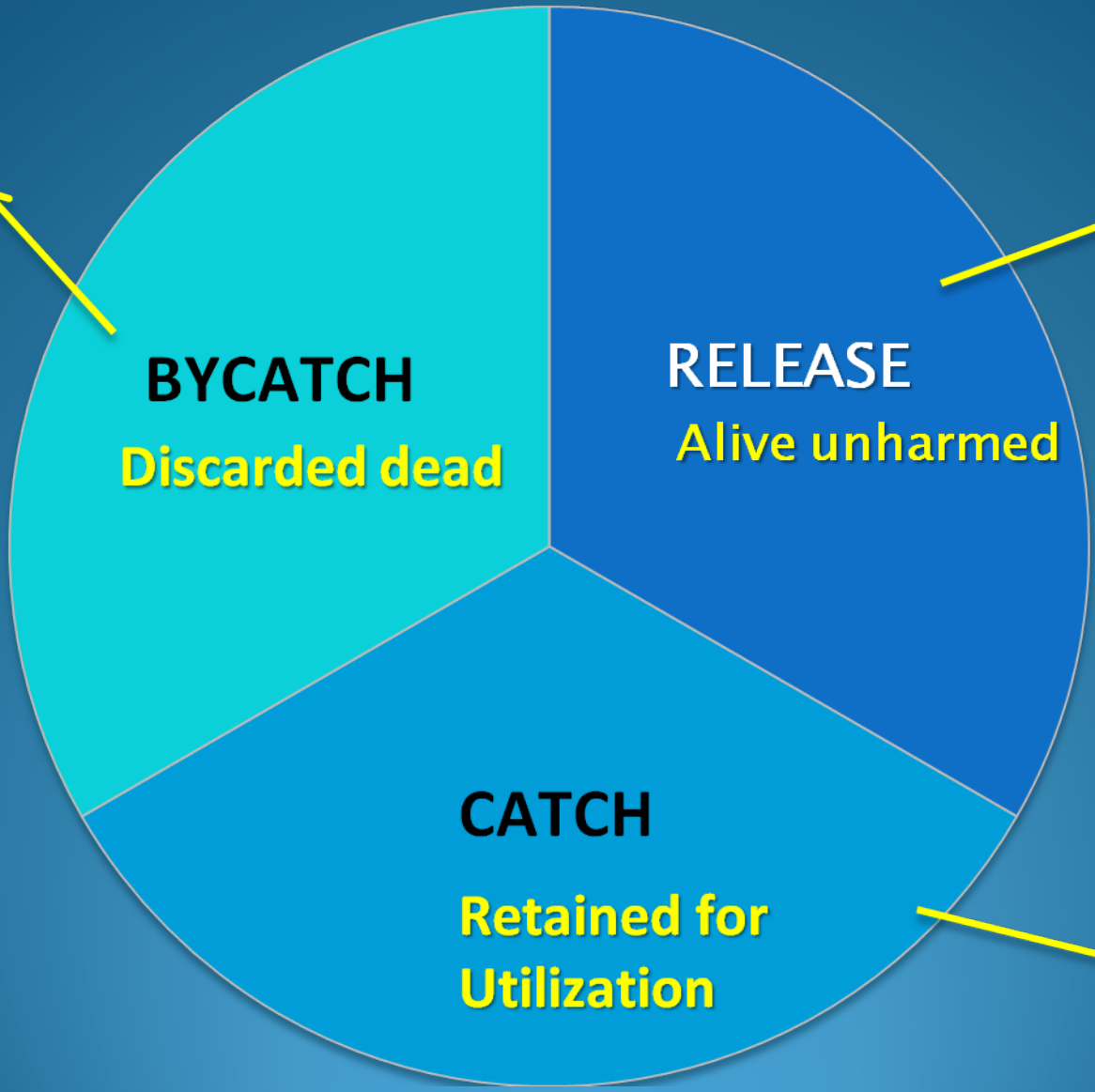
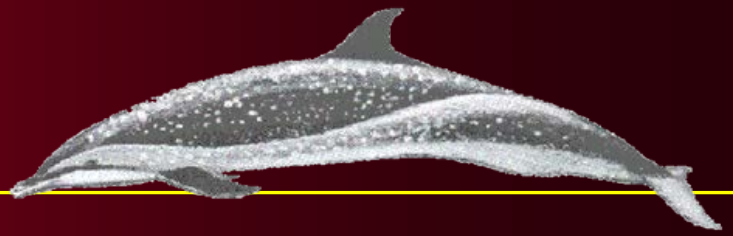
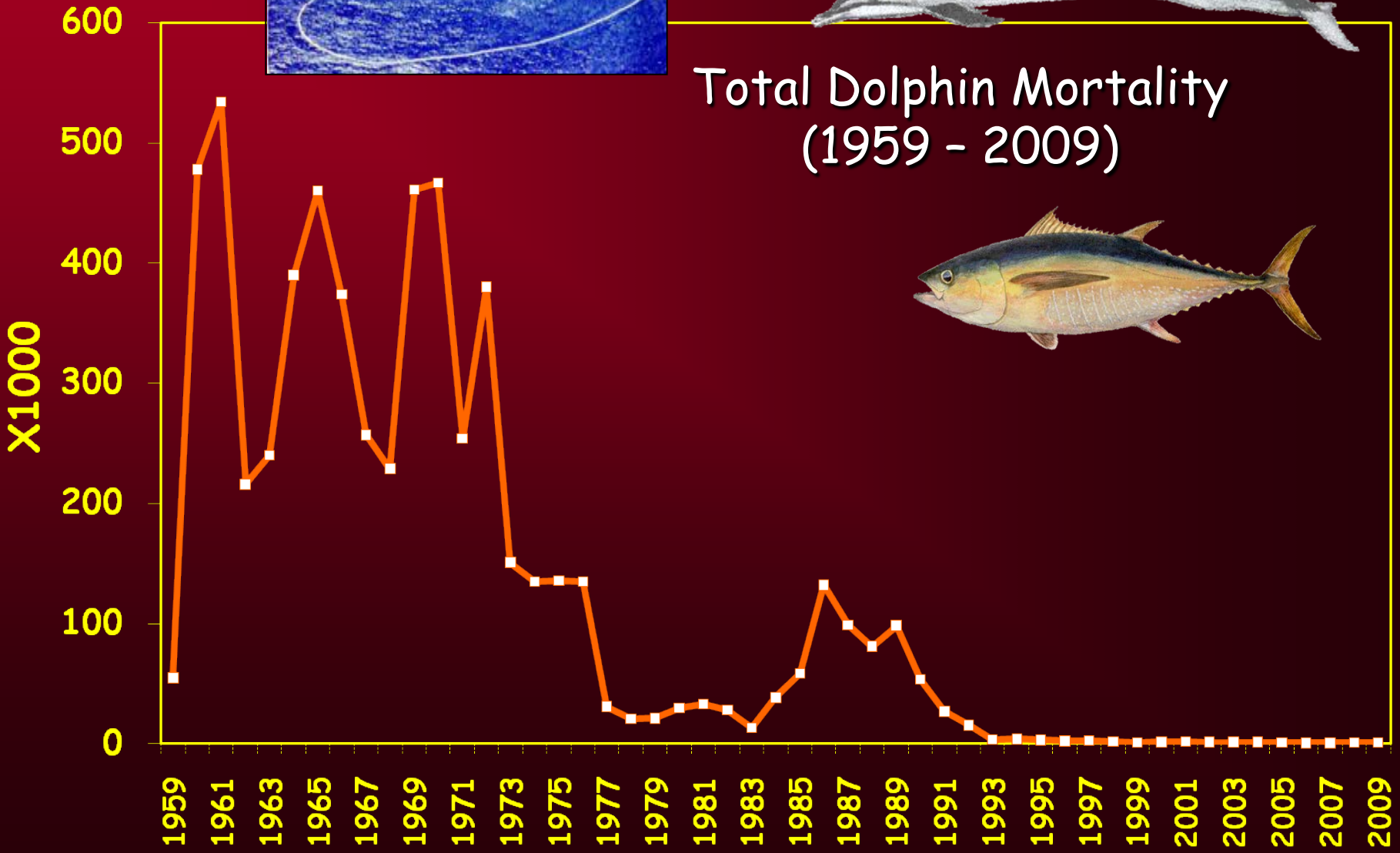
CAPTURE (in the gear)

