



LAGUNA DE TERMINOS  
Area de Protección de  
Flora y Fauna

# Identifying Critical Nesting Grounds in Campeche, Mexico



CONANP

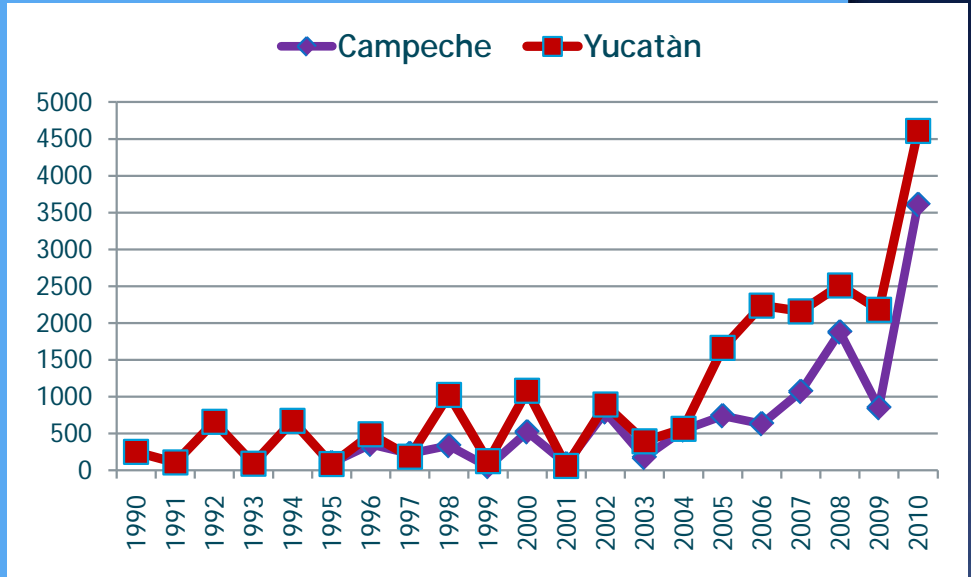


pro natura 20 Años  
