2019 REGIONAL LEATHERBACK BY-CATCH PRIORITIZATION WORKSHOP

PARAMARIBO, MARCH 17 – 18, 2019

COUNTRY PRESENTATION:

French Guiana

Organizations: WWF, ONCFS, CRPMEMG, CNRS

Summary

1. Introduction: local situation, nesting sites, migration routes
2. Concerns with regards to Leatherback bycatch reduction in Fr. Guiana
3. Data on Leatherback nesting
4. Local fisheries description
5. Leatherback bycatch per fisheries
6. Projects undertaken to reduce bycatch
7. Regulation and enforcement system
8. Goal, opportunities and challenges
9. Leatherback bycatch reduction priorities

1. Introduction: local situation, nesting sites, migration routes

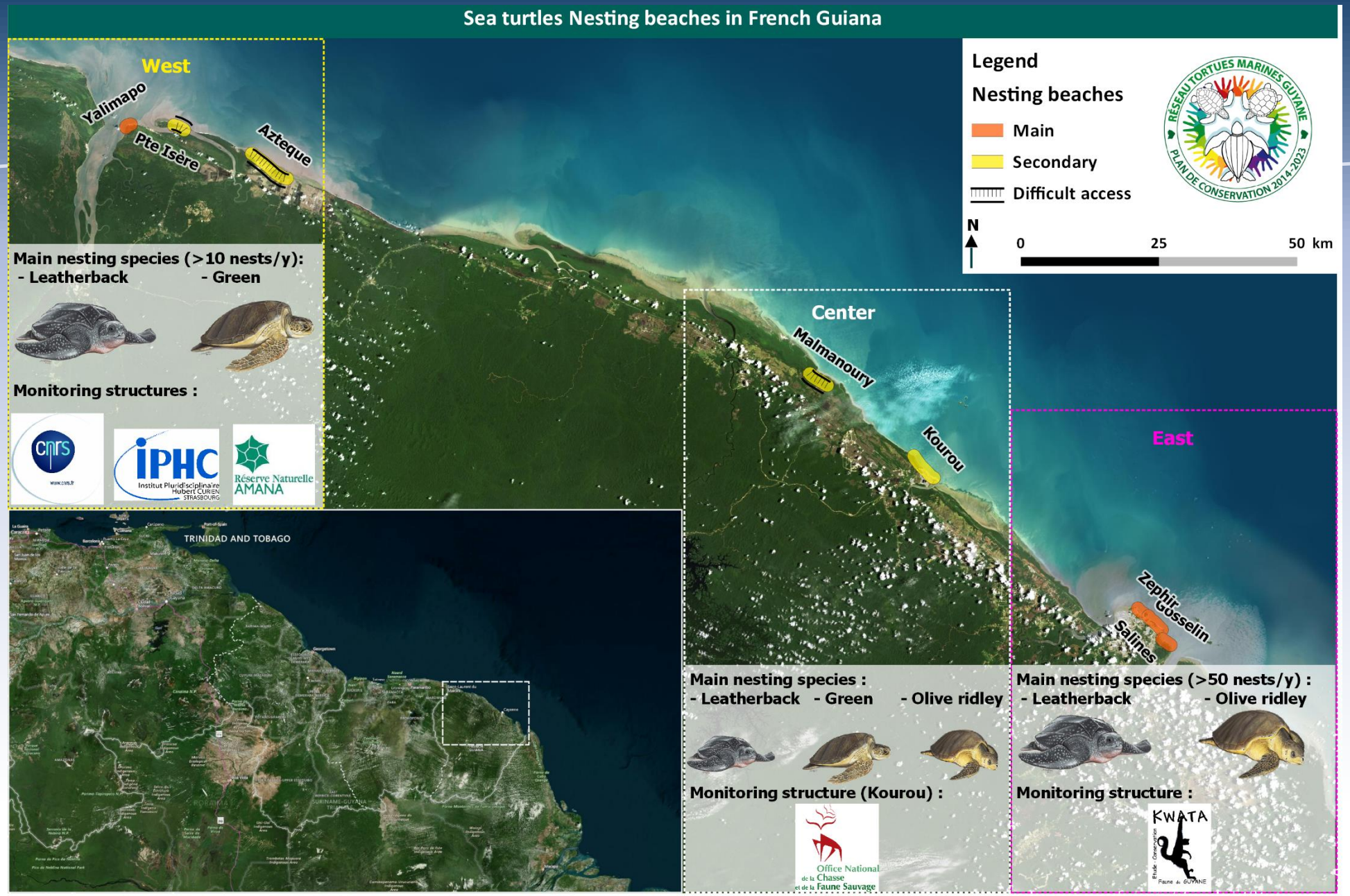
3 species occurring in French Guiana

Leatherback	**Green turtle**	**Olive ridley**
Dermochelys coriacea	*Chelonia mydas*	*Lepidochelys olivacea*
IUCN : World (2013) VU — ***Fr. Guiana (2017)*** West: VU / EN, East: NT	*IUCN : World (2004)* EN — ***Fr. Guiana (2017)*** VU	*IUCN : World (2008)* VU — ***Fr. Guiana (2017)*** NT

Nesting

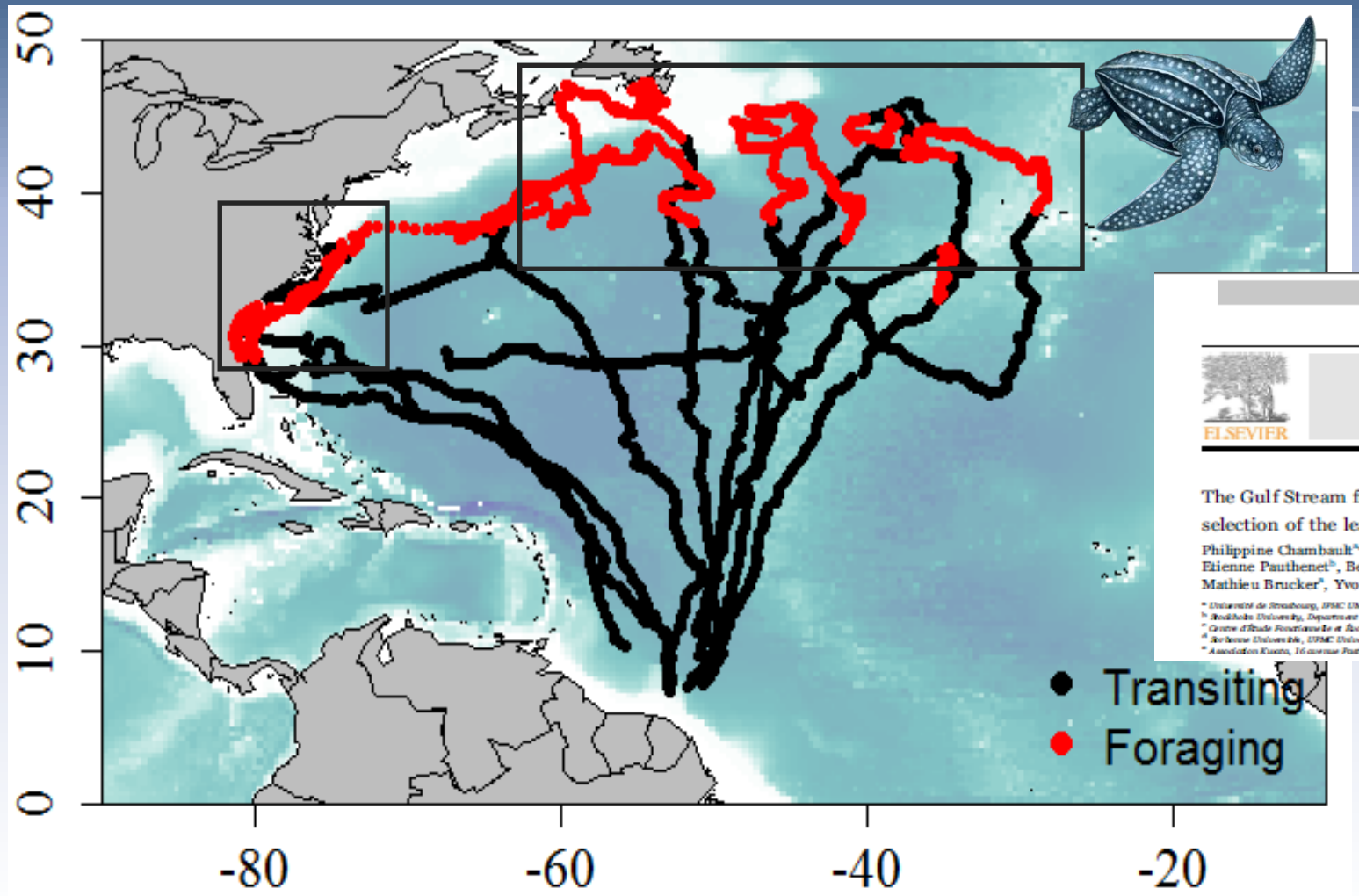
Growth for juveniles

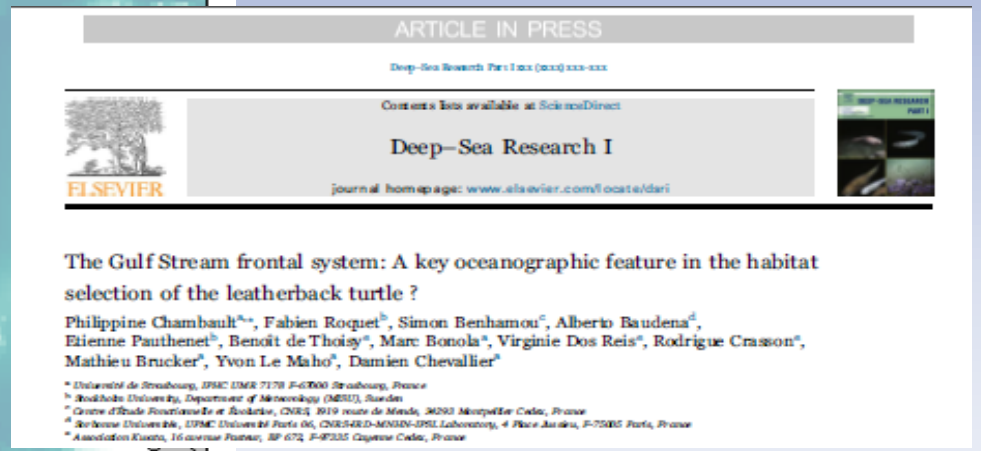
1. Introduction: local situation, nesting sites, migration routes



1. Introduction: local situation, nesting sites, migration routes

French Guiana Leatherback nesting females migration routes & feeding Areas





ARTICLE IN PRESS

Deep–Sea Research I

journal homepage: www.elsevier.com/locate/dsri

The Gulf Stream frontal system: A key oceanographic feature in the habitat selection of the leatherback turtle ?

Philippine Chambault[a,*], Fabien Roquet[b], Simon Benhamou[c], Alberto Baudena[d], Etienne Pauthenet[b], Benoît de Thoisy[e], Marc Bonola[a], Virginie Dos Reis[a], Rodrigue Crasson[a], Mathieu Brucker[a], Yvon Le Maho[a], Damien Chevallier[a]

2 schemes : coastal vs. pelagic

2. Concerns with regards to Leatherback bycatch reduction in Fr. Guiana

Reducing bycatch definied as priority # 1 in the Fr. Guiana ST National Action Plan

Why ?

➔ Declining population (see chart later).

➔ Different causes: beach severe erosion, dog predation, poaching, ageing population…

➔ BUT bycatch is admitted to be the biggest part of the problem:

- shrimp trawling: 70 to 140 leatherback were caught per year between 1999 and 2005 with no use of TTED (*CRPMEM, WWF, CNRS, IFREMER*).
- gillnet illegal and legal fishing
- longline illegal fishing

} net/line injuries for 25% of nesting females in Yalimapo (*CNRS*).

What ?

