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## Appendix

### Template for Submission of Scientific Information to Describe Ecologically or Biologically Significant Marine Areas

*Note: Please **DO NOT** embed tables, graphs, figures, photos, or other artwork within the text manuscript, but please send these as separate files. Captions for figures should be included at the end of the text file, however.*

**Title/Name of the area: Ocos-Manchón Guamuchal**

**Presented by** (names, affiliations, title, contact details)

Ing. Agr. Manuel Benedicto Lucas López  
Sub Secretario Ejecutivo  
Consejo Nacional de Áreas Protegidas de Guatemala  
5ta Av. 6-06, Zona 1 Edificio IPM, ciudad de Guatemala  
Tel: (502) 24226700 ; Fax (5029 2253-4141  
Email: [benelucas@yahoo.com](mailto:benelucas@yahoo.com)  
[www.conap.gob.gt](http://www.conap.gob.gt)

Fernando Castro ([fercastro@conap.gob.gt](mailto:fercastro@conap.gob.gt))  
Edgar Selvin Pérez ([otecbio@conap.gob.gt](mailto:otecbio@conap.gob.gt))  
National Council on Protected Areas of Guatemala  
Tel: (502) 2422 6700  
[www.conap.gob.gt](http://www.conap.gob.gt)

**Abstract** (in less than 150 words).

Guatemala has a 254 km cost line in the south and it is part of the Pacific Ocean, the most productive ocean in the world. Guatemala has the most extensive mangrove forest in the south area **Ocos-Manchón Guamuchal**. It's pivotal for social, economic, environmental activities. The area is formed by marine coastal lagoons, submerged aquatic vegetation that serve as refuge to different species of birds and fishes.

Since 1995 it is a RAMSAR area. Now the government recognizes the importance of the area and it is determine to include it in the protected areas national system and also propose as an EBSA zone. Based on NISP analysis and CDB developed as part of the convention of biological diversity.

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## **Introduction**

*(To include: feature type(s) presented, geographic description, depth range, oceanography, general information data reported, availability of models)*

The **Ocos-Manchón Guamuchal** is considered a coastal marine area located in Guatemala south pacific. The area contains 74,449.39 km<sup>2</sup>. The most extensive mangrove system in the country surrounded by private land and coastal marine protected area. The geological formation is known as the Pacific coastal lowlands, originated by quaternary alluviums from volcanic origin erosion processes that deposit several layers to the continental shelf. Guatemala is part of the Central America isthmus that was originated 3.5 million years ago and bridged the South and North mass lands. This allowed for interexchange of Nearctic and tropical fauna. However it closed the exchange between marine species, for example the Centropomidae Family was separated by this geological event (Rivas 1980).

The Tropical Pacific Ocean is the most productive ocean in the world, areas like the intertropical convergence zones (ICZ) are consider climate regulator with a large fisheries production (Cabrera y Ortiz 2010). The coastal zone is has sub-littoral deep/shallow areas and lowland circumlittoral soft/hard bottom areas with submerged vegetated areas, mangrove forest, estuarine and coastal lagoons (Fundaecco 2002, Probioma 2008, CONAP y MARN 2009). It is consider an IBA site because of the amount of migratory birds in the area (Eisermann y Avendaño 2007).

Several fisheries species and pelagic megafauna (turtles, birds and sharks) live in the area because of the importance as nursery, migration path and foraging o in the area (Dávila 2011). It is an important nesting area for Olive Ridley (*Lepidocheolys olivadae*), and nursery for shark like Scalloped Hammerhead (*Sphyrna lewini*) (Ixquiac 2009) and the shrimp production in the country comes from this zone.

The area is threatened by land use change, loss of mangrove forest, river eutrophication and water diversification for agriculture. Those changes can also severely impact fisheries production and natural ecosystems processes. Develop a policy that contemplate the sustainable use of resources in the area is a challenged for authorities that have to deal with social issues first.

## **Location**

*(Indicate the geographic location of the area/feature. This should include a location map. It should state if the area is within or outside national jurisdiction, or straddling both. It should also state if the area is wholly or partly in an area that is subject to a submission to the Commission on the Limits of the Continental Shelf)*

The area Ocos-Manchón Guamuchal is located inside Guatemala's Ocean Pacific territorial waters. It is included in the department of Retalhuleu and San Marcos; latitude 14° 22' 48" and longitude 92° 1' 27"(Annex 1).

## **Feature description of the proposed area**

*(This should include information about the characteristics of the feature to be proposed, e.g. in terms of physical description (water column feature, benthic feature, or both), biological communities, role in ecosystem function, and then refer to the data/information that is available to support the proposal and whether models are available in the absence of data. This needs to be*

*supported where possible with maps, models, reference to analysis, or the level of research in the area).*

### **Physical description**

The **Ocós-Manchon Guamuchal** geomorphology is divided in lowlands, coast and continental shelf. It has 8900 terrestrial ha, 10602 continental waters and 47000 marine waters. Within the terrestrial area 75% is mangrove forest surrounded by private lands (FIIT 1995, Dix y Hernández 2001, CONAP y MARN 2009). The lowland is formed by rocks, andesite, basalt, sand, gravel, pumice and unknown thick deposits from the last 6500 years (Neff et al. 2006, CONAP 2012). The main contributor to the bottom configuration is the Pacific volcanic chain (García et al. 2000, Dix and Hernández 2001, Boix 2011). The Estuarine lagoon system is heavily influenced by the Suchiate, Ocosito y Naranjo Rivers. Salinity is around 34 ppm and average temperature around 34 °C (Jiménez 1994, Quintana 2007, Boix 2011). Hydrological EBSA values are a) sand or pebbles beaches (barriers, banks, curbs, dunes, headlands and sand islands), b) intertidal forested wetlands, including mangroves; c) estuaries, and d) coastal brackish / saline.

