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SECRETARÍA DE EDUCACIÓN PÚBLICA

Instituto Politécnico Nacional
"La Técnica al Servicio de la Patria"

MEXICAN-CARIBBEAN: SARGASSUM BLOOM AND ITS ORIGIN, EVOLUTION AND INTEGRAL MANAGEMENT IN THE SHORT, MEDIUM AND LONG TERM.

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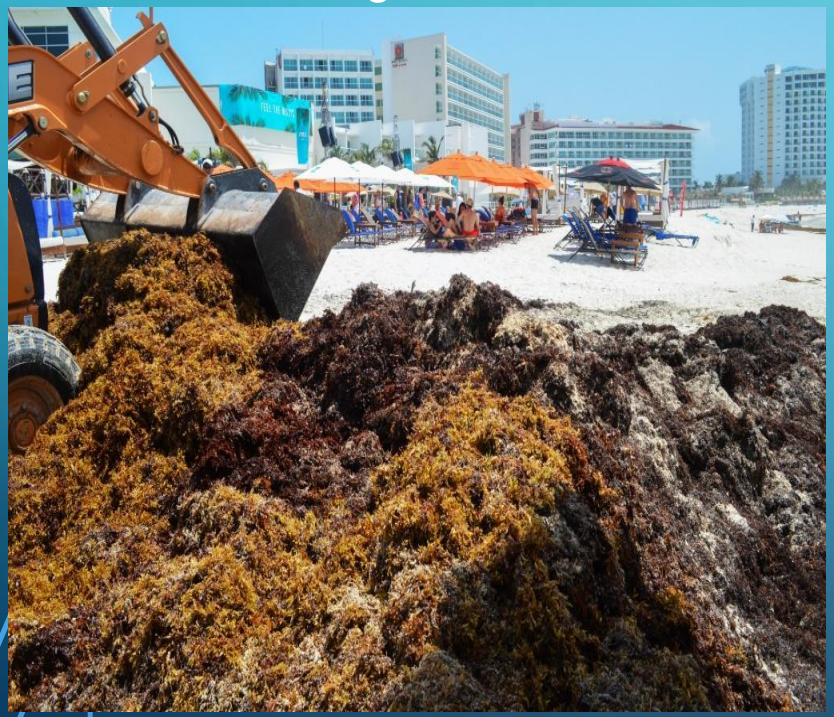
INTERNATIONAL CONFERENCE ON ENVIRONMENTAL SUSTAINABILITY AND CLIMATE CHANGE

APRIL 22-23, 2019 OSAKA, JAPAN

SARGASSUM: ¿IS ADVISABLE TO VISIT QUINTANA ROO BEACHES ?