Tras su Rastro

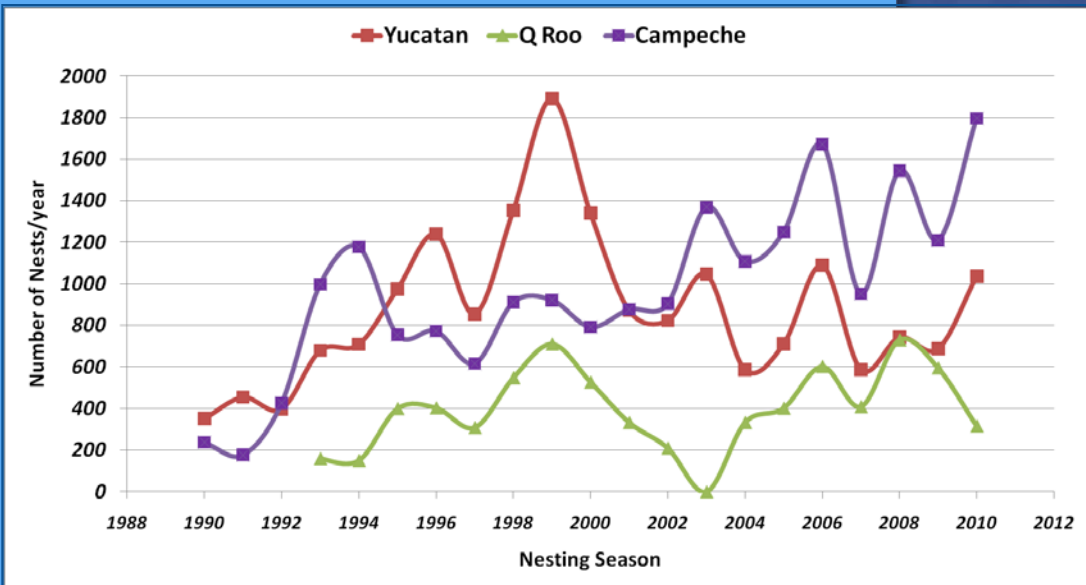


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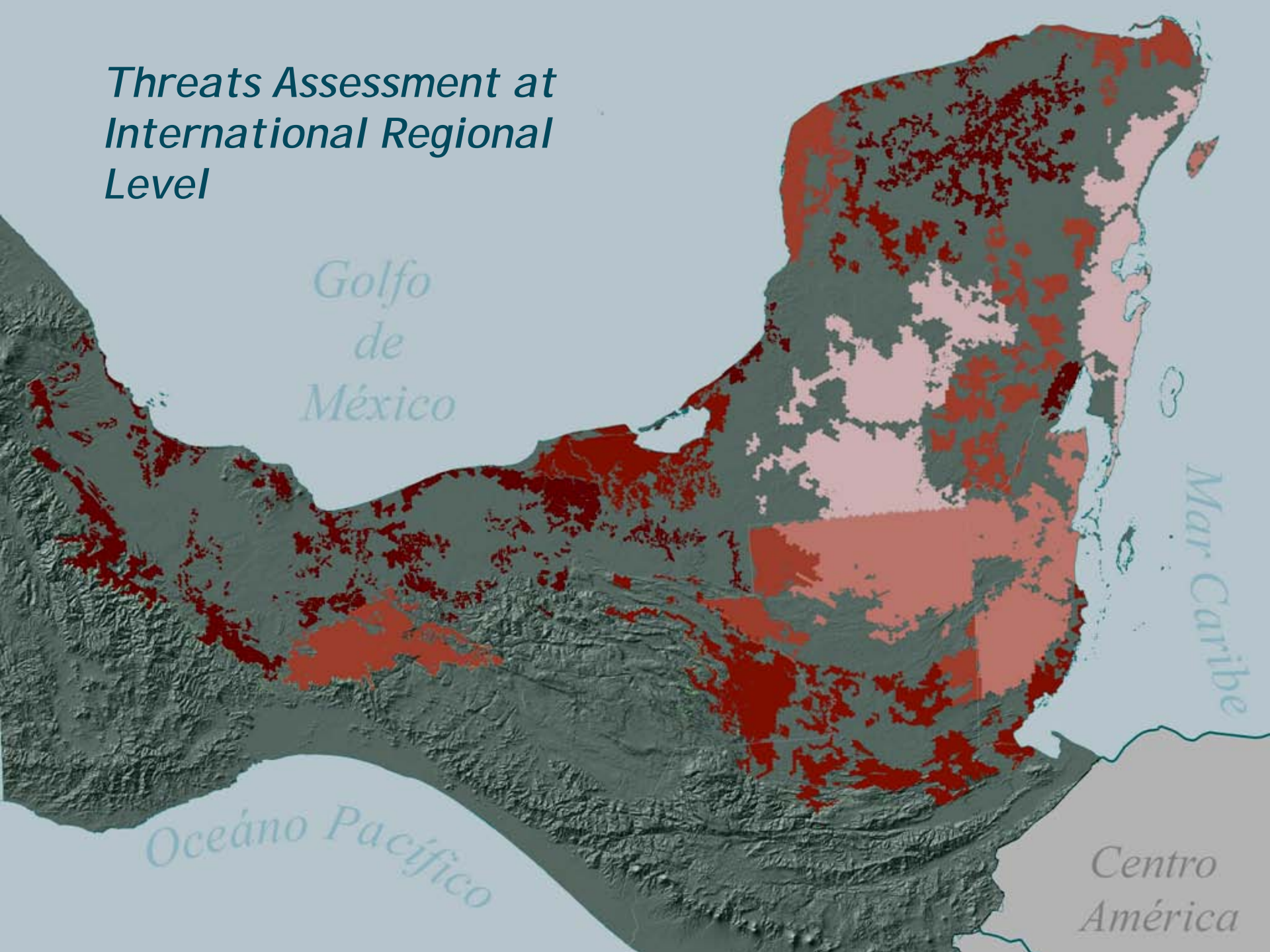
Green Turtle nesting trend