Illegal fishing using gillnets

Legal fishing using gillnets

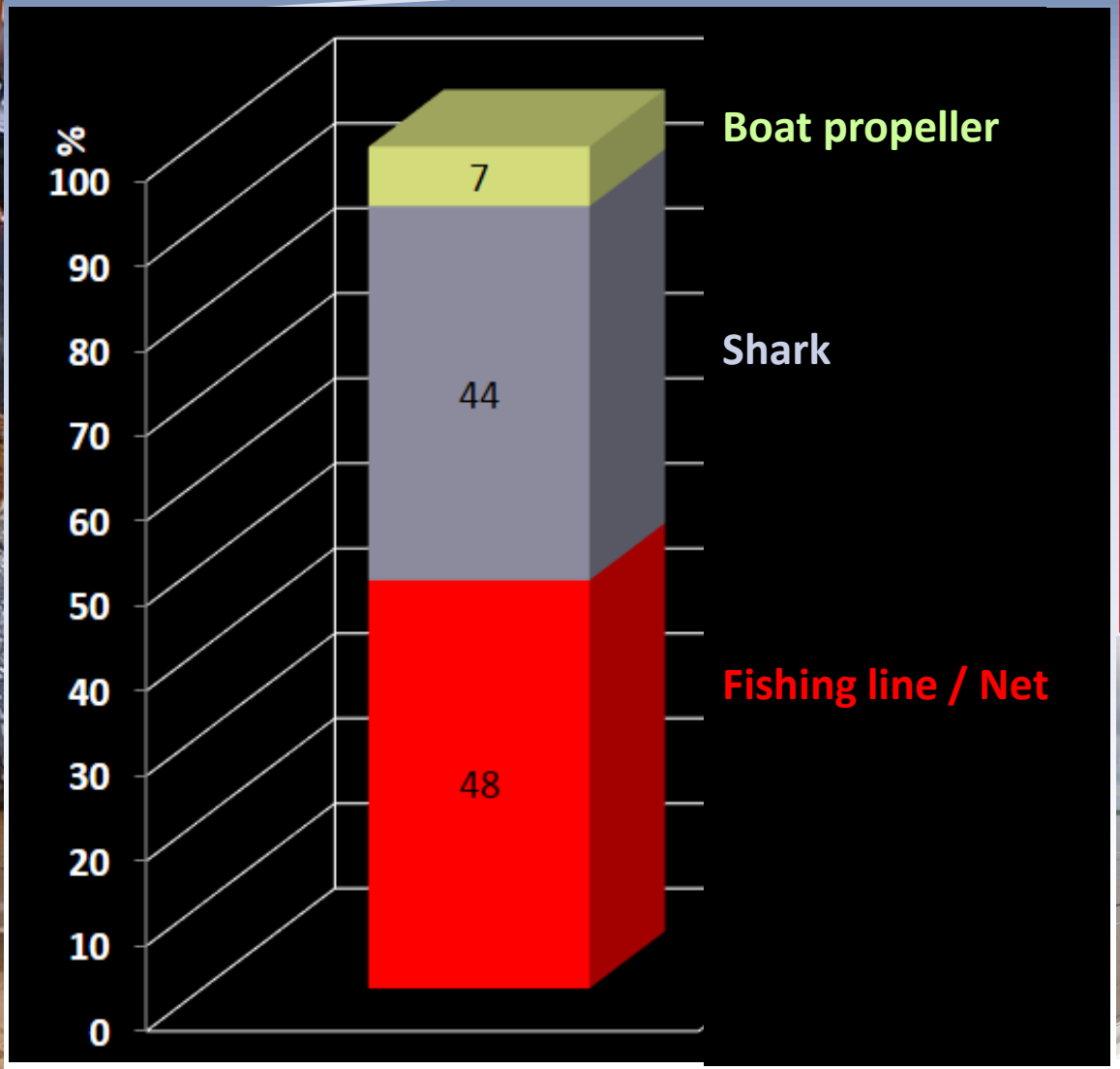
Shrimp trawling: TTED implementation

Recreational fishing using coastal gillnets

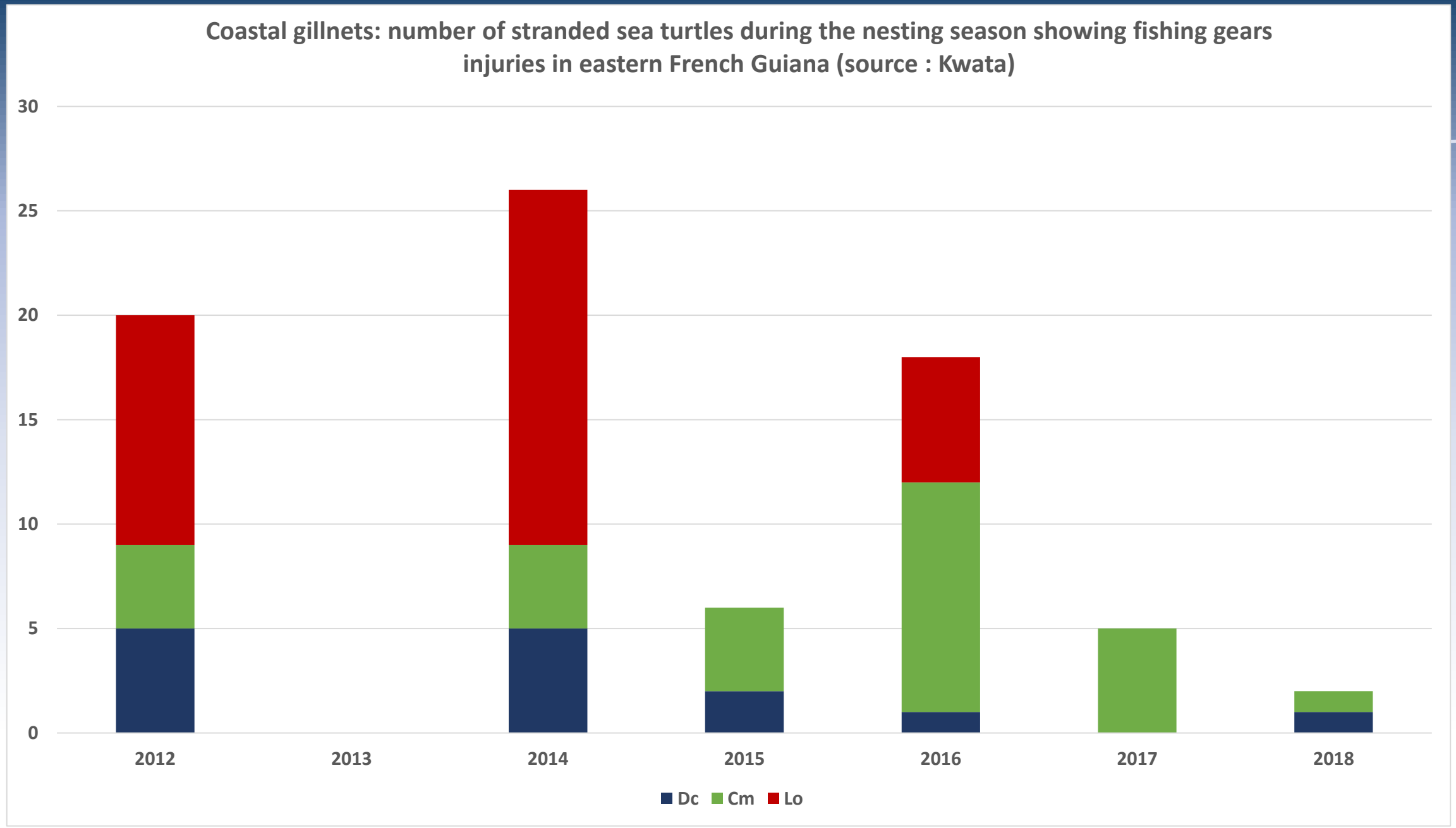
Longline fishing

2. Concerns with regards to Leatherback bycatch reduction in Fr. Guiana

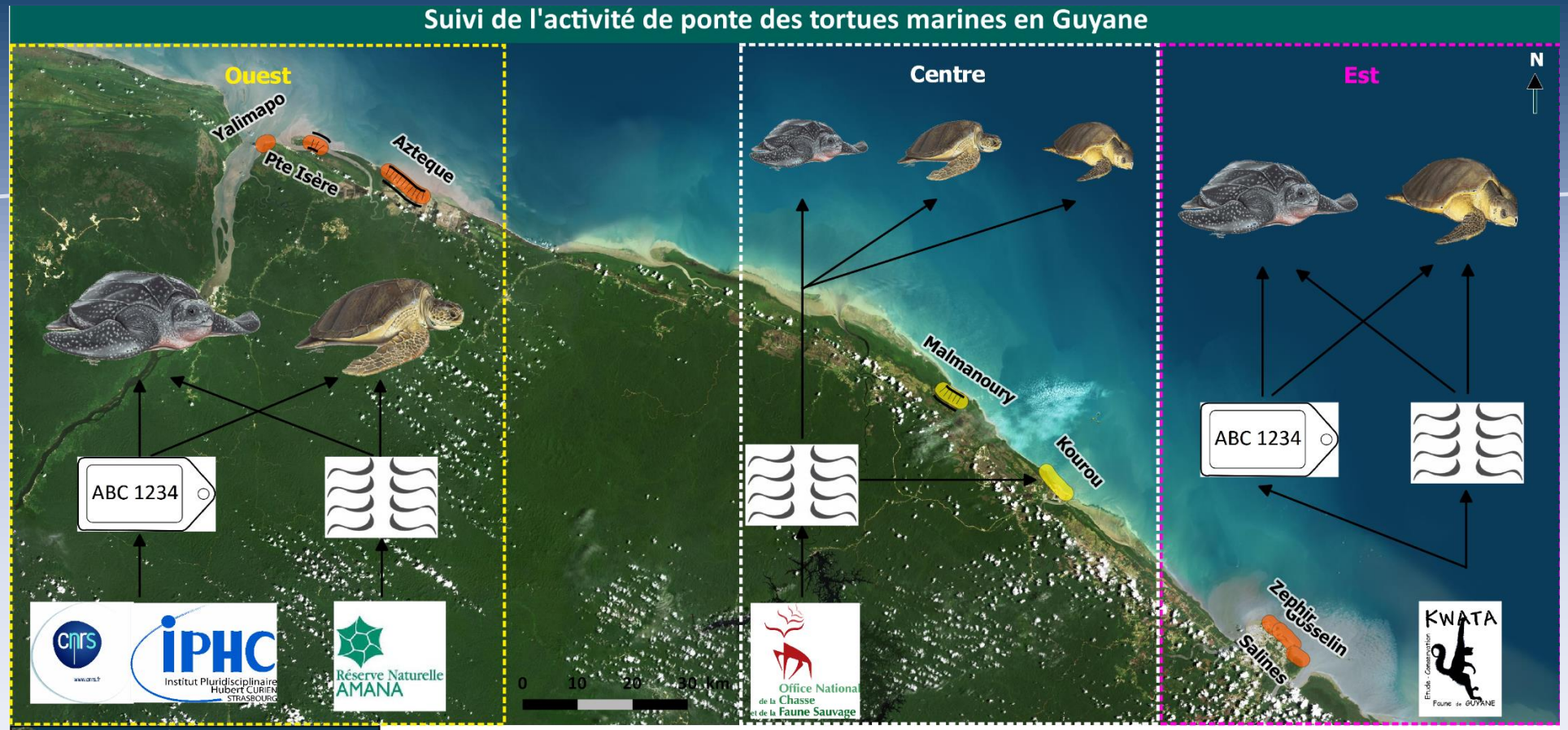
Western nesting site: Amana Natural Reserve in 2012:
46% of nesting females were injured including…
(source : CNRS-IPHC)

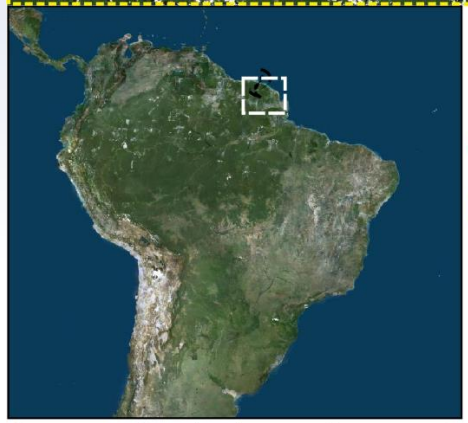


2. Concerns with regards to Leatherback bycatch reduction in Fr. Guiana



3. Data on Leatherback nesting





LEGENDE

Plages de ponte :

- Principale
- Secondaire
- Accès difficile (suivi ponctuel de l'activité de ponte)

Principales espèces nicheuses :

- Tortue luth
- Tortue verte
- Tortue olivâtre

Protocole de suivi de l'activité de ponte :

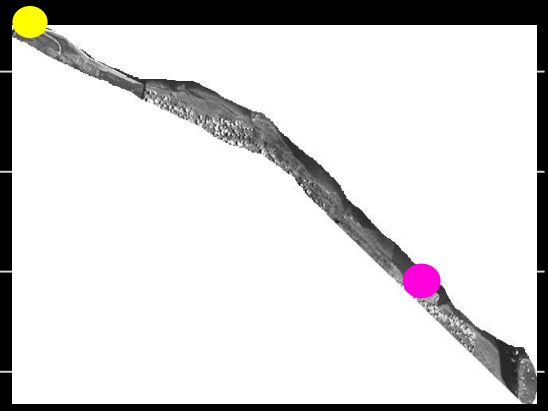
- ABC 1234 — Capture-Marquage-Recapture ("PIT tagging")
- Comptage matinal des traces

Structure assurant le suivi de l'activité de ponte :

- CNRS-IPHC
- PNRG-RNNA
- ONCFS
- KWATA

3. Data on Leatherback nesting

Nesting activity from 2002 to 2018 in eastern and western FG: nest counts (line) & number of nesting females (bars) for the Leatherback



West

East

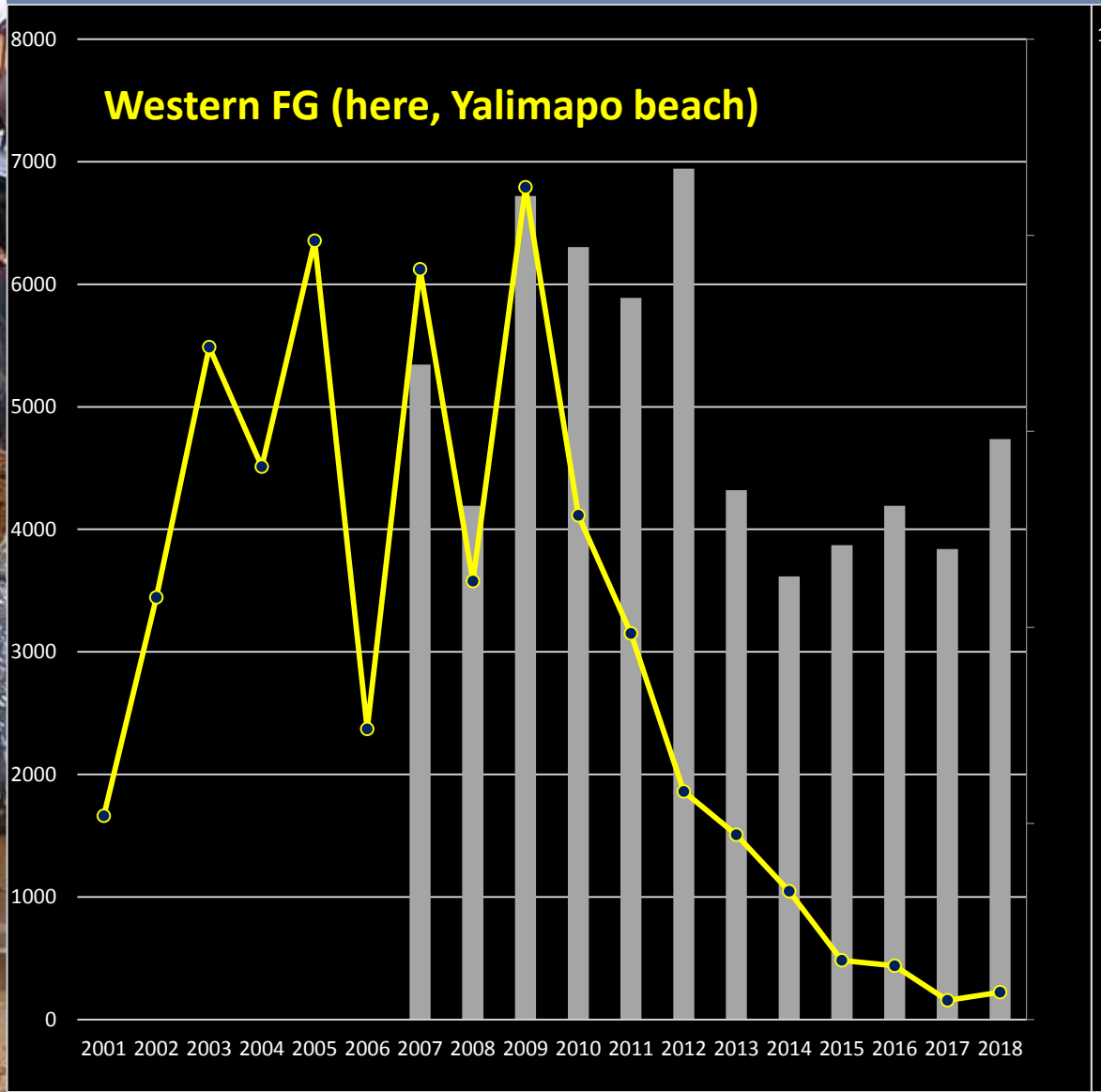
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0

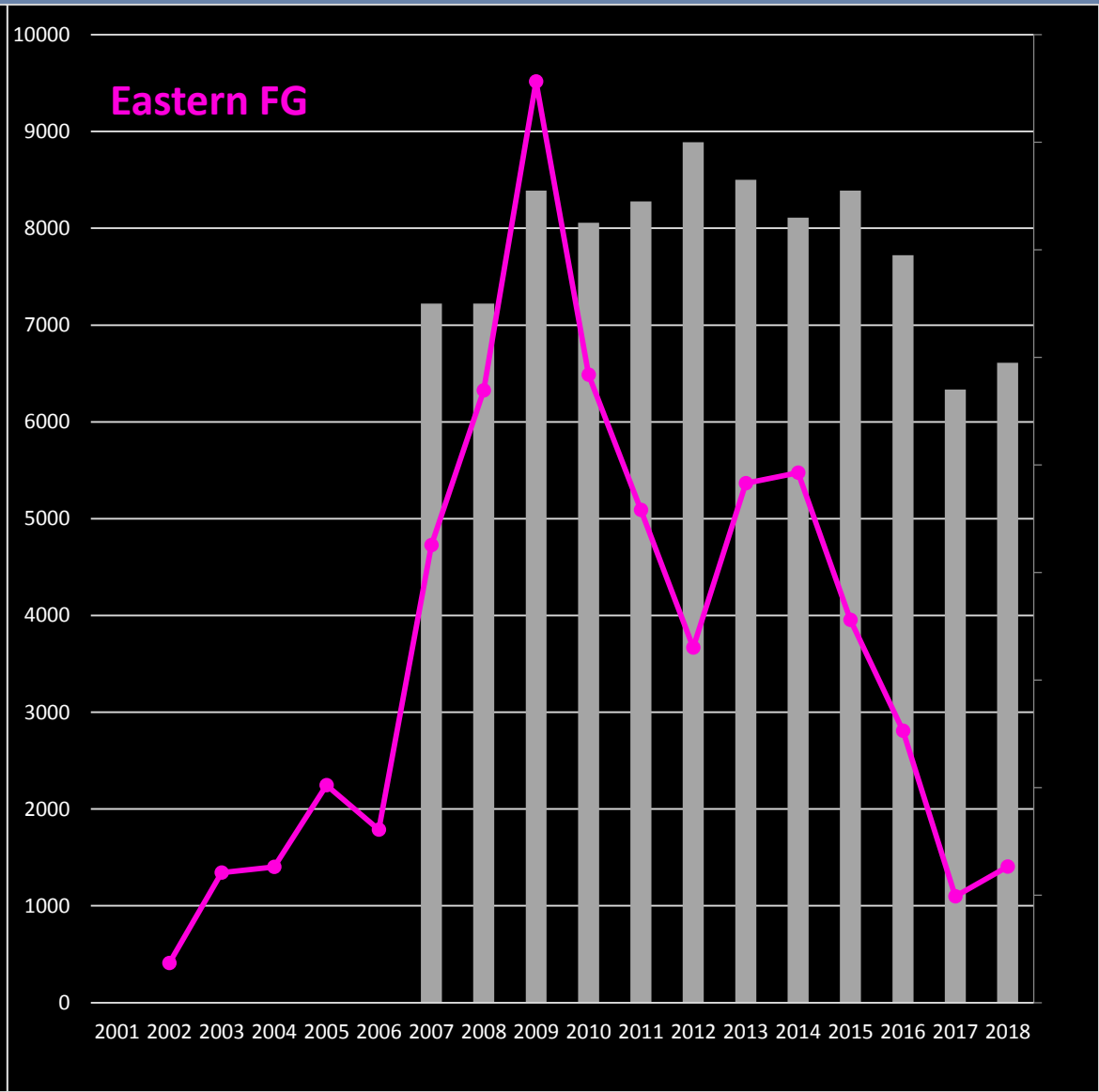
2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018

Ponte Dc (Est) Ponte Dc (Ouest)

3. Data on Leatherback nesting

Nest counts (line) and monitoring effort (number of days per year in bars) for the Leatherback from 2001 to 2018 in French Guiana





4. Local fisheries description

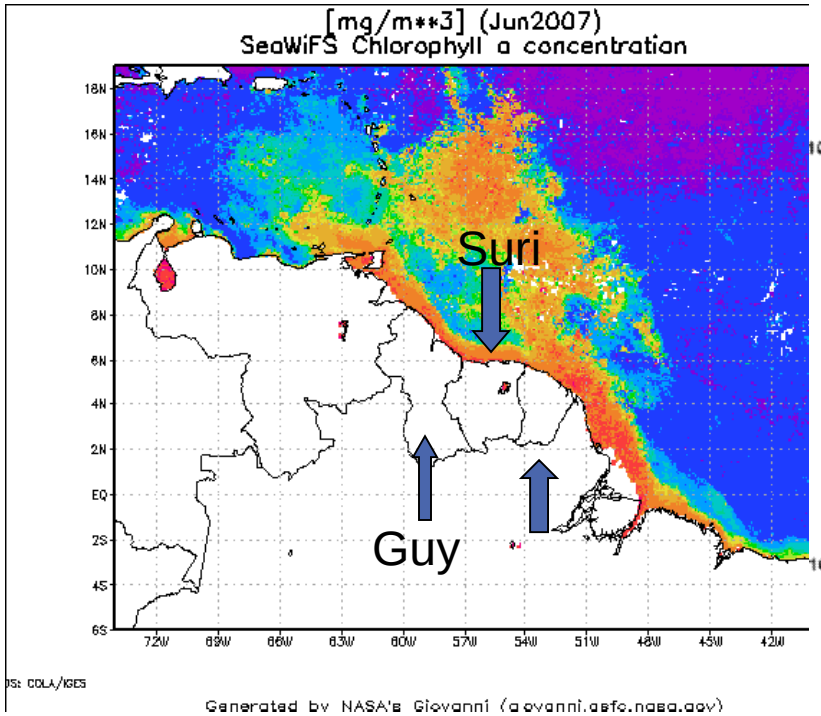
Présentation du CRPMEM

Purpose and actions:

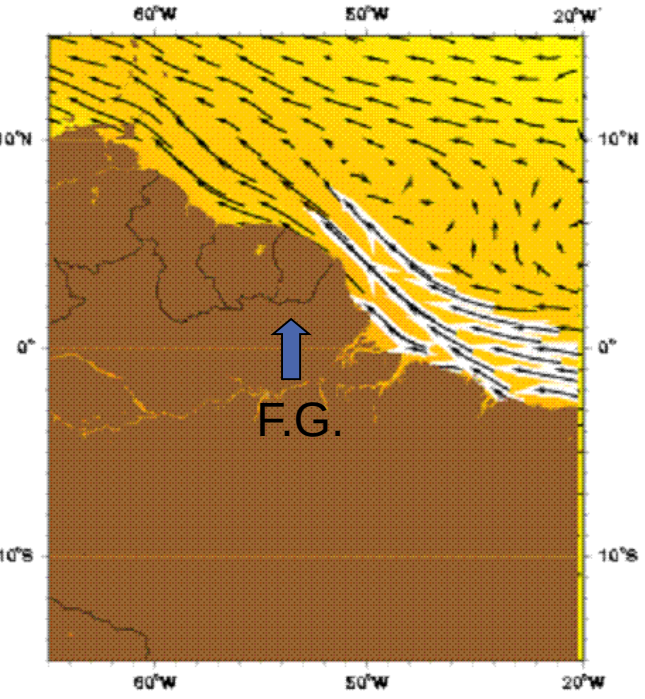
- Promotion and représentation of th fishing sector
- Technical and administarive assistance
- Expérimentation of preservation measures
- Define conservation measures

French Guiana: one piece of the Guiana's shield eco-complex.