El Universal
Miércoles 8 de agosto de 2018

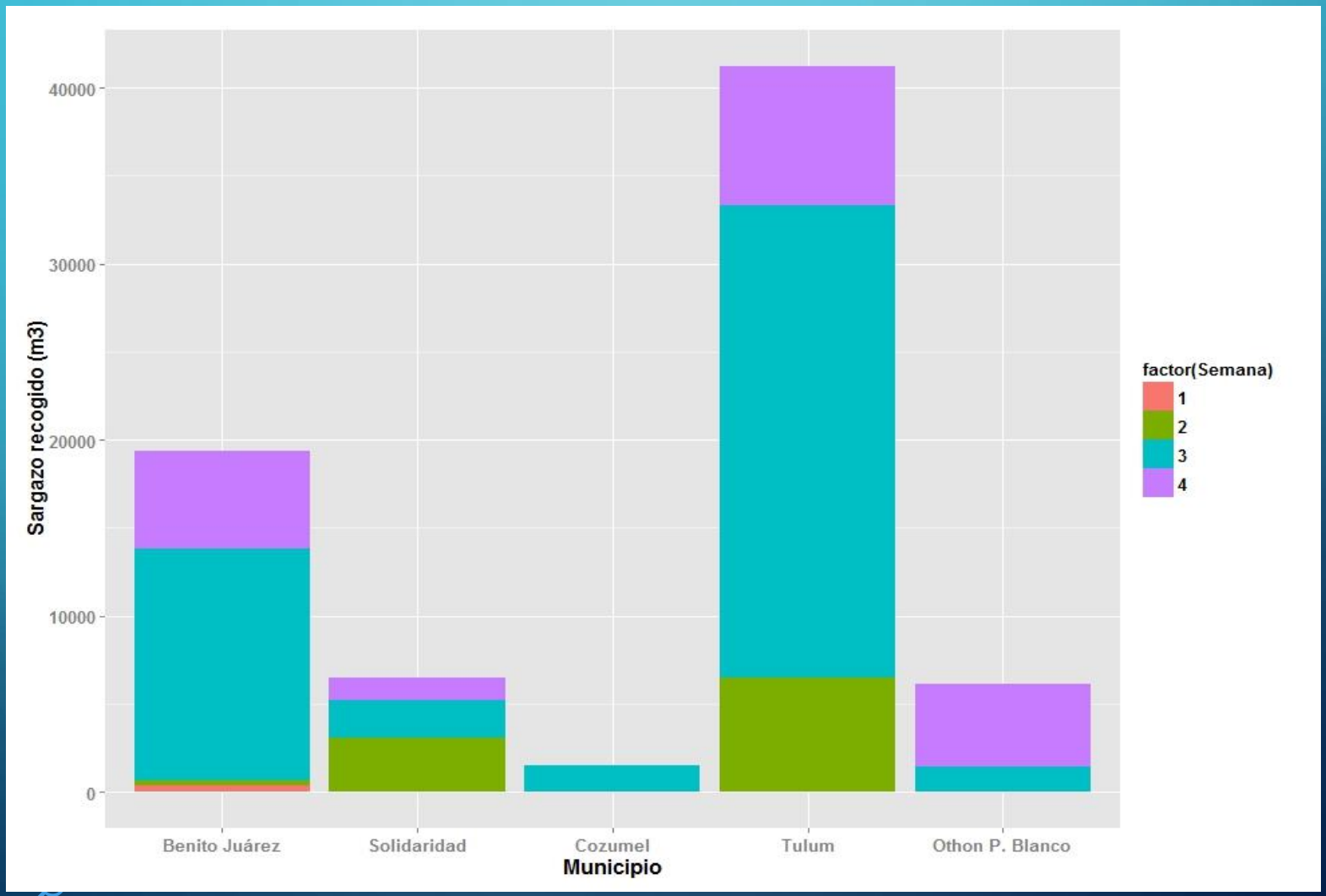


(Foto: Adriana Varillas/ EL UNIVERSAL)

"Only one thing is able to spoil our beautiful caribbean beaches in only few days. The sargassum, a macroalgae arriving to the coast forming a huge dark brown and yellow patches. Also you have a very stinky smell and those patches can affect the marine life when you have tons of algae.

INTRODUCTION

Since 2011 we have had atypical sargassum arrivals on a large scale, mainly on the beaches of the Caribbean Sea and less important at the Gulf of Mexico.



Information from SECRETARÍA DE ECOLOGÍA Y MEDIO AMBIENTE DEL ESTADO DE QUINTANA ROO (2015)

Two species of Sargassum at the Mexican Caribbean:

- *Sargassum natans*, left
- *Sargassum fluitans*, right

2018

(Fotos: Gonzalo Merediz, Amigos de Sian Ka'an A.C.)

