

# Characterization and Analysis of the Industrial Fisheries Pressures in the Cocos Marine Conservation Area and its Surrounding Economic Exclusive Zone (Costa Rica)

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#### **About Faico:**

Friends of Cocos Island is a Costa Rican non-profit organization leader in fund raising and fund management for the protection and conservation of the Cocos Island National Park (CINP).

Since its creation, the Foundation has provided a constant support to this site, a World Natural Heritge. This task is possible by an Official Cooperation Agreement signed between the National System of Conservation Areas (SINAC) and the Cocos Island Marine Conservation Area (CMCA) that sets eleven fields of mutual cooperation.

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# ACRONYMS

AIS	Automatic Identification System
SMMMA	Submarine Mounts Marine Management Area
IATTC	Inter American Tropical Tuna Commission
CIMAR	Marine Research Center (Centro de Investigación en Ciencias del Mar y Limnología)
CINP	Cocos Island National Park
CMCA	Cocos Marine Conservation Area
EEZ	Economic Exclusive Zone
Faico	Friends of Cocos Island organization
FAD	Fish Aggregating Device
FAO	United Nations Food and Agriculture Organization
GFW	Global Fishing Watch
GRT	Gross Registered Tons
IMO	International Maritime Organization
INCOPESCA	Instituto Costarricense de Pesca y Acuicultura (Costa Rican Fisheries and Aquaculture Institute)
IUCN	International Union for the Conservation of Nature
IUU	Illegal, Unreported, Unregulated Fisheries

MINAE	Ministerio de Ambiente, Energía (Ministry of Environment and Energy)
MMSI	Marine Mobile System Identity
MPA	Marine Protected Area
MT	Metric Tons
NCGS	National Coastguard Service
NGO	Non Governmental Organization
OSPESCA	Organización del Sector Pesquero y Acuícola del Istmo Centroamericano
PPC	Prevention, Protection and Control Plan
RFMO	Regional Fisheries Management Organization
ROV	Remote Operated Vehicle
SINAC	Sistema Nacional de Áreas de Conservacion (National Conservation Areas System)
SOLAS	Safety of Life at Sea Convention
UN	United Nations
UNESCO	United Nations Education, Science and Culture Organizaton
UTM	Universal Transversal Mercator coordinates system

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# ABSTRACT

his research, as requested by Faico, defines and characterizes the principal threats of industrial fisheries for the Cocos Marine Conservation Area (CMCA) and its surrounding zone and therefore becomes a fundamental component for the preparation and implementation of the Marine Prevention, Protection and Control Plan. Based upon secondary information, the access to a satellite monitoring platform (Global Fishing Watch) and interviews to key stakeholders, a diagnostic is presented about the endogenous bottle necks that count for the deficiencies on fisheries pressure monitoring, control and surveillance that affects the CMCA.

This work made extensive use of the Global Fishing Watch (GFW) satellite-monitoring platform by locating fishing vessels both in space and time dependent criteria in order to determine operation profiles. These systems display graphically the data reported by the Automatic Identification System transponders (AIS) that each vessel over 300 of Gross Tons must carry on board turned on and actively transmitting during their permanency at sea. AIS data is received by satellites as well as other terrestrial receivers and the tool has certain functionalities that allow the set up of different analysis criteria in order to find out the behavior of the industrial fishing fleet: seasonal dynamics, concentrations, fishing pressures density, vessels with more presence around the most probable fishing sites, names of the vessels, and vessels' specifications.

Once the reports of GFW were obtained, a cross reference was applied by using the Inter American Tropical Tuna Commission (IATTC) fishing sites data base for obtaining figures of vessels characteristics (fishing gear, holds capacity, length, etc.), fishing sites locations in time as well as the status of their registration with IATTC. The aggregation of the vessels' holds (in Metric Tones – MT) allowed to estimate the fishing effort capacity.

All this multiple sources analysis was developed for a timeline from January 2012 until June 2017, considering locations, course and speed of the vessels and their probable fishing sites. The spatial and temporal analysis was also expanded to cover a period from January 2012 until July 2017. CHARACTERIZATION AND ANALYSIS OF INDUSTRIAL FISHERIES PRESSURES IN THE COCOS MARINE CONSERVATION AREA AND SURROUNDING ECONOMIC EXCLUSIVE ZONE



# Foreword and Introduction

llegal, not declared and not regulated (IUU) fishing is considered to generate an economic impact between US\$10B to US\$23B on an annual and global scale. The use of illegal fishing gears and the violation of fishing quotas could reach 26 millions of metric tons of marine fishing products per year (more than 15% of the total world production) according to the Food and Agriculture Organization (FAO) in 2017.

The Agreement On Port State Measures To Prevent, Deter And Eliminate Illegal, Unreported and Unregulated Fishing is the first judicially binding treaty specifically focused on IUU. It was approved by the FAO conference during its 36th meeting period (Rome, November 18-23rd, 2009) and ratified by Costa Rica on December 4th, 2015, thereby becoming the 49th state that, together with the European Union has adhered to it until October 2017 (FAO 2017).

To date, Costa Rican authorities are working with the support of several NGOs on activities tending to implement this Agreement and to standardize fishing inspection procedures such as the formalization

of fishing inspection protocols, the design and implementation of a Fisheries Inspectors training Plan, making of a fisheries inspection Plan, identification of coordination and information interchange mechanisms, execution of socializing activities with experts oriented to high level authorities and congressmen, support for improving boats registers and data bases, among others (FAO 2016).

Illegal fishing within the Costa Rican EEZ and the CMCA in particular, implies not just a violation of sovereignty of the country's jurisdictional waters but a patrimonial destruction to the rich and unique biodiversity contained within the ecosystems currently under a legal protection regime as well as the loss of valuable economic and natural resources of the country.

The jurisdictional waters of Costa Rica add up to 589,682.99 Km2 within which there are multiple marine protected areas along the Pacific and Caribbean coastlines.



**Figure No. 1.** Map showing the location of Cocos Island National Park and Submarine Mountains Marine Management Area. Source: Authors drawing.

Currently, MPAs in Costa Rica represent approximately 14,291 Km2, which represent 2.42% of the jurisdictional waters. In the Pacific region, the EEZ covers a total of 543,842 Km2 with a total MPA area of 13,472 Km2 equivalent to 2.38% of the mentioned area. Three MPAs are islands surrounded by water (Cocos National Park, Isla del Caño Biological Reserve and San Lucas Island National Wildlife Refuge), and one is an oceanic region (Submarine Mountains Marine Management Area) (Salas et al., 2012; Cubero P., 2013). Cocos Island National Park (CINP), contains a terrestrial part (island and islets) of 23.3 Km2 and a marine region of 2,011 Km2. The total area of the CINP is 2,034.3 Km2) according to SINAC (2016)

The Submarine Mountains Marine Management Area (SMMMA) was created via Executive Order N° 36452, March 3rd 2011 and corresponds to a marine space without islands or islets that surrounds the Cocos National Park. It has a surface of 9,640 Km2.that represent a 1.6% of the Costa Rican jurisdictional waters, becoming consequently, in the largest marine protected area of the country (Salas et al., 2012). Notwithstanding both areas have different categories; they are under the administration of the Cocos Marine Conservation Area (CMCA).

Within the SMMMA there is an absolute protection sector adjoined to the northern boundary of the CINP and was created to act as a buffering zone. This sector ha 724 Km2 or surface and has a semi-arc shape of five (5) nautical miles width (SINAC 2013).



**Figure No. 2.** Map showing the boundaries of the Submarine Mountains Marine Management Area. Source: Authors drawing.

Although both MPAs are independent and with different management categories, the administration of both should be organized in an integral way for several reasons, among which we can state the following:

- The SMMMA is a large marine space that encloses a World Natural Heritage (CINP). Consequently, their administration must be highly integrated and must have coherent lines of action.
- The experience that SINAC has been able to acquire about marine ecosystems management within the eastern tropical Pacific is focused on the CINP.
- The operational implementation of the law enforcement legal framework that protects the marine ecosystems is focused within the 12 nautical miles of the Cocos National Park.
- Both MPAs share biophysical and biological characteristics, notwithstanding, the current research efforts (national and international) are concentrated in the CINP.

- The national economic situation makes it unviable to implement an independent organizational structure as it has been established by SINAC
- Currently there are no terrestrial space or infrastructure that could house the administrative headquarters of the SMMMA
- Other governmental entities have build up experience and knowledge on Cocos MPA and the region, such as the Coastguard Service (NCGS), several Universities and research centers among others.

It must be highlighted that Costa Rican marine biodiversity is comprised by a total of 6,778 species (which includes 85 endemic). This represents 3.5% of all the reported marine species that belong to tropical zones worldwide (195,000 species: Reaka-Kudla 1997, wwwmarinespecies. org) (Wehrtmann & Cortés, 2009). From this figure, 4,745 are located in the Pacific and 2,321 in the Caribbean, and 288 of these species are common. Cocos Island region reports 1,142 of those species with 35 of them classified as endemic (41.2% of the country). These species include 270 of fishes, four marine turtles and fourteen sharks. This region is a convergence zone of pelagic and open ocean species (Whitman & Cortés, 2009).

Due to the above cited conditions, the MPA around Cocos is considered a site with one of the highest marine diversity in the world (Cortés, 2012) which in 1997 motivated UNESCO for declaring it a "World Natural Heritage", remarking the existence of habitats essential for migratory pelagics such as sharks (Carcharhinidae, Sphyrnidae), billfish (Istiophoridae) and tuna (Scombridae). The presence and abundance of these pelagic species within/around Cocos MPA are the reasons why fishing vessels trespass its boundaries therefore becoming a major threat for its integrity (CMCA, 2006). CHARACTERIZATION AND ANALYSIS OF INDUSTRIAL FISHERIES PRESSURES IN THE COCOS MARINE CONSERVATION AREA AND SURROUNDING ECONOMIC EXCLUSIVE ZONE



# SITUATIONAL DIAGNOSTIC OF MARINE AND FISHERIES GOVERNANCE WITHIN THE COSTA RICAN EEZ

he Costa Rican EEZ is characterized by the presence of a rich diversity of pelagic species; many of them possess a high commercial value such as billfish, marlin, tuna, comber, shrimps and sharks. All the Costa Rican EEZ lies within the migratory territory of the yellow fin tuna.

The protection of the marine resources and their sustainable use is the result of governance developed around the fishing activity. The elements for sound governance are: legal framework, specialized public institutionalism, organized civil society, a growing scientific knowledge, environmental consciousness at society level, innovative economical instruments, institutional agreements, among others. Notwithstanding, two basic pre-requisites: proactive coordination (effective and efficient) and decision making, are usually the greatest absents in marine governance. Although very important and valuable efforts at public and private levels must be spotlighted, the results of them are usually not the expected one (Executive Order N°. 37212, of July 17th 2012).

According to Cubero (2013), "the historical absence of fisheries management and ordering in the Pacific region of the Costa Rican EEZ

over decades, has generated a significant decline in captures of all the marine species of commercial value, including sharks, billfish, dolphin fish, coastal species, and tuna, both for national as well as international fishing fleets" (Cubero, 2013; FAO-INCOPESCA, 2014).

However, it must be stand out the grave incidence of the foreign fleets by stating that: "it is necessary that the big purse seiner international fleets do not dominate the marine space and captures volume". A proof of this situation is that "within the Costa Rican Pacific EEZ, between 2002 and 2009, the international purse seiner fleet captures 17.6 times more Metric Tones (MT) of tuna than the national longliner fleet, On the contrary, between 2009 and 2012, extracted three (3) times MT of dolphin fish, 1.2 times MT of billfish and 1.9 time MT of sharks as captured by the international purse seiner fleet" (Cubero 2013).

The presidential commission's Report for marine governance (June 2012) puts in evidence the complex reality of the marine and coastal environments of Costa Rica. The Costa Rican institutionalism has not been able to handle these spaces considering the biophysical requirements of the species and the ecosystems in order to keep their

functions in the ocean (Miranda, 2013). Even though the ample legal framework that addresses the protection and sustainable use of the marine resources, in reality, the fishing activity in Costa Rica is far away of being considered sustainable or efficient (Porras, 2012).

"From the public sector organizational framework analysis it can be concluded that there are three institutions MINAE (SINAC/CMCA), INCOPESCA and NCGS with sectorial competencies in the marine space. Many times, these competencies are confusing and overlapped not just among the administered entities but also among the officers of these institutions. Costa Rica does not have a law, a policy and strategies that regulate the marine spaces in a systemic and holistic way as well as appoints an empowered authority that could manage the Costa Rican ocean with clear competences and no overlaps. In front of these weaknesses, a National Marine Commission was created as a collegiate and permanent body that acts as the maximum authority regarding the coordination and integrated management of the different public sector entities that conform the Costa Rican marine institutionalism". (Executive Order N°. 37212, July 17th, 2012).

"Although some institutions comply with the creation of policies tending to improve the ocean's management (case of SINAC), in practice, the implementation has not been effective due to limited coordination and responsibilities overlaps among the different marine space involved entities. Actually, both the Vice Ministry of Waters and Seas and the Ocean's National Commission, must join efforts in the definition of an integral marine policy and the establishment of inter and intra institutional coordination lines" (Executive Order N°. 37212, July 17th, 2012).

### 5.1 NATIONAL MARITIME SURVEILLANCE AND CONTROL STRATEGY FOR COSTA RICA

By November 2011, an Agreement was signed between MINAE (SINAC) and the Ministry of Public Security (National Coastguard Service –

NCGS) aiming to strengthen the monitoring of activities that affect the Costa Rican marine spaces and resources conservation and use. As a result, a "National Strategy for Maritime Control and Surveillance Strategy for Costa Rica" was developed and made public by June 2012.