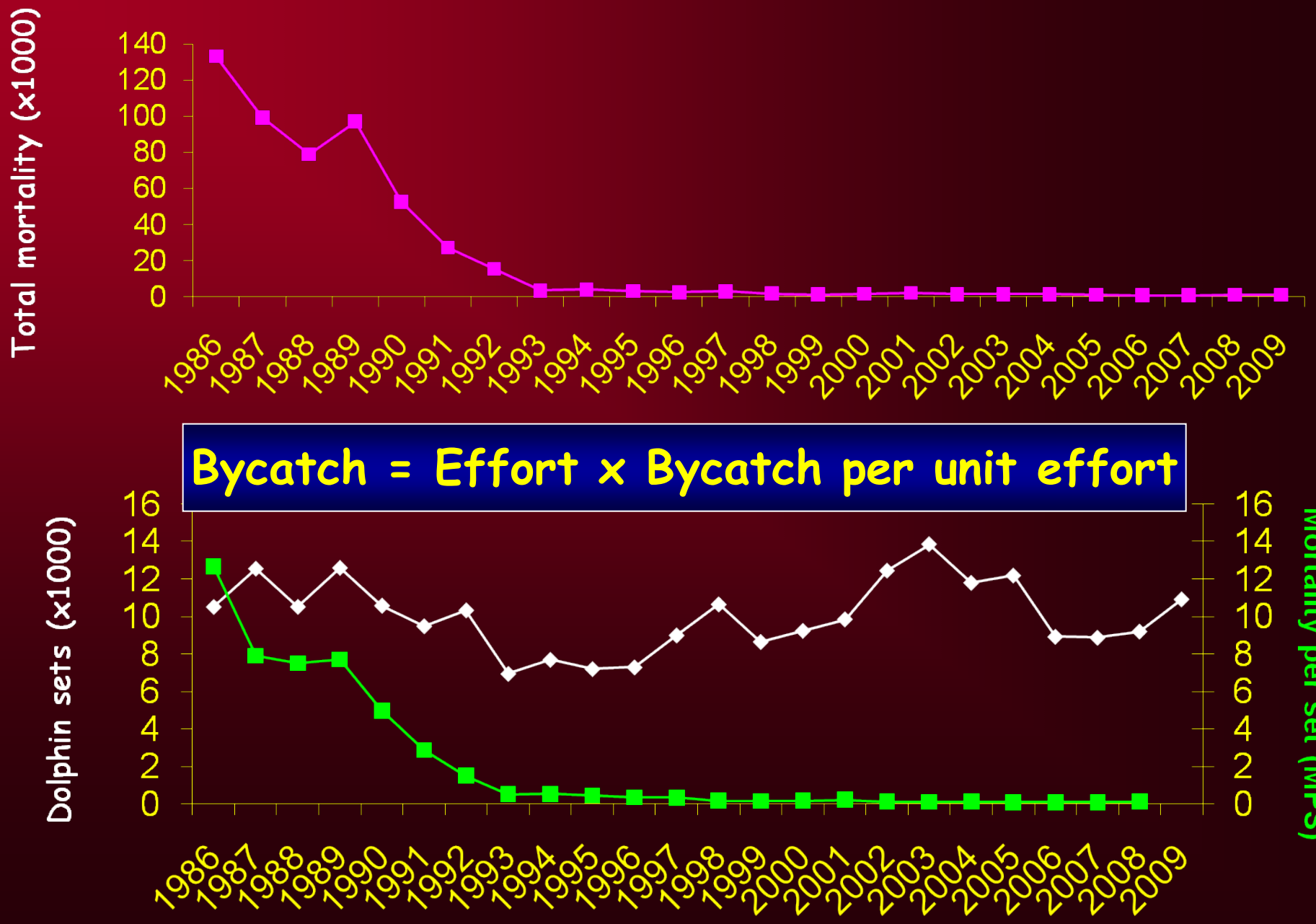



DOLPHINS

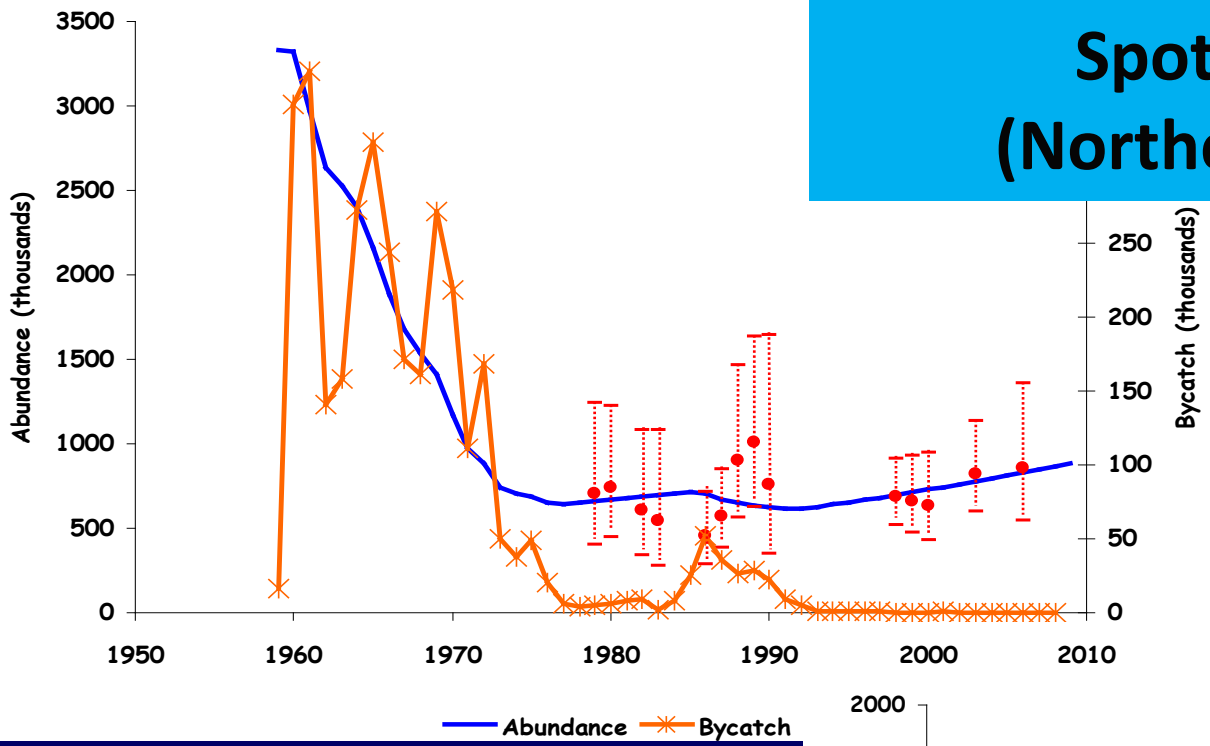


Total Dolphin Mortality (1959 - 2009)

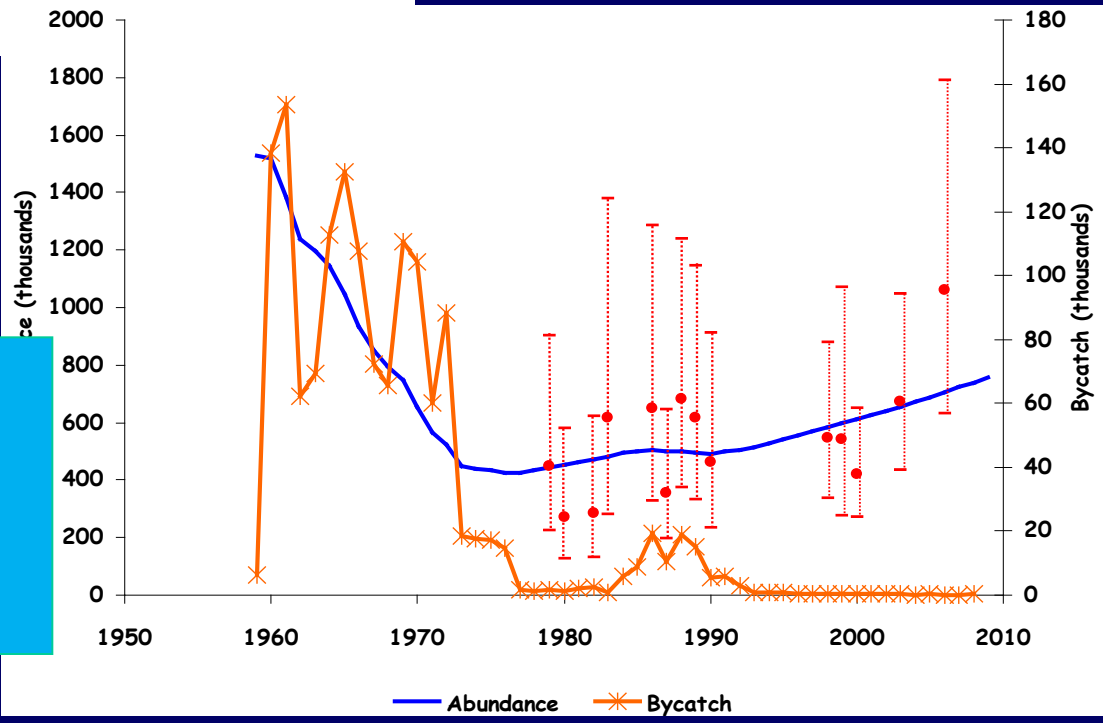



Total mortality (x1000)
140
120
100
80
60
40
20
0
1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009
Bycatch = Effort x Bycatch per unit effort
Dolphin sets (x1000)
Mortality per set (MPS)
16
14
12
10
8
6
4
2
0
1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009