### **Biological communities and ecosystem functions**

Several important ecosystem processes are regulated by marshes, herbaceous wetlands, coastal lagoons, mangroves and sand or pebbles beaches in the upper littoral. The mangrove forest is formed by red mangrove (*Rhizophora mangle*), white mangrove (*Laguncularia racemosa*), black mangrove (*Avicennia germinans*) and *Conocarpus erectus*. The continental waters fishes are inside the Chiapas-Nicaragua province (Miller 1966), which has a similar set of habitat and regional species composition (Estrada et al. 2012). Several crustacean fisheries are in the zone, and depends directly in the mangrove ecosystem, like *Xiphopenaeus riveti* and *Penaeus vannamei* shrimps that complete their life cycle using several habitats present in the Ocos-Manchón Guamuchal zone. Migratory species benefit as well in the area, some of those species are internationally protected because of the migratory status. Fisheries in the area target at least 42 species from families Centropomidae, Lutjanidae, Ariidae, Sciaenidae, Gerreidae y Mugilidae (Dix y Hernandez 2001, Quintana 2007, CONAP 2008). Without population dynamics or fisheries landing data it is difficult to know which of these species could be overfished, but with data from worldwide fisheries it is not difficult to start with the assumption of overfished in the area.

One of the most interesting fisheries in the area is the Sailfish (*Istiophorus platypterus*), family Istiophoridae which is considered the most sought species in recreational fisheries. The Guatemala Pacific is sought as one of the best fishing spot in the world. Some other keystone species like sharks are in the area. The area is considered one of the best nursery and reproduction grounds in the country, with more than 15 species. Scalloped Hammerhead (*Sphyrna lewini*) is found in fisheries, including juveniles (Ixquiac 2009).

Manchón Guamuchal was recognized as a migratory bird importance area with at least 55% of the reported 185 species of birds. Because of this it was proposed as an IBA that supports *Tachybaptus dominicus*, *Tigrisoma mexicanum*, *Mycteria americana* y *Pelecanus erythronchos* populations (Eisermann y Avendaño 2007). It is path for several migratory species of coastal marine importance including Procellariidae, Hydrobatidae, Sulidae, Stercorariidae families.

Several megafaunal groups are found in the area. Davila (2011) reports that Guatemala's west pacific have a higher frequency of cetaceans and turtle sightings, including two exclusive subspecies of Oriental Tropical Pacific. Mammals in the area included Spinner Dolphin (*Stenella longirostris centroamericana*), Pantropical Spotted Dolphin (*Stenella attenuata graffnmani*) and Bottle-nosed Dolphin (*Turiopsis truncatus*). Least concern or data deficient species are two whales reported in the area: Humpback Whale (*Megaptera novaeangliae*) and Bryde's Whale (*Balaenoptera edeni*). (Davila 2011). Several endangered turtles are found in the area and used for nesting and foraging grounds. The most frequently sight turtle was Olive Ridley (*Lepidocheolys olivadaeae*) and presensents as well are Hawksbill Turtle (*Eretmochelys imbricata*) and Loggerhead (*Caretta caretta*).

### **Available information**

Some regional studies have included the mangrove ecosystem and the forest dynamics (FIIT 1995, Dix y Hernández 2001, Fundaeco 2002, Ellisonm 2004, Windevoxel s/a). Some fisheries studies include the snapper (Andrade 2003) and sailfish (Prince 2002; Ehrhardt y Fitchett 2006). Artisanal fishery was described by Sanchez (2000). Quintana (2007) described continental waters fishes associated to mangrove in different seasons. Ixquiatic (2009 and 2010), worked sharks nursery. Most of this studies are national reports and considered gray literature.

The birds were worked by birds Sigüenza (1995, 2007) that described the area as important to the resident and migratory as well; family Anatidae was. Later Eisserman y Avendaño (2007) identifies the site as a potential IBA. Sigüenza (2009) worked also in coastal megafauna and bird by catch by fisheries in the area. Finally Quintana-Rizzo and Gerrodette (2009) describe cetaceans' distribution and abundance in the area. Finally Davila (2011) worked with megafauna sighting that included sailfish, turtles, birds, sharks and cetaceans.

### **Feature condition and future outlook of the proposed area**

*(Description of the current condition of the area – is this static, declining, improving, what are the particular vulnerabilities? Any planned research/programmes/investigations?)*

Gap analysis developed by NISP identified several pressures to the region that included Ocos-Manchon Guamuchal. The most common regional threats are global climate change, expansion of agricultural areas, urban development, shrimp farms, salt mines, wastewater discharges, erosion and solid waste accumulation. Also, natural resources use without management, such as fishing and bottom long line, gillnets and mangrove resource utilization was problem in the area (CONAP, 2011).

Economic development is scarce in the area, which also is reflected in the poverty rates in the zone. Local communities used resources readily available to them, like wildlife, fisheries, mangrove forest and others, but those resources are rapidly despairing. Just to mention, mangrove use as wood for different domestic uses was estimated as 35000 US\$/year (CONAP & MARN 2009), but the forest has dwelling at a rate that endangers fisheries and tourism that generates at least 10 million dollars annually (Siglo XXI 2009). Shrimp farms and salt mines have also a large impact on the mangrove forest. Human population has also a large impact in the nutrient content in the estuarine system and the unregulated use of pesticides also prudence large fauna kills in the area. These threats are also starting to get into the marine ecosystems, with the red tide frequency that increased in the last decade (Siglo XXI 2007).