**Figure No. 3.** Maritime monitoring & surveillance coverage. National maritime control strategy. Source: Author's drawing.

This strategy has the objective of contributing to the improvement of the maritime surveillance systems in order to track and follow those activities of exploitation and use of the marine territory and the resources that lie within. This strategy will be executed in a 4-year period and requires an investment of around U\$10M (Conservation International and Costa Rica for Ever Association, 2012). Both ministries engaged in the design and implementation of an integral maritime control and surveillance system (Figure No. 3) that will also include all other government agencies that should participate in the required joint actions.



**Figure No. 4.** Fishing Polygons. Executive Order N° 38681 November 5th, 2014. Source: Author's drawing.

Later, in November 2014, the Costa Rican Government established a maritime zoning within its EEZ with the purpose of limiting the purse seiner fishing efforts over extended sectors that were considered to be "recruitment" areas o that were reserved for the local fleet preferred access (Executive Order N<sup>o</sup>. 38681). This Executive Order refers explicitly the obligation of all foreign and national vessels to carry satellite locator devices in order for the fishing, environment and security authorities to perform the zoning management.

### **5.2 MAJOR THREATS OVER THE CMCA**

Article 9 of the Fisheries and Aquaculture Law N° 8436, March 1st 2005, forbids the fishing activities with commercial or sport purposes within national parks, natural monuments or biological reserves. In all other management categories, fishing is subject to the provisions stated in the corresponding Management Plan and in case there is no such Plan, this activity remains prohibited until such instrument shall be duly promulgated.

Cocos Island and its surrounding area (including the submarine mountains region known as "the twins"), has been a fisheries hot spot. The main interest has always been the yellow fin tuna and in

a lesser scale, dolphin fish, sea bass and serranids (Salazar et al., 2012). Coco's National Park stands out due to the great congregation of pelagic species such as sharks (Carcharhinidae y Sphyrnidae), billfish ((Istiophoridae) and tuna (Scombridae). This richness attracts commercial fishing vessels that enter the protected waters of the national park. Nowadays, this interaction between pelagic species, illegal fisheries and over fishing within the Park represent the main threats to the marine ecological integrity of this oceanic island since it is removing the adult population from the stocks (SINAC, 2016).

According to Salas, (Salas, E. et al., 2012), the main threats that impact the marine habitat of the Cocos Marine Conservation Area are the illegal fisheries, specially the longline aimed to sharks and other pelagics and the purse seine directed toward tuna.

Thus, the zones closer to Cocos Island are subject to very strong pressures. Fishermen of the "advanced artisanal fleet", take advantage of the subsidies granted via lower fuel cost to travel to the island looking after species that are relatively easier to catch because of the ecological characteristics of the surrounding waters.

# 5.3 MONITORING, CONTROL AND SURVEILLANCE: ENFORCEMENT WITHIN THE CMCA

Cocos Island National Park (CINP) and the Submarine Mounts Marine Management Area (SMMMA) compose the protected area. CINP has a basic organizational structure and shows a severe lack of technical and technological resources that slows down its management, while SMMMA has not implemented any organizational structure at all. The situation exceeds the enthusiasm, efforts and dedication of both technical staff and cooperation entities, as can be seen on **Tables 1 and 2**.

Even though authorities are aware and clear of the requirements, the limited resources do not allow this MPA to comply with a dynamic and proactive operation that could benefit the marine ecosystems protection (Executive Order N° 38327, November 4th, 2014).

# Enforcement figures at the CINP. January 2012 – August 2014:

Patrols	2012	2013	January-August 2014	Total
Total patrols performed	160	135	110	405
Total of lines found	47	38	23	108
Total of lines found (Km)	205.8	197.7	100	503.5
Average length of lines found (Km)	4.38±3.8SD	5.32±3.12SD	4.4±2.5SD	4.7±3.14SD
Number of hooks found	4,986	5,261	2,659	12,906
Average number of hooks per line	106.1±71.5	138.8±74.8	126.7±73.6	123.9±16.5
Total of buoys (Plastic Gallons or buoys)	1,627	1,538	782	3,947
Total of pelagic organisms found	130	76	51	257

SD: Standard Deviation

Table No. 1. Fishing gears found within the CNP. January 2012–August 2014. Source: López-Garro et al., 2016.

Category	2012	2013	January-August 2014	Total
Pelagic fish	88.46%	82.89%	66.67%	79.34%
Sharks	6.92%	15.79%	31.37%	18.03%
Marine turtles	3.85%	1.32%	0.00%	1.72%
Mantas	0.77%	0.00%	0.00%	0.26%
Dolphins	0.00%	0.00%	1.96%	0.65%

**Table No. 2.** Percentage of individuals found per category at illegal fishing lines within the CNP. January 2012 – august 2014 Source: López-Garro et al., 2016.

"On the other hand, the SMMMA exists only in paper since it has no capacity at all to perform any work within its marine space. As said before, the resources of the CINP are insufficient for a proper management, consequently, the obligation appointed to the CMCA for the administration for the marine management area cannot be complied until the Government assigns new resources" (Executive Order N° 38327, November 4<sup>th</sup>, 2014).

Porras (2012) points out that there is a weak control exerted by the public entities due to a lack of adequate human, financial and technological resources. For instance, INCOPESCA has a staff of only 128 and **only 18 of them are in charge of enforcement activities**. Besides, they allege that the legal framework has ambiguities and jurisdiction overlaps that complicates their tasks.

Following this situation, the Republic General Comptroller (2014) concludes about this institution that it is "**urgent to make decisions at the highest levels in order to solve the existing weaknesses** related to the establishment of enforcement of sizes for first sexual maturity and closure periods, as well as **actions for strengthening maritime control and surveillance, medium term planning and the creation** 

of integrated computerized systems, with the purpose of preserving the marine ecosystems and secure future availability of this resources (Republic General Comptroller, 2014).

With regard to the legal and sanctioning regime, Cambronero (2008), states that "it has become clear that the national disgust derived from the marine resources pillage at the park do not have an adequate legal mechanism". "The effectiveness of the legal sanctions as mechanisms to disincentive illegal economic activities, such as fishing within the Park, depend on the economic value of the imposed sanction. The message that reaches the illegal fishermen is very grim. The economic sanctions value of an eventual legal process is by far compensated by the economical benefit of fishing within the park, therefore it does not demotivate the activity". "The Costa Rican judicial system is weak for sanctioning those private persons who depredate the natural resources. From 67 denounces filed against illegal fishermen in the last years, only four (4) have been processed and from these, two (2) reached very convenient agreements (mediations) for the fishermen (information provided by the CMCA)". (Executive Order Nº 38327, November 4th, 2014).



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ILLEGAL FISHERIES STATUS WITHIN THE COCOS MARINE CONSERVATION AREA, FISHING GEARS AND TARGETED SPECIES

uring 2006 registers show an average of 101 fishing vessels per month within the boundaries of the park, 393 nautical miles of fishing lines confiscated as result of the patrol operations executed, 35 radio buoys (for fishing lines location), 605 tuna, 190 sharks of several species, 34 mantas, 16 marine turtles, 12 marlins, 2 wahoo and 16 dolphin fish (Tripartite Commission 2006). These figures show the high incidence of fisheries within the park boundaries (illegal fisheries). These sightings correspond to small longliner vessels (between 11 and 18 meters length) based mainly in Puntarenas. These fishing vessels are categorized locally as "advanced" artisanal (Vega-Araya, 2008).

According to the Park statistics, an average of 14 fishing vessels visit the park marine region per month in order to operate inside and outside the protected area. During 2006 and the early months of 2007, Park wardens found 1,090 marine species trapped in abandoned fishing lines left to drift inside the Park by fishermen. In these findings, the wardens accounted 748 tuna, 214 sharks, 22 marine turtles, 36 rays and 70 other species (Cambronero, 2008).

Local fishermen apply different means or tactics to fish within the park, such as: (a) use of longline placed outside the boundary to drift

toward the protected zone (in order to keep boats undetected to the surveillance), (b) Deploy fish aggregating devices, both with radio locator or just precarious constructions, (c) Monitoring of the patrol boats movements or their operational status in order to enter the area when they are outside or under maintenance (Cambronero, 2008). Other methods cited by the author, but that observations show are less used are: (d) use of explosives, (e) use of "bait boats" in a far area with the purpose of attracting the attention of Park Wardens to that sector leaving therefore other sectors unattended.

In the Submarine Mountains Marine Management Area the gear used by the tuna fleet vessels is the purse seine complemented with the deployment of Fish Aggregating Devices (FADs) found mainly at the southern sectors of the CMCA up to the southern boundary of the Costa Rican EEZ. Purse seiners registered with the Inter American Tropical Tuna Commission (IATTC) have each one holds capacity that range from 80 to 2,100 Metric Tons. Costa Rica does not have tuna purse seiner under its national flag; therefore all the tuna ships that operate within the EEZ are foreigners (international flag). Reports show that their nets commonly catch other species, known as "incidental not-commercial fishery", such as dolphin fish, sword fish, billfish, turtles marine mammals and sharks (Salazar et al., 2012). The purse seine operation captures small quantities of these species, some are retained and others are liberated although part of this capture could be unloaded without being reported (IATTC, 2015).

A second fishing gear used in the SMMMA is the longline. This gear is the preferred one among the Costa Rican "advanced" artisanal fishing fleet and it is estimated that 40 of this type of vessels are operating in the surroundings of the protected area and 25 of them could be home based in Puntarenas. The IATTC reports a numerous foreign longline fleet: 377 Chinese, 191 Korean, 248 Japanese, among the most numerous ones. These ships size go from 30m to 60m lengths. The targeted specie is yellowfin tuna and alternatively, they catch bigeye tuna. Other species are considered "valuable bycatch", such as dolphin fish, billfish and sharks but there is also a catch of little commercial value at all (turtles, pelagic rays, birds, etc.). The same "advanced" fleet also applies the trolling technique by using fiberglass rods (named "booms"), which is also aimed to fish tuna (Executive Order N°38327, November 11th, 2014) López-Garro (2016) points that the fishing gears found in the CINP are mostly longlines and are made up by a principal line of several kilometers long that holds vertical secondary lines with the hooks that might be of circular types N°14, N°15, N°16 and/or "J" types N°3 and 4 (Taiwanese). Vertical lines are placed every 25-40m. Usually, lines are thrown at early nighttime or after midnight. The bait commonly used by fishermen is squid (Loliginidae), small sharks (specially thresher sharks -Alopias Pelagicus) and black tuna (Scombridae). Besides, few gears are found with live bite, mostly fishes from the Balistidae family (Lopez-Garro et al., 2016).

It must be highlighted that technologically advanced fish aggregating devices are the main fish gear used by purse seiners according with information obtained by interviews made by the authors to an Ecuadorean tuna boat Captain (the biggest fleet that operates in the Costa Rican EEZ. Refer to **Annex 1.**) which is also coherent with the findings of Cubero and Martinez (2013). CHARACTERIZATION AND ANALYSIS OF INDUSTRIAL FISHERIES PRESSURES IN THE COCOS MARINE CONSERVATION AREA AND SURROUNDING ECONOMIC EXCLUSIVE ZONE



# CMCA FISHERIES PRESSURE ANALYSIS

ccording to López-Garro (López-Garro et al., 2016) at the CINP the "Costa Rican boats and those from other countries operate illegally within the protected waters, mainly looking after tuna (T. albacores) and sharks (Carcharhinidae y Alopiidae)". The Costa Rican medium and advanced industrial boats (longliners) stand out among others (**Table No. 3 and Figure No. 5**) – Cajiao, 2005.

Type of Fleet	Number of Vessels
Industrial Fleet	505
Medium Advanced	368
Advanced	74
Shrimp trawlers	60
Sardine purse seiners	3
Artisanal Fleet	6.100
Pacific Ocean	5.750
Caribbean	350
TOTAL	6.605



 Table No. 3. Costa Rican fishing fleet. Source: Industrial Fleet: INCOPESCA;

 Artisanal fleet: OSPESCA (FAO, 2014).

**Figure No. 5.** Location of advance longliners costarican vessels illegal fishing lines found within the CINP. January 2012-august 2014. Source López-Garro et al., 2016.

We also refer Serna, 2006 statements: "Notwithstanding, around the CINP is common to find industrial vessels from other countries with purse seine nets that are seeking after tuna schools and other pelagics of commercial value

It calls our attention then, that the cited publications where denounces are systematized and supports the existence of illegal fisheries activities within the CMCA do **not make any mention to sightings, boarding and detentions of purse seiners, identity, and/or flag of offender vessels, number of detentions and/or boarding accomplished, characterization of the on board confiscated catches, amount of the sanctions applied, etc.,** as result of the enforcement actions and the legitimate defense of the Costa Rican rights and sovereignty within its EEZ. The only one exception is the case of the F/V Tiuna (La Nacion newspaper, january 30th, 2008), detained in a joint interdiction operation with support of the Coastguard Service, CINP and Marviva. All other reports within the research time span of this research (January 2012-july 2017) refers 100% to Costa Rican flag vessels.

#### 7.1 USE OF FISH AGGREGATING DEVICES (FADS)

This research confirms that the foreign purse seiner fleet makes an extensive application of FADs although they are explicitly forbidden by the Costa Rican regulation (INCOPESCA Board Agreement No. AJDIP/241-99, Julio 15, 1999). The distribution of drifting FADs was georeferenced by Cubero & Martinez (2013) based upon the IATTC on board observers' reports. This spatial distribution shows a concentration on the southern region of the CMCA and the Costa Rican EEZ (**Figure No. 6**).