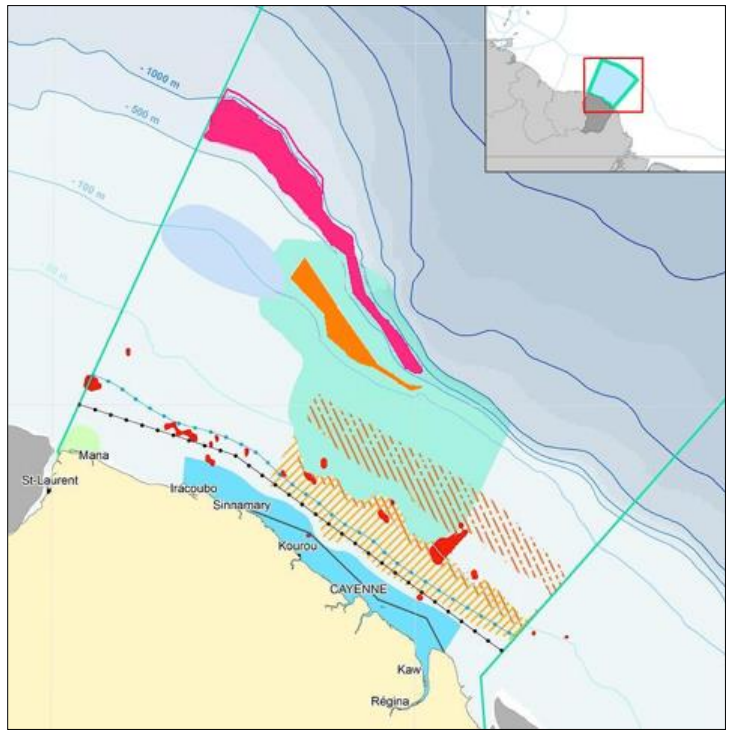
Chlorophyll



Current



Rich Fishing Zones

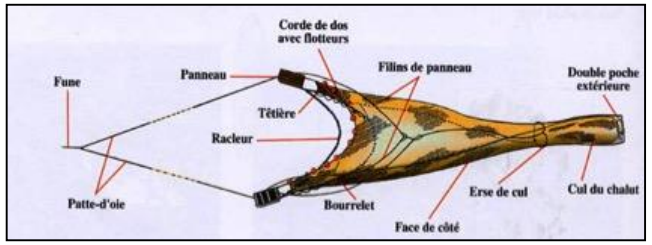


AMMP

- 350 km of coast line
- EZZ: 130 Km²
- >200 species of fish and shrimp

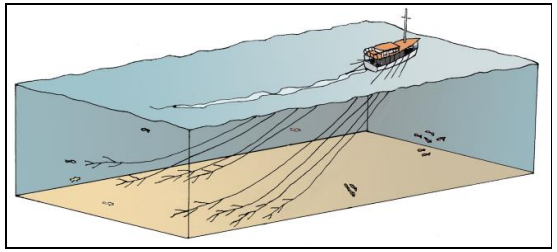
Shrimp trawling and handlines:

- 22 shrimp boat (15 active in 2018)

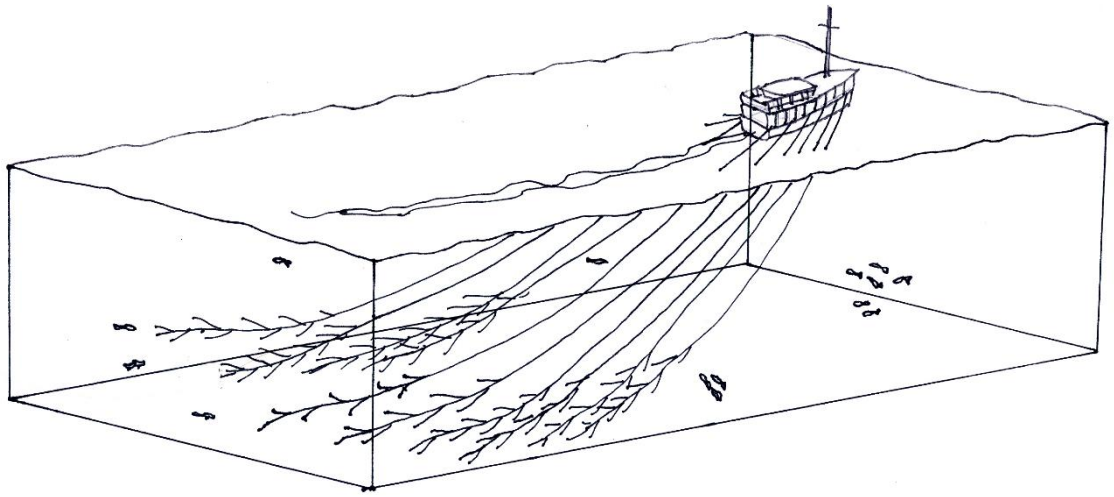


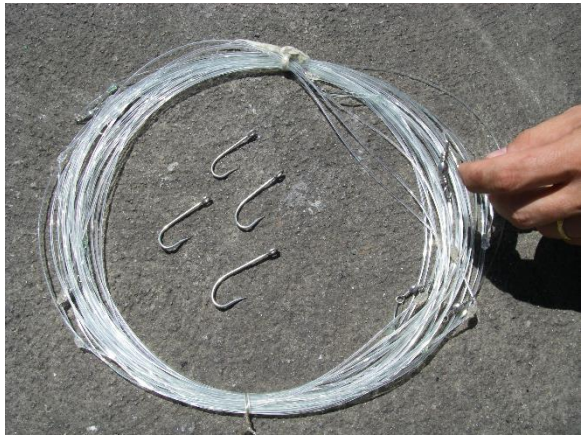
Deschamps *et al.*, 2003

- 45 handliners targeting Southern Red Snapper


JP Penez

Only handline fishing allowed: more selective and no ghost fishing from lost

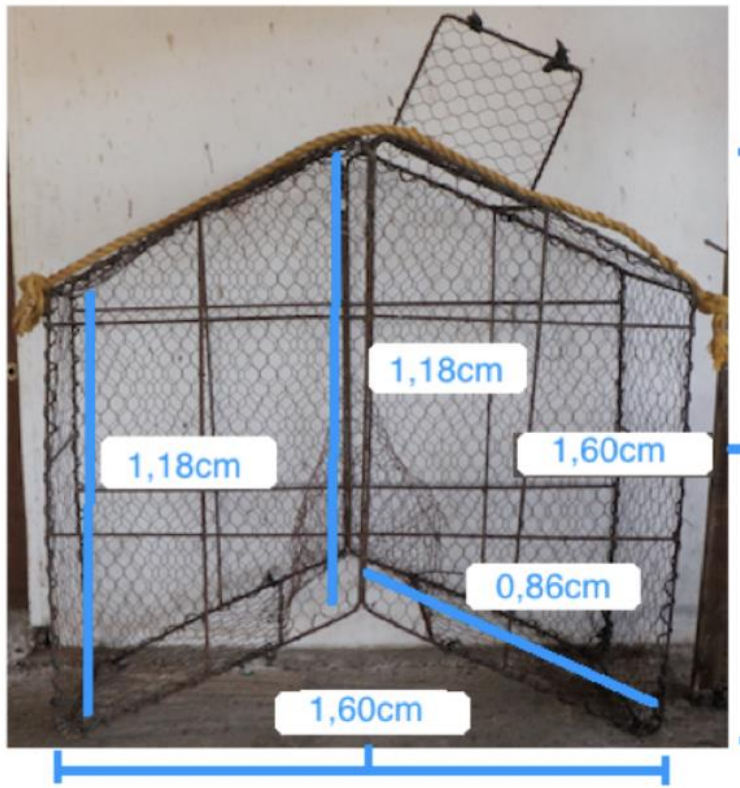




CRPMEM Guyane : has a project proposed to conduct onboard observations maybe for 2020

Red Snapper (*Lutjanus*) fisheries

- Fish traps banned in French Guiana:



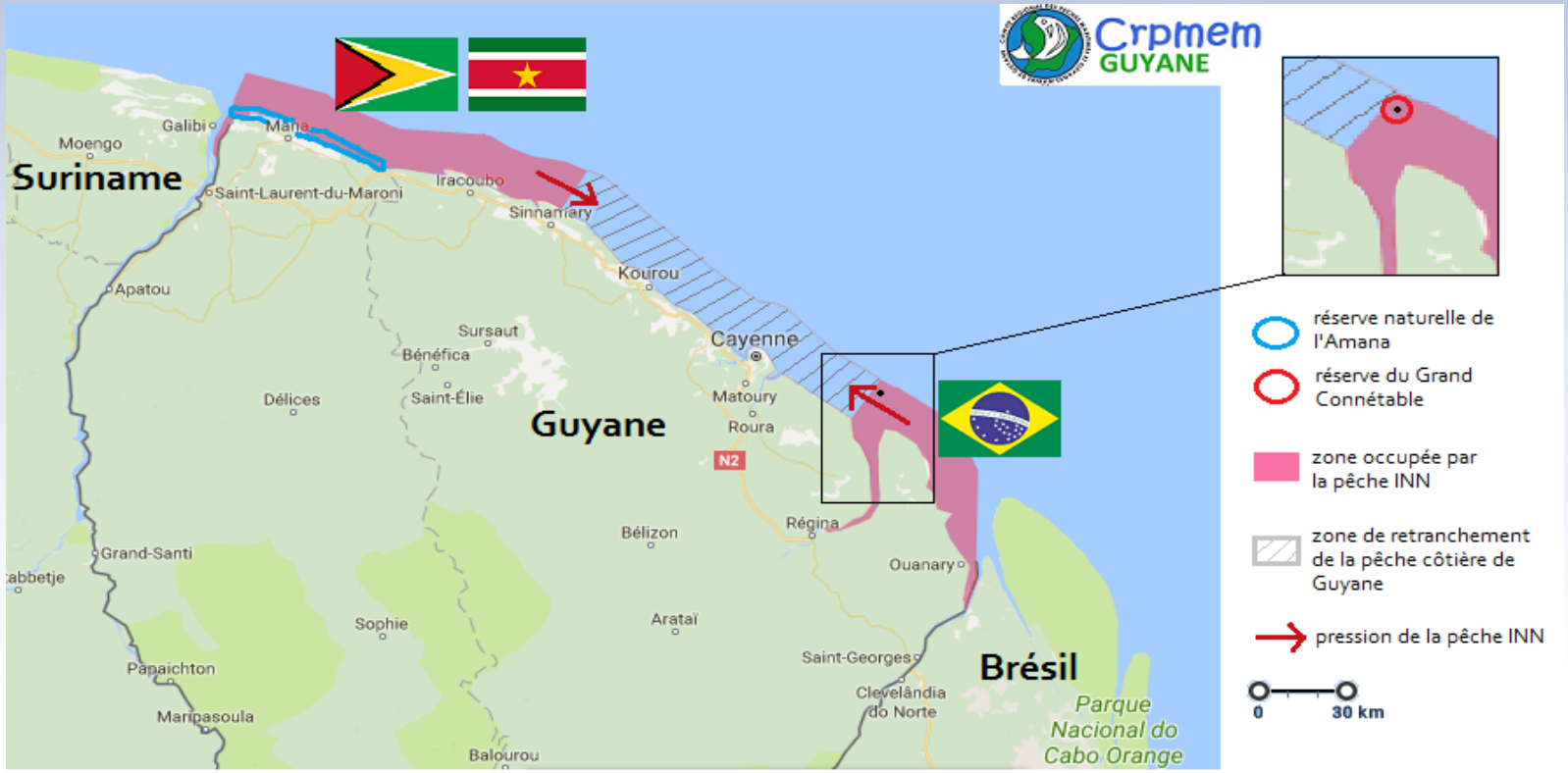
- Catch to many sizes
- Ghost fishing is a threat

The coastal fisheries of F.G.

- **200 boats**
- **Production : 3000 T (Ifremer) données déclaratives.**
- **Gillnet boats**
  - **Tapouilles : 8**
  - **Canots Créoles Améliorés 70**
  - **Canots Créoles 30 official 120**

IUU FISHERY

- **125** vessels have a licence between Saint-Georges and Mana
- Mainly use drift and fix gillnet
- **IUU fishing**: 2/3 of the ressources caught in the FG waters



5. Leatherback bycatch per fisheries

Studies conducted in French Guiana, Collaborations between CRPMEM Guyane and WWF:

2006-2018

-Feasibility of TEDs in FG

2007

-Bycatch and fishers study in the Maronie estuary

2008-2009

-At sea observations

-Internship to evaluate the efforts of shrimping fleet to reduce environmental impact

2010

- TTED Project

2011-2014

-TALCIN

2014-2015

-At sea observations

2016

-Report on the impact of shrimp imports to the EU

2017

-Internships : feasibility of conducting participatory mapping of coastal fishing activity

-Study of sawfish.

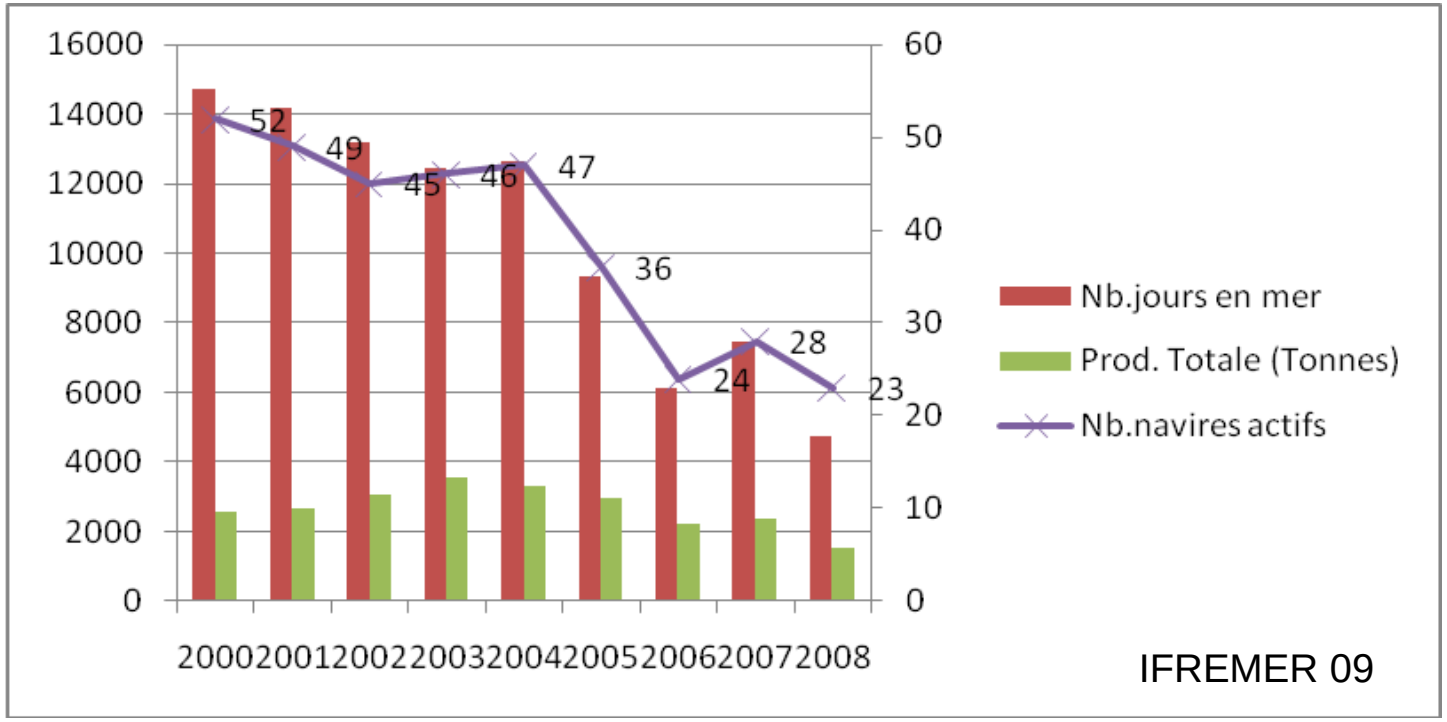
2018

-Palica (fishermen active towards the reduction of environmental impact

- Estimation of interaction between shrimp trawlers and marine turtles of the coast of French Guiana – report in prep
- Non trawling zones
- TTED and TED

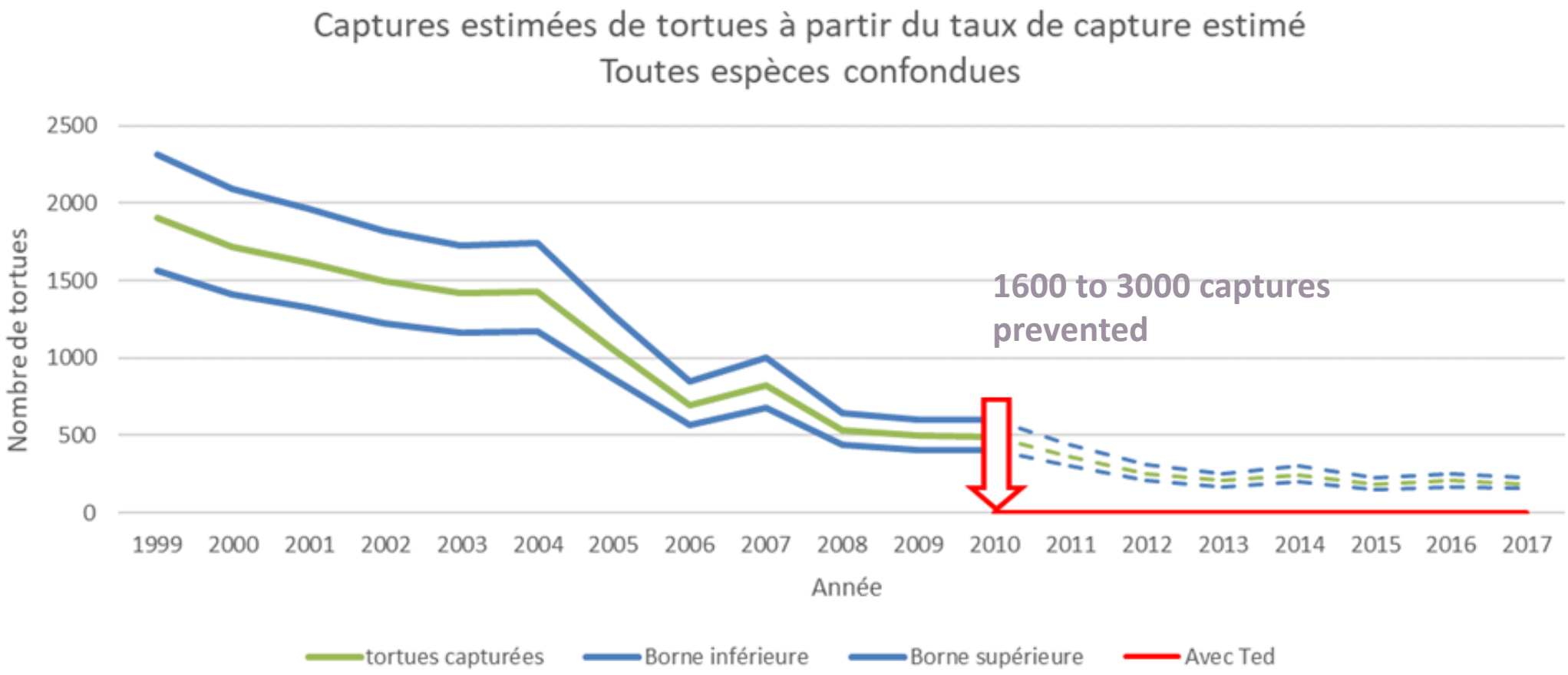
History of the shrimp fisheries in FG

- **60-80 :** 120 U.S.A. boats fishing 10 months a year.
- **79-2011 :** Steady reduction of number of boats/licenses.