It is estimated than in the Guatemala south Pacific the economy related to fresh water and coastal marine water generated US\$119 M (CONAP Y MARN 2009). However bycatch was a problem in shrimp fisheries with an estimated US\$5-6 M loss.

Most of the communities depend on tourism and fisheries related activities. Probably tourism is the main sources for temporal and permanent jobs. The artisanal fisheries are the most common activity in the zone, usually for consumption and local markets. Some industrial fishing can be located an employed people from the community. Some of the most sought species are snooks (*Centropomus* sp), mullet (*Mugil cephalus*), snappers (*Lutjanus* sp) groupers (*Epinephelus* sp) and jacks (Carangidae). From the continental waters catch is divided in several species including catfish (*Rhamdia guatemalensis*; *Cathorops* sp and *Arius* sp) and mojarras (*Cichlasoma trimaculatum*) (Dix y Hernández 2001).

The gathering of eggs from nesting turtles is still an activity in the area and since 2001 was a threat to turtle’s populations (Dix y Hernandez 2001). This activity generates approximately US\$126000 (CONAP & MARN 2009). CONAP has tackled the issue with several initiatives of conservation and management strategies including turtles protected hatcheries.

The tourism depends in several attributes of the area including the scenic view, which is an opportunity of sustainable use by locals and compatible with several long term issues in the zone.

Therefore, the area should be considered for inclusion in the National System of Protected Areas and has been proposed as a marine ecologically or biologically significant area (EBSA), in the gap analysis developed by the National Agreement for Conservation (NISP) for the work program on CDB protected areas (PoWPA).

### Assessment of the area against CBD EBSA Criteria

*(Discuss the area in relation to each of the CBD criteria and relate the best available science. Note that a candidate EBSA may qualify on the basis of one or more of the criteria, and that the boundaries of the EBSA need not be defined with exact precision. And modeling may be used to estimate the presence of EBSA attributes. Please note where there are significant information gaps)*

CBD EBSA Criteria (Annex I to decision IX/20)	Description (Annex I to decision IX/20)	Ranking of criterion relevance (please mark one column with an X)			
		Don't Know	Low	Some	High
<b>Uniqueness or rarity</b>	Area contains either (i) unique (“the only one of its kind”), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features.		X		
<i>Explanation for ranking</i>					
<ul style="list-style-type: none"> <li>Guatemalan most extensive mangrove forest, that gives an important habitat for coastal marine species.</li> </ul>					

<ul style="list-style-type: none"> <li>• Main breeding area for sharks, specially for scalloped hammerhead and high abundance of sailfish.</li> <li>• Main (PTO) hábitat of <i>Stenella longirostris centroamericana</i> y <i>Stenella attenuata graffnmani</i></li> <li>• Tropical whale nursery and foraging habitat (<i>Balaenoptera edeni</i>).</li> <li>• Turtle nesting area for <i>Dermochelys coracea</i> y Olive Ridley (<i>Lepidochelis olivacea</i>),</li> </ul>					
<b>Special importance for life-history stages of species</b>	Areas that is required for a population to survive and thrive.	<b>X</b>			
<p><i>Explanation for ranking</i></p> <ul style="list-style-type: none"> <li>• The coastal marine zone is an important habitat for several species of fishes at least during one part of their life. It's an important zone for shark breeding.</li> <li>• 103 migratory aquatic birds species during november-march</li> <li>• Turtle nesting area for the endangered marine turtle Olive Ridley (<i>Lepidochelis olivacea</i>)</li> <li>• Nursery and foraging habitat for endemic cetacean species in the PTO (<i>Stenella longirostris centroamericana</i> y <i>Stenella attenuata graffnmani</i>), and reproductive habitat to <i>Megaptera novaeangliae</i>.</li> <li>• Habitat of several fisheries species, including Centropomidae, Lutjanidae, Ariidae, Sciaenidae, Gerreidae y Mugilidae .</li> </ul>					
<b>Importance for threatened, endangered or declining species and/or habitats</b>	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species.			<b>X</b>	
<p><i>Explanation for ranking</i></p> <ul style="list-style-type: none"> <li>• Mangroves are natural habit endangered by land use change for wood using.</li> <li>• Mollusc's like <i>Anadara grandis</i> are vulnerable by their commercial importance in the Pacific Coast. Other fisheries species are intensively used and are overexploited by artisanal and industrial fisheries of shrimps, there have impact in marine mammals, birds and sharks, some of them are enlisted in the UICN Red List.</li> <li>• The complex is habitat for sharks in at least one of the UICN categories (2012), some of them are collected in breeding sizes. There are fisheries species object or incidental fishing species.</li> <li>• Endangered: Scalloped hammerhead (<i>Sphyrna lewini</i>) y smooth hammerhead (<i>Sphyrna zygaena</i>).</li> <li>• Vulnerable: pelagic thresher (<i>Alopias pelagicus</i>), smooth hammerhead (<i>Sphyrna mokarran</i>) y whitetip oceanic shark (<i>Carcharhinus longimanus</i>)</li> <li>• Near threatened or Data Deficient: Silky shark (<i>Carcharhinus falciformis</i>), Blacktip shark (<i>Carcharhinus limbatus</i>), Whitenose shark (<i>Nasolamia velox</i>), Mexican hornshark (<i>Heterodontus mexicanus</i>), Nurse shark (<i>Ginglymostoma cirratum</i>), Blue shark (<i>Prionace glauca</i>), tiger shark (<i>Galeocerdo cuvier</i>) y Bull Shark (<i>Carcharhinus leucas</i>).</li> <li>• Turtle nesting area for the endangered marine turtle Olive Ridley (<i>Lepidochelis olivacea</i>) and <i>Dermochelys coreacea</i>.</li> <li>• Nursery and foraging habitat for endemic cetacean species in the PTO (<i>Stenella</i></li> </ul>					