AFFECTED ZONE

IMPACTS

H2S-CH4 emissions

Loss of tourism

Economical losses

Health problems

Skin irritation, itchy feeling…

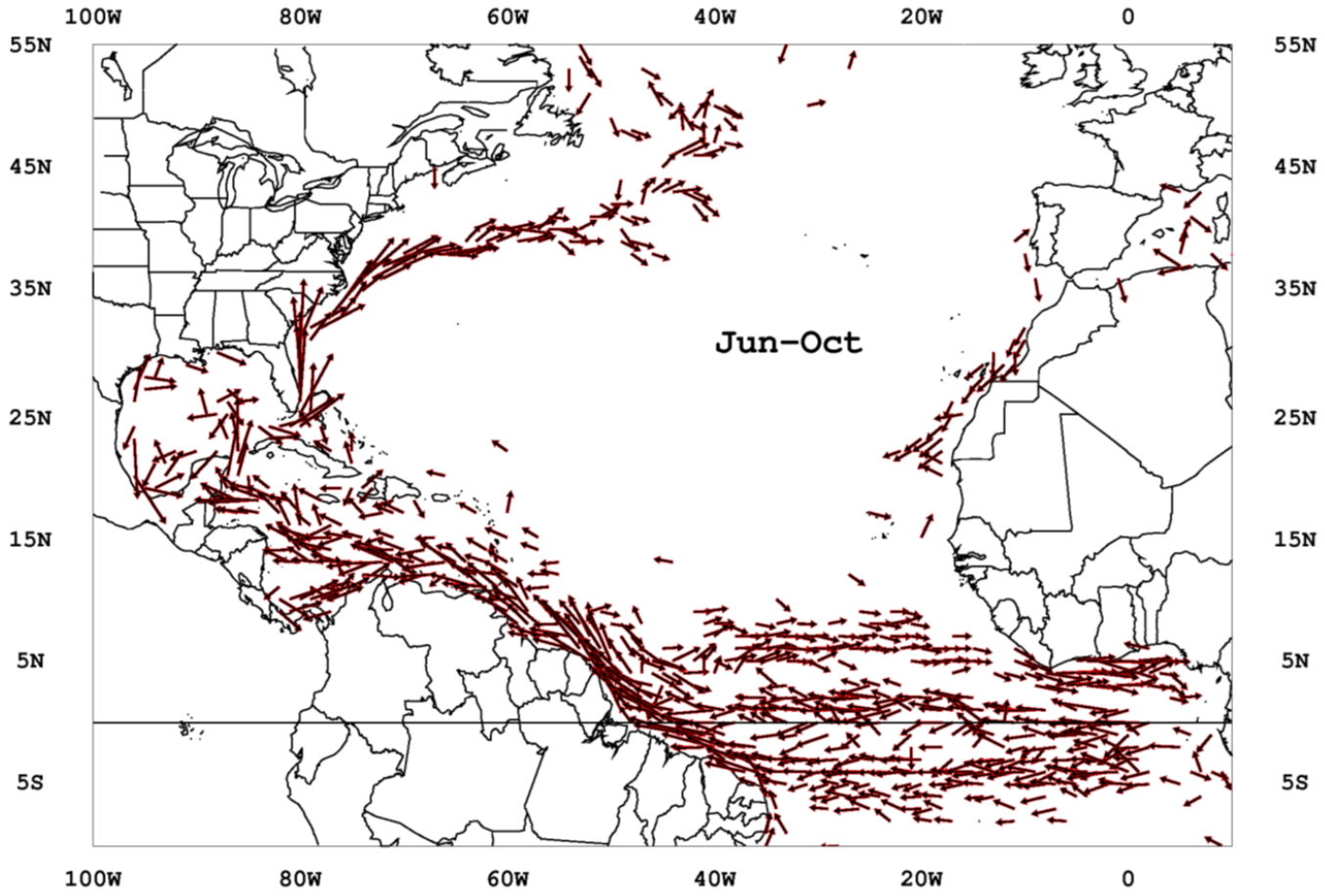
Coastal erosion)

Loss of species (corals, turtles, etc)