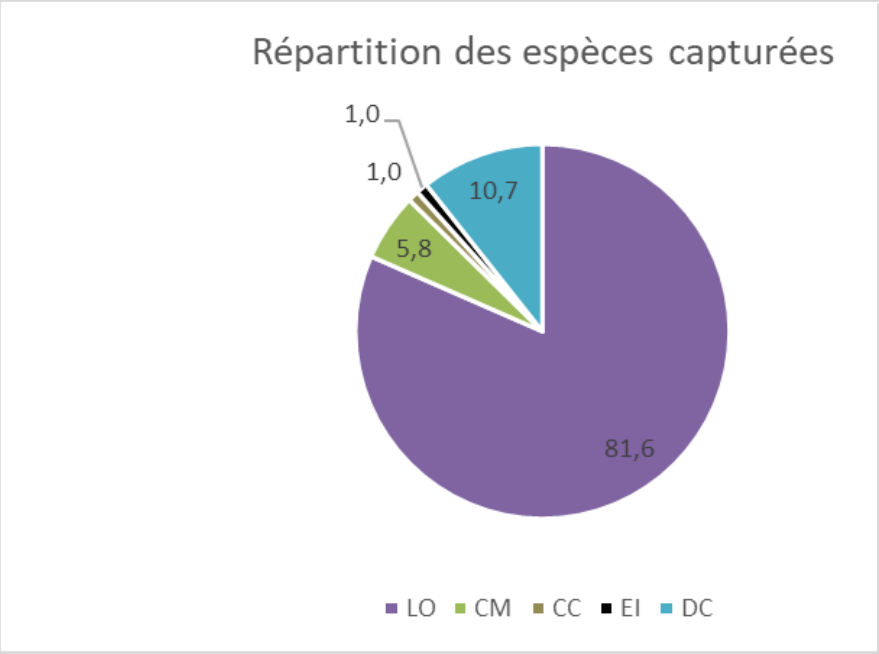
- 2018 : 22 license but only 8 licenses used

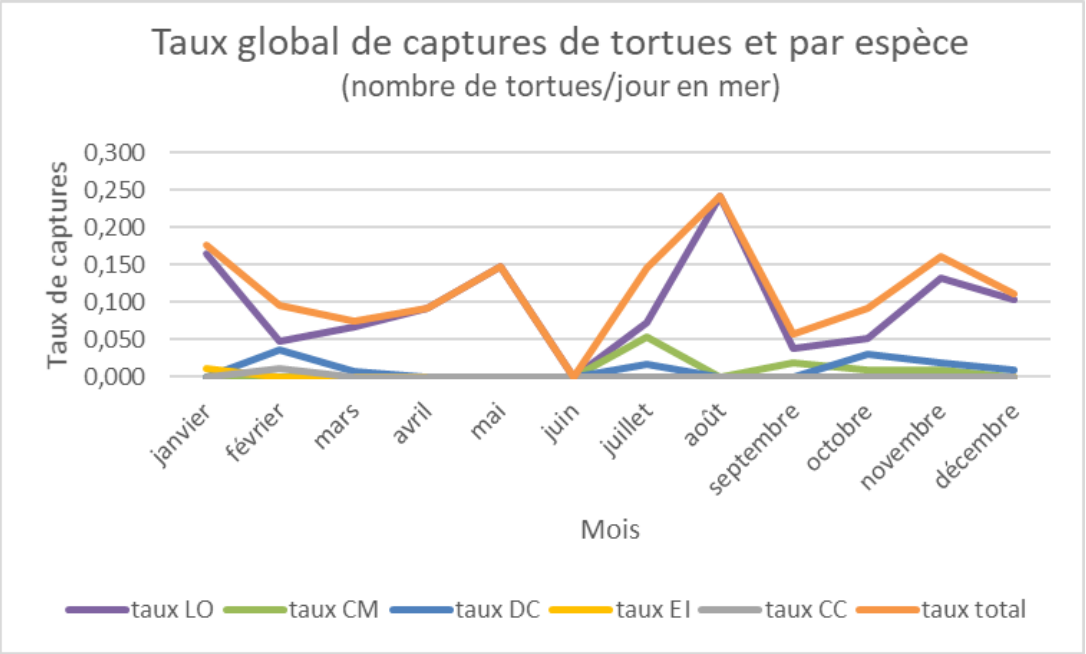
Turtle bycatch before and after TED



Turtles bycatch by species before TEDs in FG

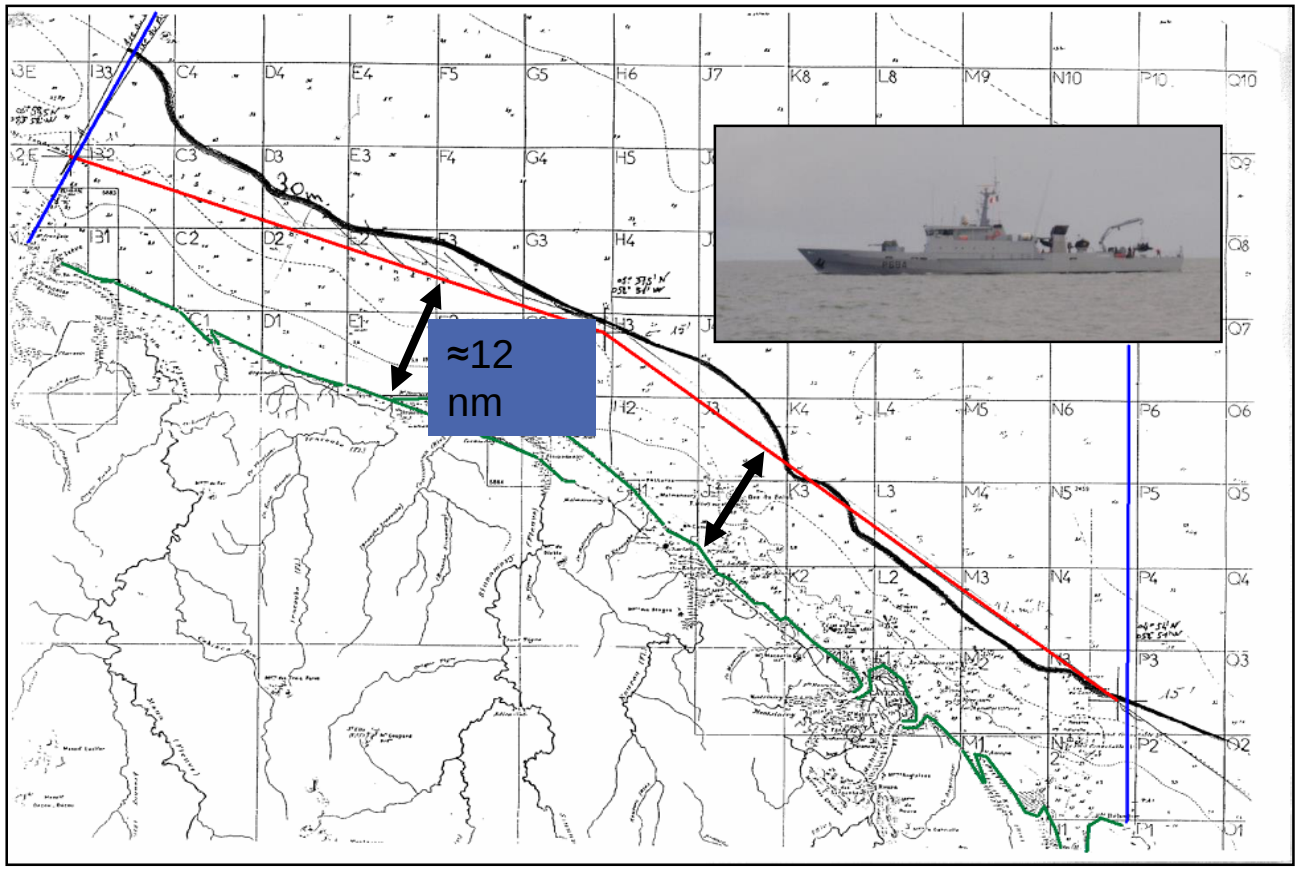
EI : imbriquée
CC : Caouanne
Dc : Leatherback





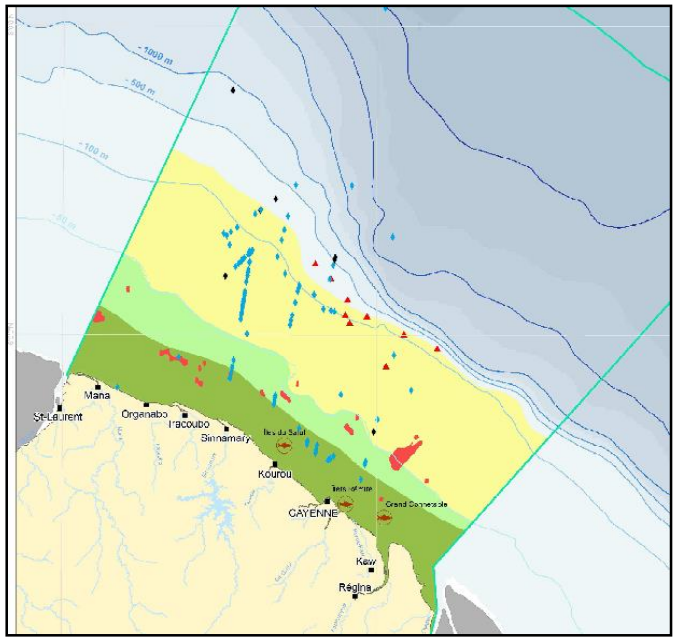
10.7% Leatherbacks

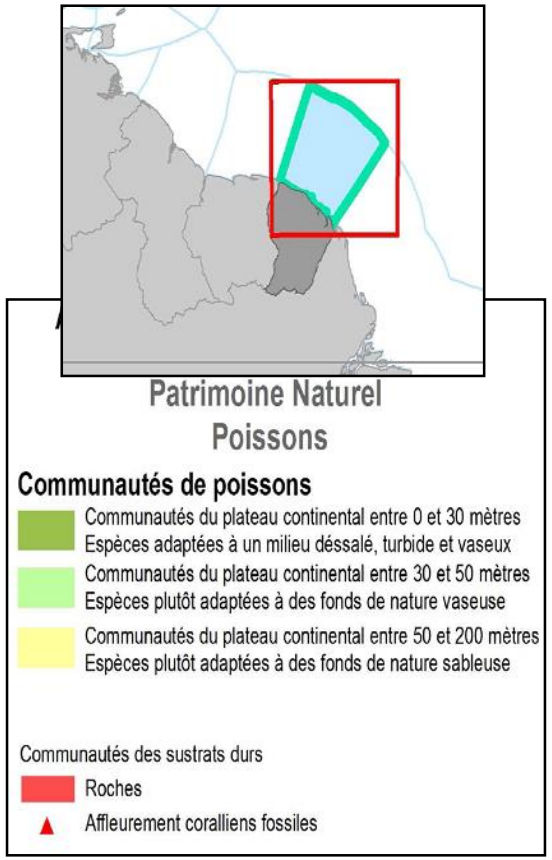
Undisputed 30 m non trawling zone since 1999.
Enforcement is necessary and continuous + VMS



Must have at sea enforcement

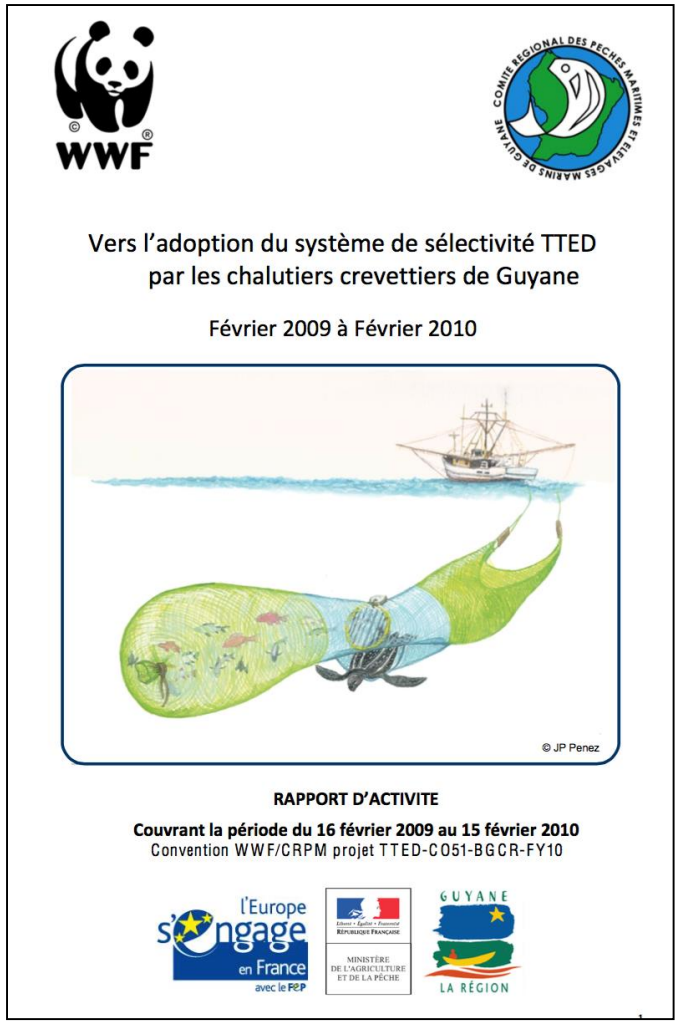
30m non trawling zone. Why?





	French Guiana	Suriname	Guyana
Approximate depth of non trawling zone	30m / 16.4 fath	18m/9.84 fath	12.8m/7fath

Selectivity of Trawls



WWF

COMITE REGIONAL DES PECHES MARITIMES ET ELEVAGES MARINS DE GUYANE

Vers l'adoption du système de sélectivité TTED
par les chalutiers crevettiers de Guyane

Février 2009 à Février 2010

© JP Penez

RAPPORT D'ACTIVITE

Couvrant la période du 16 février 2009 au 15 février 2010
Convention WWF/CRPM projet TTED-CO51-BGCR-FY10

l'Europe s'engage en France avec le FEP

MINISTÈRE DE L'AGRICULTURE ET DE LA PÊCHE

GUYANE LA RÉGION

Work done by CRPMEM, IFREMER, NOAA with complete participation of each fleet.

Technical characteristics of the TTED

-Spacing between the bars reduced to 50mm

-Flat bars

Results

-No loss of shrimp,

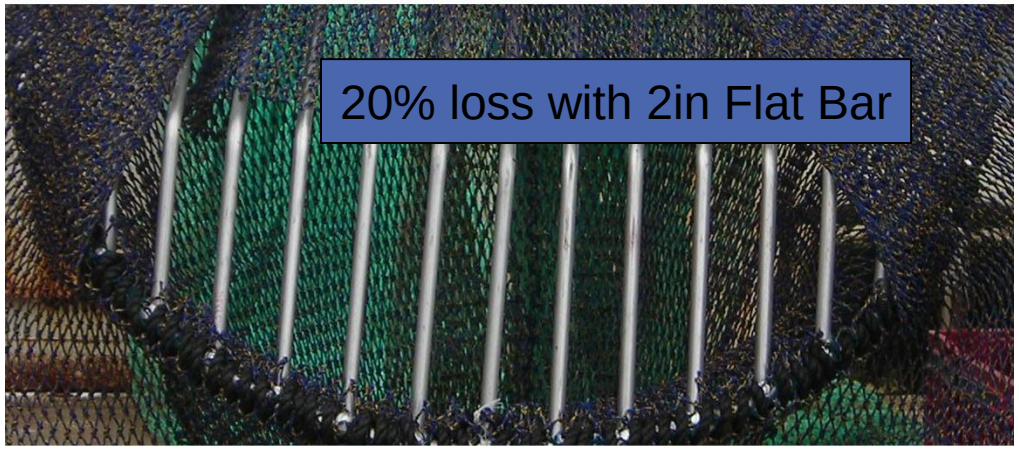
-Reduction of bycatch:

- **3 series of tests showed 0-90% bycatch reduction on any one tow**
- **Paired T-test on 90 tows 28% (95%CI +/ - 9%) bycatch reduction**

2009 2007

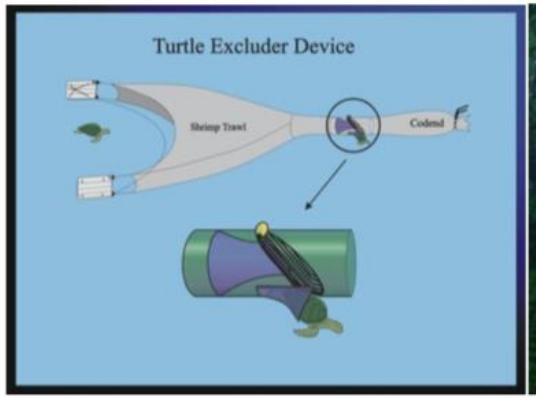
Trash and Turtle Excluder Device

In French Guiana:
-No BRD
-But TTED is like BRD



Round

Flat



TED

TTED

TED et TTED

Tableau 1 : Résultats des 4 campagnes d'essais en mer menées par le CRPMEM Guyane entre nov. 2007 et mars 2009 (6 prototypes de TED testés)

	Modèles de TTED	Espacement barreaux	Réduction prises accessoires	Production crevettes		Période des tests / Armement	Nbre traits comparatifs
				in shore	off shore		
Modèles pré-existants	Nordmore barreaux ronds	40 mm	58 %	0 %	- 20 %	Nov 07 (Abchée)	11
	Super shooter barreaux ronds	100 mm	6 %	-3 %	-3 %	Nov 07 (Abchée)	21
Prototypes	Super shooter barreaux ronds	50 mm	42 à 44 %	-1 à –4 %	-19 %	Mars 08 (Abchée)	18
	Super shooter barreaux plats	57 mm	25 à 36 %	+2 à –2 %	-2 %	Mars 08 (Abchée)	22
	Super shooter barreaux plats	50 mm	3 à 27 %	+ 2 %	+ 4 %	Oct 08 (Florus)	40
	Super shooter Barreaux plats	43 mm	40 %	+ 9 %	- 1,2 %	Mars 09 (Unifipêche)	30

Results in FG
TTED vs no TED

Bycatch Reduction (all species)

15-90% on any one tow

25-40%* Total

*Paired t-test 95% confidence

Shrimp catch equal

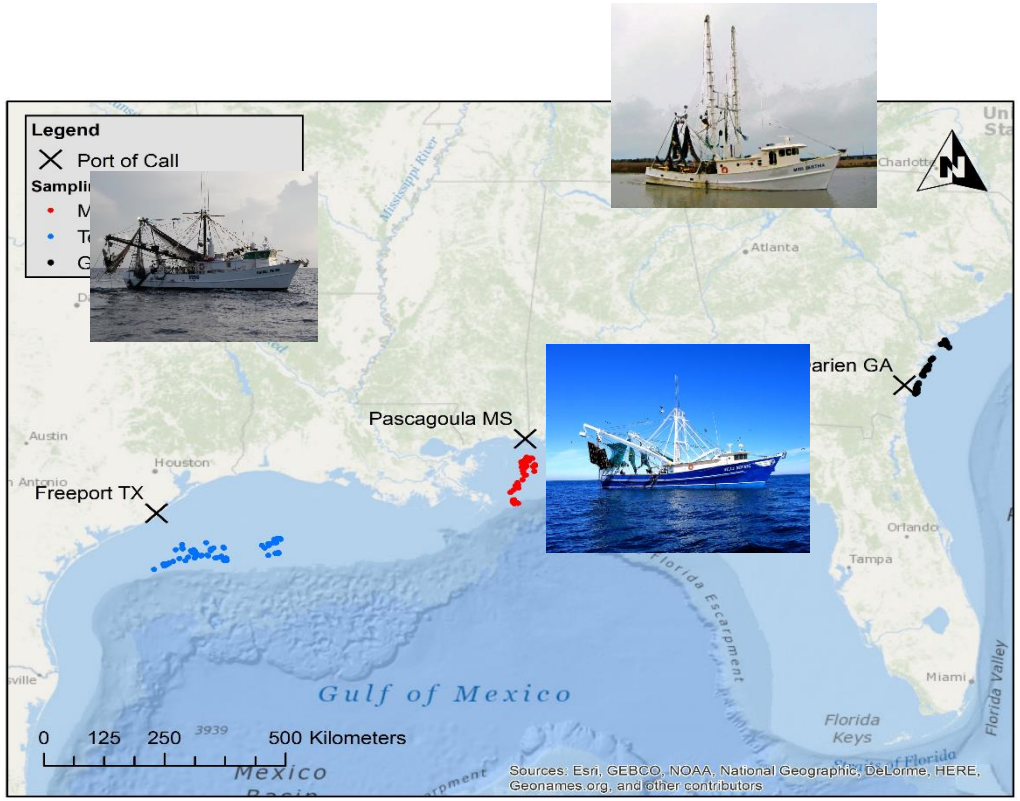
better quality

TTED vs no TED in FG

An Evaluation of a Reduced Bar Spacing Turtle Excluder Device in the U.S. Gulf of Mexico Offshore Shrimp Trawl Fishery