### 7.2 METHODOLOGY

This research made extensive use of the Global Fishing Watch maritime monitoring platform (GFW, http://globalfishingwatch.org/map/) that processes Automatic Identification Systems (AIS) data broadcasted by on board beacons and received by satellites or on shore receiver stations. The use of this platform and data for analysis purposes falls within a cooperation agreement between Faico and GFW.



Figure No. 6. FADs gear sets on water within the Costa Rican EEC. Source: IATTC (2002-2011)

The study analyzed the behavior of the industrial purse seiner fleet within the Costa Rican EEZ and particularly, within or nearby the CMCA, following quarterly periods "snapshots" from january 2012 to june 2017, in which the geographical position, course and speed of ships as well as probable fishing sites were marked.

GFW shows the higher probability fishing geographical sites by marking them as light colored dots. The analysis of routes or tracks of a specific vessel is done by automatically linking its dots together, therefore showing the time dependent movement.

#### 7.3 RESULTS

#### 7.3.1 PURSE SEINER SEASONAL ACTIVITY PATTERNS

The authors interviewed a tuna boat Captain in order to obtain profiling information about the activity:

- Seasonality: Species are related to cold or warm waters and each specie presents particular geographical distributions.
- Water temperature profile: Tuna boats seek for waters where the thermocline is within  $20^{\circ}$  C to  $25^{\circ}$  C.
- Fishing operations are usually planned to start by 16:00 to 19:00 and a second lance by 03:00 to 04:00. The fishing operation lasts between three to four hours (Source: **Annex 1.**).
- Lunar calendar. The best captures are related to new moon periods. Tuna tends to aggregate in schools and swim closer to the surface (Source: Annex 1.) making it easier to catch.

By using the analysis tools provided by GFW, a spatial and temporal evaluation was performed over the fishing efforts within the CMCA and surrounding EEZ, which leads us to obtain behavioral profiles of the pressure (**Figures 7 to 17**)



#### Figure No. 7. January-june 2012 fishing activity

First semester – 2012: Fishing effort is located West-South-South West of CMCA. Several fishing operations detected within the protected area. Source: Global Fishing Watch



#### Figure No. 8. July-december 2012 fishing activity.

Second semester -2012: fishing effort located north and north east of cmca. several fishing operations detected within the protected area. Source: Global Fishing Watch





Figure No. 9. January-june 2013 fishing activity. First semester 2013. Fishing efforts return over the CMCA. The area is surrounded with higher pressure toward the east. Several fishing sites are found within the protected area. Source: Global Fishing Watch Figure No. 11. January-june 2014 fishing activity. First semester 2014. Fishing efforts move West of CMCA. Fishing sites detected within CMCA's boundaries. Source: Global Fishing Watch



Figure No. 10. July-december 2013 fishing activity. Second semester 2013. Fishing efforts moves toward the North – North West sector. Fishing activity detected within CMCA's boundaries. Source: Global Fishing Watch



**Figure No. 12.** July-december 2014 fishing activity. **Second semester 2014. Fishing efforts move North-North West. Fishing activity detected within CMCA's boundaries.** *Source: Global Fishing Watch* 





Figure No. 13. January-July 2105 fishing activity. First semester 2015. Fishing efforts located at West and South of CMCA. Fishing activity detected within CMCA's boundaries. Source: Global Fishing Watch Figure No. 15. January-june 2016 fishing activity.

First semester 2016. Fishing efforts at South-East, South and South-West of CMCA. Fishing activity detected within CMCA's boundaries. Purse seine fish zoning is evident west of CMCA. Source: Global Fishing Watch



Figure No. 14. July-december 2015 fishing activity. Second semester 2015. Fishing efforts at North and North-West of CMCA. Fishing activity detected within CMCA's boundaries. Source: Global Fishing Watch



**Figure No. 16.** July-december 2016 fishing activity. **Second semester 2016. Fishing efforts moves north of CMCA. No fishing activities within CMCA's boundaries.** *Source: Global Fishing Watch* 



Figure No. 17. January-june 2017 fishing activity. First semester 2017. Fishing effort located South East-South – South West. Fishing activity detected within CMCA's boundaries.

Source: Global Fishing Watch

GFW's platform allows the selection and display of vessels according to their flag. Considering that the UN SOLAS Convention sets the use of AIS beacons as mandatory for vessels above 300 GRT, a selective evaluation was performed by filtering out and analyzing the operations of ships considering their countries of origin.

This option allowed to highlight that, within the Costa Rican EEZ, IATTC registers and GFW reported AIS positions within the analysis period (**Figures No 22-23** and **Table No. 4**) present major differences. Particularly, IATTC reports fishing activity of vessels various flags (China, Japan, Korea, Ecuador, Taiwan, among others) while GFW does not show any or very few fishing activity of these flags. Consequently, this lack of correlation called our attention, considering that the sample covered more than 5.5 years, making it evident that these fleets are performing a "dark" operation This detail leads us to conclude that the cooperative vessels (those with an active AIS beacon) are the minority of the universe of the fishing effort.

We could establish then that, as a result of our purse seine fleet tracking analysis, a spatial and temporal behavior can be defined within and nearby the CMCA that can be expressed as follows::

During the first semester (and more evidently in the months of February, March and April), a higher number of tuna vessels are found in the Southwest, South and Southeast of the CMCA.

Afterwards, the pressures moves toward the northern region and during the months of August, September and October it is mostly focused in the North and North-East of the CMCA with an important presence of Costa Rican artisanal boats ("advanced" longliners).

Industrial fishing vessels do not respect the maritime zoning (polygons) as set up the Executive Order N° 38281 (fishing polygons) being the CMCA part of the central polygon.

The use of FADs is mostly focused southern of the CMCA and Costa Rican EEZ.

# 7.3.2 FISHING EFFORT CHARACTERIZATION (COOPERATIVE VESSELS) WITHIN THE CMCA

GFW reports analyzed in the period January 2012 to June 2017 does not show industrial fishing activity within the Cocos Island National Park (Source: http://globalfishingwatch.org, **reports Annex 2**.), notwithstanding, fishing lances were detected within the SMMMA and surrounding waters.

The main flags of those vessels detected in fishing activities correspond to Venezuela and Panama, and their tracks, flags, identification numbers (IMO, MMSI) are registered by the GFW platform as can be seen in Figures 18 to 21.





Figure No. 18. 1st Quarter 2017. Fishing activity of the Venezuelan F/V "ORINOCO II". F/V Orinoco II enters the CMCA and fishing lances conditions are registered during January 2017. Source: Global Fishing Watch

Figure No. 20. 1st Quarter 2016. Fishing activity of the Panamanian F/V "BARAKA". F/V Baraka enters the CMCA and fishing lances conditions are observed in February 2016. Source: Global Fishing Watch





F/V Ventuari enters CMCA and fishing lances conditions are observed during April 2015. Source: Global Fishing Watch



**Figure No. 21.** 2nd Quarter 2016. Fishing activity of the Panamanian F/V "TEMPLARIO 1".

B/P Templario I enters the CMCA and fishing lances conditions are observed in May 2014. Source: Global Fishing Watch

#### 7.3.3 FLAG AND FISHING EFFORT WITHIN THE EEZ

Fleets of eight different flags were verified to perform fishing activities within the Costa Rican EEZ during the period January 2014 – June 2017 (Venezuela, Nicaragua, Panama, Colombia, USA, Peru, Spain and Kiribati). From this register, the Venezuelan vessels showed the highest number of fishing activity days and fishing effort percentage, with 702 fishing days and 54% respectively. Panamanian flags reached 336 fishing days and 26%, and Nicaraguan added to 202 fishing days and 15% of the fishing effort (see **Figure No. 22**).

As was made evident above, there are foreign and national fleets that operate within the Costa Rican EEZ without activating their AIS beacons. Complementarily, VMS vessels' locations are "visible" only to the boat's flag state authority; therefore Costa Rican maritime enforcement/ management agencies do not have access for such information. Regarding this situation we can state that:

- Costa Rica is not enforcing the application of these statutory requirements to its national vessels
- Foreign vessels operating within the Costa Rican EEZ are not being enforced the activation of locating devices
- There are no regional or bi-lateral agreements among authorities for the interchange of VMS data.

This is a relevant issue, since according to IATTC on board observers, during the period from 2001-2011, processed by Cubero (2013), the Ecuadorian tuna fleet represents, as unloaded fish figures, up to 50.5% of the overall tuna catch in the same period (**Figure No. 23**).

In other words, the fishing effort obtained via GFW's platform information and over which we have build up the conclusions of this analysis, could be far larger if we include the data of those vessels not reporting its AIS location.

According to IATTC's registers (www.iattc.org database), purse seiner vessels operating within the Costa Rican EEZ, have individual holds capacity that range from 80MT to 2,100MT. As a reference and according with information provided by INCOPESCA to FAO (FAO, 2014), and to the IATTC, the **total** holds capacity of the Costa Rican longliner vessels

adds up to 3,800 MT to 4,500 MT. In this context, is evident that the foreign purse seiner fleet is several orders of magnitude larger and technologically superior to the Costa Rican longliner fleet.







**Figure No. 23.** Geo-reference of fishing sites according to country of unloads. Source: Cubero (2013); IATTC (2002-2011).

The distribution shwon in Fig. 23 confirms that the origin of the fisheries pressure resides, fundamentally, on foreign flag fleets.

In relation to purse seiner holds capacity, Table No. 4 describes the capacity of the most recurrent fleets within the Costa Rican EEZ.

Country	Qty. of Purse Seiner Vessels	Total Holds Capacity (MT)
Ecuador	116	72.339
México	60	51.766
Venezuela	21	21.096
Panama	17	19.764
Colombia	14	12.744
Nicaragua	7	8.228
El Salvador	3	4.579
TOTAL		190.516

Table No. 4. Number of purse seiner vessels and total holds capacity per country of interest (july 2017-IATTC).

By July 2017 and according to IATTC registers, the total holds capacity of the Costa Rican longline fleet adds up to 3,800 to 4,500 MT.

# 7.3.4 TUNA SHIPS PRESENT WITHIN THE COSTA RICAN EEZ RELATED TO THE FISHING EFFORT

The analysis allowed to identify 31 industrial fishing boats associated to eight different flags of origin and their individual fishing effort, measured in fishing days for the same time period. The leading ship is the Venezuelan F/V "Ventuari" with 224 fishing days, followed by the Nicaraguan F/V "Capt. Joe Jorge" with 202 fishing days, "Templario" and "Baraka" from Panama with 156 and 153 fishing days each and after them, the Venezuelan "Canaima", "Orinoco II", "Gran Roque", "La Rosa Mistica" and "Taurustuna" that registered 12, 140, 85, 79 and 26 fishing days respectively. The last ship recorded of interest was the F/V "Diva Maria" with 23 fishing days. All other vessels register between 7 and 1 fishing days (**see Figure No. 24**).



Figure No. 24. Fishing days per vessel within the Costa Rican EEZ, january 2014 - june 2017 Source: Authors based upon GFW reports http://globalfishingwatch.org/map/ (see Annex 3). As mentioned in numeral 7.3.3, GFW data taken from January 2012 to June 2017 shows information coming from cooperative ships, however, IATTC registers permit to evidence that the activity not being reported to the satellites ("dark fleet") is significant and according to our estimation, the total real effort could be twice the number of fishing sites that GFW reports within the costa Rican EEZ.

#### 7.3.5 OTHER FISHING VESSELS WITH SUSPICIOUS BEHAVIORS

The initial analysis was focused on the evaluation of purse seiner fishing boats operating within the CMCA o nearby maritime region, based upon the fact that these fisheries represents largest holds capacity and has a highly technical operation. However, IATTC data base also shows other boats with different fishing techniques such as longliners and trawlers that also should be added to the fishing pressures.

Given the fact that this analysis was time limited, it required a rapid assessment, consequently, it specifically focused its attention on purse seiner boats, but the application of the GFW platform features did identify other vessels in unusual fishing activities.

As a sample of above said situation, a particular fishing activity was detected on Monday, March 27th 2017 involving the F/V Ocean Alaska (trawler). This ship was transiting form the south and GFW reports probable fishing lances very close to the coast nearby Cape Blanco and Samara (Nicoya Peninsula).



**Figure No. 25.** F/V Ocean Alaska track and probable fishing sites (march 26<sup>th</sup> – 27<sup>th</sup>, 2017). *Source: Global Fishing Watch* 



gure No. 26. F/V Ocean Alaska. Source: Marinetraffic.

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# CONCLUSIONS

rimary and secondary information sources analysis show that there is a significant increase of spatial-temporal fishing pressures within the Costa Rican EEZ and accounts for the main persistent challenges, affecting the efficiency and efficacy of monitoring, control and surveillance of the EEZ in general and the CMCA in particular. The following points are among the identified and highlighted weaknesses are:

- A. Insufficient legal framework and/or weak law enforcement with overlaps and mutual interferences among authorities and the lack of a legal body that makes it mandatory the use of satellite locating devices on board vessels (AIS and/or VMS).
- B. Fisheries law enforcement results are far from what is set by the Costa Rican legal framework with respect to regulating and management of the fishing efforts. The real number of fishing vessels working within the EEZ do not correspond with the number of licenses granted. On the other hand, the proportion of sanctions is extremely low and are not expedite processes.
- C. There is an evident weakness in governance mechanisms, citizen's participation and co-management. Governance mechanisms, among communities, agencies and authorities related to maritime territory ≈and marine resources management. These mechanisms do not have a development and empowering level that could assure

the organization and structuring of fisheries in such a way that its benefits will be for Costa Rica and could become a long-term sustainable activity.