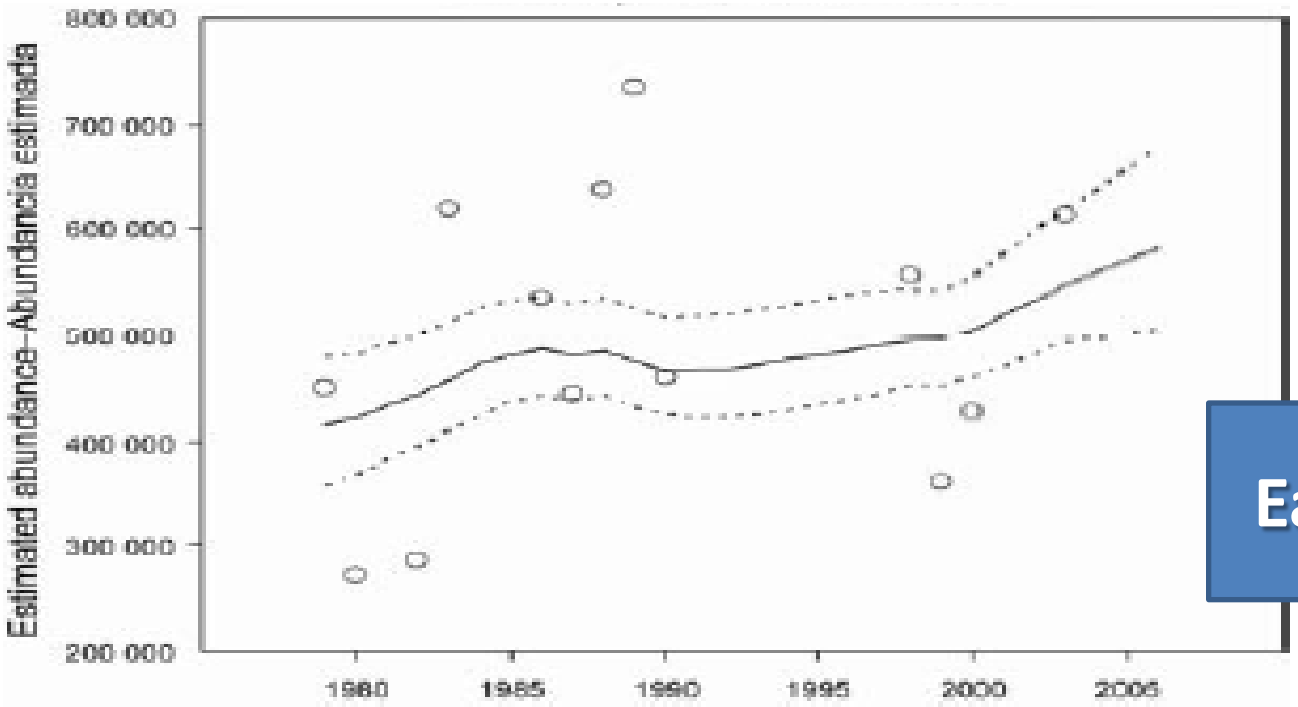
Spotted dolphin (Northeastern stock)



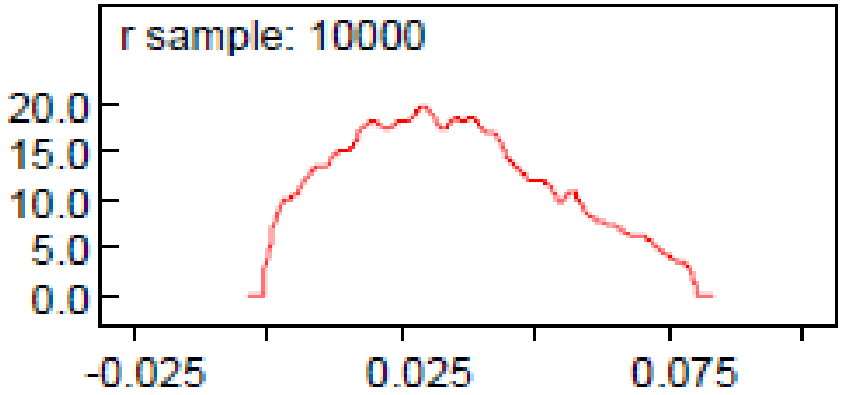
Spinner dolphin (Eastern stock)



