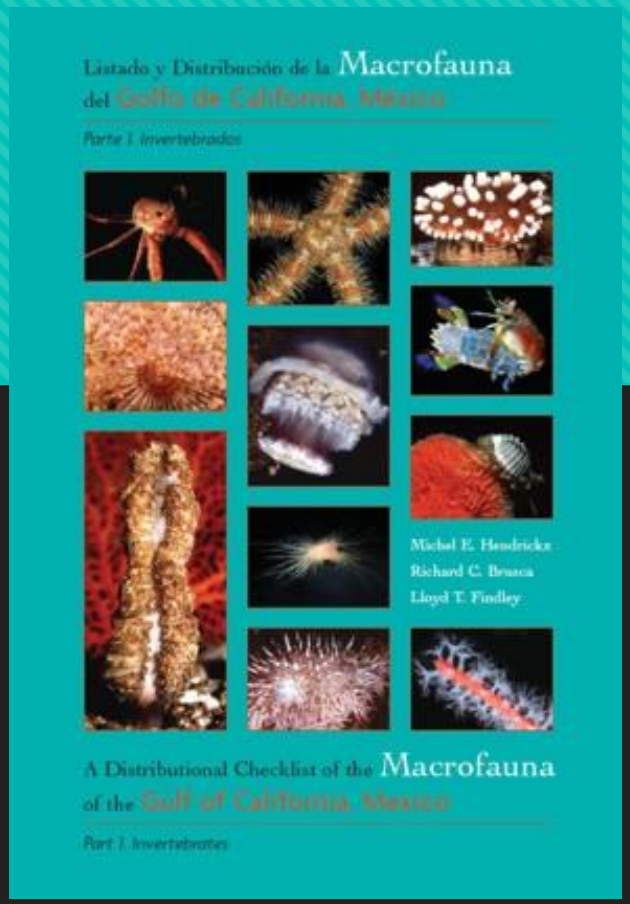
PARTNERSHIPS – Patricia Gómez, Francisco Solís, Goncalo Calado, Arthur Anker, Sammy DeGrave, Ernesto Campos, Darryl Felder, Rosana Rocha, Ignacio Winfield, Manuel Ortiz, Fernando Campos, José Luis Villalobos, Jorge Hernandez-Aguilera, Edlin Guerra, Juan Motta


Sea of Cortez
Marine Invertebrates
2nd Edition (Revised)
Alex Kerstitch and Hans Bertsch


Listado y Distribución de la Macrofauna
del Golfo de California, México
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Michel E. Hendrickx
Richard C. Brusca
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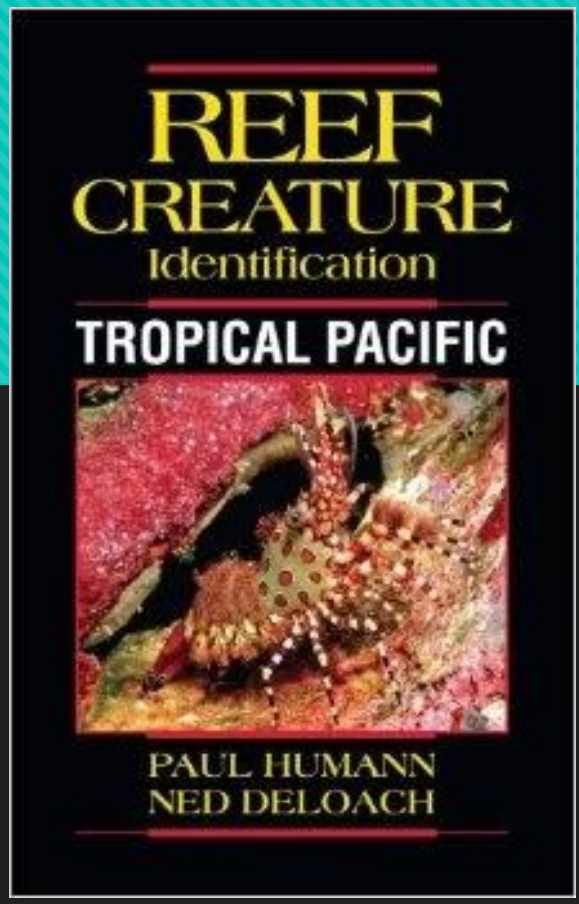
of the Gulf of California, Mexico
Part I. Invertebrates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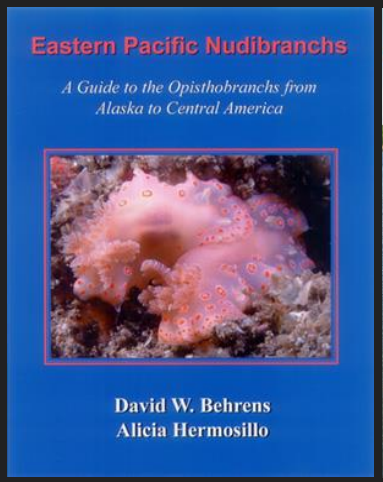
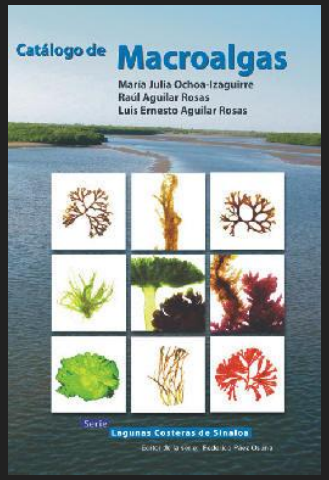