- D. Lack of decision-making and coordination among Costa Rican authorities as well as an absence of a corporate and unique position, that is, the several institutions related to the sea have divergent operational visions and objectives.
- E. Insufficient assignment of financial, logistic and specialized human resources for the tasks of monitoring, control and surveillance of the maritime territory, set the conditions why key agancies are absent in the exercise of sovereignty over the EEZ. At this moment, there is no ocean going patrol capacity (if it departs from the continent) that could survey areas beyond the 12 nautical miles of the CINP and/ or the external boundaries of the SMMMA. According to authorities (NCGS and CMCA) by 2018 new logistic resources will be joined as well as vessels with off shore patrol endurance.
- F. Both government entities and research institutions do not have real figures about the industrial fisheries pressure within the purse seine polygons and CMCA exerted both by national or foreign flags.
- G. The systematization of the information provided by the satellite platform (tracking of "cooperative" vessels) shows that the foreign

industrial fishing fleet exerts a fishing pressure both within the CMCA as in the surrounding EEZ. GFW features for knowing the behavior of the fleet in general terms, allows for the profiling of illegal fishing activities within Costa Rican jurisdictional waters, and determination of the identity, type of ship and the size of the fishing pressure.

- H. By comparing the information of fishing pressure provided by GFW and the catch and unload registers prepared by IATTC observers, it is shown that about 50% of the fishing activity within the Costa Rican EEZ could be considered as "dark" which means that does not operate AIS locators. From this "dark" fleet, IATTC reports show fishing activities from boats with Chinese, Japanese, Korean, Spain, Ecuadorian and Taiwaneese flags (among others). Henceforth, our estimation of the fishing pressures could very well represent just half of the real pressure.
- I. Among the secondary sources that were analyzed, there was not a single reference of industrial fishing vessels, national or foreign, or records of boardings or detentions. The one and only systematized information available was focused exclusively on the Costa Rican advanced longliner fleet.
- J. The excesive fishing pressures both from national and international fleets, generates a lack of balance between the marine resources extraction and its resilient capacity, particularly coming from the CMCA.

- K. The main pressure comes from the foreign fleet with 190,516 MT of holds capacity (in the purse seiner fleet) versus 3,800 to 4,500MT of the Costa Rican advanced longlinger boats. The biggest proportion, by far, are not fished by the local fleet.
- L. Industrial fisheries pressure has a spatial and temporal behavior. In the first semester (particularly February to April) the pressure focuses on the Southeast, South and Southwest of CMCA. During the second semester (particularly August-October), stocks move to the Northeast, North and Northwest. Fishing operations intensify during new moon phases and particularly they start operations by the end of the afternoon. A first lance is usually prepared to start about 16:00 to 19:00 and a second lance by 02:00 – 03:00.
- M. The use of Fishing Aggregating Devices is extensive notwithstanding it is forbidden by law (INCOPESCA Board of Directors' Agreement No. AJDIP/241-99, July 15th, 1999).
- N. The fisheries pressures scenario that CMCA and surrounding EEZ face, surpasses its current management- financial, logistic operational and law enforcement capacities

The analyzed information shows an important weakness in marine resources management, law enforcement within the EEZ and maritime control. This situation derives in a situation of permantent threat over the CMCA and surrounding maritime zone. CHARACTERIZATION AND ANALYSIS OF INDUSTRIAL FISHERIES PRESSURES IN THE COCOS MARINE CONSERVATION AREA AND SURROUNDING ECONOMIC EXCLUSIVE ZONE



# RECOMMENDATIONS

ecommendations are mainly oriented toward the optimization of the decision making process, inter institutional coordination, legal framework improvements, evaluation of the applicability of fines and sanctions, develop a strategy for maritime/fisheries management and above all, considering the possibility of implementing new economical or tax incentives aimed to offer opportunities to the local fleet, protect the CMCA region and discourage illegal fishing.

For reaching this objective, it is very important to articulate the participation, communication and information interchange permanently within the community, institutions and authorities, strengthening the Costa Rican marine and coastal spaces co-management and governance.

From the conclusions the following recommendations are identified:

A. Develop coherent policies at national (inter-institutional) and regional levels with respect to monitoring, control and surveillance of fleets, strengthening the legal and sanctioning framework. A regional vision of maritime surveillance requires the standardization of policies, strategies and legal bodies. At the CMCA scenario, threats come from the outside and are projected toward its space.

- B. In the case of trans zoning pelagic resources, the geographical management scope must be expanded therefore improving surveillance and patrol capacities as well as inter institutional field works coordination. For this purpose, ocean going vessels and extended EEZ region surveillance capacities are required.
- C. Strengthen governance by proper maritime zoning policies in a hand with a balance among rights and obligations. This policy will grant fish resources preferential rights to the local fleet, but the Government must focalize incentives and set ordering conditions to these vessels such as: boat's register, fishing license grants requisites, installation and use of AIS/VMS locating devices, search and rescue services, fuel subsidies, access to credits and social security benefits to seamen.
- D. Control strategies must include extended area surveillance platforms and assets that should focus on regional scope: Satellite AIS/ VMSmonitoring, satellite imagery, satellite radar, marine drones, ROVs, etc.). In accordance with that purpose, it is required to set up an information interchange among local state entities and similar agencies at regional level, in order to be able to follow fishing fleets that operate after trans zonal resources.

- E. Improve the Prevention, Protection and Control Plan of the CMCA by including the industrial fisheries characterization and derive cost/ effective actions to counter it. Based on the spatial and temporal patters, patrolling and control plans should be upgraded. In that sense, patrols must follow the fishing vessels space- time profiles as determined in this analysis.
  - From February to April, the fishing pressure is located at the South, Southwest and Southeast of the CMCA. This is basically a foreign vessels' activity.
  - From August to October, the fishing pressure moves to the North, Northeast of the CMCA with a significant increase of advanced artisanal vessels of Costa Rican flag.
  - Increase the frequency of patrol operations during new moon phases.
  - Patrol operations should preferably cover the outer limits of the Cocos Island National Park as well as the Submarine Mountains Marine Management Area, since illegal fishing activities are prepared and planned from outside the MPAs.
- F. The CMCA must include higher endurance patrol boats and long distance surveillance assets within its maritime control plan. Satellite surveillance must be considered as well as the deployment of long range maritime drones and ROVs
- G. Fisheries management strategy shall prioritize the access to the marine resources to the national fleet, the development of a local fisheries industrial cluster and the enforcement of the current maritime zoning (polygons and CMCA). If the purse seiner fleet is duly controlled, the local vessels must obtain an increment in its productivity.

- H. Maritime, fisheries and environmental authorities must favor the enforcement of the EEZ zoning and its effective control applying eco systemic management policies, the conservation of the hydro biological resources and the application of National Policy for the Ocean, within the framework of a fisheries industry sustainable development strategy. These actions would derive positively in lowering the fishing pressures over the MPAs
- The Costa Rican government must prioritize the strengthening of management, financial, logictics and operational capacities of the CMCA in pursuing the implementation of an effective and efficient law enforcement system under the consideration that the current fisheries pressures scenario. Among the most urgent actions to implement is the need to commission patrol vessels with higher capacities and off shore patrol endurance.
- J. Plan and perform long term studies about the condition of the mainly targeted pelagic species, secondary catches and eco system condition bio indicators, to support the establishment of management policies over a basis of real data. This will support a sustainable fisheries management based on scientific information and allowing the generation of timely fisheries management measures such as: management and definition of quotas, ban periods, appointing the local fleet with rights of use and access and the technological development of local vessels and fishing gears.

It is very important to remark that, according with the maritime policies of Costa Rica, the Cocos Marine Conservation Area has been considered as the last maritime frontier, and in practice, has been appointed for the exercise of the sovereignty over the surrounding EEZ. The above-cited recommendations aim to support this objective. HARACTERIZATION AND ANALYSIS OF INDUSTRIAL FISHERIES PRESSURES IN THE COCOS MARINE CONSERVATION AREA AND SURROUNDING ECONOMIC EXCLUSIVE ZONE



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SINAC (Sistema Nacional de Áreas de Conservación). 2013a. Plan de Manejo del Área Marina de Manejo Montes Submarinos (AMMMS). San José-Costa Rica. 102 p. CHARACTERIZATION AND ANALYSIS OF INDUSTRIAL FISHERIES PRESSURES IN THE COCOS MARINE CONSERVATION AREA AND SURROUNDING ECONOMIC EXCLUSIVE ZONE



# ANNEXES

#### **11.1 ANNEX 1. INTERVIEW WITH A TUNA BOAT SKIPPER**

Within the framework of this research and with the purpose of gathering sensible information from first hand sources, on data 27th August 2017 authors had the opportunity to interview a tuna boat skipper in Ecuador. The interviewed person pointed out that he was talking on a personal basis and explicitly requested that his identity must not be disclosed. For this reason, within these minutes, he has been named as "CP" (Captain) and interviewers will be identified as: OW and AR (the authors).

#### OW

We have been requested to characterize the fishing activity in order to plan what to do as a country about the problem of illegal fishing, not just the issue of managing the protected area but a general scope about resources management. What strategies could be defined?

#### СР

Fisheries have three corners, one is the "fish", second are the resources/ assets to catch it and catching means the existence of the fuel, distance, time, accessibility, etc. and third are the fishing boats. Here in Manta the activity started about 50 years ago with small vessels (40 to 50 MTs) and when they realized that the resource was plenty, new companies started to arrive. Once you have the product, then you know what to do with it, you have two options: to sell the fish or to process it. If you sell it you are loosing. In fact you win but you loose since when you process it you are adding value. At the beginning companies made loins of fillets, that is, the result when the fish is divided to get the whole meat pieces. The loins were exported and canned overseas which is the most popular commercial presentation but afterwards they realized that they were still loosing so decided to install processing plants locally and that is how Manta became the kind of city that is now. Everything walks hand by hand.

#### OW

In Central America is common to find Ecuadorian sardines, mackerel, etc.

#### СР

This is what is happening in Peru. Peru had an important tuna fleet but political mismanagements (politicians started to blackmail the shipowners, demanding benefits for whatever political justification) lead the sector until it went broke. Politicians even decided to create a stateowned fleet generating an unloyal competition so all the investment was gradually taken out of the country.

#### OW

I've seen that all the tuna commercialized in Peru comes from Manta, Ecuador so the only difference is the paper label of the can, but Ecuador's tax policies are not supporting the industry

# СР

Right now, Peruvians are trying to return to the past and do have a new visions. What is happening now is that we are exploiting their resources, more or less as the Costa Rican situation. We, from December to March take advantage of the "productivity" of the Peruvian region. All the Peruvian and foreign fishing vessels request a license to operate within Peruvian waters and therefore thousands of tons of tuna are captured. Initially, they charged US\$100 for the license and then, when they realized that more and more ships were coming, they raised the license to \$2,000 and now the license's cost reached US\$25,000 for a 30 day period and you have to embark four to six Peruvian crew obligatorily and unload part of the catch at Peruvian ports. We were taking everything away from them because they did not have processing plants. Peru was specialized in anchovies and mackerel used as raw material for making fish food so they became a world leader on that.

#### AR

What about the seasonal fishing patters of the Ecuadorian tuna fleet nearby the Costa Rican waters? You just described what is happening in Peru. What is going on in the Costa Rican zone?

# СР

In Costa Rica there is fish all year long because they have this phenomena known as "Thermal Dome". There are high and low peaks. By now (august) it gets better.

#### AR

Which months do you think are the best for fishing in the Pacific, around the Central American waters? And which specific area could you remark?

# СР

The issue is that the world is changing. Right now there is a phenomena going on. There is no fish in the entire Pacific, from meridian 120° toward the Continent but there is fish in the northern regions, north of Colombia. The rest of the Pacific is empty. Ships have gone crazy trying to find fish.

#### AR

So this means that the pressure over Malpelo and Cocos is high now?

# СР

Yes... the problem is that Colombia also strengthened the licenses conditions. In the past, they were loose requirements but now they are toughening them and by now, fishing in Colombia is more complicated.

#### AR

But besides this toughening, what kind of enforcement at sea do they have? Since they can be tough on paper, on ports on licenses procedures but illegal fishing boats can perform clandestine operations anyhow. What kind of controls do they have?

# СР

Ahhh no... They do not have much control; Colombia does not care about the Pacific since their problems are in the Caribbean... Colombia's problem is drug trafficking.

# OW

I thing this could change... the problem is that IATTC is requesting the increase of on board observers.

# СР

Drug trafficking "is not comfortable" with having more surveillance in this side of the Pacific. I presume there must be influences for not doing so and if they do, they do it wrong.

# OW

I can imagine that the Navy's priority is drug trafficking

#### СР

You start fishing operations and if suddenly you are in a zone where "you shouldn't be", they "do not see you" and they "become unaware"... then, you take the chances and dare to enter.

#### AR

Is it the same situation in front of Costa Rica?

# СР

There is nothing over there. People do and undo. Cocos Island has two sides and toward the continent there is a submarine ridge. On the exterior side this ridge is very rich for fishing. Nobody exerts controls in that sector and is there where you find the fish. Everybody knows that there is a periodic movement of ships between the island and the continent ...as said, there is a government entity that routinely travels toward Cocos Island carrying provision, a commissary or something like that and since this route is periodic and related to a government agency, we prefer not to operate within this sector.