Logistic model fitted to survey abundance estimates for eastern spinner dolphins

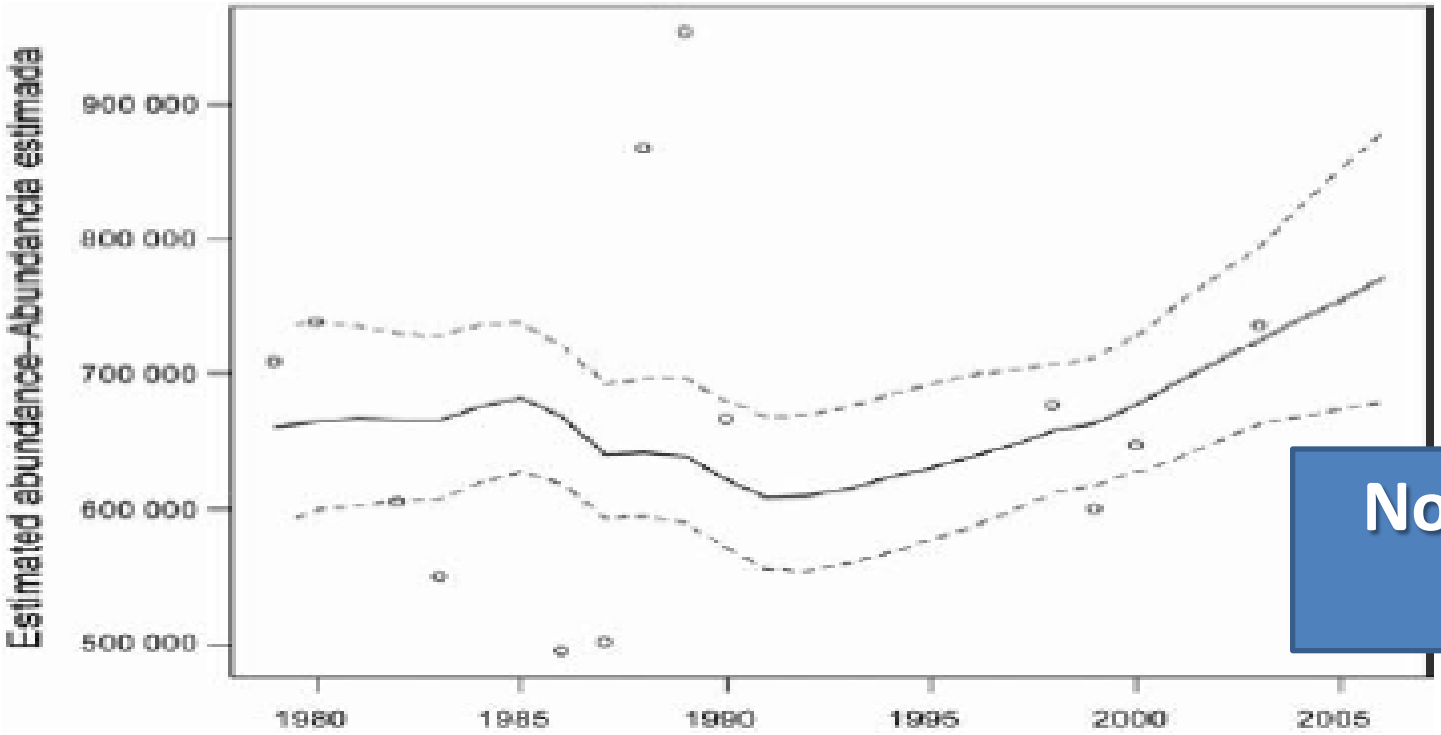


Eastern spinner

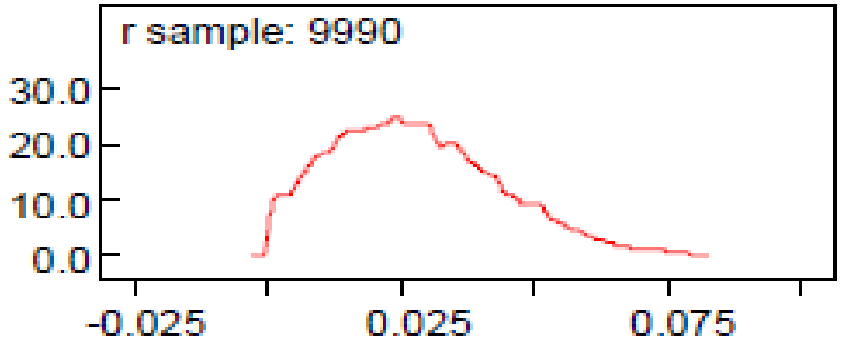


node	r
mean	0.03444
sd	0.01921
MCerror	3.617E-4
2.5%	0.002955
median	0.03298
97.5%	0.07369
start	1001
sample	10000

Logistic model fitted to survey abundance estimates for northeastern spotted dolphins



Northeastern spotted



node	r
mean	0.02787
sd	0.01579
MCerror	2.362E-4
10.0%	0.008181
25.0%	0.01576
median	0.02638
75.0%	0.038
90.0%	0.04981

Ecological cost of producing 1000 MT of tunas - 2009

Year: 2009	Bycatch per 1,000 MT tons tuna (3 spp.)			
Species	Dolphin sets		Log sets	
OFFSHORE SPOTTED	3.22	3	0.00	
EASTERN SPINNER	1.79	2	0.00	
WHITEBELLY SPINNER	1.37	1	0.00	
COMMON DOLPHIN	1.16	1	0.00	
OTHER DOLPHIN	0.15	0	0.00	
SAILFISH	3.46	3	0.16	
SWORDFISH	0.09	0	0.01	
BLACK MARLIN	0.29		1.82	2
STRIPED MARLIN	0.56		0.70	0
BLUE MARLIN	0.88		5.28	4
OTHER BIG FISH	0.12		24.84	25
MAHI MAHI	1.80		1,927.53	1,926
WAHOO	0.29		1,136.61	1,136
RAINBOW RUNNER	0.03		247.57	248
YELLOWTAIL	0.02		98.00	98
TRIGGER FISH	0.11		411.91	412
OTHER SHARKS	1.94	1	1.21	
WHITETIP SHARK	0.25		0.50	0
HAMMERHEAD SHARK	0.20		2.45	2
UNID. SHARK	2.03		12.90	11
MANTARAY	3.49	3	0.35	