<p><i>longirostris centroamericana</i> y <i>Stenella attenuata graffnmani</i>), and reproductive habitat to <i>Megaptera novaeangliae</i>, these are important species with some indirectly risk populations by overfishing.</p> <ul style="list-style-type: none"> <li>• 20 vulnerable birds' species according to UICN.</li> </ul>					
<b>Vulnerability, fragility, sensitivity, or slow recovery</b>	Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery.			<b>X</b>	
<p><i>Explanation for ranking</i></p> <ul style="list-style-type: none"> <li>• Dwelling of mangrove forest to different activities related to different land use.</li> <li>• Fresh water pollution and soil erosion to the marine zone.</li> <li>• Unsustainable use of wood, fisheries, turtle eggs and wildlife.</li> <li>• Unsustainable shrimp fishing practice.</li> <li>• Shark's are fishing without size discrimination, especially smooth hammerhead (<i>Sphyrna sygaena</i>) and endangered species.</li> <li>• Marine mammals, turtles and sharks have special populations that have slow recovery populations.</li> </ul>					
<b>Biological productivity</b>	Area containing species, populations or communities with comparatively higher natural biological productivity.				<b>X</b>
<p><i>Explanation for ranking</i></p> <ul style="list-style-type: none"> <li>• The Guatemala Pacific is sought as one of the best fishing spot for Sailfish (<i>Istiophorus platypterus</i>) in the world.</li> <li>• General production in the pacific is higher but no specific studies for Guatemala.</li> <li>• Second place in shrimp fisheries.</li> </ul>					
<b>Biological diversity</b>	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.	<b>X</b>			
<p><i>Explanation for ranking</i></p> <p>Guatemala is considered a hotspot of diversity, however comparative we lack comparative studies and recent inventories with a broad approach that include not only richness, but seasonal tendencies and population's dynamics for several fisheries and not fisheries species. Reported species in the area are 183 mollusk, 185 birds, 20 amphibians, 58 reptiles, 18 marine mammals .</p>					
<b>Naturalness</b>	Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation.		<b>X</b>		
<p><i>Explanation for ranking</i></p> <p>Although the area is highly impacted by humans in the terrestrial part the marine part is still less impacted, because of the lack of resources of people. Artisanal fisheries and some industrial shrimp companies are strong impact in marine resources, but there are high diversity and some</p>					

abundance datas. Part of the complex is high used by tourism in Iztapa and Monterrico, but Las Lisas is difficult acces.

### Sharing experiences and information applying other criteria (Optional)

Other Criteria	Description	Ranking of criterion relevance (please mark one column with an X)			
		Don't Know	Low	Some	High
<b>Equitable Access and Benefit Sharing (ABS) for all goods from nature (oceans).</b>	It is important to find a right balance between the natural productivity of the sea for industry and local livelihoods especially in areas beyond national jurisdiction, in accordance with national and regional policies and the CBD objectives.		X		

#### *Explanation for ranking*

An idea on how much goods from the ecosystems and some relations to communities. But we lack of information on access or general benefits. Definitely tourism and sustainable fisheries are the main activities that we need to address in the short term.

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*(e.g. relevant documents and publications, including URL where available; relevant data sets, including where these are located; information pertaining to relevant audio/visual material, video, models, etc.)*