The fact is that a tuna boat is afraid to national laws since those are the ship owners' orders because they know that a tuna boat captured in illegal activities by another country represents a high cost, therefore, they always instruct the captain "not to enter". If a marine area is restricted or protected, orders are not to enter but the captain sometimes dares to take the risk due to a, b, or c, conditions. For instance, in Galapagos it is assumed that during holidays such as January 1st the park wardens and coastguard do not operate because of the party the day before, so the fleet is ready at the boundary so at sun dawn, they enter. In general terms you always operate carefully.

#### CP

(Checking the fleets behavior on the satellite surveillance images)... Ecuadorian ship owners consider very risky to operate in Malpelo surroundings and order not to operate in that sector. When you depart Manta and set the course to that region, they become nervous.

#### AR

What about the on board observers on the Ecuadorian fleet? Is it frequent to have an observer on board?

#### СР

We embark an observer in all of our travels, in all the Class IV vessels and above (from 300 MT upwards)

#### OW

In the last IATTC summit there was a proposal to increase the number of observers and disembark them from the smaller boats.

#### CP

Smaller vessels do not have a major impact as the bigger purse seiners do. Those ships of over 1,000 Tons have enormous holds and fill them with whatever falls in the nets, so they are more prone to commit

irregular activities, but the smaller ships because of their smaller capacity, are more selective.

#### AR

But being more selective means that there is a bigger discard? In practice, do they discard more?

#### СР

Not necessarily because if they see a big school they do not make the lance since the net is too small. It can rip or the vessel can heel over.

#### AR

And in the case of bigger ships, do they take everything? Targeted and by catch all in the same holds?

#### СР

Exactly and that is the problem we face. I fish to the south and there are huge ships that come from other latitudes, Spaniards and others. They have no flag at all and operate without any control. They are the ones that are generating the greater damage.

#### OW

That is another point that called my attention. I was checking the IATTC database and the biggest fleet is the Chinese with 347 ships, most of them longliners or Squid jiggers.

# СР

The key issue is not the fishing gear you have but how efficient you are

#### OW

They operate with a logistic cluster behind that you are not allowed to. The ship that was detained in Galapagos (July 2017) is not a fishing boat but a reefer ship

# СР

They have overseas operations, sailing thousands of kilometers from their homeports so they need replenishment at sea support somewhere in the high Pacific. Mother ships perform rendezvous for receiving the cargo, bring women, they remain alongside for days, relieve the whole crew, deliver food, fuel, take the fish and then...continue the fishing effort in the area.

#### AR

Seems like the Chinese government provides a huge support

#### OW

Technically, this is an illegal operation. FAO forbids it explicitly

#### CP

We used to work that way in the past but not now. We do not do it because it is illegal

#### OW

The question is to define a joint strategy between countries. Since as it has been made evident, we need to enforce beyond the 200 miles (EEZ) based on IATTC and FAO agreements

#### CP

When there is an interest, things can be done. The ship owner is interested in caring for the vessel as well as the economical results and it is convenient for him to know what is going on whit his boats, what are they doing, where are they. That is why we have a dual satellite locator beacon (based on GPS). They have us tracked, we have video cameras on board, motion detection sensors, etc., and all this information is gathered in real time at our head quarters. Ship owners want to know what are we fishing, they can take control of the on board sensors in order to "see" what are we doing. As per today, technology is available for monitoring purposes and many things can be implemented. There are gadgets not available now but another issue is when there is no interest in implementing technology. A "predator" that leaves port without control from south east Asia, can travel any where in the world and leaves without control because the authority allows it to happen. Imagine our case, the ship owner cares a lot about drug trafficking and that kind of worries are similar to secure the compliance of respecting the exclusion zones or restricted areas that countries implement. For instance, our company has a particular oceanic zoning that is applied to all our ships. He asks me where am I going to fish and where am I going to travel. He creates a fence in this computer to represent the fishing plan I have to present before each tour. If I start to derive from my plan,

he automatically receives an alarm and then I get an inquiry about why am I out of the virtual fence.

#### AR

Is this fence an auto-imposed mechanism? Is it created because he handles information that the captain does not have access? How come he is able to plan from the Head Quarters if the fishing variables are in situ such as temperature, salinity, etc.

#### CP

No.... he performs a briefing meeting with the captain before the ship leaves the homeport. This is a planning phase and he asks me what is my idea for the operation. Every captain already has an idea about what to do for the next six months. This is the advanced time window I handle. Tuna is highly migratory then we use ancient costumes, traditions and sniff to decently predict the future movements. We use FADs that are dropped by each boat and we start monitoring them after a month or three months. When you drop the FAD you have to be aware about the drift since I need to predict where it will be six months later.

#### AR

How do you know a third party is using the FAD? Has it been the case of somebody using another's FAD?

#### CP

You can find a FAD at sea for coincidence but you do not have the information that the buoy is sending out since it is coded and encrypted. Only the owner or mother ship can read this information.

#### OW

Is it true that modern FADs can measure biomass?

#### СР

Only me, as captain can access to the FADs position and drifting. Complementary, I can check if it has or does not have fish underneath but that is known only for me. Perhaps by chance a ship passing by could stop to check if the FAD has fish and perform a lance. This happens.

#### AR

How frequently do you use FADs? Is it considered as "the technique" for fishing tuna?

### СР

Currently, yes.

#### AR

Aren't FADs forbidden?

# СР

NO. They are regulating it by making it biodegradable. They are still made of synthetic material since it lasts longer but we are already testing other types of materials that do not last long.

#### OW

"Lasting" is how much time?

#### CP

Considering the area I operate and the type of fisheries I look later, it should last at least one year but I have not found it yet.

#### OW

And the buoy is expensive.

#### СР

What happens is that from Latitude 0° to the north, if you seed a FAD it will last one month, then you fish quickly because the zone is productive. A FAD creates life and attracts life.

#### AR

What do you use for the FAD? Dead horses?

#### СР

I do not prefer to use animals but yes, many things have been used such as horses, pigs, dogs, donkeys, etc. We use old nets, making a 20m to 30m long strip but this does not have an impact on ecology since it is not convenient for us to loose them. When I see that a FAD is drifting too far, I pick it up because ecologically speaking, this FAD is of higher quality because it has life already. I can put it back to water and it will revive quickly. I loose from 3% to 5% since it is not convenient for me to let them go.

#### OW

Given the vastness of the territorial waters and EEZ both of Costa Rica and Ecuador, another angle I would like to address is: How concerned are other countries about the compliance of the IATTC regulations considering that regulations and recommendations are fairly good but sometimes they remain in paper. How are the member states enforcing them and what is the level of commitment?

#### AR

How binding are they for Costa Rica?

#### CP

There is a tug of war between IATTC efforts for regulating the activity and the economical part of the industry. In our case the struggle is hard against IATTC and we had a big confrontation on July 30th since IATTC planned to apply fishing quota limits that derived in stopping the whole fleet when reaching it. But for I, as a fisherman, think that the ban must be total, that is, everybody should stop at a determined time, and all the tuna boats must remain at port. If you allow that someone could proceed and other could not, at the end it will not work. If we take an eco systemic point of view, they are not doing it any favor since they are forcing a small group to stop all the activities, but another small group keeps on fishing, therefore this last group has the opportunity to take the hell out of the specie. The fishing effort does not go down.

#### OW

The fishing effort goes down? The resources are still in the water

#### CO

We fish together usually in the same areas, and suddenly you are taken out (banned). What do I do if I'm left alone? I start to overfish!!!. What is the benefit for the specie, are we allowing the stocks to recover? The specie is not benefited. We all must stop, but then it comes the other perspective, economic interests. Ship owners of both sides do not want to be at dock since, what happens with the income generation? You remain a while economically "frozen" but expenses and product deliver commitments are still n force. What do they do then? They purchase wherever to keep the processing plants operating and keep the delivery line working to comply with clients. This is why it is not convenient for ship owners to stop all the ships, consequently you end up in as economic struggle and fight for interests between what IATTC proposes (could be the best intentions) and what people and reality imposes.

#### OW

Now let's suppose that a ban is declared. How is it enforcement done at sea? Is it true that any maritime or fisheries authority does enforcement activities as sea?

#### СР

For instance, right now, IATTC with its limited efforts does exert control. Observers are now definitively much more prepared, with better knowledge about everything. In the past they were persons or young guys that just wanted to make some money but now they are marine biologists who "know".

#### AR

Are they Ecuadorian observers or is the IATTC sending them from different parts?

# СР

Most of them are Ecuadorians

#### AR

And what do you think could make it more efficient? Perhaps if you hire foreign professionals?

# СР

That could make it more efficient

#### OW

And what about a rotating them? What I see is a system that could resolve weaknesses by itself

# СР

The ship owners pay observers. If you plan to bring foreigners for control purposes, it is going to increase costs: air ticket, lodging, transportation,

etc. All those expenses shall be paid by us, then I prefer to hire national observers

#### AR

I thought they should be independent guys

#### CP

Let's see. The observers are controlled and managed by IATTC but economically they are paid by the ship owners

#### AR

There are countries with mechanisms such as a "common fund" managed by a specific state agency, which pays the observers so corruption can be minimized (it is a permanent threat).

# СР

Refers an anecdote many years ago where the observer was suggested to "turn a blind eye" in exchange of a gift because a big school of tuna was detected at sunset but with numerous dolphins around.

#### OW

Then the states are not participating in the enforcement. They don't even smell it. IATTC controls itself.

#### СР

I was arguing that... In Manta there is a Tuna association (ATUNEC) that gathers most of the ship owners. This association meets periodically. Why ATUNEC was created? When Manta started to become a tuna power, an American company landed there and started to send its production to the US, they established a labor regime that included medical insurance, pay on a US\$/hour basis, and other common benefits as it was in the US. By that time, ATUNEC did not exist and the tuna industry labor hand did not have such benefits. Tuna boat owners then got together and agreed to drive out this American company since it was considered a "bad example". They should move out wherever. In addition, they resolved to auto-regulate the labor conditions so no one could affect others. In that sense, ATUNEC consolidated it self step by step, becoming more powerful and now is the "spear head" for any fight for rights or industry planning that they set to achieve. The issue about the observers then, lies on the problem that they represent a cost for the ship owners then, when the program started, they committed with IATTC to pay. They said 'do not worry, we will pay", but why is it convenient for the ship owners to accept this cost? Because they do not accept that just anybody to do the task. Then the IATTC regulated the activity and the protocols that observers must follow, but at the bottom, it's the ship owners who pay so they have a sort of veto power in order to not allow just anybody to perform as observer.

#### OW

In our region, the IATTC is the RFMO and Chile has just joined since the trans zoning species has been addressed by the IATTC. In a recent meeting performed in Manta (April 2017), called by NOAA for analyzing maritime traceability, there was the head officer of fisheries law enforcement of NOAA who pointed out that "we spend our funds and efforts pursuing all the ships, but we simply think that countries that wan to sell to the US must have monitoring systems, fisheries traceability and we will be here waiting at our customs stating: "If you do not have them implemented I wont be able to purchase. Simple as that". This is a good strategy since forces the tuna boats and IATTC to auto regulate themselves, then what they are saying is 'I'm not going to purchase if you do not get organized and besides, as a private industry cluster, reach agreements to order yourself. The actor who is remaining "off side" is China, the biggest consumer of fish products but that acts as a privateer sending its fleet with "patent of corso" to operate as outlaws. Then what we are witnessing is a situation where the "enemy of my enemy is my friend". At this time, the Chinese became everyone's threat, they are enemies of the tuna industry and are enemies of the region's States, and consequently, they should join interests to face this threat. If not, it might be too late and national actors in the fishing industry will end up without resources and country's exports will fall.

#### CP

Several months ago NOAA sends a project to avoid the capture of "big eye" and to fish only "yellow fin". How can we do this? It is easy to say it because they are not familiar with the operation. I can answer that I'll take the net and will start to select ones from the others!!! In practice, this is impossible but "it's a scientific word", they say. There are things impossible to set up, they are nonsense.

#### OW

Then, you are fishing in an absolute disadvantageous condition. According to sources, the Chinese fleet has between 400 to 500 vessels from longitude 150° to the east. How do you logistically support such effort? It is a fleet the size of the Guadalcanal landing!! And even bigger. There are tankers, replacement crews, and even family gatherings.

#### AR

Well, it is known that the Chinese have factory ships

#### CP

The Chinese trawlers came to Ecuador several years ago. They were predators operating in front of the "La Libertad" peninsula. They generated a disaster in the marine bottoms and the fleet got the authorization of remains here until some intelligent guy arrived and stopped this mess. One of the good things that President Correa did was to set limits to trawling activities but in Manta you now find a stepwise grow in marine resources that benefit the artisanal boats. Now you find beautiful fishes at the market that were gone before.

#### OW

I think we could make a unanimous speech that will focus directly toward the Chinese fleet urging the Chief of Naval Operations to talk with them directly stating that "we are going to set up a surveillance strategy, we are going to plan it in the next 6 months and see what will happen with this tools". The US could facilitate their satellite platforms, the French have already provided help in the last incident but until now, local authorities in each country are focused on their national fleets but all others remain invisible. We must "ask for the key" and watch everything that is happening in the oceans.

Now we focused on control and surveillance topics around the Galapagos region, discussing weaknesses of the system and how fishing boats use tricks to by pass the surveillance and the protected space.

#### СР

By now, ATUNEC officials are "ecologists" because they are really concerned about the problems of fines, stocks recovery and market share. Ship owners are always watching after its own people, captains and other fleets in order to avoid fines and market loss. If you find a dead turtle, you could receive a considerable fine and they want to avoid losses of this type. Perhaps they turtle is not as important as the fine and market loss.