STINGRAY	0.46	0	0.29	
SILKY SHARK	9.24		86.96	88
UNID. TURTLE	0.01		0.01	
OLIVE RIDLEY	0.01		0.04	0

GREENPEACE International

- Seafood home page
- News
- Understanding the problem
- Greenpeace International Seafood Red list
- What does sustainable mean?
- Testimonials
- Changing your business
- Glossary

Thousands of sharks and turtles wiped out for tinned tuna

12 August 2008 Print Send to a friend

Tuna Can from John West.

Enlarge Image

AMSTERDAM, Netherlands — John West, the UK's largest seller tuna, has been ranked bottom environmentally-friendly tinned league table published by Greenpeace today, due to the use of destructive fishing methods used to catch it. New research shows that John West's tinned tuna is often caught using aggregation devices', or FADs, responsible for wiping out thousands of sharks and turtles every year – including some rare and threatened species.

Greenpeace targets canned tuna in New Zealand

By SeafoodSource staff
27 April, 2011 – Back in Ja
ramped up its campaign u
Kingdom's canned-tuna b
harvested in a sustainab
manner.

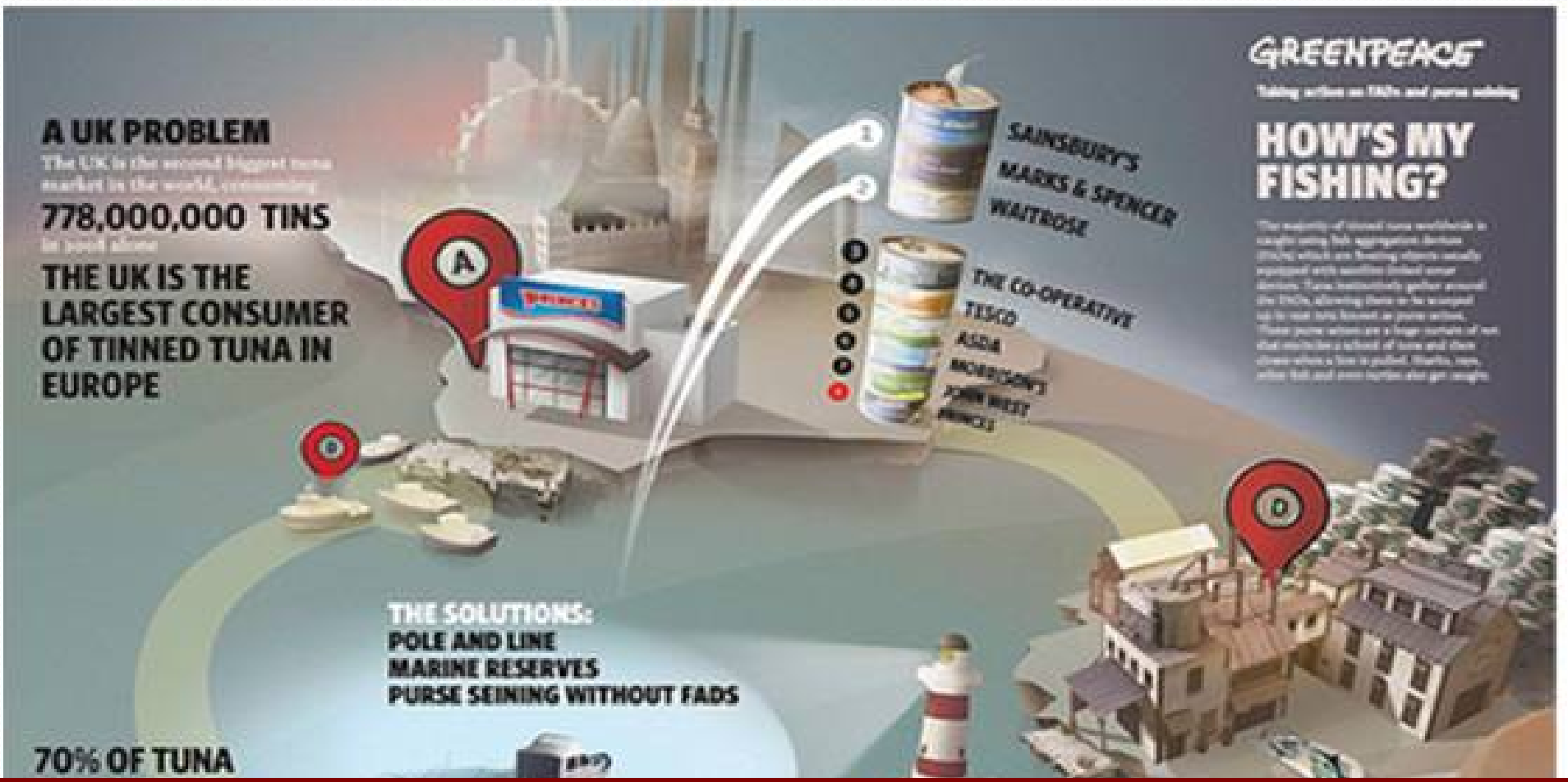
Now the environmenta
taking its message to
country's canned-tu
Sealord, Greenseas
brands sold at Ne
supermarket chai
Enterprises.