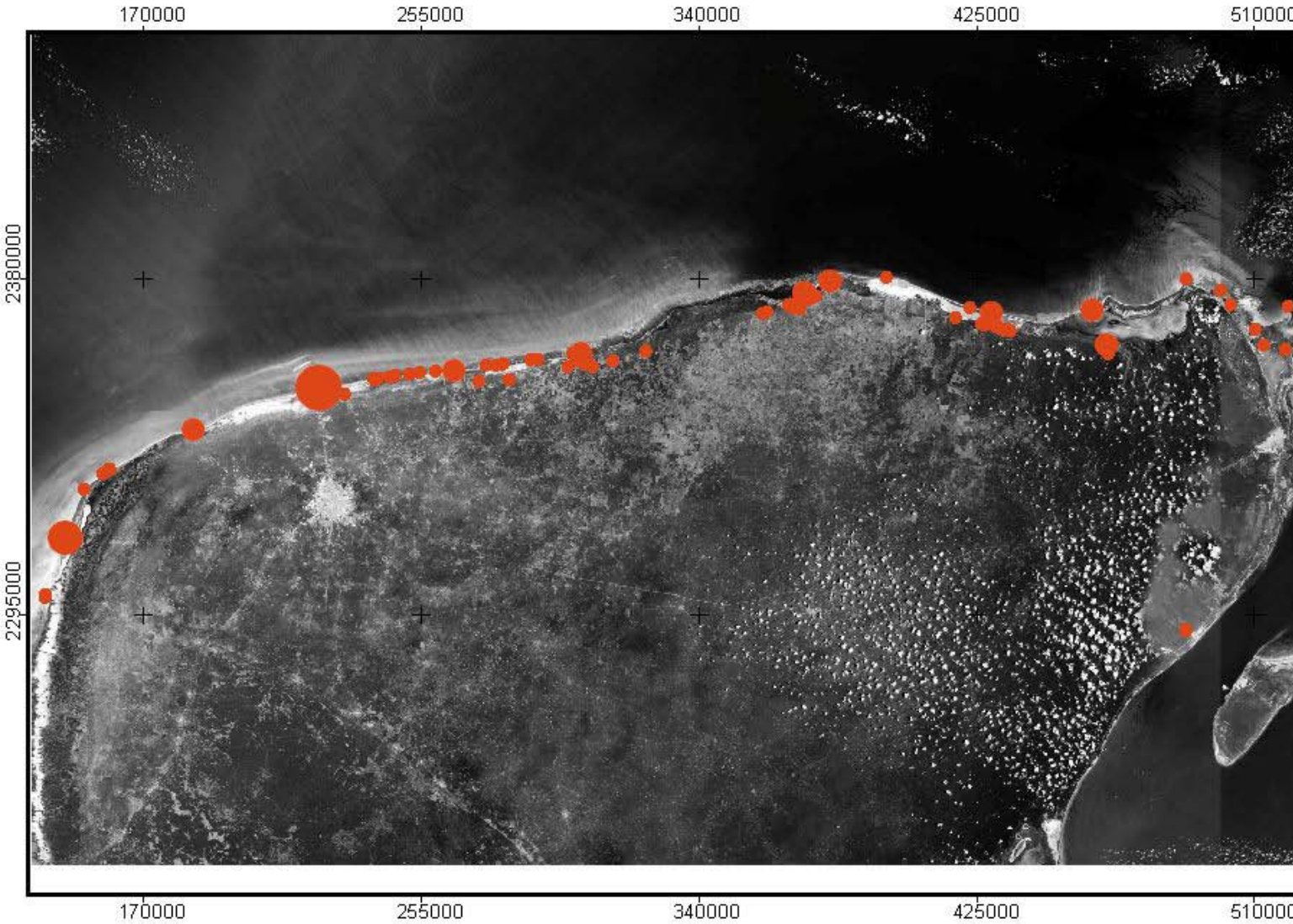


Hawksbill Turtle nesting trend



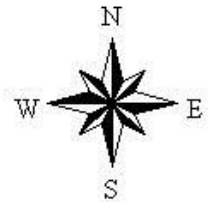
# *Threats Assessment at International Regional Level*