#### AR

Regarding this, are they still applying the practice to throw divers to take out dolphins from the net that are commonly stabbed to avoid it to come out and be observed? What is going on really?

#### CP

The normal situation is that dolphins get choked within the net. The on board biologist will check for dead dolphins. Then the procedure states that divers take the exhausted dolphin and cut the net to let him free. If the dolphin is dying or dead they kill and sink him.

#### AR

How often does this happen? If you get ten dolphins do you kill five, do you kill three?

# СР

The dolphin has a natural instinct to escape. They always look how to get out the net. Problems arise when the captain makes a bad maneuver forming "pockets" within the net. You must keep the net tightly so the dolphin will clearly see where is the wall and they jump out. If the captain has made a bad maneuver the net does not help and the animal chokes. This is a very rare situation since by now; captains are strictly selected and are experienced. Situations now are basically exceptions, accidents.

Nobody kill dolphins on purpose.

#### AR

Is this happening with other species? Which other animals could be within this classification? Dolphins, turtles, what else?

# СР

Turtles get tangled but they are slow thank god and very easy to handle when tangled.

AR Is there a will to take them out or do they become food for the crew?

# СР

Yes, yes, because even the captain gets fined as well.

#### AR

But, how does the Captain find out? Is there a chance to "negotiate" with the observer?

### СР

No...no... in theory there are no "negotiations". The biologist registers the dead turtle and the fine goes to the Captain, the ship owner and the company.

### AR

Then the fine is per unit. How much is for a fine?

# CP

It is \$500 for the captain; ship owner pays around \$1,200. But since this regulation has many years in force, everyone knows that the turtle is protected so why you should promote a damage. Simply you stop the maneuver, turtles are friendly animals, and take them out.

AR

How many divers are usually on board for these tasks?

# СР

Two. Always have to operate in couple. They are part of the crew

#### AR

What certification do they have?

# CP

I cannot tell

# OW

But they have a license?

# СР

Yes. There are "good" licenses and "bad licenses'. In Manta there is a company operating for three or four years for this.

#### OW

Regarding the oceanographic topics. How do you look after the right temperature and thermocline?

### СР

The tuna is located in areas where the temperature changes; it is a band that goes from 21° to 23°. This is the region where the tuna prefers to be. I look after a little colder, until 20° since I prefer, due to company instructions, tuna with more grease in the meat. In the process I eviscerate on board, remove the head and afterward it is sent to Japan directly. Tuna is sold per whole frozen pieces and quality is extremely important. I use type of mattresses, more comfortable that my bed, where we accommodate the tuna so they do not get stressed.

Now we talk about the certification requirements set up by the European Community and the associated requirements. This goes hand by hand with operational improvements on board.

#### AR

Regarding other flags fleets. Is there a presence of Russian, Japanese fleets within the zones of your interest?

#### СР

Not Russians. Japanese vessels yes. The closest the Russians we have seen are the deep trawlers

#### OW

How does it work?

#### СР

Explains the deep trawl technology and variations. These ships work on depths that can go as far as 2,000 or 3,000 meters. Those nets raze with everything. They should forbid the departure authorization to this kind of ships from any port of the world because of the level of damage the can generate.

### OW

There are three things that could be done with this respect, first you need to have the capacity of "knowing" what is happening, secondly, you need a clear legal framework that forbids this, and thirdly, you need to have the assets and political will to go after them, then you can say that your are generating incentives to the national industry and deincentivating these destroyers. That should be the position to adopt.

A comment is drawn about the subsidy policy that the Russian Federation is going to apply to their fishing fleet and joint actions that countries must take to enforce the law in ports different to their flag of origin and international mechanism to detain vessels.

#### AR

What is the most common fishing gears that fleet use in this zone?

# СР

Basically purse seine and longline

#### AR

What are the targeted species besides tuna?

# СР

Dolphin fish, billfish, wahoo and squid. Longline is the gear mostly used for these fisheries (except for squid). I use purse seine up to 60m depths. Longline or other gears are regulated basically the hook to apply.

#### OW

Squid is the principal targeted specie for the Chinese. It represents their main effort.

# СР

Small squid is the favorite food for tuna. Where you have squids, there is big tuna.

#### AR

Then you will not agree that they are razing the squid stocks

# СР

The Chinese are behind the "giant" squid, not after the small one

# AR

Have you seen Korean or Spanish fleets

# СР

Spanish corporations have moved out from the countries in this region. There are a few left. With respect to the crew of those vessels, during the 80's it was common to find Spanish skippers and first engineers but not now since little by little local capacity was built up. There are Korean, Taiwanese and Japanese fleets operating in the region via agreements with the countries or they keep up by means of a long-range logistic support form their countries.

A comment is drawn regarding the capacity and seamanship of aborigines people from Ecuador that traveled up to Mexican coasts as well as the expertise of local artisanal fishermen

#### AR

With respect to superficial chlorophyll, do you use it as an indicator for fisheries?

# СР

Of course. On board, we have a satellite imagery service to check the variations of it. It provides information about plankton, currents, temperature and besides these technical data, they provide advise translating what is the meaning of what I'm seeing, recommending the area I should go. They perform a scientific analysis and I cross that with what I'm seeing on site. They can route me if I wish.

#### AR

And to what point this "guide" is coherent with your expertise as captain?

#### СР

I can tell that this information reaches a 70% correlation. They are experienced technicians.

#### OW

What about the moon phases?

# CP

That is an ancestral technique. The moon attracts or deepens the fish, according to its phase. When it is "new moon" the fish tends to "get lost" so they gather in close schools and moves to the surface but when it is full moon, the night is lighted and the fish can maneuver "freely" therefore they disperse or break-up making it more difficult to catch.

A comment is drawn about a former study about the correlation between fishing activities and moon phase

#### AR

In terms of submarine topography (bathymetry), is there a correlation between fish activity and submarine mounts?

# СР

It is highly correlated since the bottom of the ocean is very rich in nutrients the ridges tend to "move the food closer to the surface" so instead of being at thousands of meters it is at a depth near the surface. Any fisher looks after a ridge of mount. When you don't have a specific hint about where the fish is, then you go after the mounts.

We talk about highly productive sites such as the Thermal Dome of Costa Rica and other "secret" sites discovered by captains. Finally satellite monitoring and surveillance technology scope is analyzed as well as its suitability and possibility of application for law enforcement of the maritime territory. End up talking about the way they deploy satellite FADs and how are they used in conjunction with a tuna boat.

### 11.2 AANNEX 2. SATELLITE REPORTS ABOUT TUNA BOATS PRESENCE AND FISHING ACTIVITY AT THE CMCA

GlobalFishingWatch.org <no-reply@globalfishingwatch.org> 21 de setiembre de 2017, 16:48 Para: Alvaro Rodríguez <alvaroceano@gmail. com>You requested a report with the following parameters: Regions: Cocos Island National Park. From: 2014-01-02T01:56:08.956Z. To: 2014-04-17T11:10:04.682Z. Limited to: 500 vessels. No vessels were found.

GlobalFishingWatch.org <no-reply@globalfishingwatch.org> 21 de setiembre de 2017, 17:07 Para: Alvaro Rodríguez <alvaroceano@gmail. com>You requested a report with the following parameters: Regions: Cocos Island National Park. From: 2014-04-16T00:52:45.063Z. To: 2014-07-30T10:06:40.789Z. Limited to: 500 vessels. No vessels were found.

GlobalFishingWatch.org <no-reply@globalfishingwatch.org> 21 de setiembre de 2017, 17:18 Para: Alvaro Rodríguez <alvaroceano@gmail. com>You requested a report with the following parameters: Regions: Cocos Island National Park. From: 2014-07-28T23:49:21.170Z. To: 2014-11-11T09:03:16.896Z. Limited to: 500 vessels. No vessels were found.

GlobalFishingWatch.org <no-reply@globalfishingwatch.org> 21 de setiembre de 2017, 18:11 Para: Alvaro Rodríguez <alvaroceano@gmail. com>You requested a report with the following parameters: Regions: Cocos Island National Park. From: 2015-01-29T22:30:03.083Z. To: 2015-05-02T00:36:44.422Z. Limited to: 500 vessels. No vessels were found.

GlobalFishingWatch.org <no-reply@globalfishingwatch.org> 21 de setiembre de 2017, 18:24 Para: Alvaro Rodríguez <alvaroceano@gmail. com>You requested a report with the following parameters: Regions: Cocos Island National Park. From: 2015-08-01T16:10:05.505Z. To: 2015-11-01T18:16:46.844Z. Limited to: 500 vessels. No vessels were found.

GlobalFishingWatch.org <no-reply@globalfishingwatch.org> 21 de setiembre de 2017, 17:57 Para: Alvaro Rodríguez <alvaroceano@gmail. com>You requested a report with the following parameters: Regions: Cocos Island National Park. From: 2014-10-31T06:40:41.361Z. To: 2015-01-31T08:47:22.700Z. Limited to: 500 vessels. No vessels were found. GlobalFishingWatch.org <no-reply@globalfishingwatch.org> 21 de setiembre de 2017, 19:24 Para: Alvaro Rodríguez <alvaroceano@gmail. com>You requested a report with the following parameters: Regions: Cocos Island National Park. From: 2016-02-01T09:50:07.927Z. To: 2016-05-03T11:56:49.266Z. Limited to: 500 vessels. No vessels were found.

GlobalFishingWatch.org <no-reply@globalfishingwatch.org> 21 de setiembre de 2017, 19:45 Para: Alvaro Rodríguez <alvaroceano@gmail. com>You requested a report with the following parameters: Regions: Cocos Island National Park. From: 2016-05-03T06:40:09.138Z. To: 2016-08-03T08:46:50.477Z. Limited to: 500 vessels. No vessels were found.

GlobalFishingWatch.org <no-reply@globalfishingwatch.org> 21 de setiembre de 2017, 19:51 Para: Alvaro Rodríguez <alvaroceano@gmail. com>You requested a report with the following parameters: Regions: Cocos Island National Park. From: 2016-08-03T03:30:10.349Z. To: 2016-11-03T05:36:51.688Z. Limited to: 500 vessels. No vessels were found.

GlobalFishingWatch.org <no-reply@globalfishingwatch.org> 21 de setiembre de 2017, 19:16 Para: Alvaro Rodríguez <alvaroceano@gmail. com>You requested a report with the following parameters: Regions: Cocos Island National Park. From: 2015-11-01T13:00:06.716Z. To: 2016-02-01T15:06:48.055Z. Limited to: 500 vessels. No vessels were found.

GlobalFishingWatch.org <no-reply@globalfishingwatch.org> 21 de setiembre de 2017, 20:04 Para: Alvaro Rodríguez <alvaroceano@ gmail.com>You requested a report with the following parameters: Regions: Cocos Island National Park. From: 2017-03-31T11:24:28.661Z. To: 2017-07-01T13:31:10.000Z. Limited to: 500 vessels. No vessels were found.

GlobalFishingWatch.org <no-reply@globalfishingwatch.org> 21 de setiembre de 2017, 18:18 Para: Alvaro Rodríguez <alvaroceano@gmail. com>You requested a report with the following parameters: Regions: Cocos Island National Park. From: 2015-05-01T19:20:04.294Z. To: 2015-08-01T21:26:45.633Z. Limited to: 500 vessels. No vessels were found.

# 11.3 ANNEX 3. INDUSTRIAL FISHING FLEET REPORTS WITHIN COSTA RICAN EEZ. JANUARY $1^{\text{ST}}$ , 2014 TO JUNE 30 $^{\text{TH}}$ , 2017

ID	REGIONS	FROM	то	VESSEL_NAME	FLAG_STATE	MMSI	IMO	Call_Sign	Days At sea	Fishing_ Day	Earliest Detection	Latest Detection
1	CR-EEZ	Thursday, January 2nd 2014, 1:56:08 am	Thursday, April 17th 2014, 11:10:04 am	T EMPLARIO 1	Panama	371696000	8003216	HO4221	21	16	2014-02-17 01:53:38	2014-04-17 00:06:21
2	CR-EEZ	Thursday, January 2nd 2014, 1:56:08 am	Thursday, April 17th 2014, 11:10:04 am	BARAKA	Panama	371759000	8103107	HO4222	21	9	2014-01-21 04:39:52	2014-04-10 18:02:29
3	CR-EEZ	Thursday, January 2nd 2014, 1:56:08 am	Thursday, April 17th 2014, 11:10:04 am	TAURUSTUNA	Venezuela	775628000	7230422	YYEK	35	3	2014-01-14 03:45:32	2014-04-09 12:45:52
4	CR-EEZ	Thursday, January 2nd 2014, 1:56:08 am	Thursday, April 17th 2014, 11:10:04 am	FALCON	Venezuela	775616000	7395521	YYCL	12	1	2014-01-24 15:30:51	2014-03-26 15:47:29
5	CR-EEZ	Wednesday, April 16th 2014, 12:52:45 am	Wednesday, July 30th 2014, 10:06:40 am	LA ROSA MISTICA	Venezuela	775626000	7342304	VLYJV	54	30	2014-04-25 17:27:45	2014-07-13 06:59:32
6	CR-EEZ	Wednesday, April 16th 2014, 12:52:45 am	Wednesday, July 30th 2014, 10:06:40 am	T EMPLARIO 1	Panama	371696000	8003216	HO4221	59	21	2014-04-16 02:05:41	2014-07-29 05:20:26
7	CR-EEZ	Wednesday, April 16th 2014, 12:52:45 am	Wednesday, July 30th 2014, 10:06:40 am	TAURUSTUNA	Venezuela	775628000	7230422	YYEK	33	19	2014-05-04 00:46:51	2014-07-28 23:48:54
8	CR-EEZ	Wednesday, April 16th 2014, 12:52:45 am	Wednesday, July 30th 2014, 10:06:40 am	CABO DE HORNOS	Colombia	730019000	905003400	HJDC	5	3	2014-04-30 21:07:25	2014-07-06 19:21:44
9	CR-EEZ	Wednesday, April 16th 2014, 12:52:45 am	Wednesday, July 30th 2014, 10:06:40 am	DOMINADOR 1	Colombia	730059000		НКМО	6	3	2014-04-17 00:03:36	2014-06-05 04:06:05
10	CR-EEZ	Wednesday, April 16th 2014, 12:52:45 am	Wednesday, July 30th 2014, 10:06:40 am	VENTUARI	Venezuela	775610060	7407908	YYGZ	8	2	2014-07-05 22:32:38	2014-07-23 17:48:12
11	CR-EEZ	Wednesday, April 16th 2014, 12:52:45 am	Wednesday, July 30th 2014, 10:06:40 am	CANAIMA	Venezuela	774559424	1048576	YYEM	5	2	2014-05-26 06:18:59	2014-07-10 20:16:36
12	CR-EEZ	Wednesday, April 16th 2014, 12:52:45 am	Wednesday, July 30th 2014, 10:06:40 am	CARDON STATION	Venezuela	775000000	9999999999	YYX X	23	2	2014-04-24 05:54:57	2014-07-24 13:35:58
13	CR-EEZ	Wednesday, April 16th 2014, 12:52:45 am	Wednesday, July 30th 2014, 10:06:40 am	BARAKA	Panama	371759000	8103107	HO4222	9	2	2014-05-08 23:03:29	2014-06-02 11:45:02
14	CR-EEZ	Wednesday, April 16th 2014, 12:52:45 am	Wednesday, July 30th 2014, 10:06:40 am	GRENADIER	Colombia	730052000	743527800	HKRQ	3	1	2014-05-26 09:57:37	2014-07-02 05:51:28