2012 Field Work

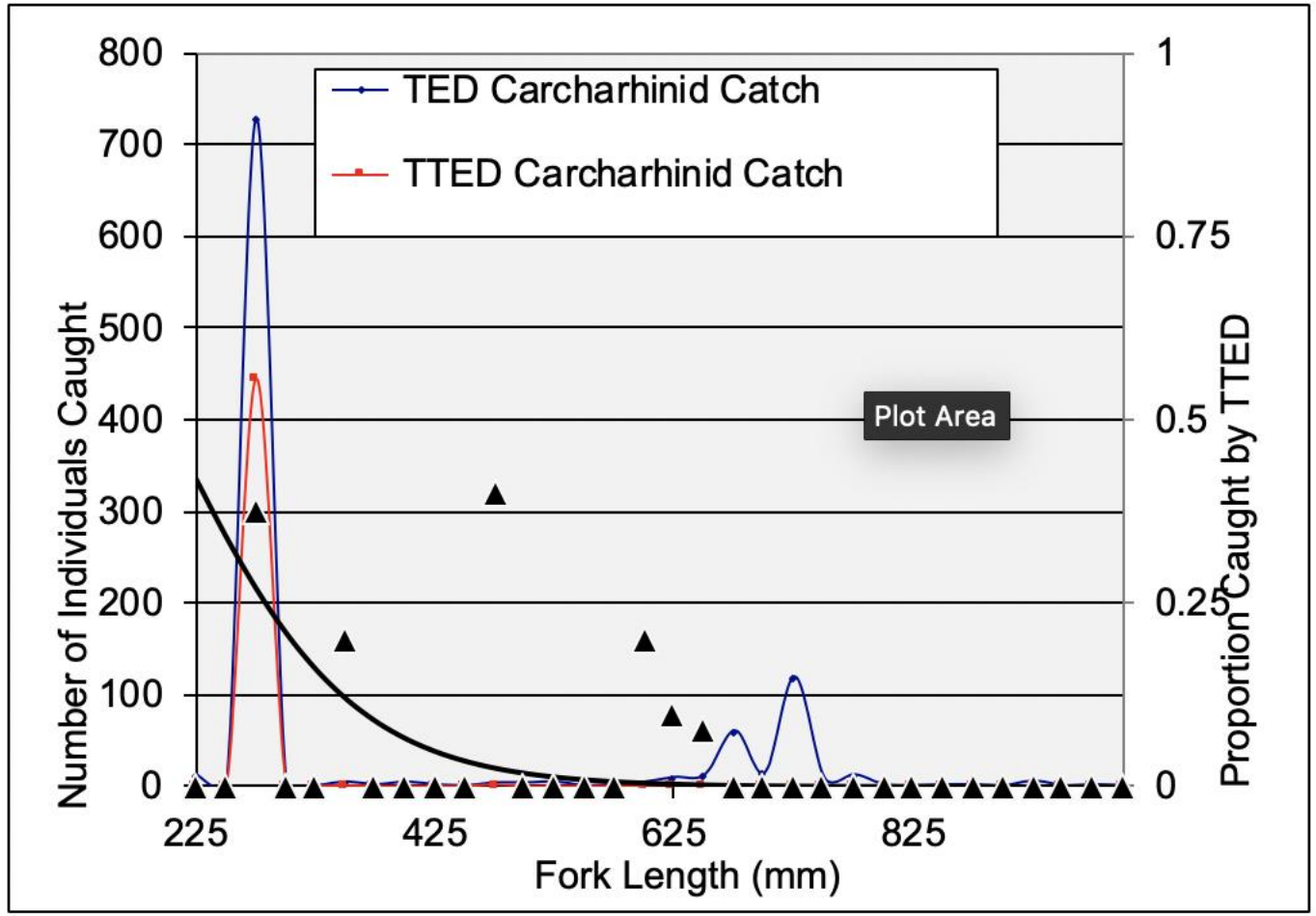
Port	Dates	Days-at-Sea	Valid Tows
Darien, GA	May 14-27	13	31
Freeport, TX	June 27-July 28	32	44
Pascagoula, MS	August 2-27	26	34
TOTAL		71	109



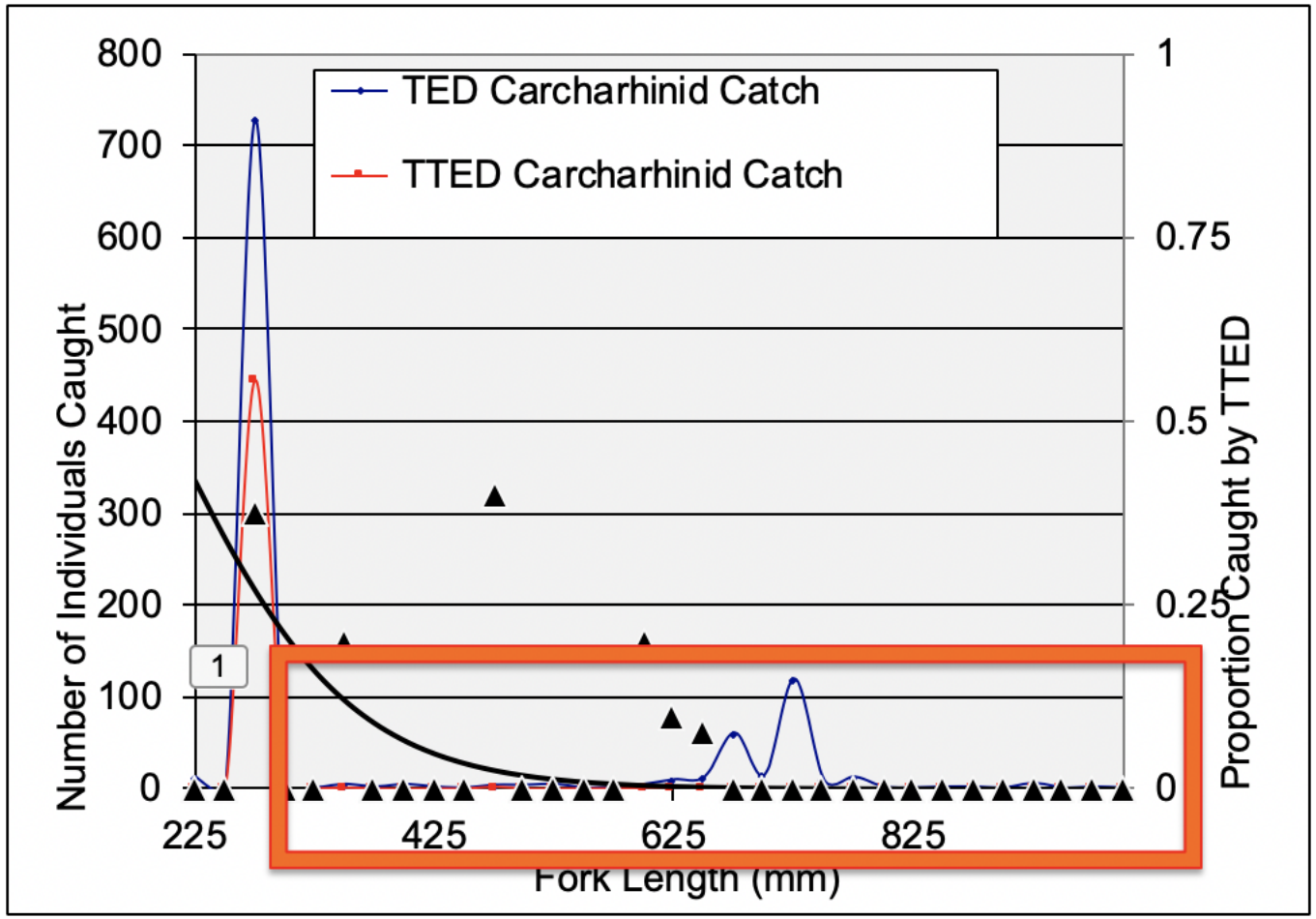
Weight CPUE *t*-tests for Large Fish in GA

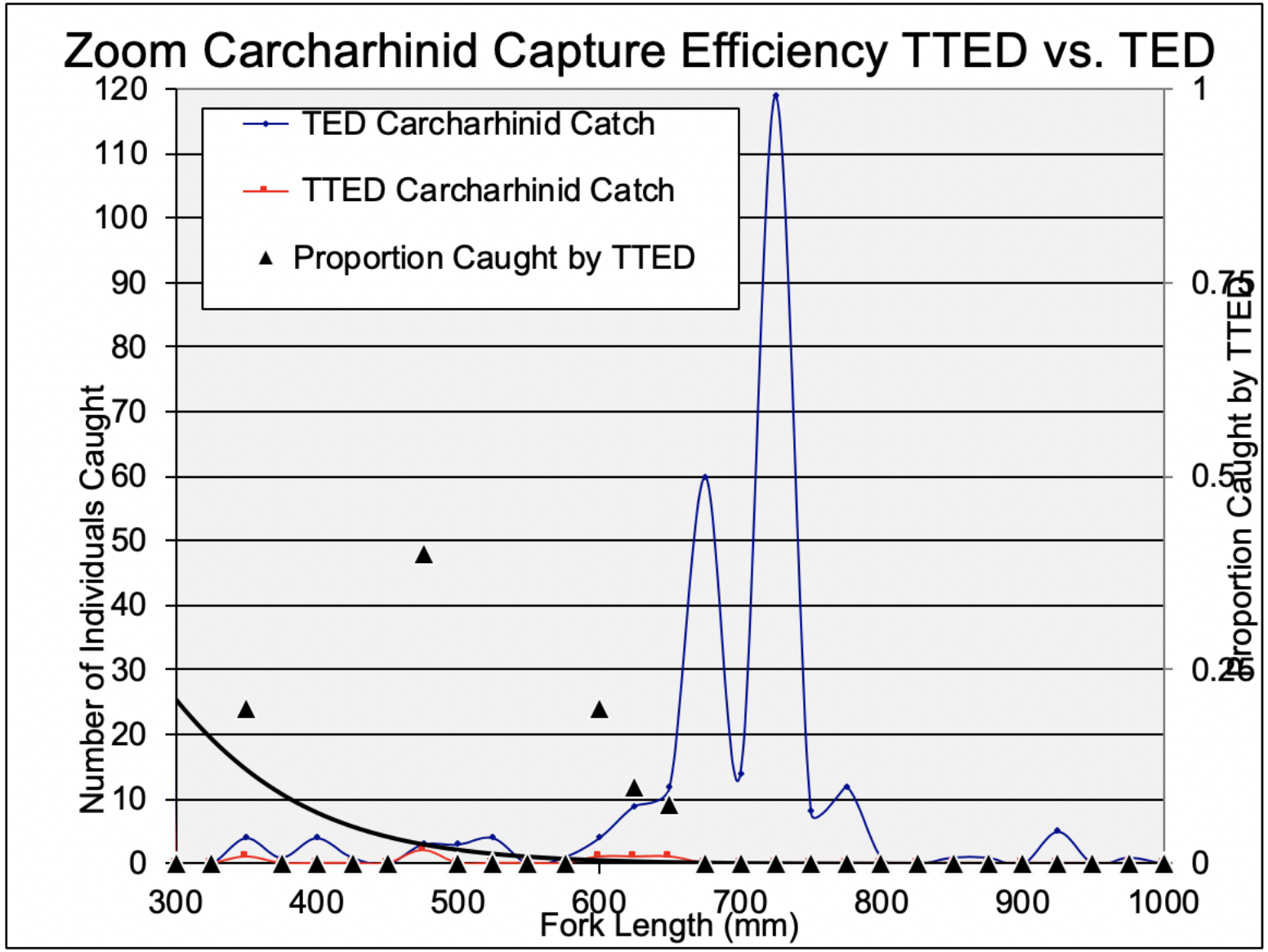
Species	kg TED	kg TTED	% diff	p-value
Atlantic Sharpnose	482	0.5	-99.90%	<0.0001
Blacknose Shark	5.5	0.5	-93.40%	<0.0001
Bonnethead Shark	54.5	0.5	-99.30%	0.0023
Rays & Skates	20	2	-93.40%	0.0103
Atlantic Sharpnose (small)	105	62	-41.10%	0.0206
Blacktip Shark	7	0	-100.00%	0.0907
Spanish Mackerel	1.3	0.5	-74.30%	0.1488
Scalloped Hammerhead	2.6	0.2	-91.10%	0.1638
Smoothed Hammerhead	3.7	0.3	-96.10%	0.4492
Winter Flounder	0.4	0	-100.00%	NA

Carcharhinid Capture Efficiency TTED vs. TED



Carcharhinid Capture Efficiency TTED vs. TED




Zoom Carcharhinid Capture Efficiency TTED vs. TED
TED Carcharhinid Catch
TTED Carcharhinid Catch
Proportion Caught by TTED
Number of Individuals Caught
Proportion Caught by TTED
Fork Length (mm)
0
10
20
30
40
50
60
70
80
90
100
110
120
0
0.25
0.5
0.75
1
300
400
500
600
700
800
900
1000

Results for Shrimp Weight

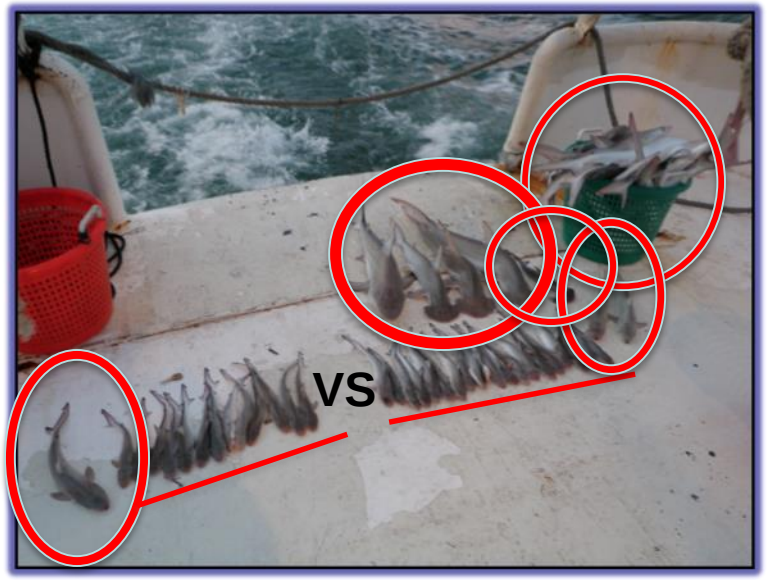
t-test of CPUE (Kg/hr)

Cruise	Shrimp	Freq	Kg TED	Kg TTED	% diff	P-Value
GA	White	31	856	824	-4.32	0.0489
TX	Brown	44	2895	3058	+6.07	0.0111
MS	Brown	34	1653	1633	-1.58	0.4611

Results for Grouped Small Fish Weight

cruise	kg TED	kg TTED	% diff	p-value
GA	3541	2268	-37.0%	<0.0001
TX	6930	6738	-2.9%	0.1601
MS	6190	5900	-4.1%	0.2917

TTED side



TED side

1 Blacknose*

13 small Atlantic Sharpnose

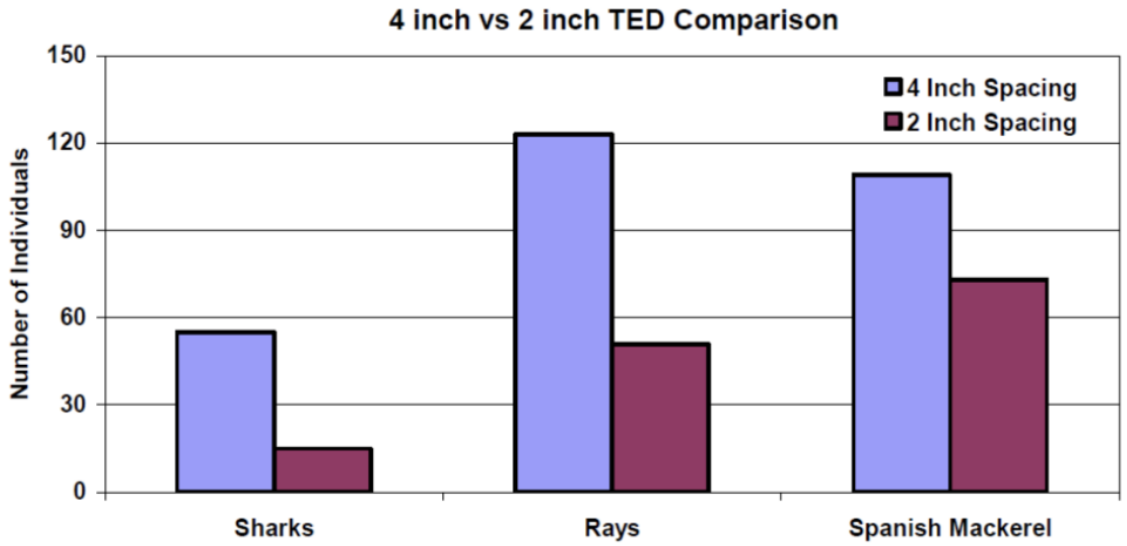
vs

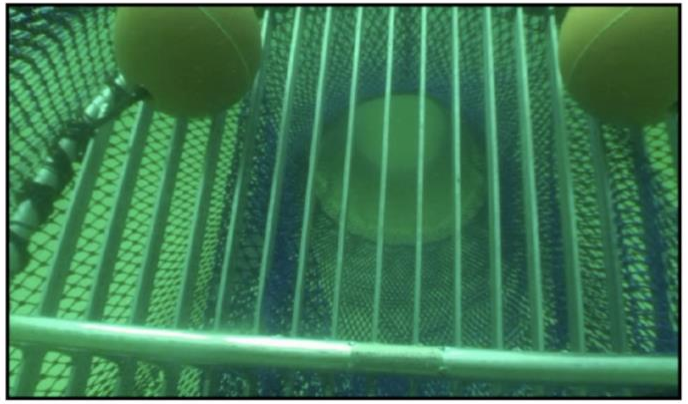
2 Blacknose*
19 small Atlantic Sharpnose
1 Blacktip*
3 Bonnethead Hammerhead
1 Scalloped Hammerhead**
24 adult Atlantic Sharpnose

*Near Threatened
**Endangered

All this for a single 2.5 hr tow !