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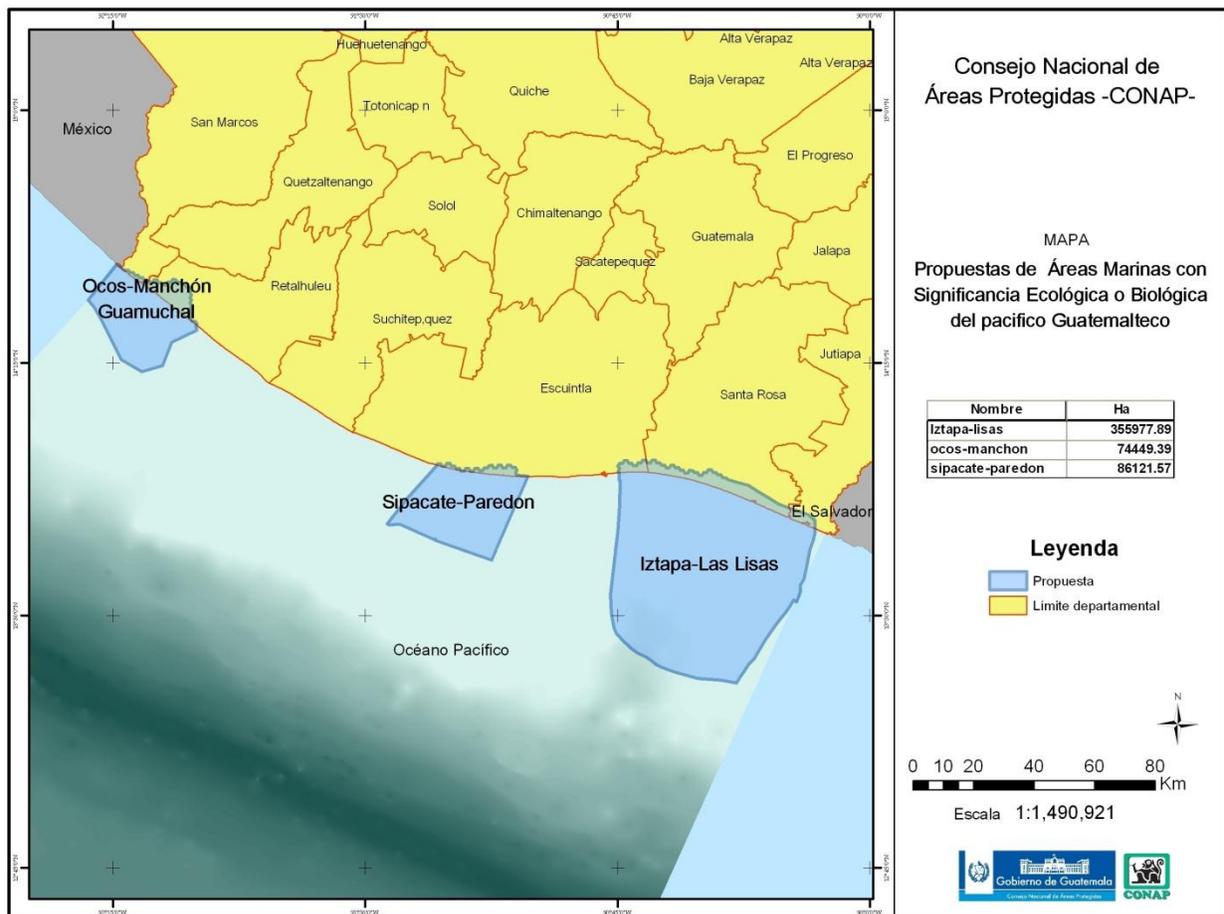
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Information can be used given the recommended citation in each document.