Greenpeace Calls for Urge ... on Fish Aggregation Devices to Save Pacific Tuna

Press release - August 20, 2010

Amsterdam, August 20, 2010- The Pacific skipjack tuna that provides some 55% of the world's tinned tuna is now facing declines along with the Pacific bigeye and yellowfin tuna, according to reports (1) presented at the Science Committee meeting of the Western Central Pacific Fisheries Commission (WCPFC) in Tonga this week.

A record 2,467,903 million metric tons of tuna were caught in the Pacific last year. Of this, 73% was skipjack tuna mainly caught by large purse seine fleets using fish aggregation devices (FADs). The method is meant to increases catch levels and efficiency. It results in large numbers of turtles and sharks being caught together with juvenile tuna.



more than 70 percent of the United Kingdom's major canned tuna brands have committed to sustainable tuna fishing, claimed Greenpeace.

Bycatches in the eastern Pacific FAD fisheries

- Species involved
- Significance
- Options for mitigation

Discards by major types of fishery

FAO Kelleher

Fishery	discard *(%)*
Shrimp trawl	62.3
Demersal finfish trawl	9.6
Tuna and HMS longline	28.5
Midwater (pelagic) trawl	3.4
Tuna purse seine	**5.1**
Mobile trap/pot	23.2
Dredge	28.3
Small pelagics purse seine	1.2
Demersal longline	7.5
Tuna pole and line	0.4

2 %

2009 Capture 500,000 MT Bycatch 9,300 MT

Capture 2009

Species	Dolphin	School	Log	All Sets
	Total capture			
OFFSHORE SPOTTED	518	0	0	518
EASTERN SPINNER	288	0	0	288
WHITEBELLY SPINNER	221	0	0	221
COMMON DOLPHIN	186	2	0	188
OTHER DOLPHIN	24	0	0	24
SAILFISH	748	78	51	877
SWORDFISH	15	7	3	25
BLACK MARLIN	58	27	484	569
STRIPED MARLIN	92	20	156	268
BLUE MARLIN	154	63	1,226	1,443
OTHER BIG FISH	25	484	6,058	6,567
MAHI MAHI	429	1,790	473,286	475,505
WAHOO	54	137	269,715	269,906
RAINBOW RUNNER	5	0	55,454	55,459
YELLOWTAIL	3	1,518	21,298	22,819
TRIGGER FISH	16	510	101,125	101,651
OTHER SHARKS	301	129	266	695
WHITETIP SHARK	37	2	121	160
HAMMERHEAD SHARK	36	77	587	700
UNID. SHARK	298	126	2,804	3,228
MANTARAY	792	202	79	1,074
STINGRAY	122	18	70	210
SILKY SHARK	1,103	662	20,541	22,307
UNID. TURTLE	1	1	2	4
OLIVE RIDLEY	2	0	9	11

Average Annual Bycatch Nr. Individuals (1993-2009)

Type of set	Dolphin sets	Unassociated Set	FOB Sets	TOTAL
BILLFISHES	322	383	429	1,134
LARGE FISHES				
MAHI MAHI	998	4,551	263,548	269,097
WAHOO	113	373	118,372	118,859
RAINBOW RUNNER	8	942	88,326	89,186
YELLOWTAIL	947	8,917	27,474	37,338
OTHER BIG FISH	188	9,696	5,711	15,596
SHARKS and RAYS				
SILKY SHARK	1,101	2,958	19,241	23,301
WHITETIP SHARK	120	185	2,706	3,011
HAMMERHEAD SH.	65	219	1,088	1,373
Unid/Other Shark	684	566	2,619	3,869
MANTA RAY	717	2,751	111	3,579
STING RAY	198	784	114	1,096
SEA TURTLES	10	19	50	78