Ecosystem damage

TO UNDERSTAND THE PHENOMENON

- The sargassum arrival is:
- A natural phenomenon coming from the Sargassum Sea were the algae is release
- Enrichment with the high level of nutrients in the sea, the climate change and the meteorological and oceanographic variations (e.g. changes in the marine currents)


100W
80W
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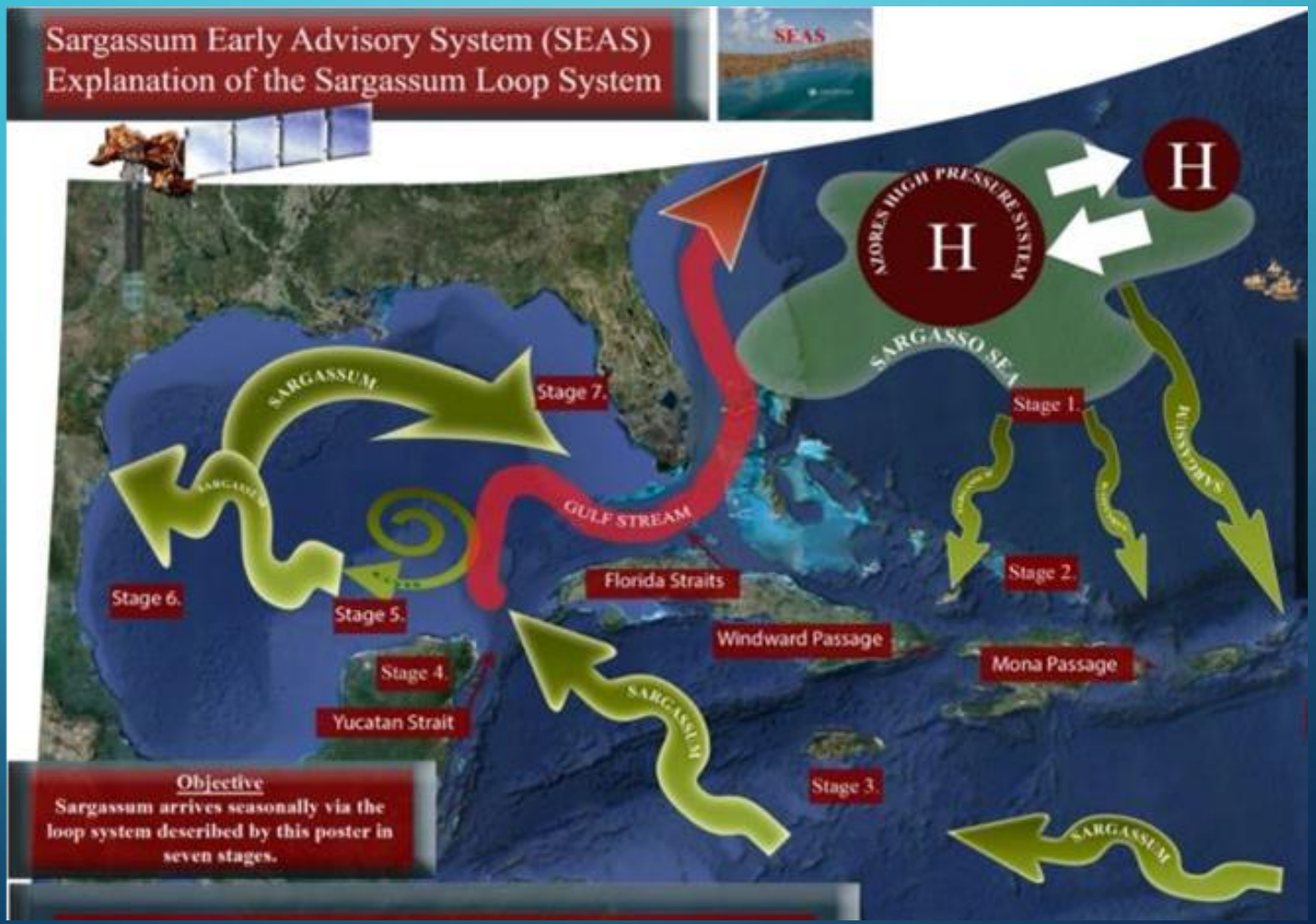
40W
20W
0
55N
45N
35N
25N
15N
5N
5S
Jun-Oct