### Anexo 1. Ocos –Manchon Guamuchal Complex



**Map of Mangrove cover in Guatemala's South Coast**



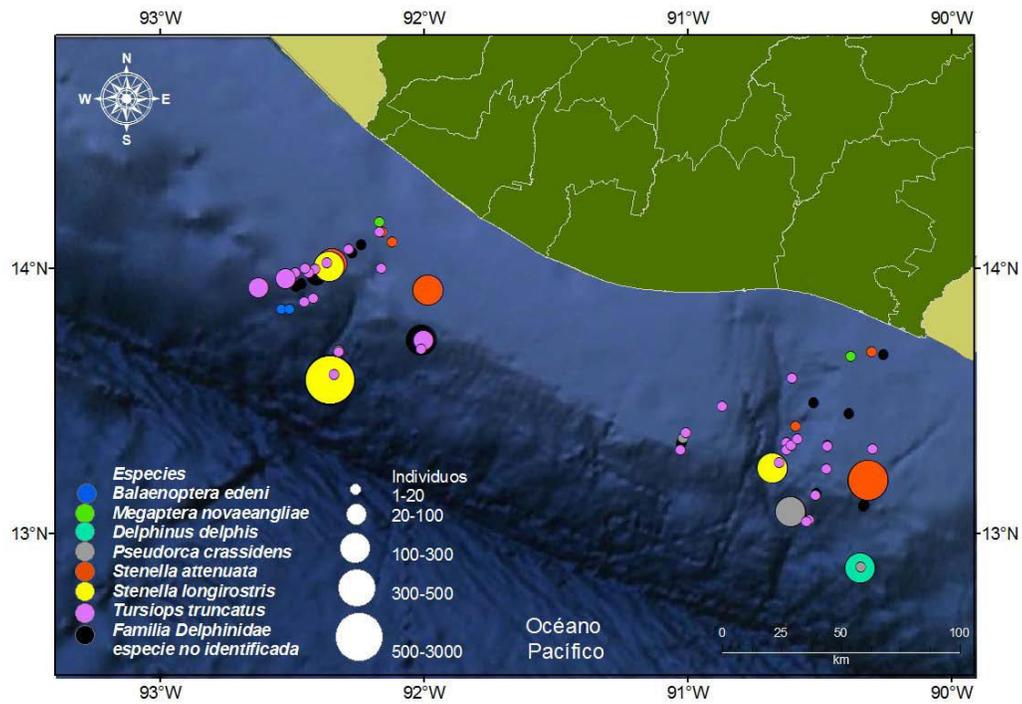
Source: CONAP & MARN 2009

**Important Aquatic Bird Sites**



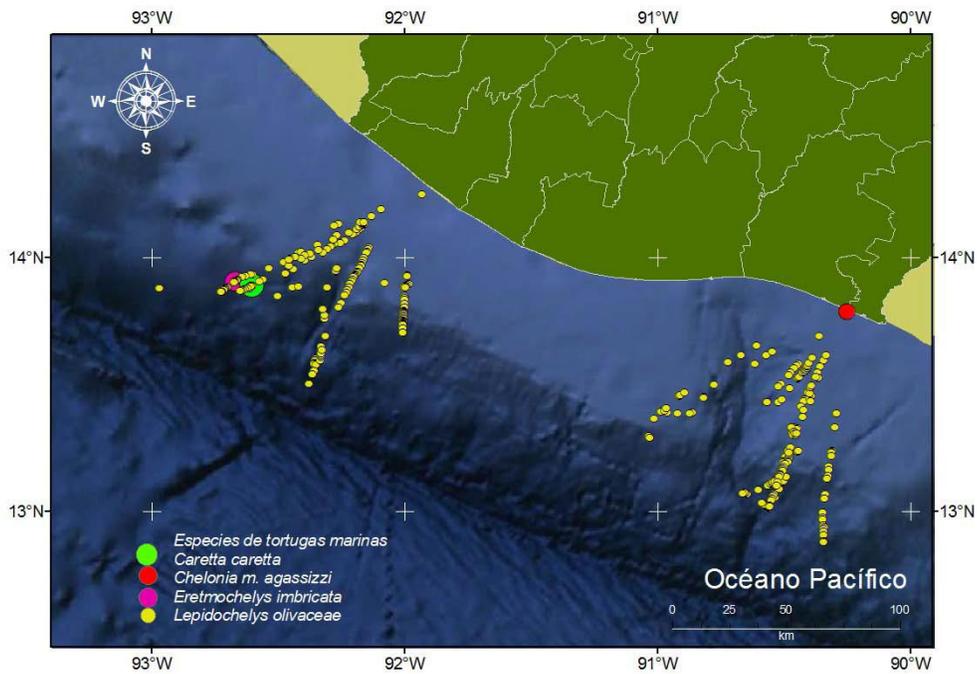
Source: CONAP y MARN, 2009

Spatial distribution of cetaceans in the study area. Shows the number of individuals according to the size of the circle



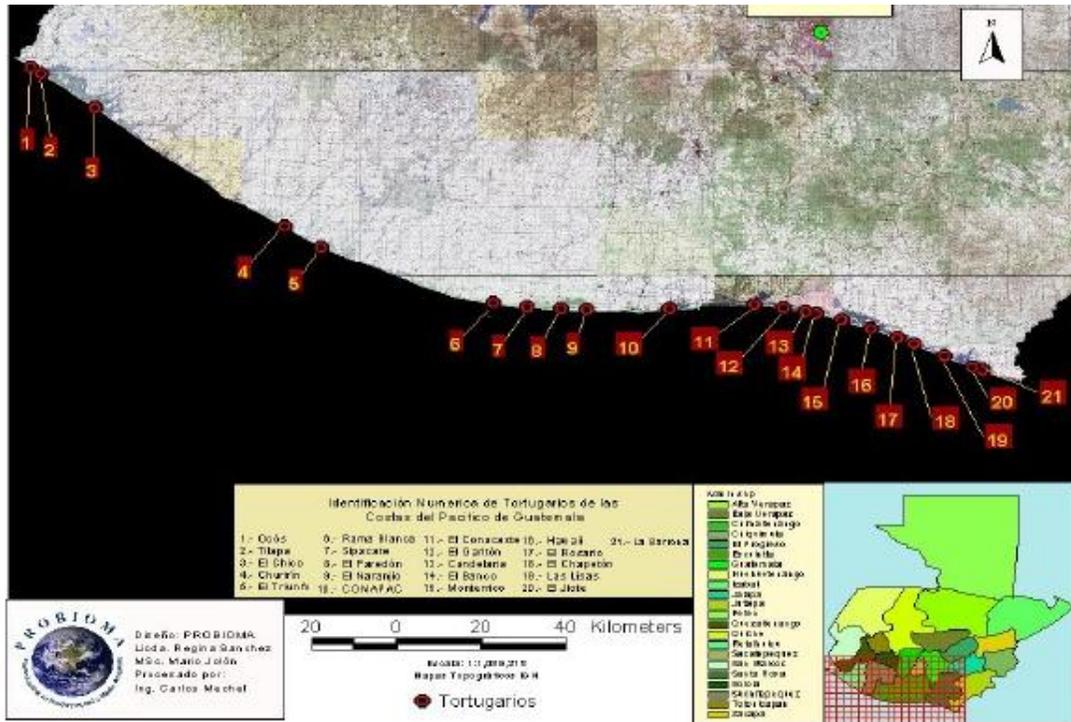
Fuente: Dávila 2011.

Spatial distribution of sea turtles in the study area. Shows the number of individuals according to the size of the circle.