FADS

FADs seeded and set on

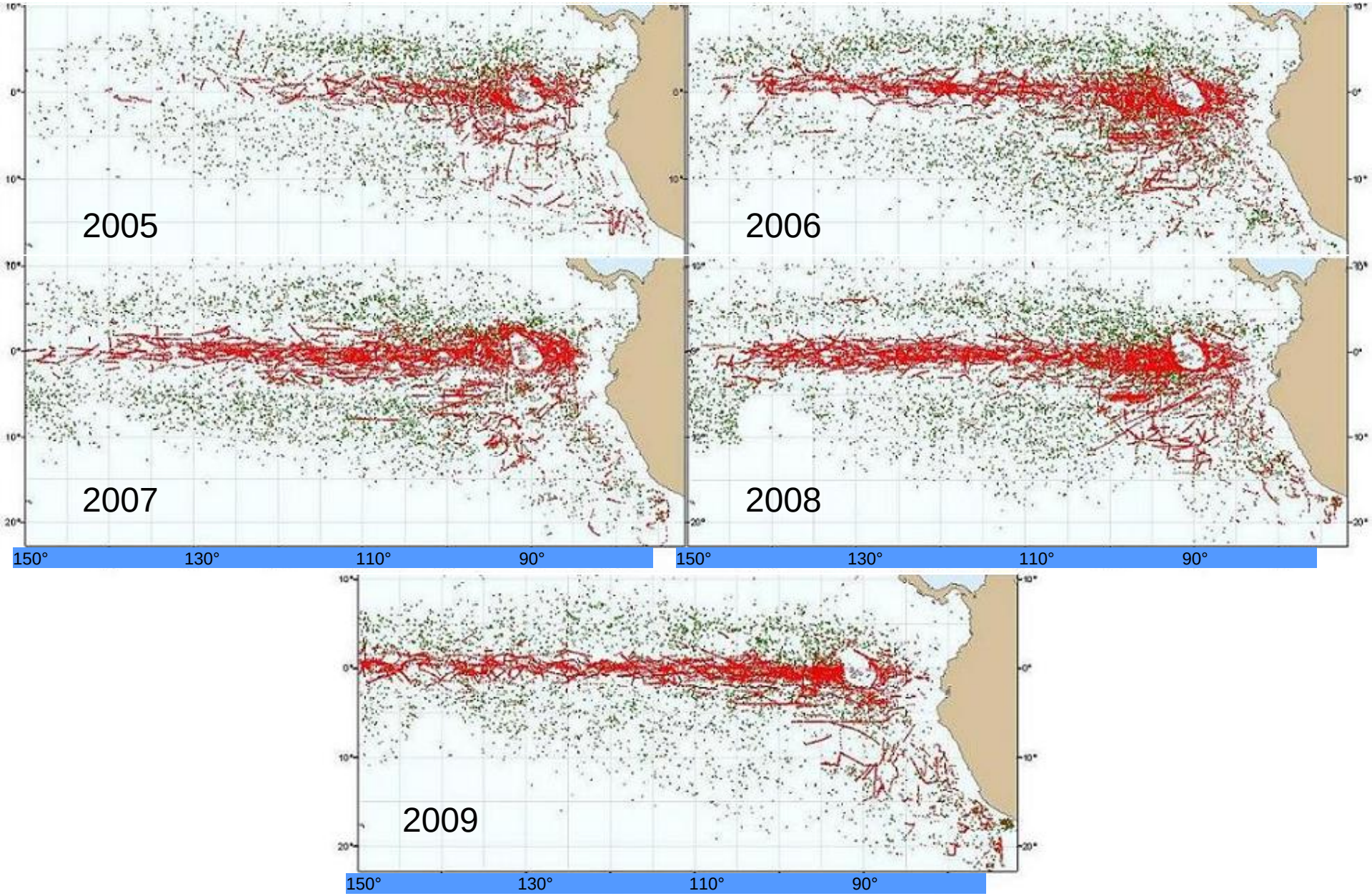


FIGURE 25

Proportion of unsuccessful “Skunk” sets (Capture = 0 MT) 2005 – 2009 in two areas - EPO

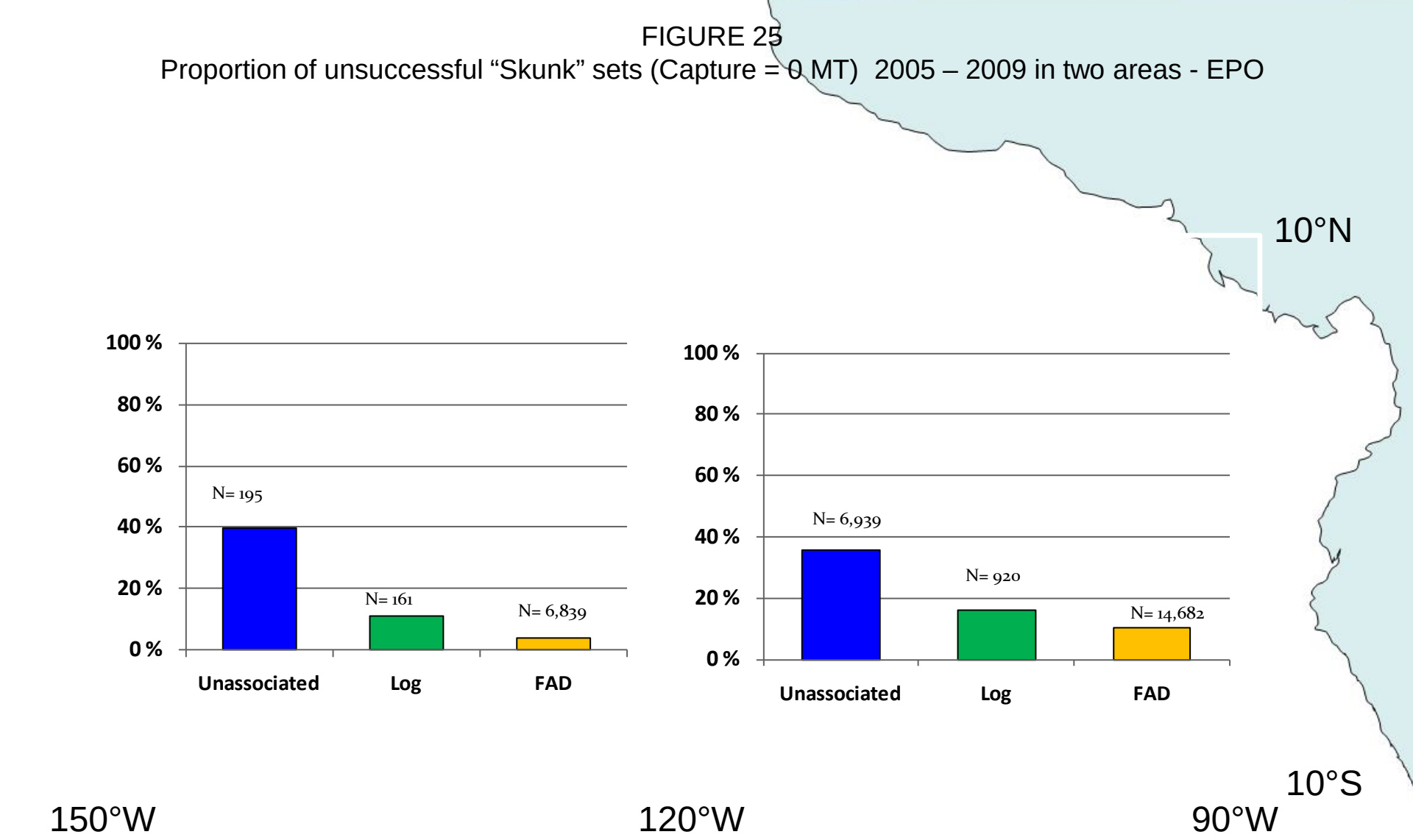
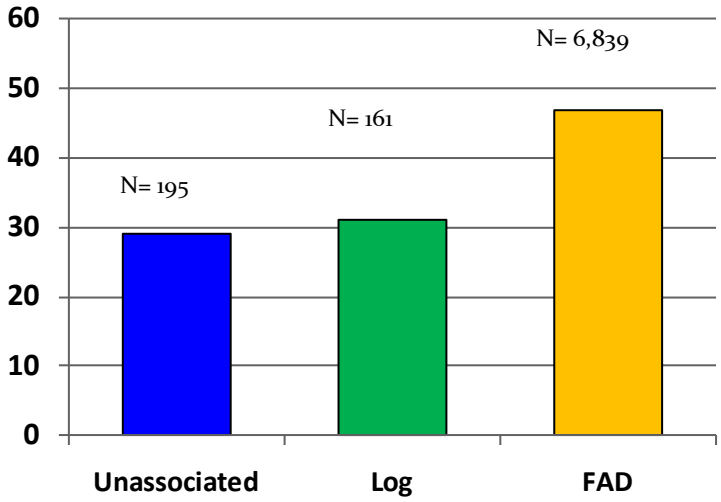
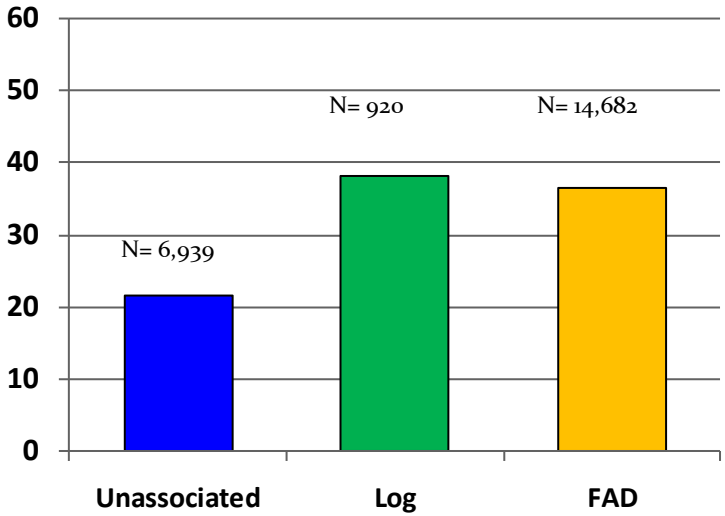