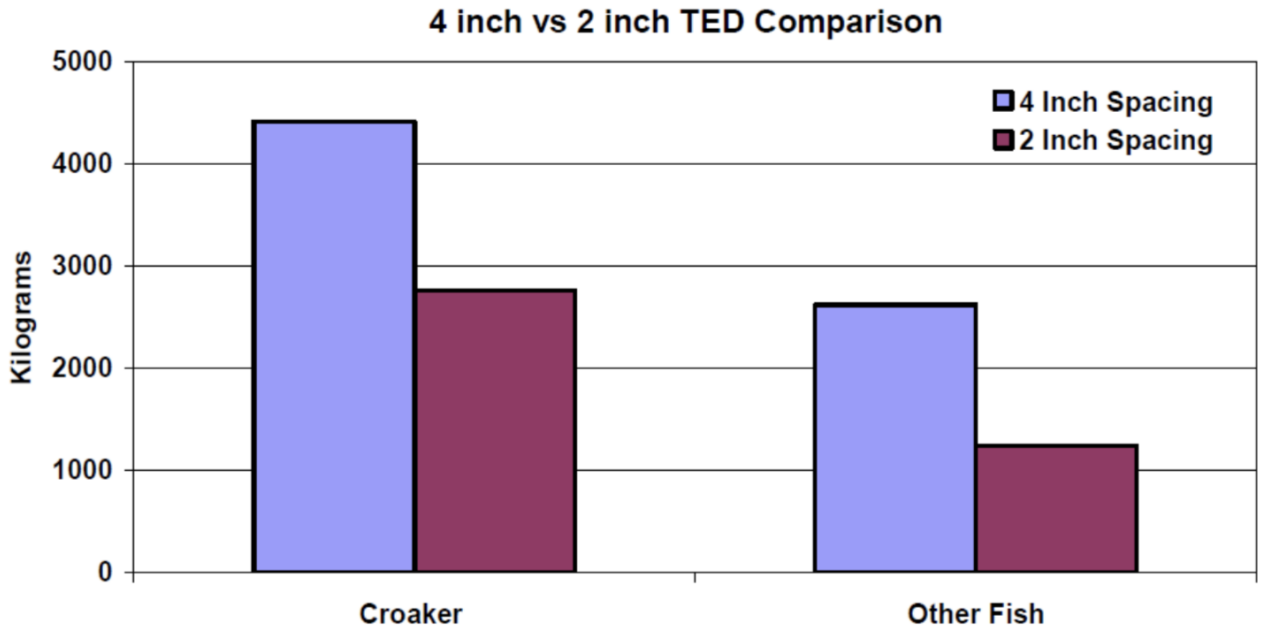
Reducing Bycatch in the Southeast U.S. Penaeid Shrimp Fishery: A Pilot Study to Assess Catch Rates of Shrimp and Finfish Bycatch using TEDs with Reduced Bar Spacing





TTED reduced :
- all sharks (regrouped) by 72.3% in numbers (55 vs. 15) and 78.0% by weight.
- All rays regrouped by 59.5% in number and 80.6% by weight.

Shrimp loss for the experimental TED was 6.3% by weight



Atlantic croaker (*Micropogonias undulates*),
Represents 52.8% of the total catch reduced 37.5%

Trout species *(Cynoscion sp.)*
reduced 35.7%

Other recreational and commercially important species
reduced 34.0%

Sustainable Management of Bycatch in Latin America and Caribbean Trawl Fisheries

REBYC-II LAC - SURINAME

Evaluating Trash-and-Turtle Excluder Devices (TTEDs) for bycatch reduction in Suriname's seabob shrimp trawl fishery

- December 2017 -

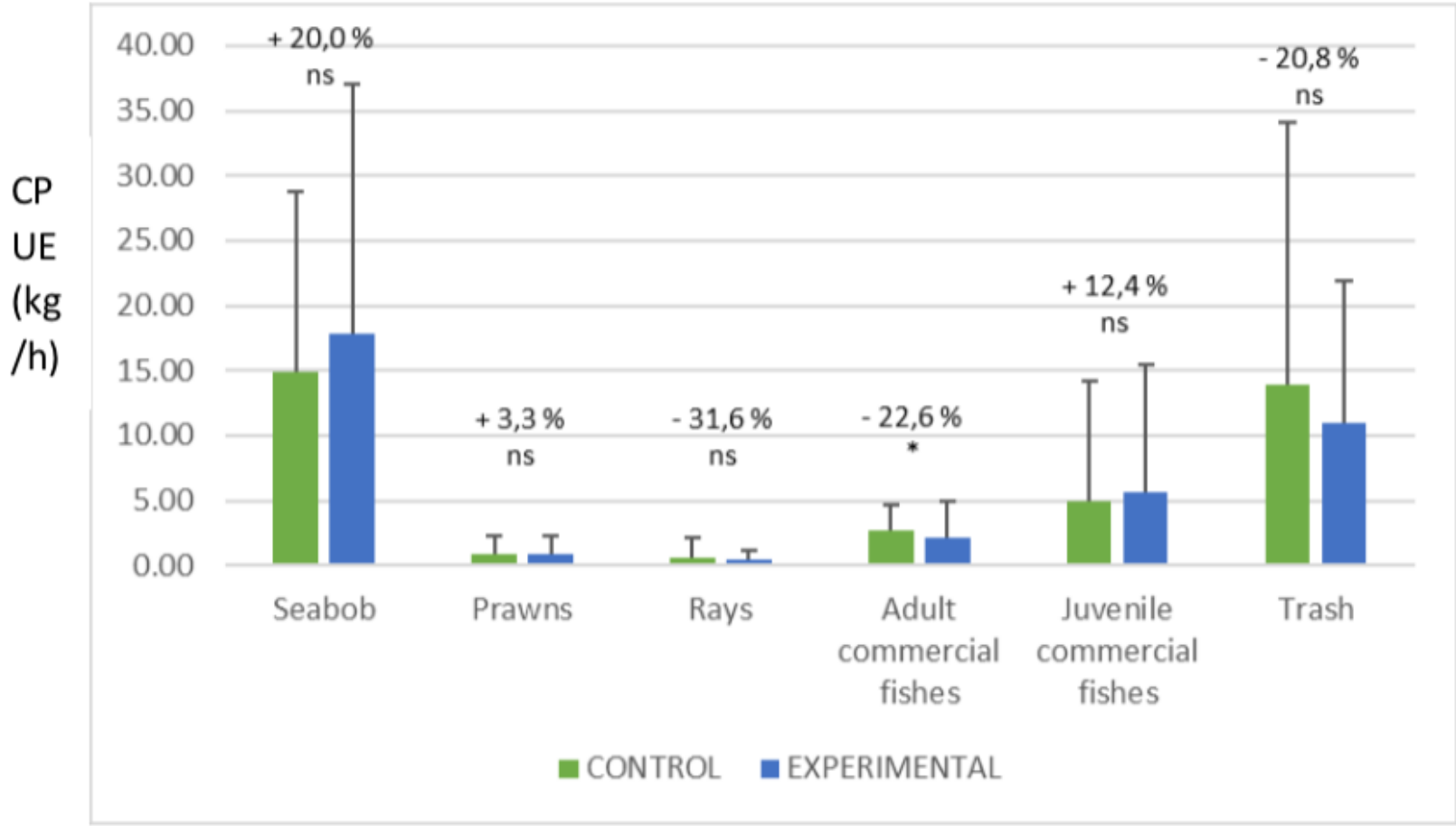
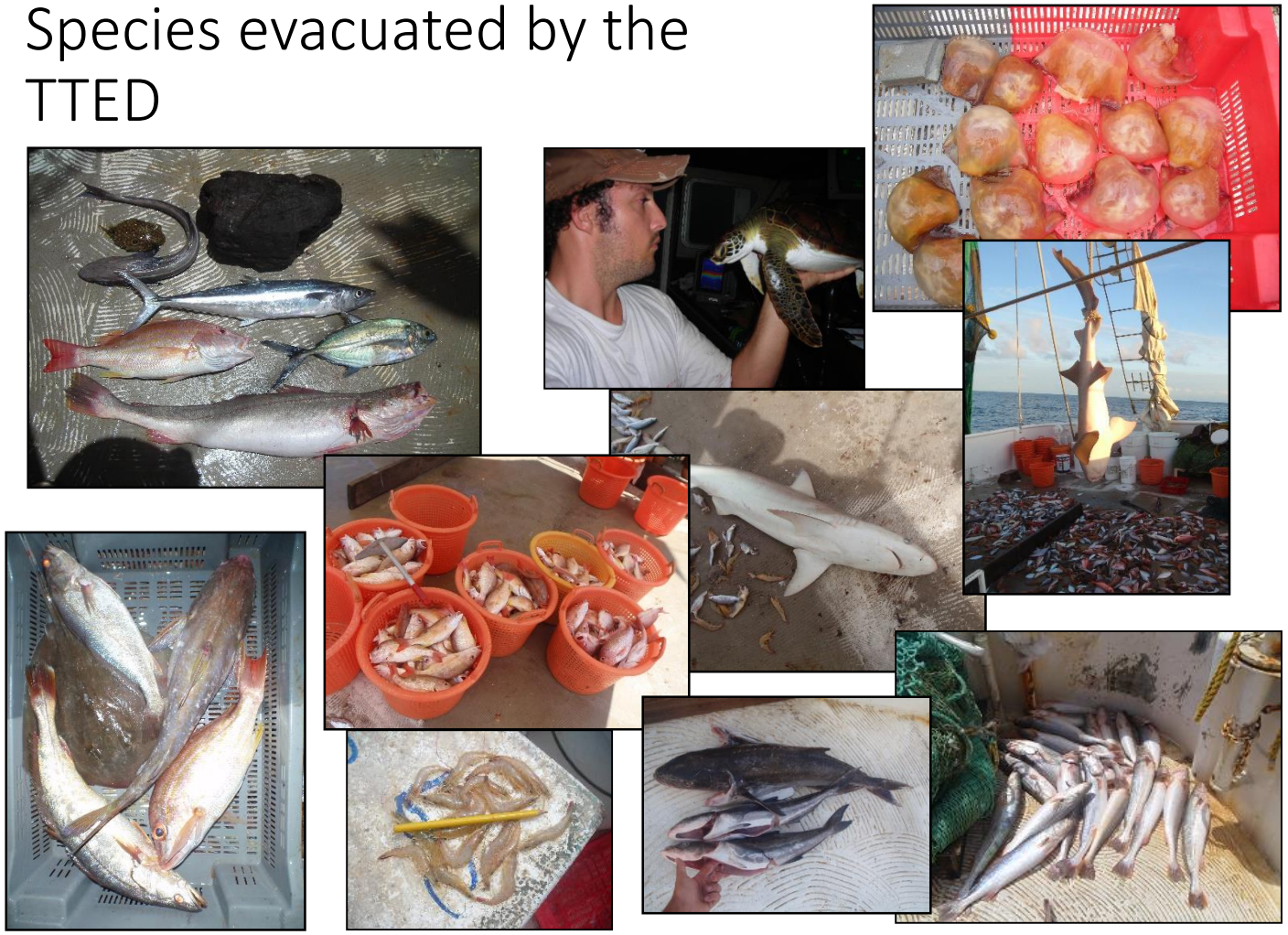


Figure 13 Mean (+SD) catch-per-unit effort (CPUE)of the different catch components in control codend (4" TED; green) and experimental codend (2" TTED; blue). Percentages denote reduction or increase in mean CPUE in the experimental codend. Asterisks indicate significant differences (paired t-test or Wilcoxon test; * = $p < 0.05$; ns = not significant).

Species evacuated by the TTED



Today shrimpers in FG use TEDs and TTEDs depending on season and gear availability - TTED are more expensive

Interactions between the coastal fisheries and marine turtles in French Guiana.

Why do this work ?

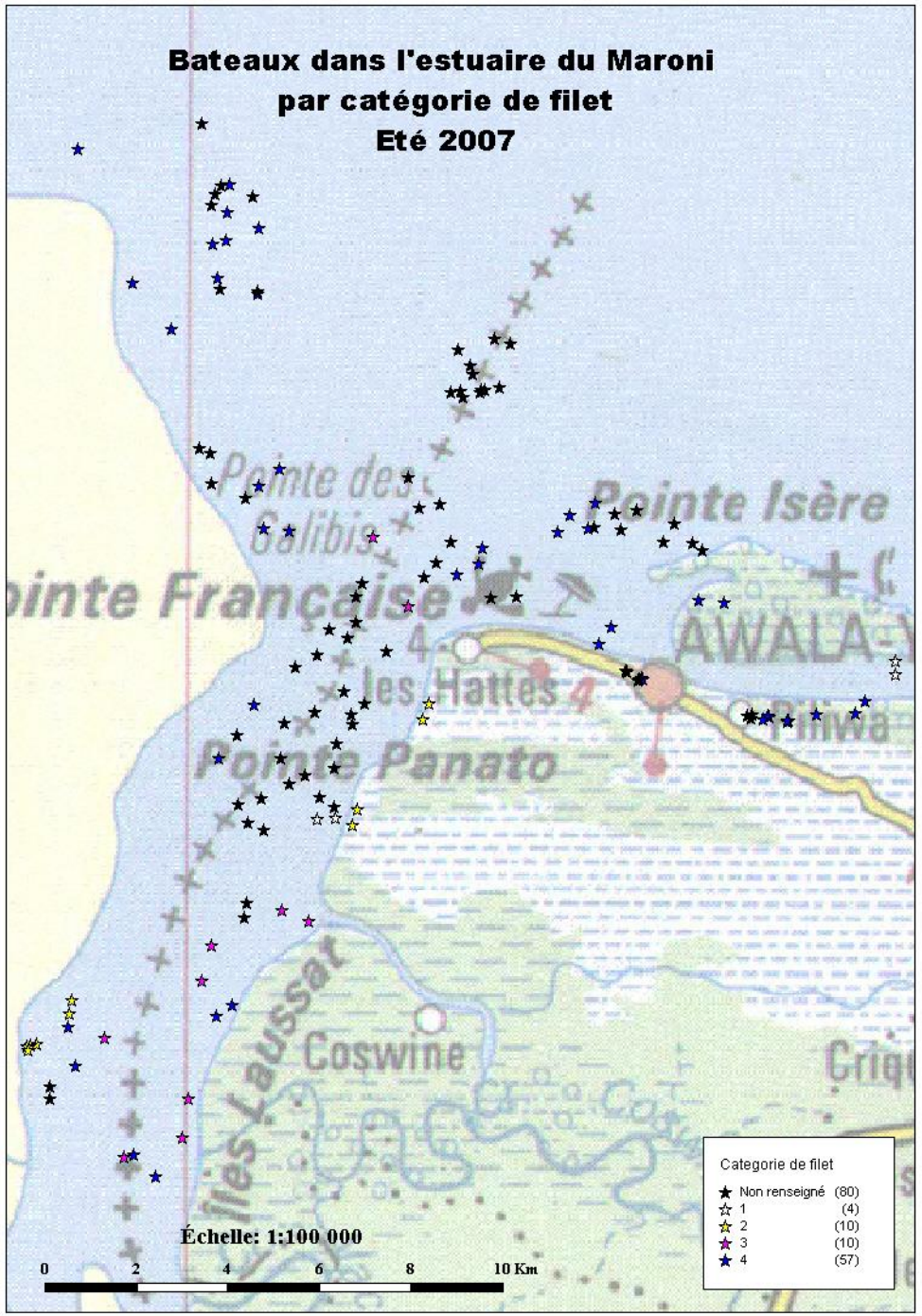
- **No info on bycatch levels of coastal fisheries.**
- **Interaction levels not well known.**
- **Few observations of exploitation methods.**
  - ✓ **Fishing zone.**
  - ✓ **Fishing times (soak time).**
  - ✓ **The actual practice of this fishing.**

An analyses of the fishing practices in the Maroni 2007

The actions during the mission:

- Meetings with the fishermen aiming to answer questions concerning there boats and there exploitation strategy.
- Participating in fishing trips to observe the techniques, the fishing spots and the captures.
- Frequent visits to various landing sites to better understand the activity and the infrastructures dedicated to the fishing activity.

Results : Fishers modulate their effort during the nesting season
Don’t fish in front of beaches at night during the high tide
39 fishing trips non occurred during this period.



This map dates back to 2001 with GPS points from 2007.

Biggest issue reported by the galibi and awala fishermen

Effort of the fleet from Suri and Guyana

-Open S.K. boat that fish in French Guiana especially at night and hide during the day

-Information confirmed with

meetings with S.K. boat captains.

Different F.G. Boats studied

Tapouilles:

-Trips last 8 to 14 days

-Ice holes of 6 to 7 T (large prod.)

-All boats equipped with nets hauls (reduce soak times)

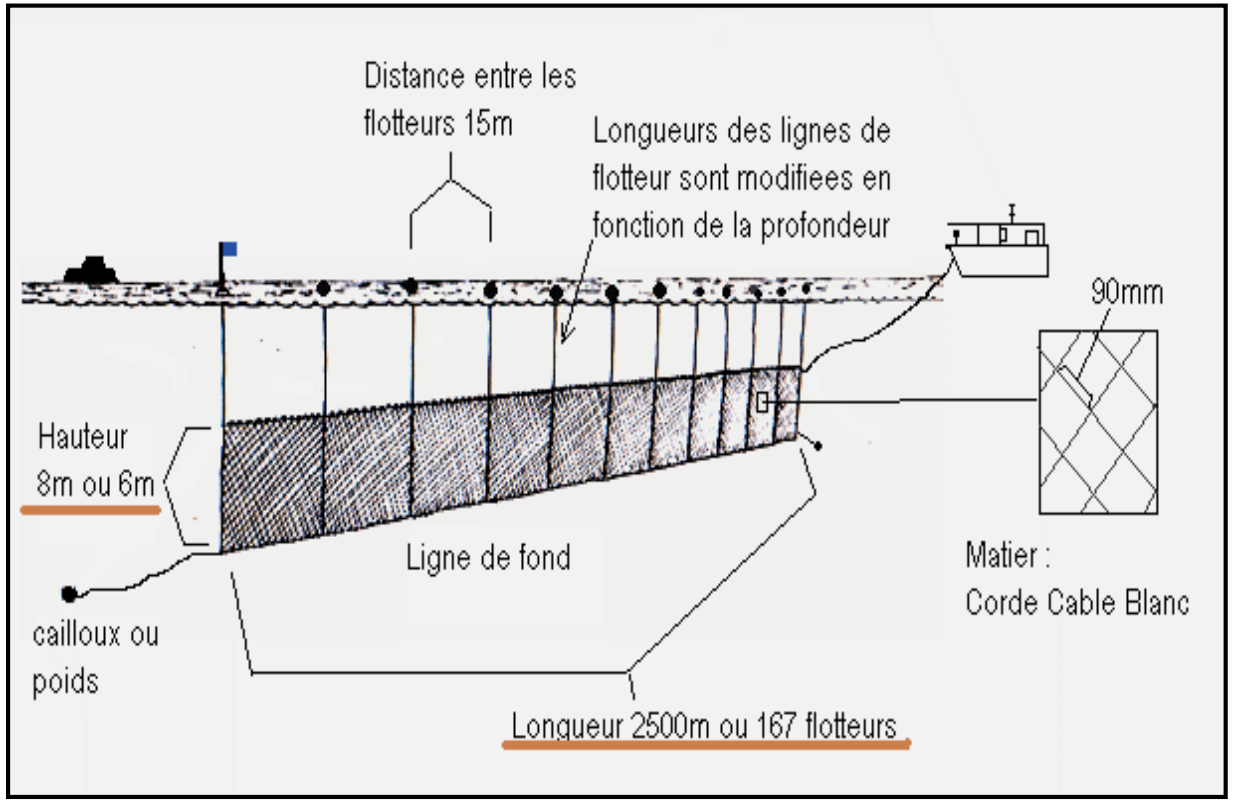
Improved Creole Canoes:

-Trips last from 3 a 8 days

-Ice holes of 1-2 T

-20 boats equipped with nets hauls (increased soak times)