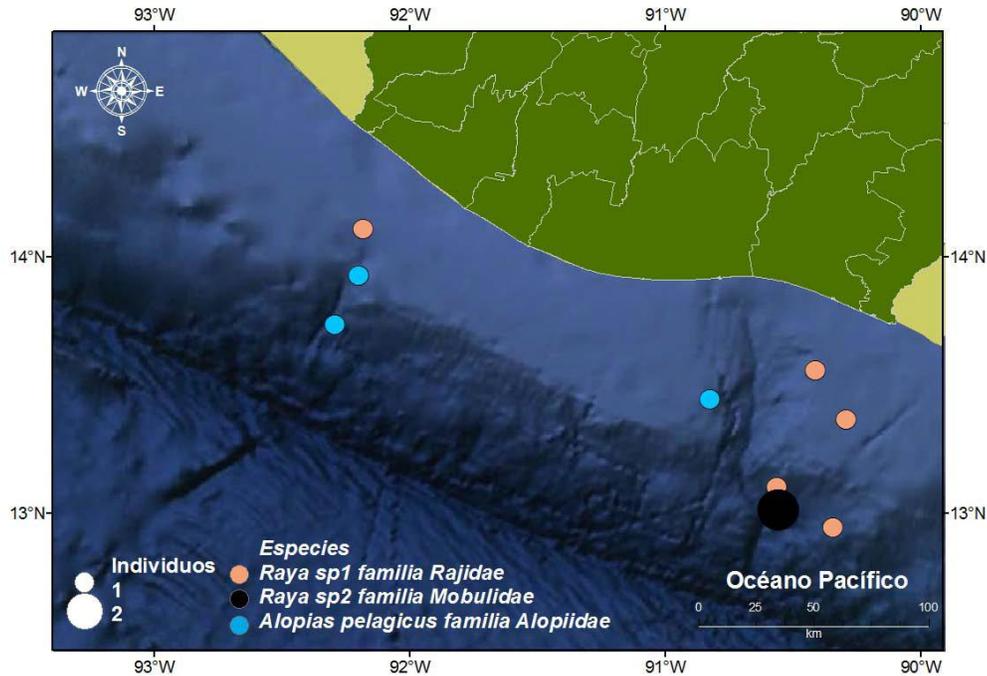
Source: Dávila 2011

Location of hatcheries in operation during the 2005-06 season on the Pacific Coast in Guatemala. (Source: Sánchez et al. 2006)



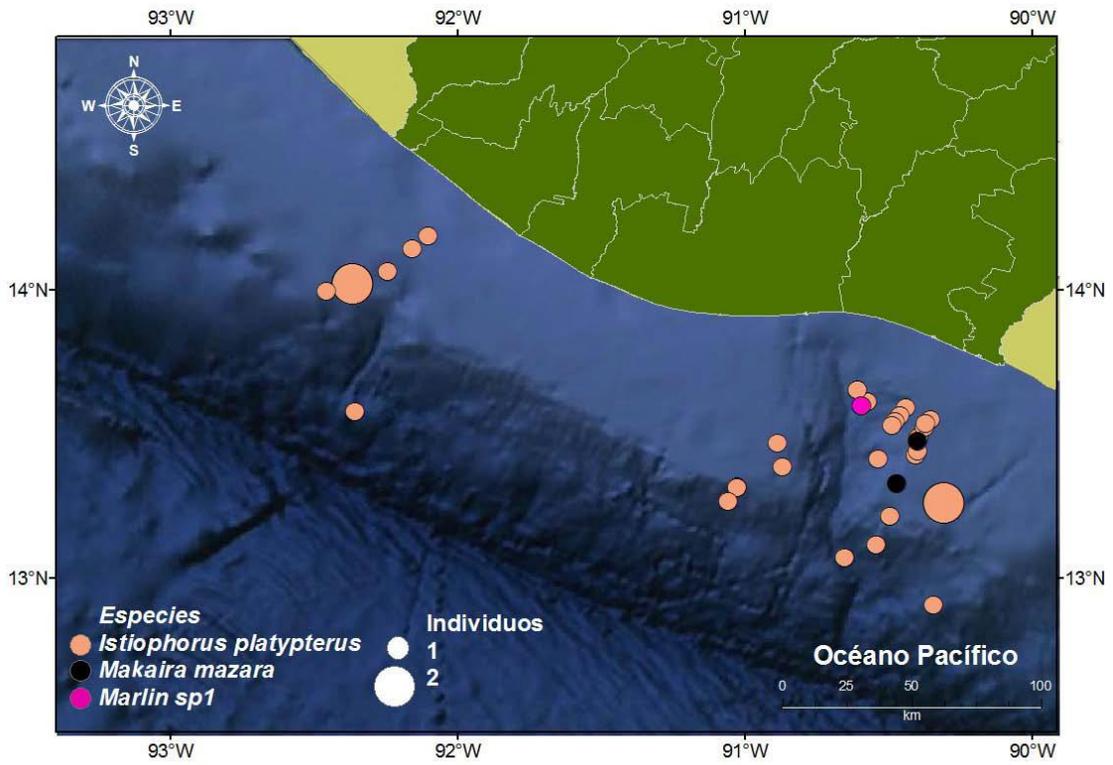
CONAP y MARN 2009

Spatial distribution of rays and sharks in the study area. Shows the number of individuals according to the size of the circle.



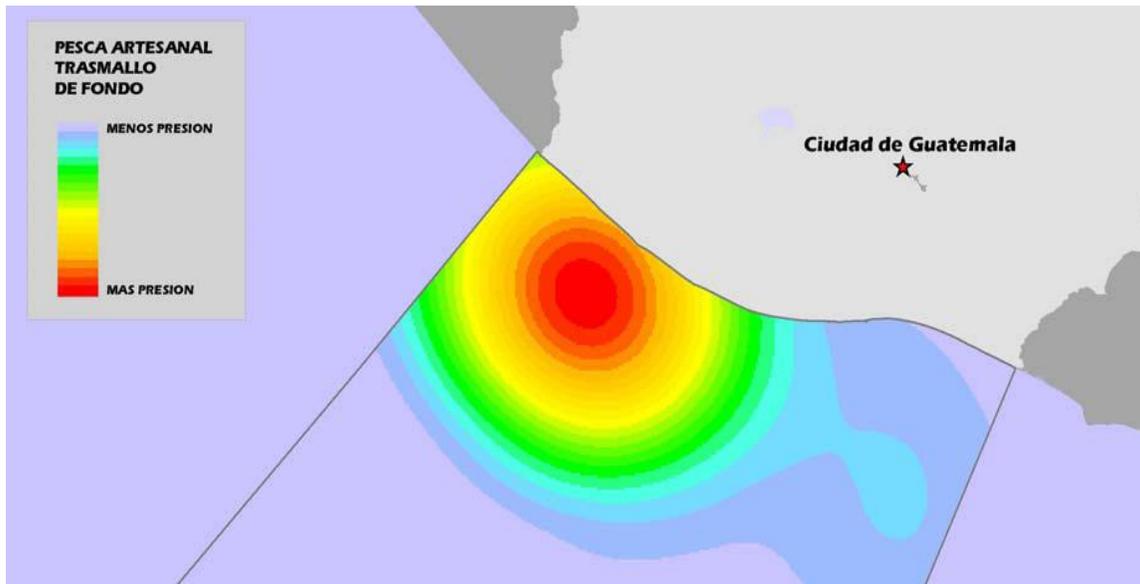
FUENTE: Dávila 2011

Distribución espacial de peces picudos en el área de estudio. Se indica el número de individuos de acuerdo al tamaño del círculo.