56		CHARA	CTERIZATION AND ANAL	YSIS OF INDUSTRIA	L FISHERIES PRES	SURES IN THE	COCOS MARII	NE CONSERVAI	FION AREA A	ND SURROU	NDING ECONON	AIC EX
ID	REGIONS	FROM	то	VESSEL_NAME	FLAG_STATE	MMSI	ІМО	Call_Sign	Days At sea	Fishing_ Day	Earliest Detection	Late
15	CR-EEZ	Monday, July 28th 2014, 11:49:21 pm	Tuesday, November 11th 2014, 9:03:16 am	T EMPLARIO 1	Panama	371696000	8003216	HO4221	52	34	2014-07-29 01:10:55	2014 17:5
16	CR-EEZ	Monday, July 28th 2014, 11:49:21 pm	Tuesday, November 11th 2014, 9:03:16 am	BARAKA	Panama	371759000	8103107	HO4222	41	27	2014-08-07 05:02:47	2014 08:4
17	CR-EEZ	Monday, July 28th 2014, 11:49:21 pm	Tuesday, November 11th 2014, 9:03:16 am	RM ZEUS	Peru	760000001	9673903	CE28791	5	2	2014-09-20 16:53:01	2014 10:4
18	CR-EEZ	Monday, July 28th 2014, 11:49:21 pm	Tuesday, November 11th 2014, 9:03:16 am	SEA GEM	Colombia	730017000	7528001	HJDA	5	1	2014-08-01 05:30:22	2014 08:3
19	CR-EEZ	Monday, July 28th 2014, 11:49:21 pm	Tuesday, November 11th 2014, 9:03:16 am	CANAIMA	Venezuela	774559424	1048576	YYEM	5	1	2014-08-28 13:26:32	2014 12:5
20	CR-EEZ	Thursday, January 29th 2015, 10:30:03 pm	Saturday, May 2nd 2015, 12:36:44 am	VENTUARI	Venezuela	775610060	7407908	YYGZ	47	23	2015-02-01 07:56:37	2015 17:0
21	CR-EEZ	Thursday, January 29th 2015, 10:30:03 pm	Saturday, May 2nd 2015, 12:36:44 am	LA ROSA MISTICA	Venezuela	775626000	7342304	YLA	32	10	2015-02-12 16:53:30	2015 07:0
22	CR-EEZ	Thursday, January 29th 2015, 10:30:03 pm	Saturday, May 2nd 2015, 12:36:44 am	HIGH C`S	United States of America	367347140		W DE3998	29	5	2015-02-11 15:53:49	2015 18:17
23	CR-EEZ	Thursday, January 29th 2015, 10:30:03 pm	Saturday, May 2nd 2015, 12:36:44 am	T EMPLARIO 1	Panama	371696000	8003216	HO4221	16	3	2015-02-05 08:45:17	2015 23:1
24	CR-EEZ	Thursday, January 29th 2015, 10:30:03 pm	Saturday, May 2nd 2015, 12:36:44 am	BARAKA	Panama	371759000	8103107	HO4222	14	1	2015-01-30 10:06:01	2015 10:0
25	CR-EEZ	Thursday, January 29th 2015, 10:30:03 pm	Saturday, May 2nd 2015, 12:36:44 am	CART ADEDECES		123450800		Х ССВ	1	1	2015-03-08 17:50:56	2015 18:2
26	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	BARAKA	Panama	371759000	8103107	HO4222	63	53	2015-05-13 05:35:01	2015 06:1
27	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	LA ROSA MISTICA	Venezuela	775626000	7342304	VLYY	77	33	2015-05-06 18:07:39	2015 06:1
28	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	371759000	8103107	HO4222	63	53	2015- 05-13 05:35:01	2015- 07-28 06:13:29	2015-06-30 01:12:01	2015 19:0
29	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	DIVA MARIA	Panama	371224000	7915917	3EBT 3	28	23	2015-06-26 01:00:32	2015 13:4

57		CHARAC	CTERIZATION AND ANAL	YSIS OF INDUSTRIA	L FISHERIES PRES	SURES IN THE	COCOS MARIN	E CONSERVAT	TION AREA AI	ND SURROU	NDING ECONOM	1IC EX
ID	REGIONS	FROM	то	VESSEL_NAME	FLAG STATE	MMSI	ІМО	Call_Sign	Days At	Fishing_	Earliest	Late
					_				sea	Day	Detection	Det
30	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	122408213	8381826	YYDX	32	28	2015-06- 30 01:12:01	2015- 08-01 19:02:11	2015-05-14 04:03:22	2015 15:23
31	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	LA ROSA MISTICA	Venezuela	775626000	7342304	VLAA	77	33	2015-05-06 18:07:39	2015 06:1
68	CR-EEZ	Wednesday, August 3rd 2016, 3:30:10 am	Thursday, November 3rd 2016, 5:36:51 am	CART ADEDECES		123450800		Х ССВ	1	1	2016-08-20 09:27:09	2016 17:28
33	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	371224000	7915917	3EBT 3	28	23	2015- 06-26 01:00:32	2015- 07-28 13:45:59	2015-05-25 12:44:05	2015 17:24
34	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	122408213	8381826	YYDX	32	28	2015-06- 30 01:12:01	2015- 08-01 19:02:11	2015-07-20 14:37:13	2015 19:0
35	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	TAURUSTUNA	Venezuela	775628000	7230422	YYEK	24	4	2015-05-01 20:04:23	2015 02:3
36	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	123450800		Х ССВ	1	1	2016- 08-20 09:27:09	2016- 08-20 17:28:18	2015-06-01 16:31:27	2015 06:4
37	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	MARTA LUCIAR	Colombia	730014000		HJCV	11	7	2015-05-25 12:44:05	2015 17:24
38	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	AMANDA.S	Colombia	730015000	812158700	HJCZ	2	1	2015-06-17 05:49:36	2015 18:5
39	CR-EEZ	Saturday, August 1st 2015, 4:10:05 pm	Sunday, November 1st 2015, 6:16:46 pm	ORINOCO II	Venezuela	122408213	8381826	YYDX	21	18	2015-08-01 17:25:53	2015 06:1
40	CR-EEZ	Saturday, August 1st 2015, 4:10:05 pm	Sunday, November 1st 2015, 6:16:46 pm	774559424	1048576	YYEM	12	6	2015- 07-20 14:37:13	2015- 08-01 19:00:49	2015-08-01 19:00:49	2015 18:0
41	CR-EEZ	Saturday, August 1st 2015, 4:10:05 pm	Sunday, November 1st 2015, 6:16:46 pm	VENTUARI	Venezuela	775610060	7407908	YYGZ	21	15	2015-08-01 18:58:39	2015 04:3
50	CR-EEZ	Friday, October 31st 2014, 6:40:41 am	Saturday, January 31st 2015, 8:47:22 am	RONG CHANG NO1		800810001		3X -2025	2	1	2014-11-21 20:16:22	2014 15:16
43	CR-EEZ	Saturday, August 1st 2015, 4:10:05 pm	Sunday, November 1st 2015, 6:16:46 pm	775628000	7230422	YYEK	24	4	2015- 05-01 20:04:23	2015- 07-09 02:37:22	2015-08-06 22:49:59	2015 22:3
44	CR-EEZ	Saturday, August 1st 2015, 4:10:05 pm	Sunday, November 1st 2015, 6:16:46 pm	EL REY	Colombia	730050000	731353500	HJSX	9	4	2015-06-01 16:31:27	2015 06:4
45	CR-EEZ	Saturday, August 1st 2015, 4:10:05 pm	Sunday, November 1st 2015, 6:16:46 pm	CARDON STATION	Venezuela	775000000	9999999999	YYX X	6	1	2015-08-28 00:56:24	2015 00:4

58		CHARAC	TERIZATION AND ANAL	YSIS OF INDUSTRIA	L FISHERIES PRES	SURES IN THE	COCOS MARII	NE CONSERVAT	TION AREA A	ND SURROUI	NDING ECONOM	IIC EXC
	REGIONS	FROM	то	VESSEL NAME	ELAG STATE	MMSI	IMO	Call Sign	Days At	Fishing	Farliest	Late
	REGIONS	- Kom		TEODEL_HAME		MINO	inio	cun_orgn	sea	Day	Detection	Dete
46	CR-EEZ	Friday, October 31st 2014, 6:40:41 am	Saturday, January 31st 2015, 8:47:22 am	BARAKA	Panama	371759000	8103107	HO4222	13	8	2014-11-05 05:08:39	2015 12:53
47	CR-EEZ	Friday, October 31st 2014, 6:40:41 am	Saturday, January 31st 2015, 8:47:22 am	730019000	905003400	HJDC	4	3	2015- 05-12 03:57:24	2015- 05-15 19:07:54	2014-11-02 06:26:49	2015 18:11
48	CR-EEZ	Friday, October 31st 2014, 6:40:41 am	Saturday, January 31st 2015, 8:47:22 am	SUN LAUREL	Kiribati	529765000	9405631	T 3PU 2	2	2	2014-12-23 00:40:58	2014 11:08
49	CR-EEZ	Friday, October 31st 2014, 6:40:41 am	Saturday, January 31st 2015,	HIGH C`S	United States of America	367347140		W DE3998	12	1	2015-01-05 05:57:59	2015 00:4
67	CR-EEZ	Wednesday, August 3rd 2016, 3:30:10 am	Thursday, November 3rd 2016, 5:36:51 am	730015000	812158700	HJCZ	2	1	2015- 06-17 05:49:36	2015- 06-18 18:51:41	2016-08-31 13:24:03	2016 14:38
51	CR-EEZ	Monday, February 1st 2016, 9:50:07 am	Tuesday, May 3rd 2016, 11:56:49 am	ORINOCO II	Venezuela	122408213	8381826	YYDX	21	18	2015-08-01 17:25:53	2015 06:1
52	CR-EEZ	Monday, February 1st 2016, 9:50:07 am	Tuesday, May 3rd 2016, 11:56:49 am	CANAIMA	Venezuela	774559424	1048576	YYEM	29	16	2015-08-01 19:00:49	2015 18:07
32	CR-EEZ	Friday, May 1st 2015, 7:20:04 pm	Saturday, August 1st 2015, 9:26:45 pm	CAPT. JOE JORGE	Nicaragua	349052425	3979268	HO-2836	16	9	2015-05-20 04:09:10	2015 17:31
54	CR-EEZ	Monday, February 1st 2016, 9:50:07 am	Tuesday, May 3rd 2016, 11:56:49 am	T EMPLARIO 1	Panama	371696000	8003216	HO4221	35	25	2016-02-01 09:57:51	2016 09:5
55	CR-EEZ	Monday, February 1st 2016, 9:50:07 am	Tuesday, May 3rd 2016, 11:56:49 am	775610060	7407908	YYGZ	21	15	2015- 08-01 18:58:39	2015- 08-27 04:30:50	2016-03-26 15:20:33	2016 21:06
56	CR-EEZ	Monday, February 1st 2016, 9:50:07 am	Tuesday, May 3rd 2016, 11:56:49 am	RONG CHANG NO1		800810001		3X -2025	2	1	2014-11-21 20:16:22	2014 15:16
57	CR-EEZ	Monday, February 1st 2016, 9:50:07 am	Tuesday, May 3rd 2016, 11:56:49 am	AMERICAN EAGLE	Colombia	730051000	7508910	HJSY	2	2	2016-04-17 22:16:33	2016 04:4
58	CR-EEZ	Monday, February 1st 2016, 9:50:07 am	Tuesday, May 3rd 2016, 11:56:49 am	GRAN ROQUE	Venezuela	775634000	9698757	YYOA	12	1	2016-02-26 8:55:44	2016 13:10
42	CR-EEZ	Saturday, August 1st 2015, 4:10:05 pm	Sunday, November 1st 2015, 6:16:46 pm	371759000	8103107	HO4222	22	8	2015- 08-06 22:49:59	2015- 10-12 22:37:43	2015-08-01 16:23:15	2015 17:16
60	CR-EEZ	Tuesday, May 3rd 2016, 6:40:09 am	Wednesday, August 3rd 2016, 8:46:50 am	LA ROSA MISTICA	Venezuela	775626000	7342304	VLYY	7	6	2015-08-08 03:11:12	2015 01:23
53	CR-EEZ	Monday, February 1st 2016, 9:50:07 am	Tuesday, May 3rd 2016, 11:56:49 am	CAPT. JOE JORGE	Nicaragua	349052425	3979268	HO-2836	40	28	2016-02-26 08:26:33	2016 22:2:

59		CHARAC	TERIZATION AND ANA	LYSIS OF INDUSTRIA	L FISHERIES PRES	SURES IN THE	COCOS MARI	NE CONSERVAT	FION AREA A	ND SURROU	NDING ECONON	1IC EXC
ID	REGIONS	FROM	ТО	VESSEL NAME	FLAG STATE	MMSI	ΙΜΟ	Call Sign	Days At	Fishing	Earliest	Late
				_	_			_ 5	sea	Day	Detection	Dete
62	CR-EEZ	Wednesday, August 3rd 2016, 3:30:10 am	Thursday, November 3rd 2016, 5:36:51 am	CANAIMA	Venezuela	774559424	1048576	YYEM	66	53	2016-08-12 02:41:03	2016 05:3
63	CR-EEZ	Wednesday, August 3rd 2016, 3:30:10 am	Thursday, November 3rd 2016, 5:36:51 am	775000000	9999999999	YYX X	6	1	2015- 08-28 00:56:24	2015- 09-08 00:45:45	2016-09-09 01:46:45	2016 03:4
64	CR-EEZ	Wednesday, August 3rd 2016, 3:30:10 am	Thursday, November 3rd 2016, 5:36:51 am	BARAKA	Panama	371759000	8103107	HO4222	13	8	2014-11-05 05:08:39	2015 12:53
65	CR-EEZ	Wednesday, August 3rd 2016, 3:30:10 am	Thursday, November 3rd 2016, 5:36:51 am	BARAKA	Panama	371759000	8103107	HO4222	15	6	2016-08-06 15:09:26	2016 01:4
66	CR-EEZ	Wednesday, August 3rd 2016, 3:30:10 am	Thursday, November 3rd 2016, 5:36:51 am	GRAN ROQUE	Venezuela	775634000	9698757	YYOA	6	1	2016-08-30 03:56:50	2016 09:3
59	CR-EEZ	Tuesday, May 3rd 2016, 6:40:09 am	Wednesday, August 3rd 2016, 8:46:50 am	CAPT. JOE JORGE	Nicaragua	349052425	3979268	HO-2836	58	47	2016-05-03 15:18:30	2016 08:4
61	CR-EEZ	Wednesday, August 3rd 2016, 3:30:10 am	Thursday, November 3rd 2016, 5:36:51 am	CAPT. JOE JORGE	Nicaragua	349052425	3979268	HO-2836	64	57	2016-08-03 03:37:13	2016 05:3
69	CR-EEZ	Sunday, November 1st 2015, 1:00:06 pm	Monday, February 1st 2016, 3:06:48 pm	VENTUARI	Venezuela	775610060	7407908	YYGZ	36	25	2015-11-12 16:50:20	2015 08:0
70	CR-EEZ	Sunday, November 1st 2015, 1:00:06 pm	Monday, February 1st 2016, 3:06:48 pm	T EMPLARIO 1	Panama	371696000	8003216	HO4221	24	15	2015-11-24 15:22:03	2016 14:33
71	CR-EEZ	Sunday, November 1st 2015, 1:00:06 pm	Monday, February 1st 2016, 3:06:48 pm	CAYU DE	Venezuela	775627000	7601736	YYEH	3	2	2016-01-21 00:16:23	2016 23:2
72	CR-EEZ	Sunday, November 1st 2015, 1:00:06 pm	Monday, February 1st 2016, 3:06:48 pm	RIO LANDRO	Spain	224295000		EHU W	9	1	2015-11-12 18:54:18	2015 09:0
73	CR-EEZ	Wednesday, February 1st 2017, 4:09:33 pm	Thursday, May 4th 2017, 6:16:14 pm	VENTUARI	Venezuela	775610060	7407908	YYGZ	54	35	2017-02-01 18:19:01	2017 18:51
74	CR-EEZ	Wednesday, February 1st 2017, 4:09:33 pm	Thursday, May 4th 2017, 6:16:14 pm	CAPT. JOE JORGE	Nicaragua	349052425	3979268	HO-2836	38	35	2017-02-06 07:48:14	2017 22:3
75	CR-EEZ	Wednesday, February 1st 2017, 4:09:33 pm	Thursday, May 4th 2017, 6:16:14 pm	GRAN ROQUE	Venezuela	775634000	9698757	YYOA	58	29	2017-02-09 04:49:42	2017 18:11

60		CHARAC	TERIZATION AND ANAI	YSIS OF INDUSTRIA	FISHERIES PRES	SURES IN THE	COCOS MARIN	E CONSERVAT	ION AREA A	ND SURROU	NDING ECONON	AIC EX
	RECIONS	<b>FROM</b>	70			MAG		Coll Sign	Dave 44	Fishing	Faulicat	
U	REGIONS	FROM	10	VESSEL_NAME	FLAG_STATE	MINISI		Can_sign	sea	Day	Detection	Det
76	CR-EEZ	Wednesday, February 1st 2017, 4:09:33 pm	Thursday, May 4th 2017, 6:16:14 pm	CANAIMA	Venezuela	774559424	1048576	YYEM	40	10	2017-02-13 10:44:46	2017 17:4
77	CR-EEZ	Wednesday, February 1st 2017, 4:09:33 pm	Thursday, May 4th 2017, 6:16:14 pm	T EMPLARIO 1	Panama	371696000	8003216	HO4221	13	7	2017-02-01 18:22:13	2017 17:0
78	CR-EEZ	Wednesday, February 1st 2017, 4:09:33 pm	Thursday, May 4th 2017, 6:16:14 pm	ORINOCO II	Venezuela	122408213	8381826	YYDX	28	3	2017-02-01 18:15:08	2017 01:0
79	CR-EEZ	Wednesday, February 1st 2017, 4:09:33 pm	Thursday, May 4th 2017, 6:16:14 pm	OCEAN ALASKA	United States of America	366900170		W DB4599	2	2	2017-03-26 05:43:33	201 17:4
80	CR-EEZ	Wednesday, February 1st 2017, 4:09:33 pm	Thursday, May 4th 2017, 6:16:14 pm	BARAKA	Panama	371759000	8103107	HO4222	12	1	2017-02-22 23:48:35	2017 07:3
81	CR-EEZ	Wednesday, February 1st 2017, 4:09:33 pm	Thursday, May 4th 2017, 6:16:14 pm	AMANDA.S	Colombia	730015000	812158700	HJCZ	3	1	2017-02-04 19:05:42	2017 08:2
82	CR-EEZ	Friday, March 31st 2017, 11:24:28 am	Saturday, July 1st 2017, 1:31:10 pm	GRAN ROQUE	Venezuela	775634000	9698757	YYOA	34	16	2017-03-31 11:24:56	201 19:3
83	CR-EEZ	Friday, March 31st 2017, 11:24:28 am	Saturday, July 1st 2017, 1:31:10 pm	VENTUARI	Venezuela	775610060	7407908	YYGZ	40	13	2017-04-02 05:17:38	2017 13:1
84	CR-EEZ	Friday, March 31st 2017, 11:24:28 am	Saturday, July 1st 2017, 1:31:10 pm	REINA DE LA PAZ	Panama	372880000	9545792	3EFR6	5	2	2017-05-01 22:51:59	2017 13:1
85	CR-EEZ	Friday, March 31st 2017, 11:24:28 am	Saturday, July 1st 2017, 1:31:10 pm	T EMPLARIO 1	Panama	371696000	8003216	HO4221	3	1	2017-04-03 01:52:23	2017 17:0
86	CR-EEZ	Friday, March 31st 2017, 11:24:28 am	Saturday, July 1st 2017, 1:31:10 pm	MARIA ISABEL C	Colombia	730016000	730398200	HJCW	2	1	2017-05-16 16:26:45	2017 22:1
87	CR-EEZ	Friday, March 31st 2017, 11:24:28 am	Saturday, July 1st 2017, 1:31:10 pm	CAPT. JOE JORGE	Nicaragua	349052425	3979268	HO-2836	5	1	2017-04-02 02:40:15	2017 15:4
88	CR-EEZ	Thursday, March 23rd 2017, 8:36:12 am	Saturday, July 1st 2017, 5:33:04 am	GRAN ROQUE	Venezuela	775634000	9698757	YYOA	42	25	2017-03-23 09:01:58	2017 19:3
89	CR-EEZ	Thursday, March 23rd 2017, 8:36:12 am	Saturday, July 1st 2017, 5:33:04 am	VENTUARI	Venezuela	775610060	7407908	YYGZ	46	19	2017-03-23 09:03:25	2017 05:0
90	CR-EEZ	Thursday, March 23rd 2017, 8:36:12 am	Saturday, July 1st 2017, 5:33:04 am	CANAIMA	Venezuela	774559424	1048576	YYEM	24	4	2017-03-24 22:28:36	2017 02:3
91	CR-EEZ	Thursday, March 23rd 2017, 8:36:12 am	Saturday, July 1st 2017, 5:33:04 am	REINA DE LA PAZ	Panama	372880000	9545792	3EFR6	5	2	2017-05-01 22:51:59	2017 05:0
92	CR-EEZ	Thursday, March 23rd 2017, 8:36:12 am	Saturday, July 1st 2017, 5:33:04 am	OCEAN ALASKA	United States of America	366900170		W DB4599	2	2	2017-03-26 05:43:33	2017 17:4

61		CHARAC	TERIZATION AND ANA	LYSIS OF INDUSTRIA	L FISHERIES PRES	SURES IN THE	COCOS MARIN	E CONSERVAT	ION AREA A	ND SURROUI	NDING ECONON	1IC EXC
ID	REGIONS	FROM	то	VESSEL_NAME	FLAG_STATE	MMSI	ІМО	Call_Sign	Days At sea	Fishing_ Day	Earliest Detection	Late
93	CR-EEZ	Thursday, March 23rd 2017, 8:36:12 am	Saturday, July 1st 2017, 5:33:04 am	BARAKA	Panama	371759000	8103107	HO4222	7	1	2017-03-24 18:44:49	2017 09:2
94	CR-EEZ	Thursday, March 23rd 2017, 8:36:12 am	Saturday, July 1st 2017, 5:33:04 am	CAPT. JOE JORGE	Nicaragua	349052425	3979268	HO-2836	5	1	2017-04-02 02:40:15	2017 15:44
95	CR-EEZ	Thursday, March 23rd 2017, 8:36:12 am	Saturday, July 1st 2017, 5:33:04 am	MARIA ISABEL C	Colombia	730016000	730398200	HJCW	2	1	2017-05-16 16:26:45	2017 22:19
96	CR-EEZ	Thursday, March 23rd 2017, 8:36:12 am	Saturday, July 1st 2017, 5:33:04 am	T EMPLARIO 1	Panama	371696000	8003216	HO4221	3	1	2017-04-03 01:52:23	2017 17:02
97	CR-EEZ	Tuesday, November 1st 2016, 7:19:32 pm	Wednesday, February 1st 2017, 9:26:13 pm	ORINOCO II	Venezuela	122408213	8381826	YYDX	59	45	2016-11-03 05:16:12	2017- 21:07
98	CR-EEZ	Tuesday, November 1st 2016, 7:19:32 pm	Wednesday, February 1st 2017, 9:26:13 pm	VENTUARI	Venezuela	775610060	7407908	YYGZ	47	32	2016-11-01 19:24:55	2017- 21:07
99	CR-EEZ	Tuesday, November 1st 2016, 7:19:32 pm	Wednesday, February 1st 2017, 9:26:13 pm	GRAN ROQUE	Venezuela	775634000	9698757	YYOA	27	13	2016-11-10 03:10:16	2017- 14:26
100	CR-EEZ	Tuesday, November 1st 2016, 7:19:32 pm	Wednesday, February 1st 2017, 9:26:13 pm	CAPT. JOE JORGE	Nicaragua	349052425	3979268	HO-2836	13	11	2016-11-01 19:26:08	2017- 14:36
101	CR-EEZ	Tuesday, November 1st 2016, 7:19:32 pm	Wednesday, February 1st 2017, 9:26:13 pm	CANAIMA	Venezuela	774559424	1048576	YYEM	15	5	2016-11-01 19:28:38	2016 23:2
102	CR-EEZ	Tuesday, November 1st 2016, 7:19:32 pm	Wednesday, February 1st 2017, 9:26:13 pm	T EMPLARIO 1	Panama	371696000	8003216	HO4221	20	4	2016-12-22 00:23:42	2017 18:47
103	CR-EEZ	Tuesday, November 1st 2016, 7:19:32 pm	Wednesday, February 1st 2017, 9:26:13 pm	BARAKA	Panama	371759000	8103107	HO4222	10	2	2016-11-19 00:30:31	2017 02:5