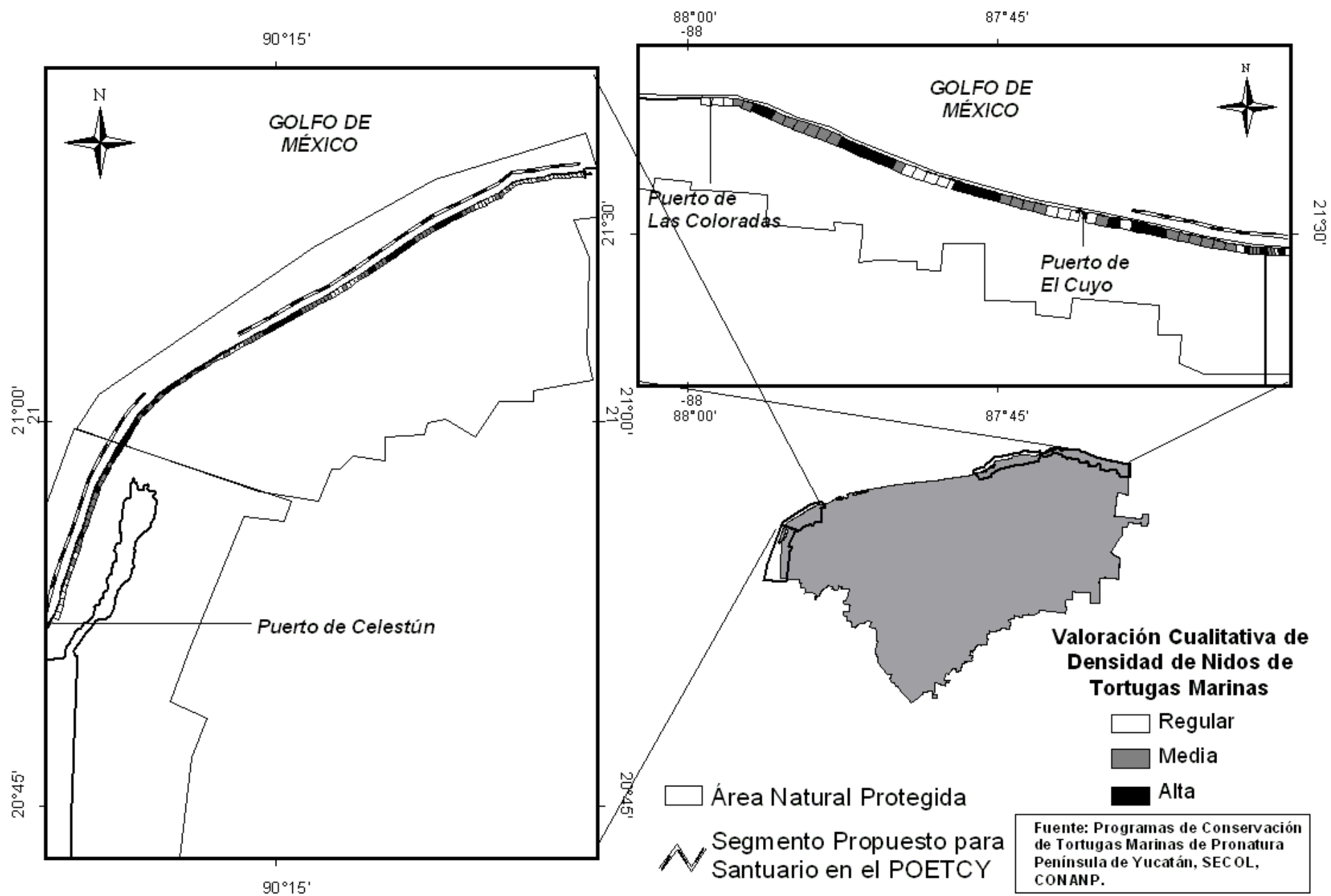
**Number of Inhabitants  
 (by 2002)**

- 1 - 1500
- 1500 - 3000
- 3000 - 10000
- 10000 - 45000



(CR) Sea Turtle Conservation Program and Centro Pronatura de Información para la Conservación, 2007





- The nesting females coming to Campeche are being impacted by different threats along the whole coast, suffering a decrease in their nesting beaches' adequacy as incubating habitats.



# Objective

- Identify critical sea turtle nesting beach segments by a expert multivariate approach considering threats (costs to conservation) and