The nets of the Tapouilles and ICC in F. Guyane



Tapouille floats

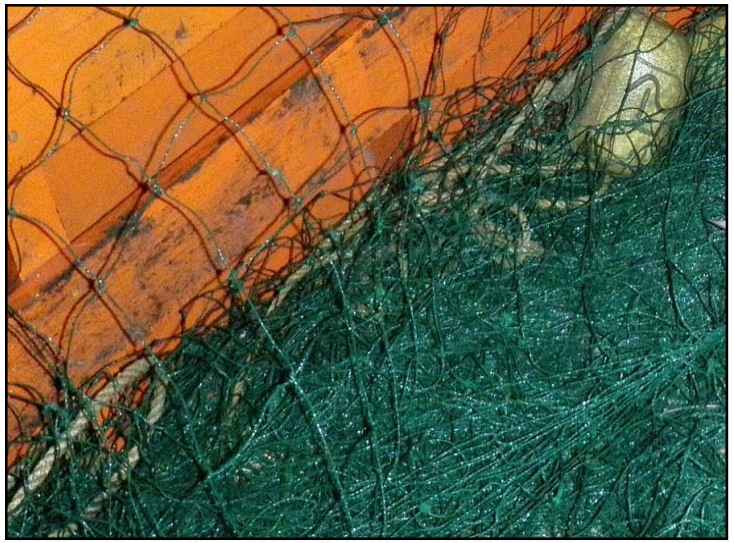
ICC floats

Différence:

- Floats

-ICC nets are sometimes shorter then some Tapouille nets

- 2009 Study : Compare the capture of Tapouilles and ICC



Method used:

- **At sea observations during actual fishing trips.**
  - **Best way to get close to the reality.**

Strong points of this work :

- **New collaboration NGO / fishing sector**
- **Strong implication for the professionals**
- **Able to teach the crews on proper MT handling techniques.**

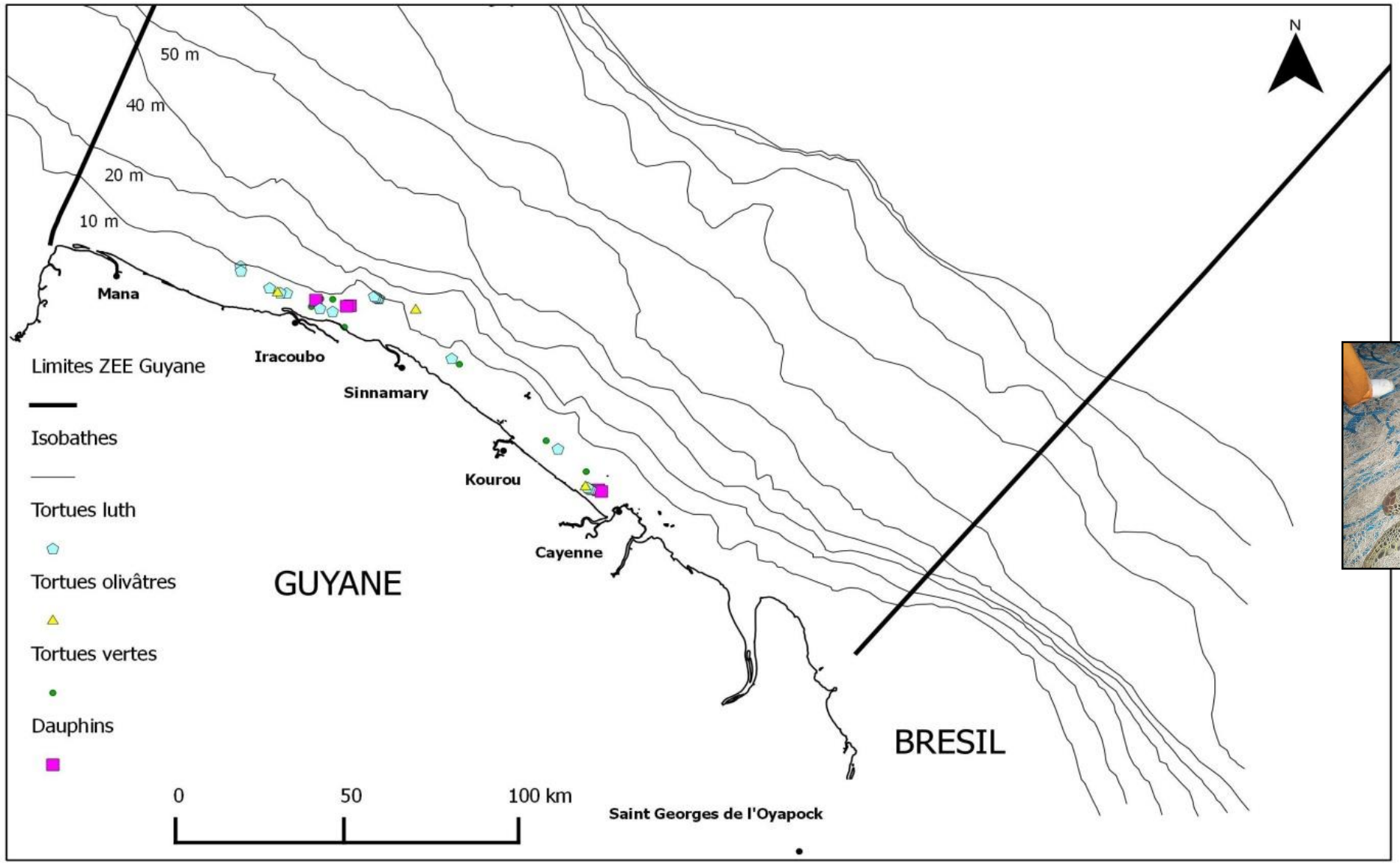
weighing in

DATA COLLECTED ON EACH TRIP

- GPS Points for each shot
- Data on the fishing actions (tps de pêche, gestes)
- Characterization of species caught and bycatch
- Number and nature of interactions (turtles, cetaceans)

Results

5. Leatherback bycatch per fisheries



2014

PALICA PROJECT (2017-2018)

Partnership WWF France – French Guiana Fisheries Committee (CRPM)

Fishermen issues :

- Bycatch = Loss of time and money
- Possibilities to promote fishery, reducing sea turtle and cetacean bycatch

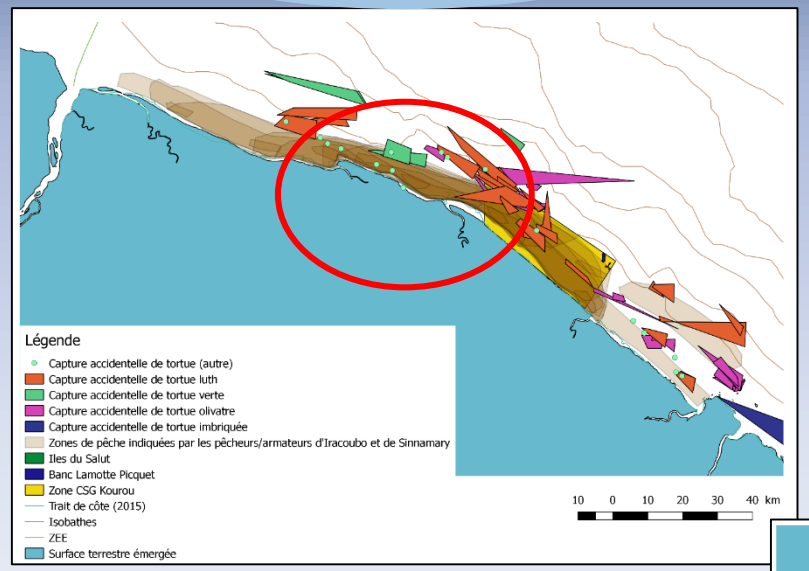
PALICA aims :

- Improve knowledge about bycatch in each fishing community
- Collaborative work with fishermen to find feasible solutions to reduce bycatch

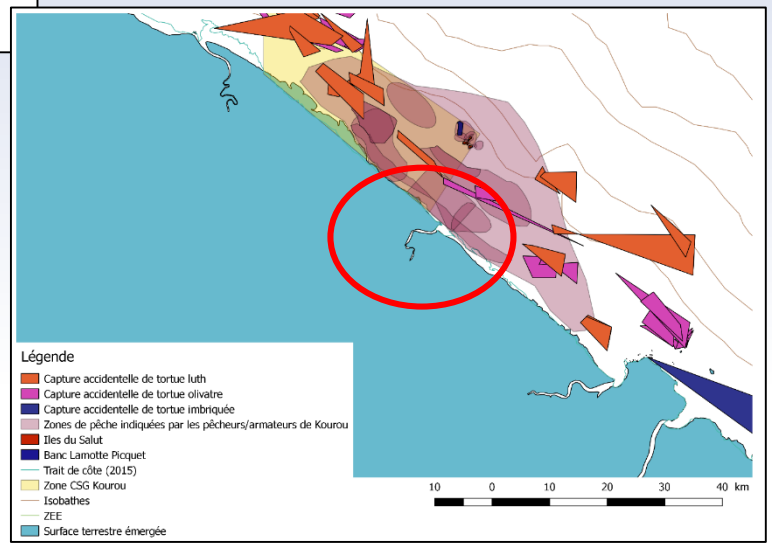
Around 50 fishermen were interviewed multiple times in the 5 fishing communities

COMMUNITIES CONCERNED BY BYCATCH

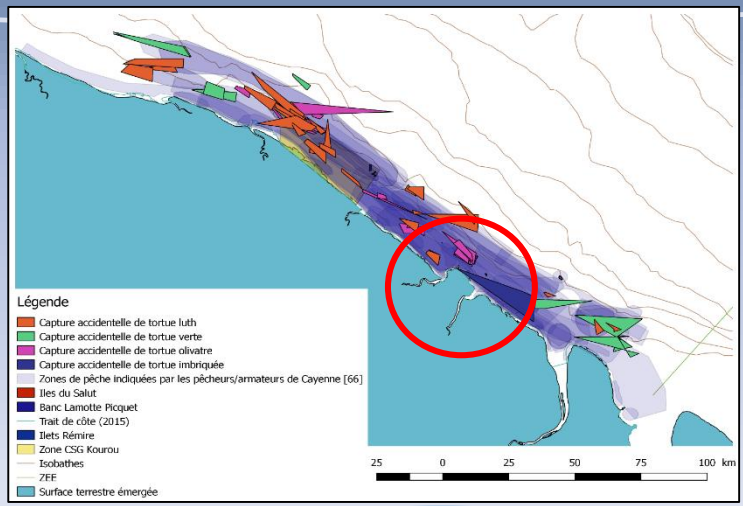
Iracoubo, Sinnamary



Kourou



Cayenne



PALICA OUTCOMES

There are 3 ways to reduce sea turtle bycatch :

1) Change type of fishing gear → **Would require targeting other species**

2) Limit or ban fishing activities depending on season and place

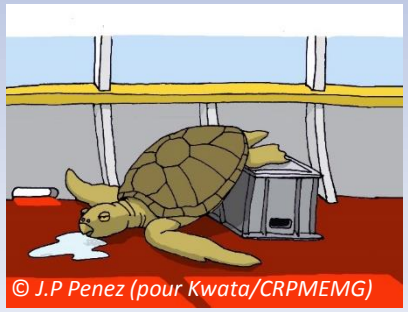
→ **Need to have good knowledge on bycatch species ecology**

3) Adapt fishing gear and practices, adopt Bycatch Reduction Devices

TRAINING AND DATA TRANSMISSION

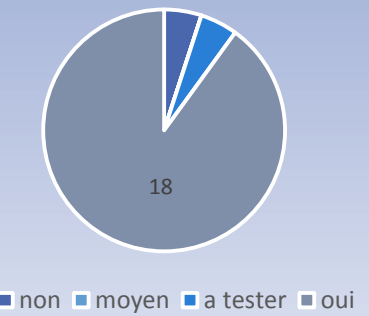
Species concerned : all sea turtles

Aim : decrease trapped sea turtle mortality



Description :

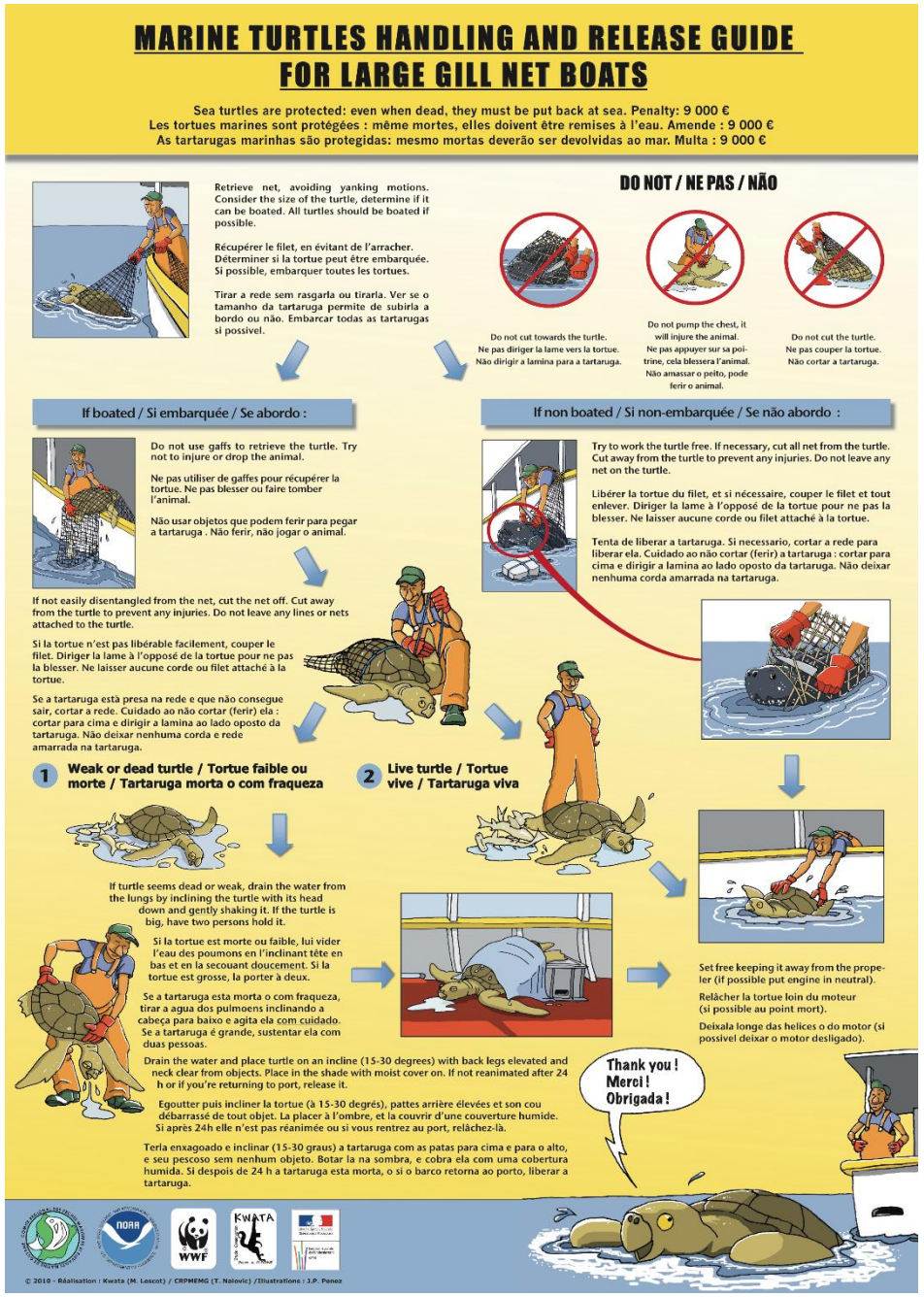
- Volunteer fishermen
- Distribute good practices guide
- Teach how to handle a sea turtle



date	time	Landing location	Set time	gear	GPS points	species	size	Alive or dead	resuscitation yes / no / unsuccessful			release yes / no	Remarks

Reanimation techniques.

Good releasing techniques.



ILLUMINATING THE NET

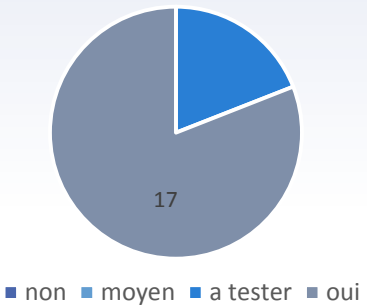
Species concerned : sea turtles and marine mammals
Aim : to illuminate the net

Description:

- Put on the float lines all night
- Bycatch decrease of 59% in the Gulf of Mexico with lighsticks (Wang et al., 2009) and 64% in Peru with LEDs (Ortiz et al., 2016)
- Same yield

Limitations :

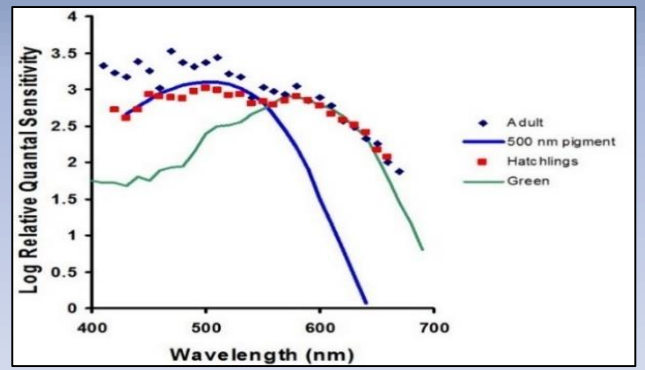
- Cost
- Maintenance
- Turbidity of Guiana Shield waters

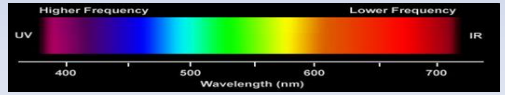


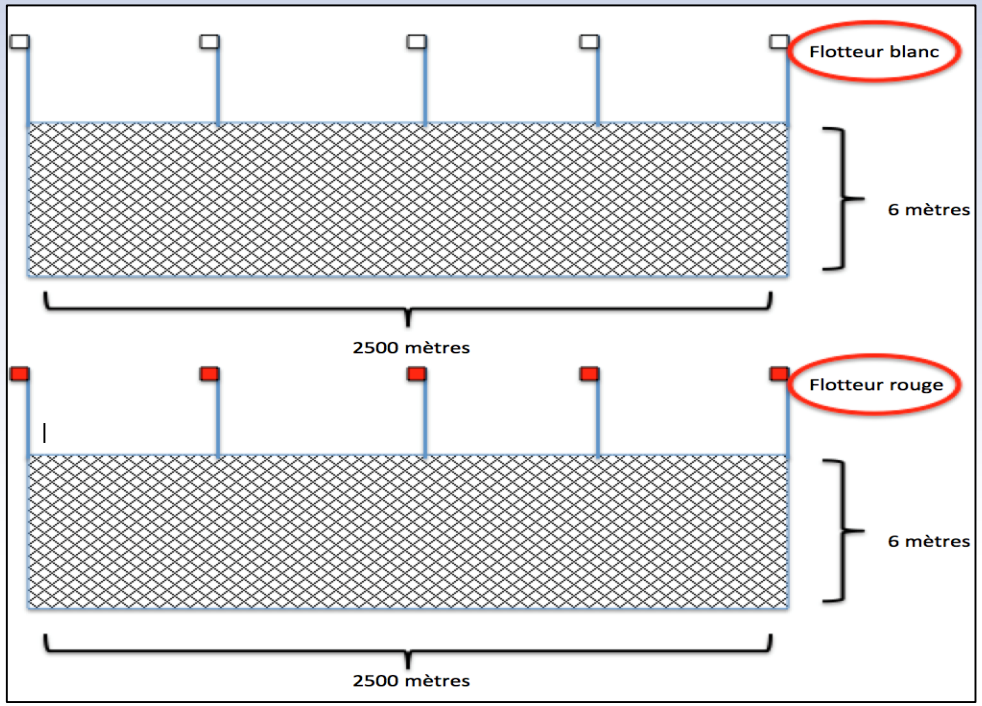
CHANGE FLOAT COLOR

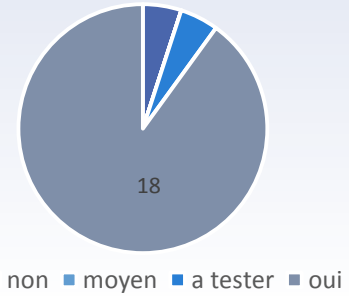
Species concerned : leatherback
Aims : Avoid leatherbacks been attracted by white color of floats