Sargassum Early Advisory System (SEAS)
Explanation of the Sargassum Loop System
SEAS
AZORES HIGH PRESSURE SYSTEM
H
H
SARGASSO SEA
Stage 1.
Stage 2.
Stage 3.
Stage 4.
Stage 5.
Stage 6.
Stage 7.
SARGASSUM
SARGASSUM
SARGASSUM
SARGASSUM
GULF STREAM
Florida Straits
Windward Passage
Mona Passage
Yucatan Strait
Objective
Sargassum arrives seasonally via the loop system described by this poster in seven stages.

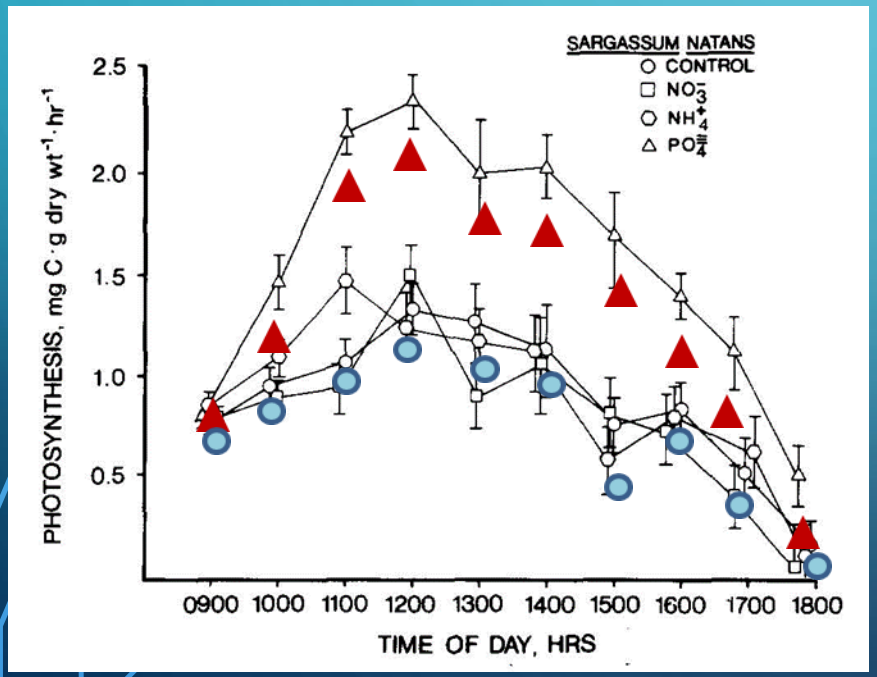
¿WHY NOW?
¿WHY SO MUCH?

Probably its origin was in the Atlantic coast of South America, like in 2011. Tons of sargassum arrived to the east part of the Caribbean Sea and to the west coast of Africa.