historic marine turtle nesting records (viability for target populations) in Campeche.

# METHODS

Definition and spatial location of the main threats (GIS)

Spatial characterization of historic marine turtle nesting records

Weighting threats and their sources

Cost Optimizing Analysis (MARXAN)

Conservation Targets: Hawksbills/Greens

Management Units:

Hawksbills: North, Center, South

Greens: South

Goal: Include in Critical Zones to Protect 80% of nests per Management Unit.

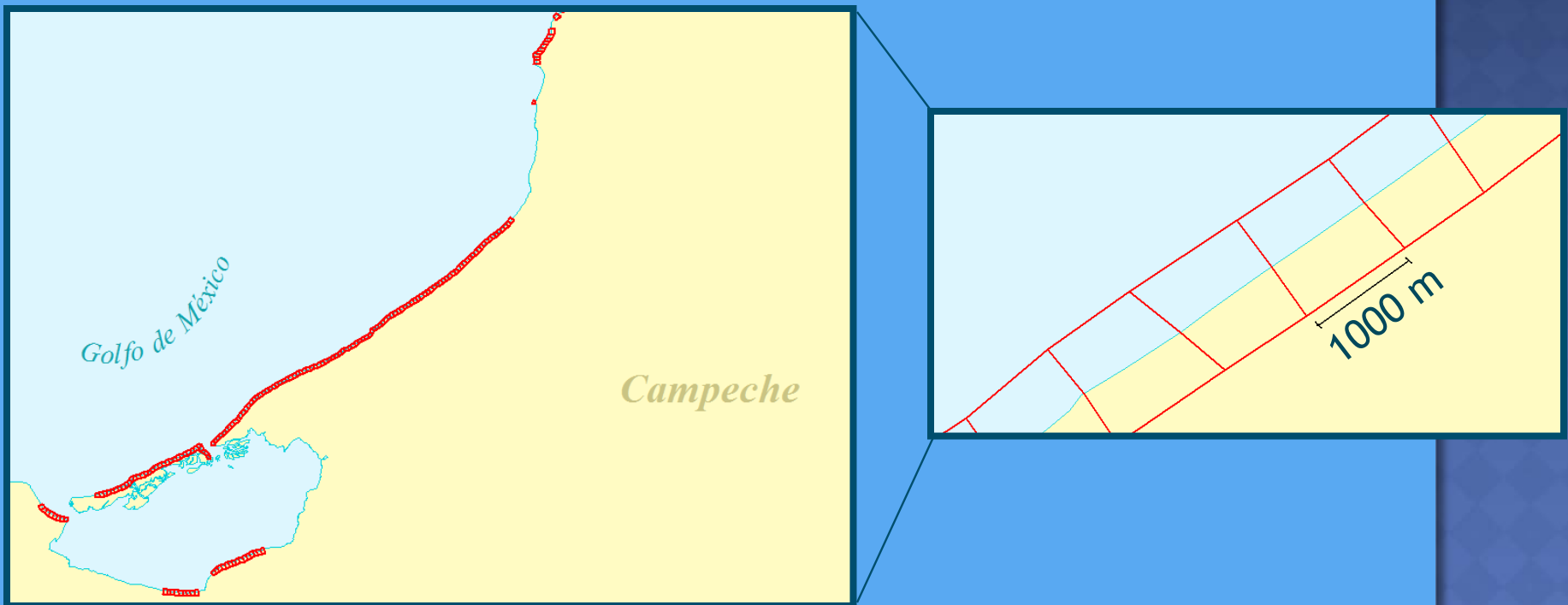
- Severity
- Extension
- Irreversibility