Sea turtles see white and yellow but don't see red (Horch et al, 2008)









REDUCE NET HEIGHT

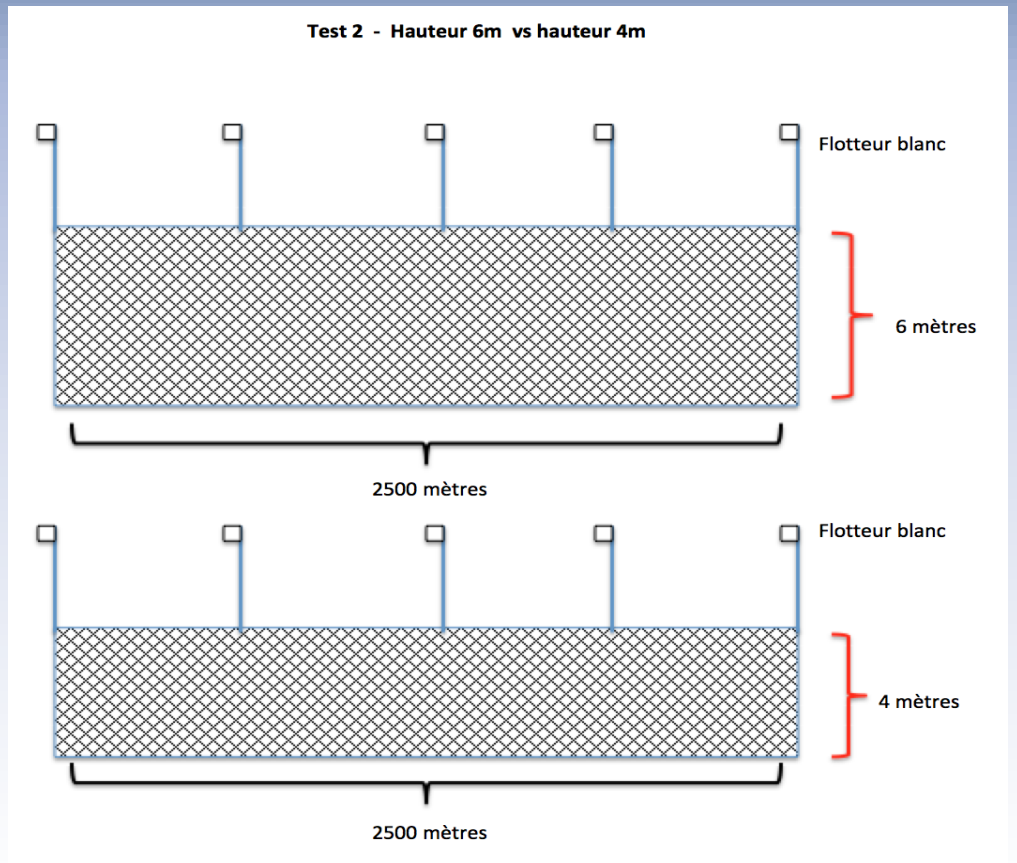
Species concerned : sea turtles and marine mammals
Aims : leave water surface free

Issue :

- Sea turtles and Guiana dolphin are mainly found at the top of the net

Benchmark :

- Experiment conducted in Trinidad and Tobago in 200
- FAO recommandations (2013) « how to reduce sea turtle bycatch »



7. Regulation and enforcement system

Regulations

1. Marine Turtles are protected through a National law (Arrêté Ministériel) since 2005.

- No destruction or damage to the marine turtles habitat
- ---------- or harvest of eggs or nests
- ---------- or catch or intentionnal disturbance to marine turtles
- No business with marine turtles, dead or alive.

2. Trawl fisheries: TTED are mandatory since 2010 upon insistance from the fisheries sector through a French Guiana law (Arrêté Préfectoral) ➔ collaborative advantage.

3. Gillnets specifications:

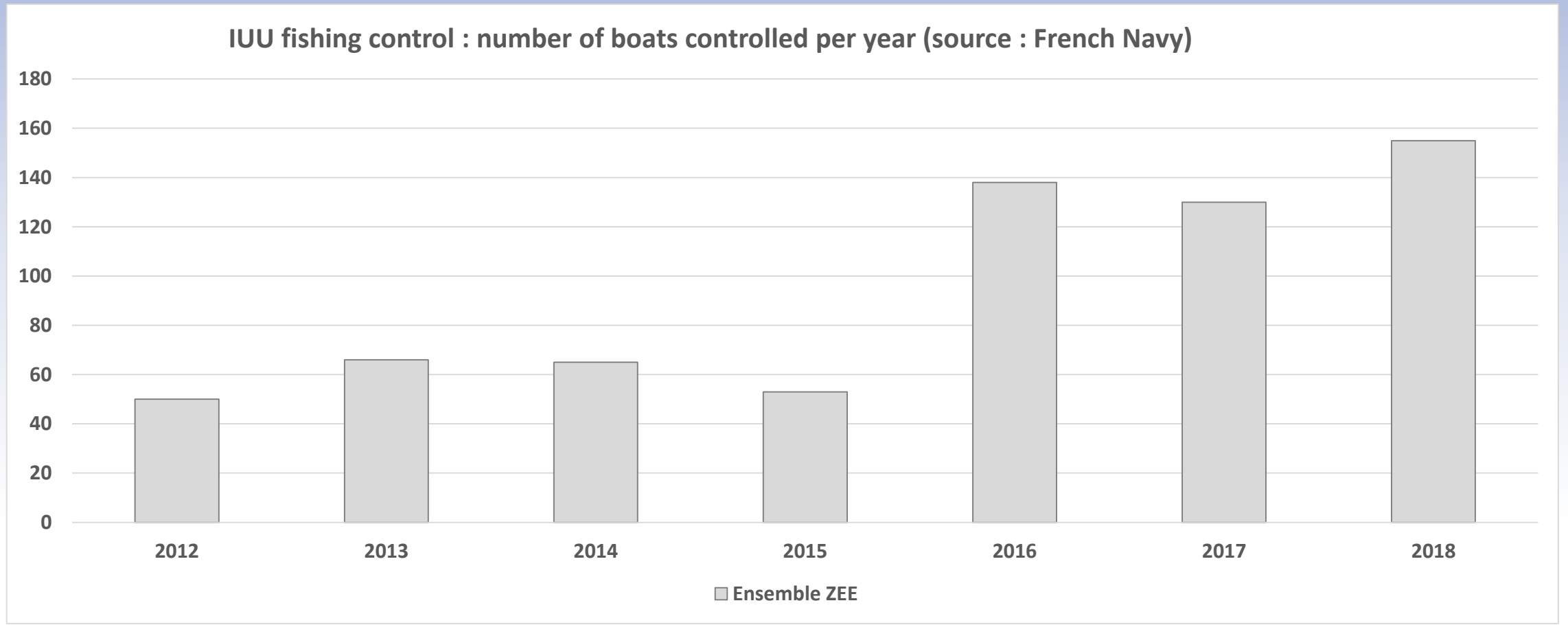
- **profesional fisheries**: maximum size of professional nets: 2,500 m in length – 7 m in height.
- **recreational fisheries** : coastal gillnets set from the beach are forbidden through a French Guiana law. Setting recreational gillnet is authorized from a boat under conditions:
  - under visible license
  - 50 m lenght maximum
  - 2 m height maximum
  - Minimum mesh of 80 mm
  - have floats.

7. Regulation and enforcement system

Enforcement system for IUU fishing using gillnets : several cooperating structures:

- Marine Affairs
- French Navy
- Environmental police service
- Amana Natural Reserve game wardens

Their missions: monitor IUU fishing, control and seize IUU boats and associated fishing gear and goods, control TTED implementation…



8. Goal, opportunities and challenges

Opportunities and priorities

At an international level :

Illegal fishing using gillnets ➔ joint deployment plans… Cf. IUU fishing workshop

Longline fishing

At a local / national level :

Legal fishing using gillnets ➔ Raise funds to test and then implement bycatch reduction fishing gears / methods : ARRIBA, PALICA 2…

At a national / european level :

Trawl fishing: TED implementation ➔ French Guiana must be the pilot of a European regulation to make the TED mandatory for countries exporting tropical shrimps to EU.

9. Leatherback bycatch reduction priorities

More TTED controls on shrimp trawl fishery

The main goal is to make the TTED mandatory for all countries exporting tropical shrimps to the EU

PALICA follow-up

Continue efforts against IUU fishing

PALICA 2

Aims :

For 28 months

- **Implement onboard monitoring**
  - With onboard observers (tapouille)
  - With a camera (cca)

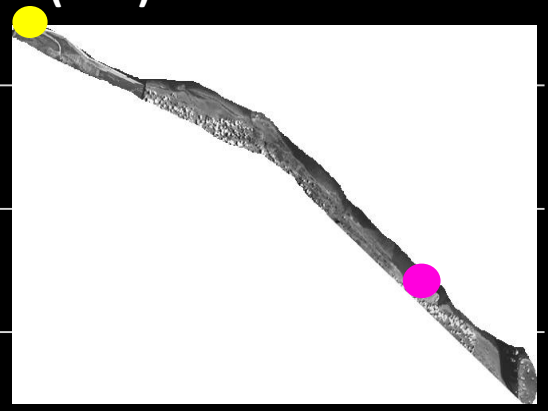
- **Test the solutions selected in PALICA with volunteer fishermen (from March to November for 2 years)**
  - Reduce net height
  - Illuminate net
  - Change float color
  - Implement acoustic device

- **Define sensitive areas depending on dolphin habitats and sea turtle migrations**

Closing Remarks

APPENDIX

Nesting activity from 2002 to 2018 in eastern and western FG: nest counts (line) & number of nesting females (bars) for the Leatherback



West

East

4000
3500
3000
2500
2000
1500
1000
500
0

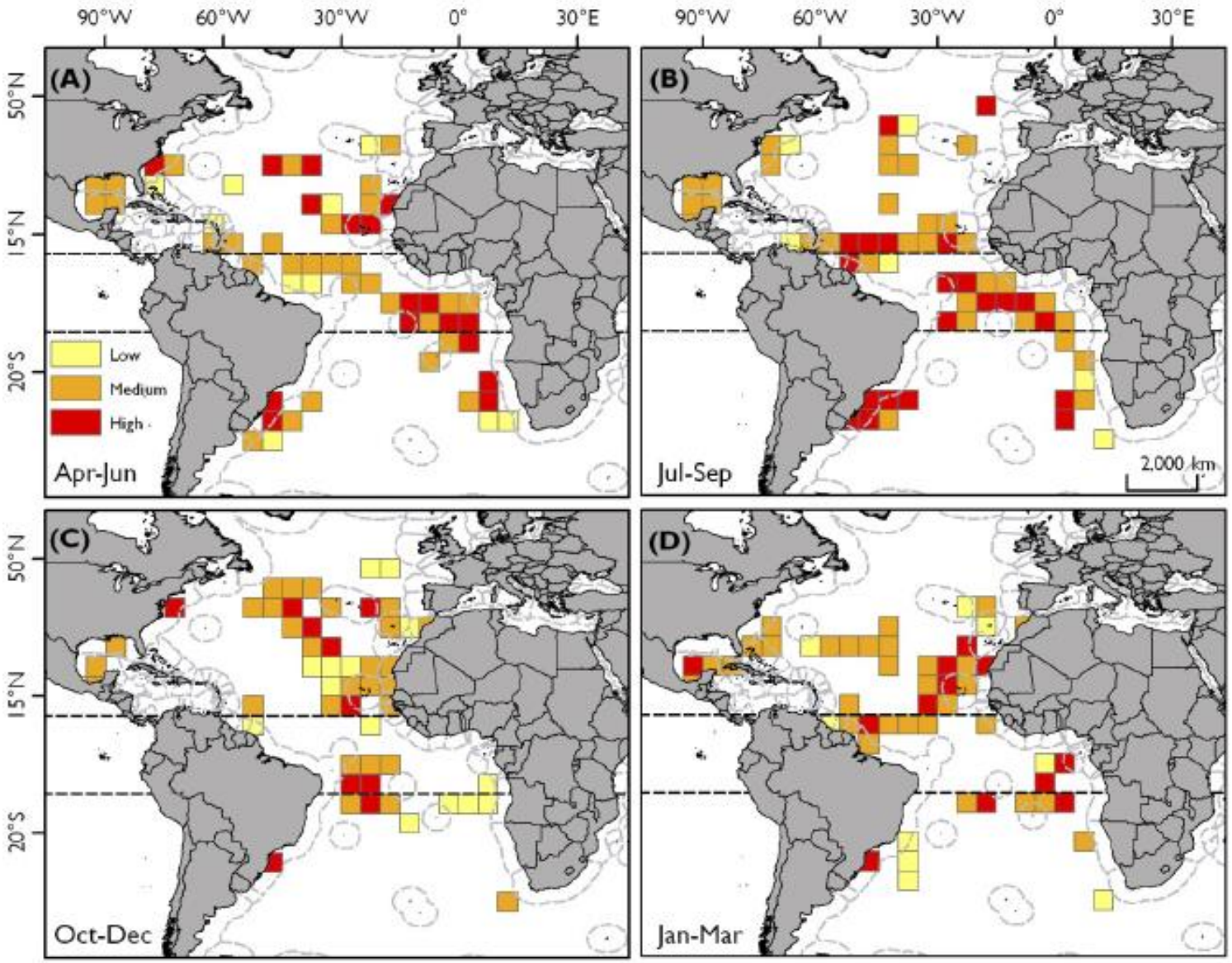
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

Femelles id Dc Est Femelles id Dc Ouest

Pan-Atlantic analysis of the overlap of a highly migratory species, the leatherback turtle, with pelagic longline fisheries

S. Fossette, M. J. Witt, P. Miller, **M. A. Nalovic**, D. Albareda, A. P. Almeida, A. C. Broderick, D. Chacón-Chaverri, M. S. Coyne, A. Domingo, S. Eckert, D. Evans, A. Fallabrino, S. Ferraroli, A. Formia, B. Giffoni, G. C. Hays, G. Hughes, L. Kelle, A. Leslie, M. López-Mendilaharsu, P. Luschi, L. Prosdocimi, S. Rodriguez-Heredia, A. Turny, S. Verhage and B. J. Godley

High ICCAT fishing-pressure areas overlapped with LB habitat use, from 1995 to 2009 (quarterly)



TACLIN+ICCAT Data

REDUCING BYCATCH OF LEATHERBACKS IN THE ATLANTIC

WHAT'S THE PROBLEM? LONGLINES DON'T JUST CATCH FISH.

More than 4 billion hooks set throughout the Atlantic by longline fisheries (1995-2010) approx.

730,000 hooks/day

Source: ICCAT

ABOUT LEATHERBACKS

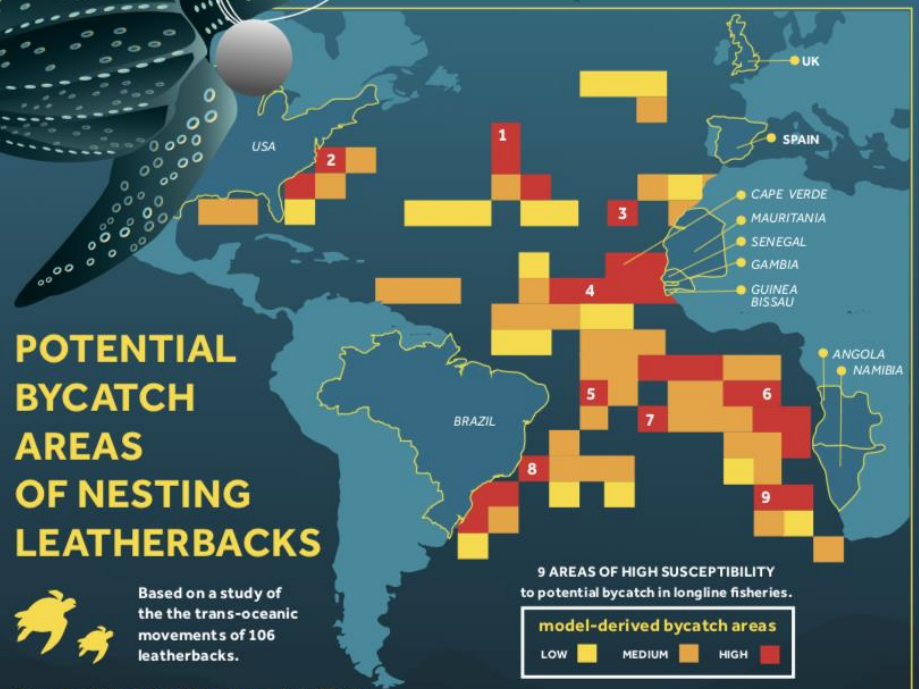
Highly **migratory species** found throughout **the Atlantic Ocean**

Atlantic populations are **showing trends of early recovery**

2 distinct management units: **northern and southern Atlantic**

Leatherbacks are vulnerable to bycatch from artisanal and industrial fisheries

POTENTIAL BYCATCH AREAS OF NESTING LEATHERBACKS



9 AREAS OF HIGH SUSCEPTIBILITY to potential bycatch in longline fisheries.

model-derived bycatch areas

LOW MEDIUM HIGH

Based on a study of the the trans-oceanic movements of 106 leatherbacks.

Download the scientific paper : *bit.ly/1TRHC6u*

THE TRANS-ATLANTIC LEATHERBACK CONSERVATION INITIATIVE (TALCIN) is an international, multi-partner effort which provides a platform for the compilation and dissemination of travel route information about the trans-oceanic movements of leatherback turtles

More information on: bit.ly/1nyub0Z

WHAT NEEDS TO HAPPEN

01 **Countries where susceptibility to bycatch in longline fisheries is shown to be high should mitigate risks** through spatial and/or temporal closures or by promoting sustainable fishing gear such as circle hooks, entanglement reduction techniques, and best handling practices when fishing vessels can operate in specific areas.

ANGOLA · BRAZIL · CAPE VERDE · GAMBIA · GUINEA BISSAU · MAURITANIA · NAMIBIA · SENEGAL · SPAIN · UK · USA

02 By collaborating in fisheries science activities with ICCAT it becomes **possible to encourage bycatch mitigation with nations that are not on the atlantic but have boats long lining in the Atlantic** (Japan, Taiwan, etc.).

03 **Making bycatch rates available and creating observer programs** when the data is not available would increase understanding of factors affecting bycatch induced mortality.

04 **Stricter rules for the reporting of bycatch and fishing effort by all fisheries** would greatly help in the assessment of bycatch risks and the design of effective mitigation for species of conservation concern.

05 **Countries should promote ecological certification of tuna and swordfish** fishery and consumers should purchase ecologically certified tuna and swordfish from longline fleets that have observer programs and respect bycatch mitigation techniques.

06 **Continue to track this and other species.**

07 **Implement best handling practices** and study the fate of turtles released when captured.

'Thank you to all countries that provided the bycatch information and data, making it possible for us to provide this infographic. Without them, this work could not have been done.'