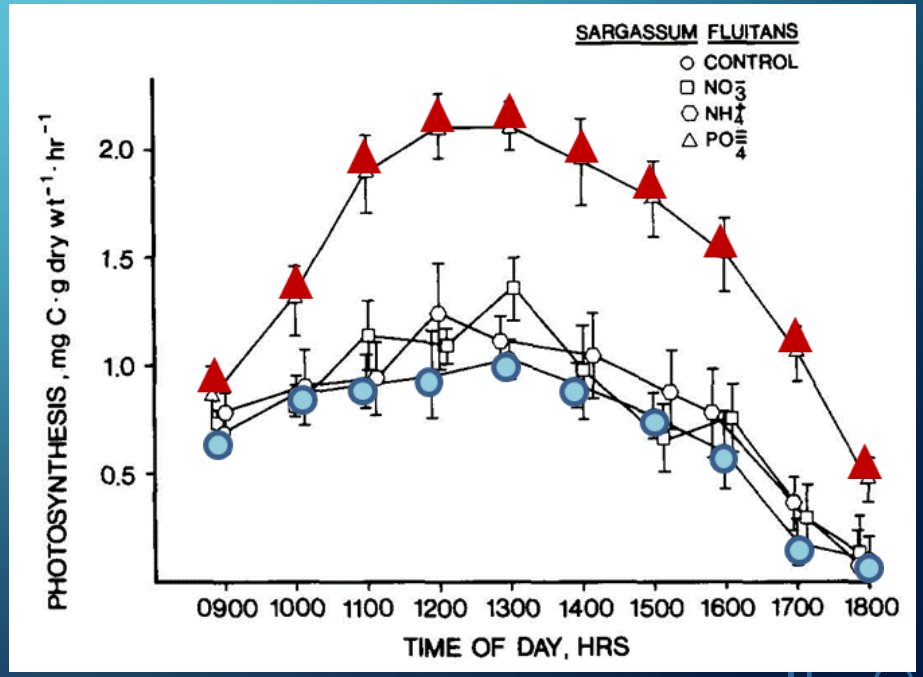
- The input of the Amazonas River with a high level of nutrients benefit the reproduction of the sargassum (going from 1m3 to 6m3)

Direct relation between photosynthesis (growth) and nutrients availability (Lapointe, 1986)

Sargassum natans
(especies dominantes del mar de Sargazo original)



Sargassum fluitans
(especies dominantes de los arribos masivos)