- Very High
- High
- Medium
- Low

Highest Viability, the Least Cost

Decision Making/Reserve System Proposal.

- This type of analysis helps to design natural protected areas systems. It requires the intervention of experts for criteria definition.
- It identifies critical beach segments for protection, those analysis units with the highest viability (nests) and lowest cost (threats).



# DEFINED PRESSURES

Nesting Beach Degradation

Coastal Dune Vegetation Loss

Hatchling Mortality and Egg Loss because of  
Anthropogenic Causes

Number of Individuals Diminishing

Changes in Nesting Behavior

Pressure Evaluation	Threats Evaluation	Sources of Threats Evaluation
<b><i>Nesting Beach Degradation</i></b>	Physical Barriers on Beach	Palapas
		Beach Houses
		Hotels
		Rock walls in the sea (Escolleras)
		Docks
		Rock walls perpendicular to beach
		Rock walls parallel to beach
		Wood and rock walls in the sea
		Tethrapods (Structures mode of concrete)
		Wave breakers
	Changes in Beach Morphology (Erosion)	Erosiive processes
	Beach Degradation by Urbanization	Beach Houses
		Palapas
		Docks
		Wave breakers
	Solid Residual Accumulations on the Beach	Beach Houses
		Docks
		Fishermen Camps
		Recreative use for beaches
		Restaurantes
		Hotels
		Urban zones
	Distance to roads	

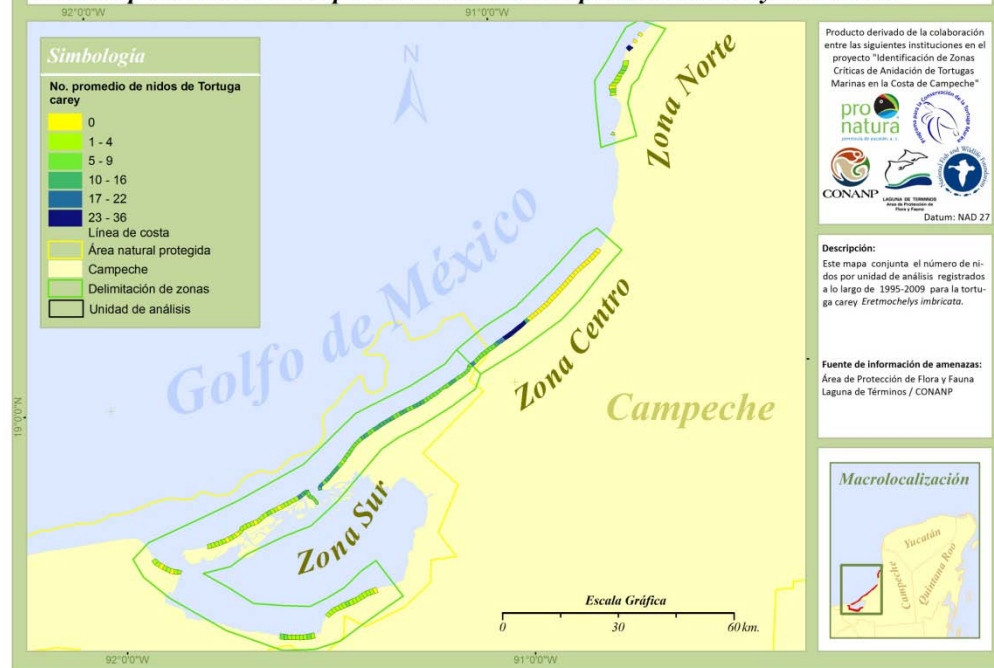
## Número promedio de nidos por unidad de análisis para *Chelonia midas*