Eastern Pacific Nudibranchs
A Guide to the Opisthobranchs from
Alaska to Central America
David W. Behrens
Alicia Hermosillo


Catálogo de Macroalgas
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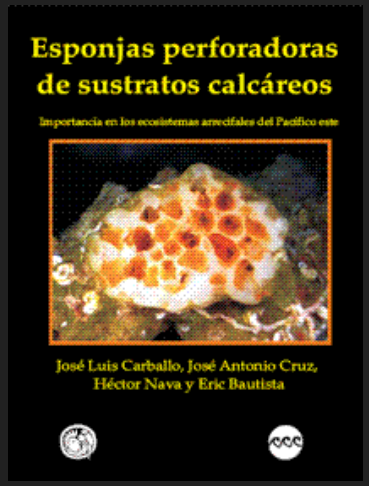
Luis Ernesto Aguilar Rosas
Serie
Lagunas Costeras de Sinaloa


Esponjas perforadoras
de sustratos calcáreos
Importancia en los ecosistemas arrecifales del Pacífico este
José Luis Carballo, José Antonio Cruz,
Héctor Nava y Eric Bautista


Atlas de corales pétreos (Anthozoa: Scleractinia) del Pacífico mexicano
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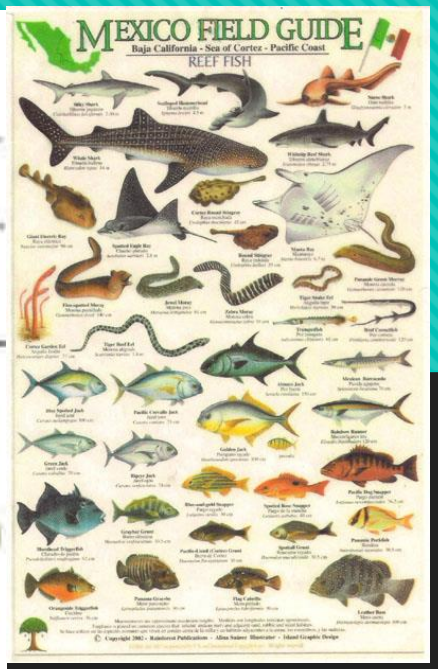
Guide to the Fish of the Sea of Cortez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Baja California - Sea of Cortez - Pacific Coast
REEF FISH


MEXICO FIELD GUIDE
Baja California - Sea of Cortez - Pacific Coast
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Baja California - Sea of Cortez - Pacific Coast


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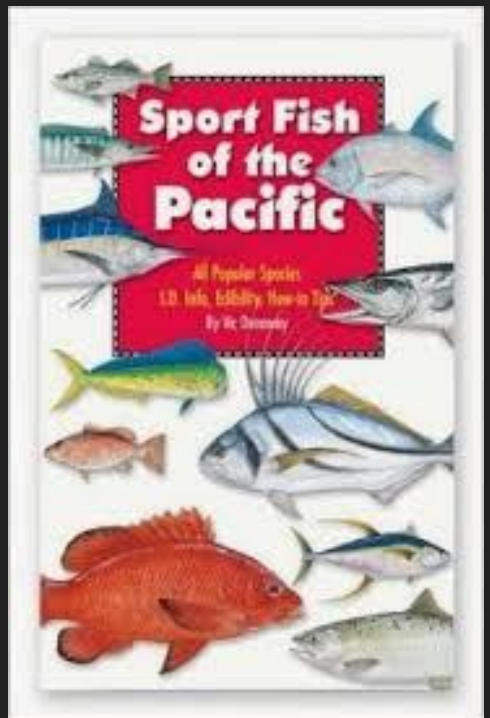
California, Baja California, Sea of Cortez and Pacific Coast of Mexico
PACIFIC OCEAN