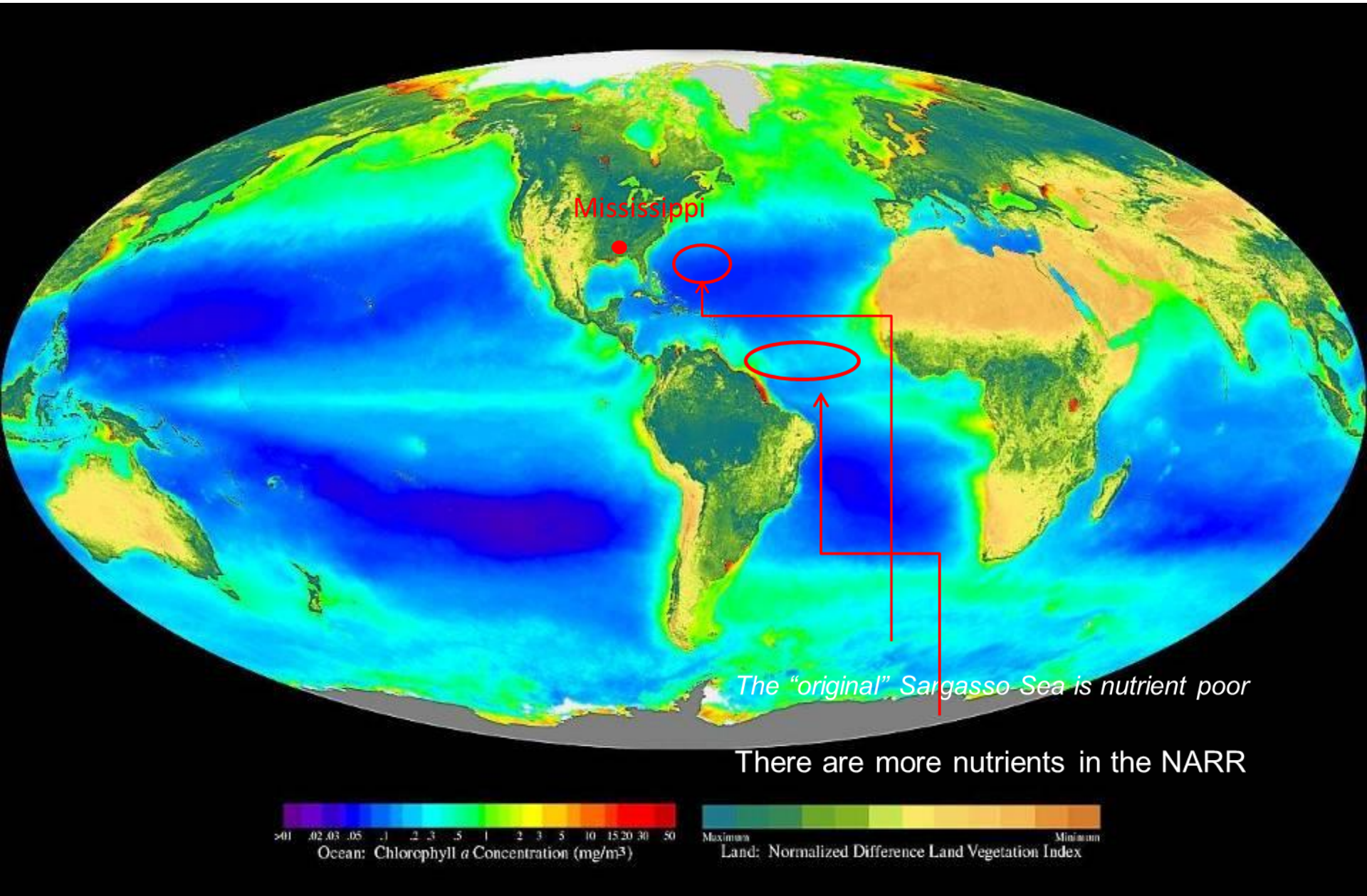

Mississippi
The "original" Sargasso Sea is nutrient poor
There are more nutrients in the NARR
>01 .02 .03 .05 .1 .2 .3 .5 1 2 3 5 10 15 20 30 50
Ocean: Chlorophyll a Concentration (mg/m3)
Maximum
Minimum
Land: Normalized Difference Land Vegetation Index