Mean historic number of Green Turtle nests in Campeche (1990 - 2010)

Mean historic number of Hawksbill Turtle nests in Campeche (1990 - 2010)

## Número promedio de nidos por unidad de análisis para *Eretmochelys imbricata*



# Costo total de amenazas por unidad de análisis

92°0'0"W

91°0'0"W

## Simbología

### Costo por unidad de análisis

Bajo

Medio

Alto

Muy alto

Línea de costa

Área natural protegida

Campeche

Delimitación de zonas

Unidad de análisis



Producto derivado de la colaboración entre las siguientes instituciones en el proyecto "Identificación de Zonas Críticas de Anidación de Tortugas Marinas en la Costa de Campeche"



Datum: NAD 27

### Descripción:

Este mapa conjunta los valores totales de las amenazas por unidad de análisis. El costo determina la importancia de incluir esa unidad de análisis en el sistema de reservas final. Un costo mayor implica mayor esfuerzo de conservación.

### Fuente de información de amenazas:

Área de Protección de Flora y Fauna Laguna de Términos / CONANP

### Macrolocalización



92°0'0"W

91°0'0"W

Escala Gráfica

0 30 60km.

19°0'0"N




# Sistema de reservas seleccionado mediante Marxan

92°0'0"W

91°0'0"W

## Simbología

### Portafolio final

-  Unidades no incluidas en el sistema de reservas final
-  Unidades de análisis seleccionadas
-  Delimitación de zonas



92°0'0"W

91°0'0"W

Producto derivado de la colaboración entre las siguientes instituciones en el proyecto "Identificación de Zonas Críticas de Anidación de Tortugas Marinas en la Costa de Campeche"



Datum: NAD 27

### Descripción:

En este mapa se incluyen las unidades de planeación seleccionadas mediante el software Marxan, que representan las unidades prioritarias y viables para la conservación de sitios de anidación para la tortuga Carey y tortuga blanca de Campeche.

### Fuente de información de amenazas:

Área de Protección de Flora y Fauna  
Laguna de Términos / CONANP

### Macrolocalización



- ① The results were presented in a friendly agile format that we assume will facilitate its adoption and use by decision makers, authorities and actual stakeholders on marine turtle conservation in the peninsula.
- ① A middle term outcome is the insertion of this spatial information into local land orderings.
- ① Short term outcomes are collaboration with different Federal and State Government Ministries to attend different threats.



## Running and coming conservation and research lines...

- Telemetry tracking (hawksbill, greens and loggerheads).
- Mixed stock analysis in juvenile feeding grounds.
- Multiple paternity assessment.
- Assessment of spatial artisanal fishing effort and bycatch.
- Light pollution on nesting beaches.
- Thermal conditions on nesting beaches.
- Medicine and Rehabilitation.
- Hatchling dispersion by superficial currents.
- Economic alternatives for local coastal communities.
- Beach morphology monitoring.
- Climate change and nesting trends relationship.
- Demography and depletion risk analysis for nesting populations

# AKNOWLEDGMENTS

Comité Estatal de la Tortuga Marina  
del Estado de Campeche

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***THANK YOU VERY MUCH  
FOR YOUR TIME!***