MEXICO FIELD GUIDE
Baja California - Sea of Cortez - Pacific Coast
SPORT FISH


Sport Fish of the Pacific


Los Camarones
Pelágicos
(Crustacea : Dendrobranchiata y Caridea)
del Pacífico Mexicano
Michel E. HENDRICKX
y
Flor Delia
ESTRADA NAVARRETE
Comisión Nacional para el Conocimiento y Uso de la Biodiversidad
Instituto de Ciencias del Mar y Limnología
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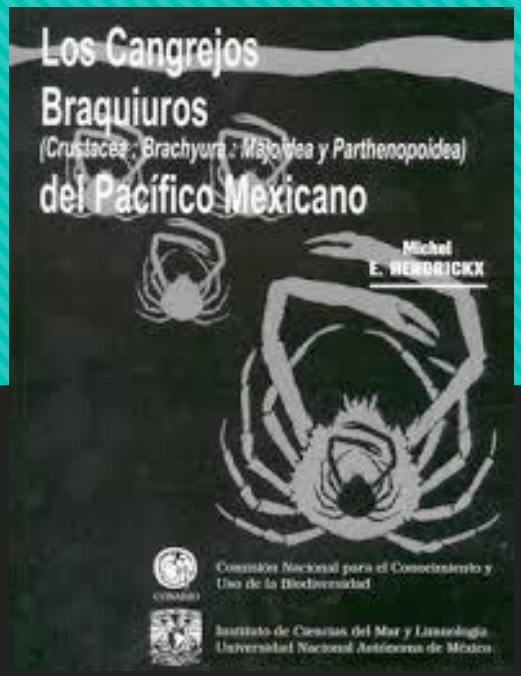
Los Cangrejos
Braquiuros
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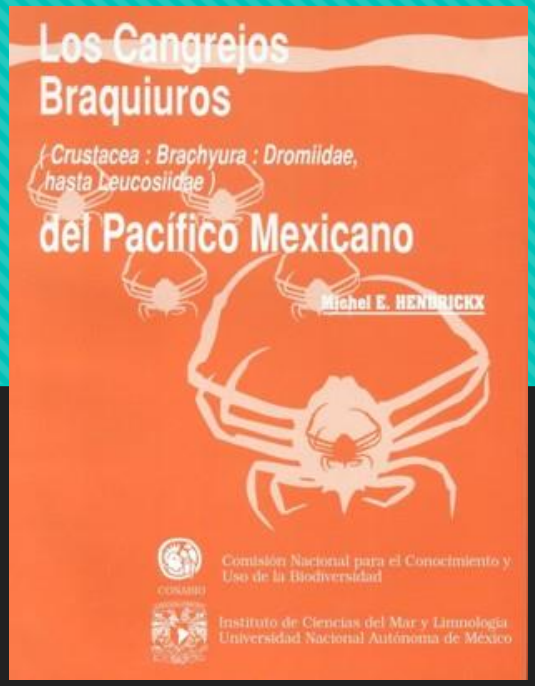
Los Cangrejos
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hasta Leucosiidae)
del Pacífico Mexicano
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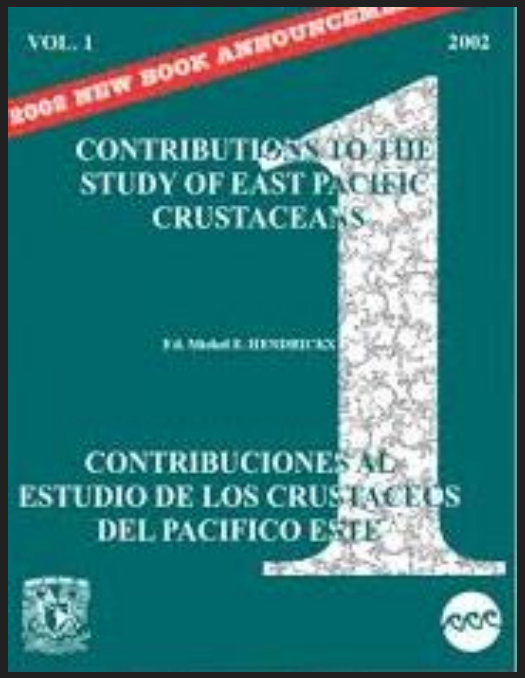
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