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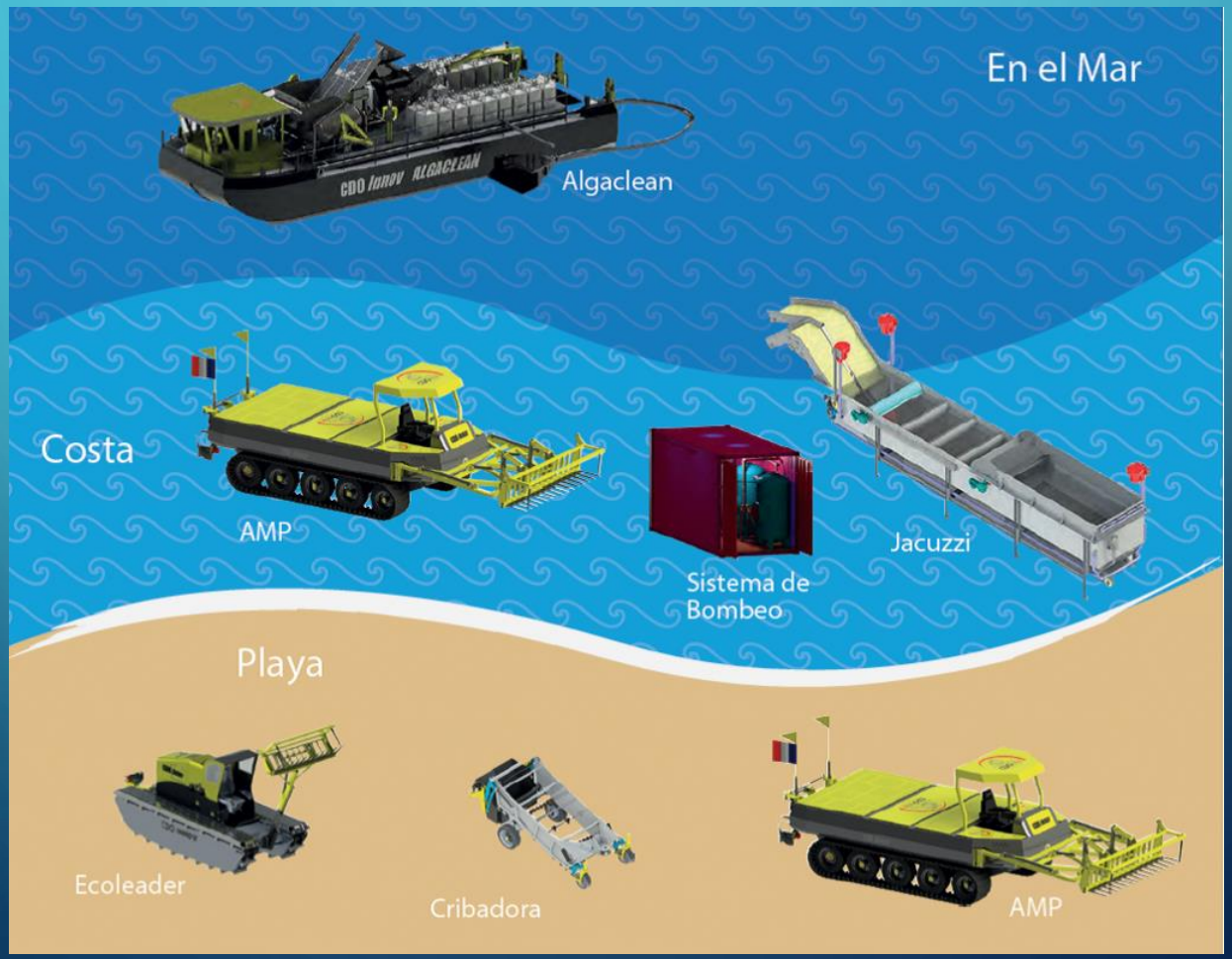
DIAGRAM OF A CONCEPTUAL MODEL

(realización: Francisco Arreguín Sánchez, CICIMAR-IPN, en el marco de la Red Océano, Clima y Cambio Global)

PERSPECTIVES

FENCES INSTALLATION

COLLECTION


En el Mar
Algaclean
Costa
AMP
Sistema de Bombeo
Jacuzzi
Playa
Ecoleader
Cribadora
AMP

EXPLOITATION

https://www.youtube.com/watch?v=t07EKe-Py20

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PROPOSAL FROM THE NETWORK "OCEAN, CLIMATE AND GLOBAL CHANGE

Short term

Industria
Investigación

Contención
SEGOB/SEMARNAT

Ecología

Academia
Técnico Industrial
Oceanología
Ecología

SEGOB
Emergencia Nacional
Contención
Acción
Acad. Técnica

Medium term

Industria
Piloto

Diagnóstico
Análisis

Solución Largo Plazo

Long term

Industria
Comercial

Academia

Services Provider

NGO's

Government
Fed, St and Loc

NATIONAL EMERGENCY DECLARATORY

CONCLUSIONS

We have some local and national initiatives to mitigate the Sargassum arrival.

Nevertheless, causes and effects of this phenomenon are going beyond local border and requires regional focus and strong collaboration.

The regional organization (Large Marine Ecosystems) can play an important and coordinated rol to raise funds for scientific projects.

REFERENCES

Information compiled from Conferences and workshops:

- "*Latin American and Caribbean Large Marine Ecosystems*" meeting, organized by Instituto Politécnico Nacional september 7-8, 2015 in Cancún, México;

- Workshops organized by the CONACYT network "Océano, Clima y Cambio Global" during 2018.

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Thank you for your attention

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