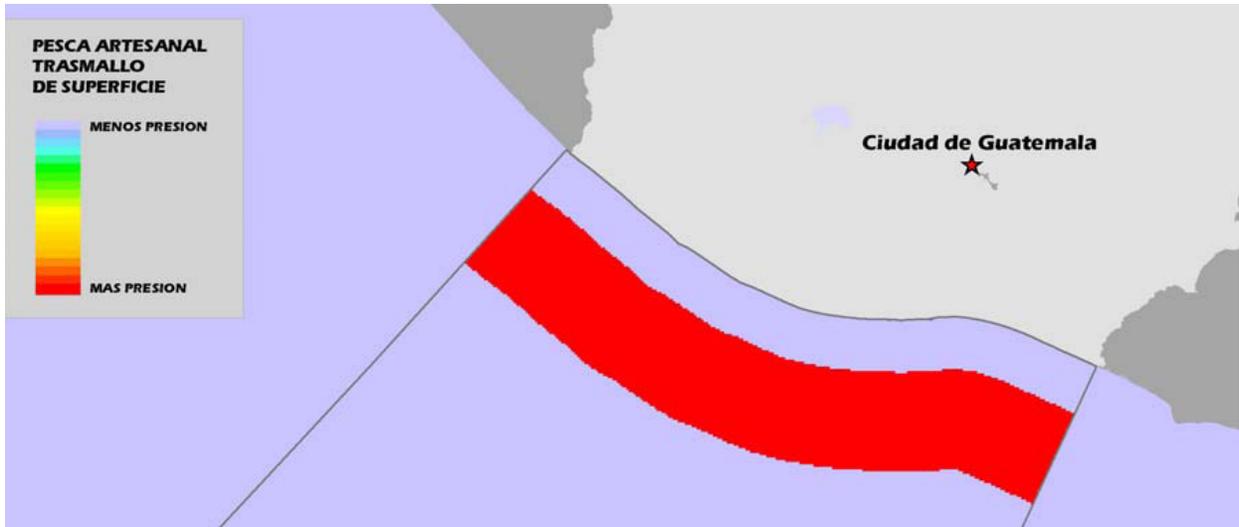
Sources: Dávila 2011

### Artisanal trammel pressure



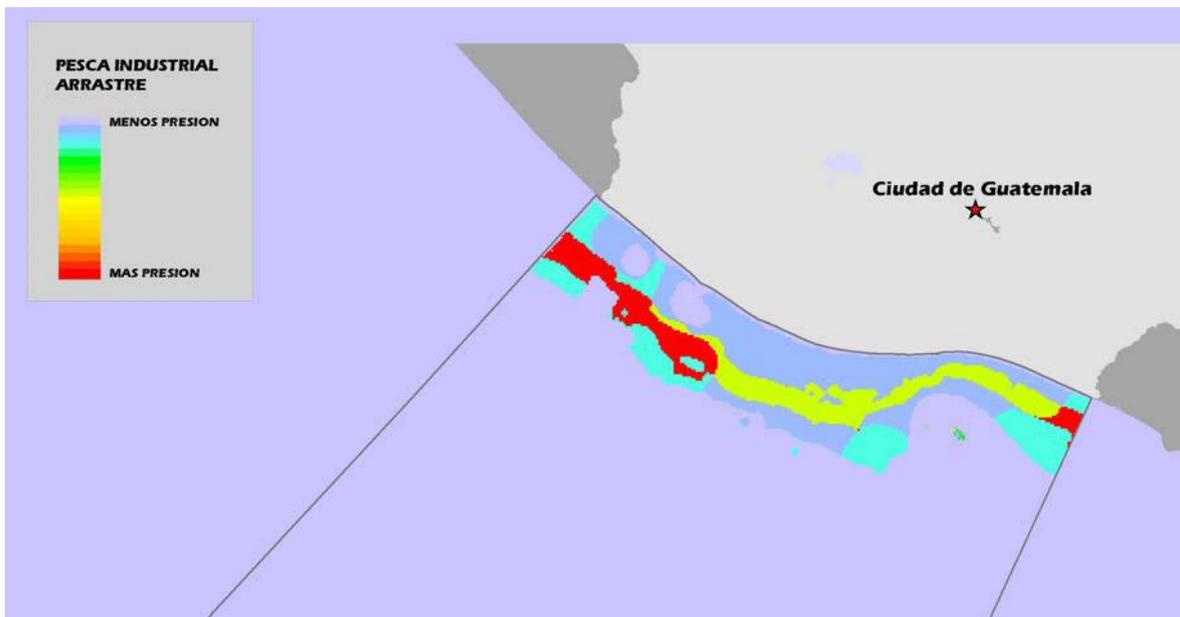
Fuente: CONAP y MARN 2009.

### Artisanal gillnet pressure



CONAP y MARN 2009.

### Intensity of industrial trawl fishing in the Coastal Marine



CONAP y MARN 2009.

Identification of areas with infrastructure and settlements pressure



CONAP y MARN 2009.