FIGURE 26
Capture per set (MT). Years 2005 – 2009 in two areas - EPO





10°N

10°S

150°W

120°W

90°W

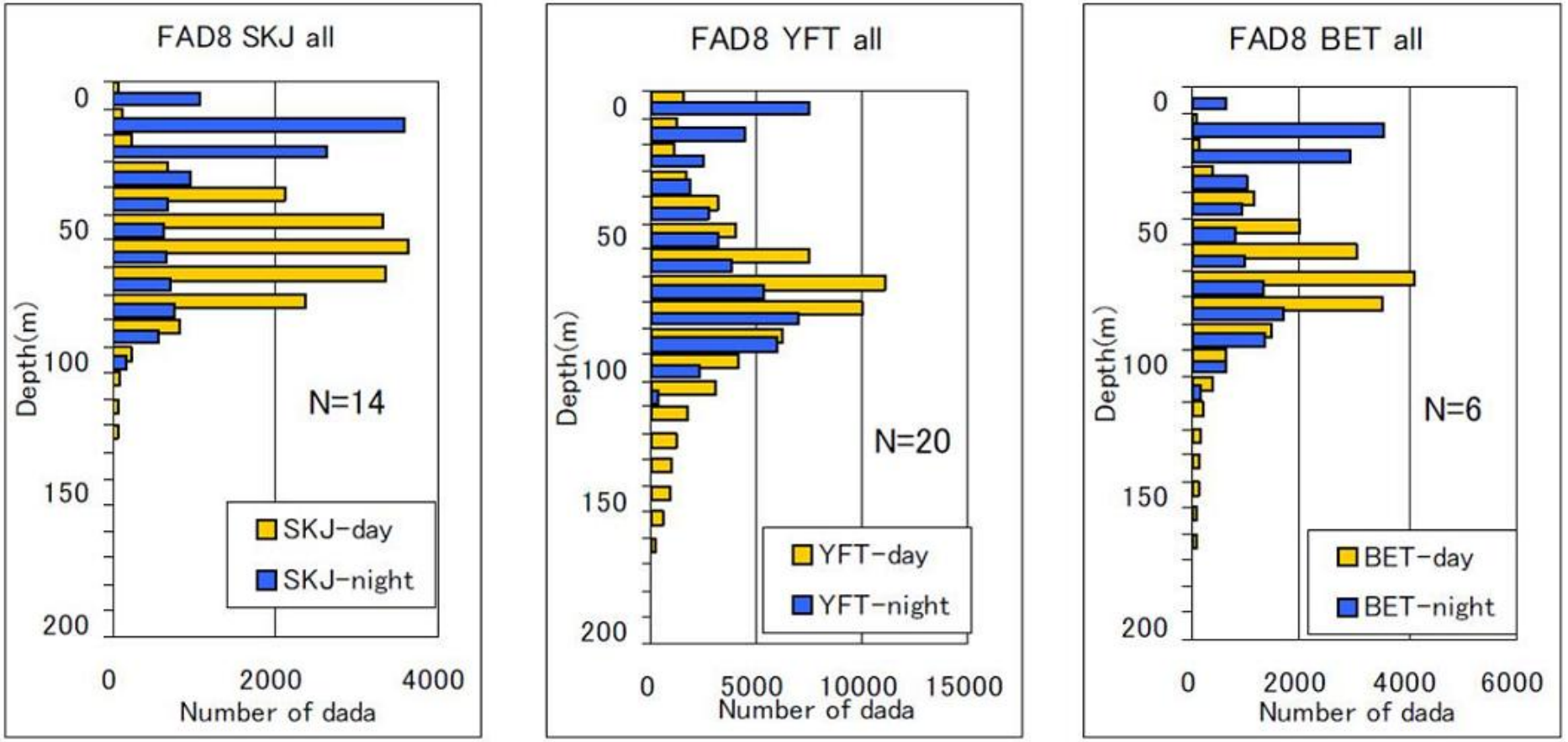
Number of FADs deployed and removed

Nr FADs	2006	2007	2008	2009
Deployed	7,999	8,521	9,909	10,394
Removed	6,072	7,496	8,252	8,420


SORTING GRIDS

FIGURE 47

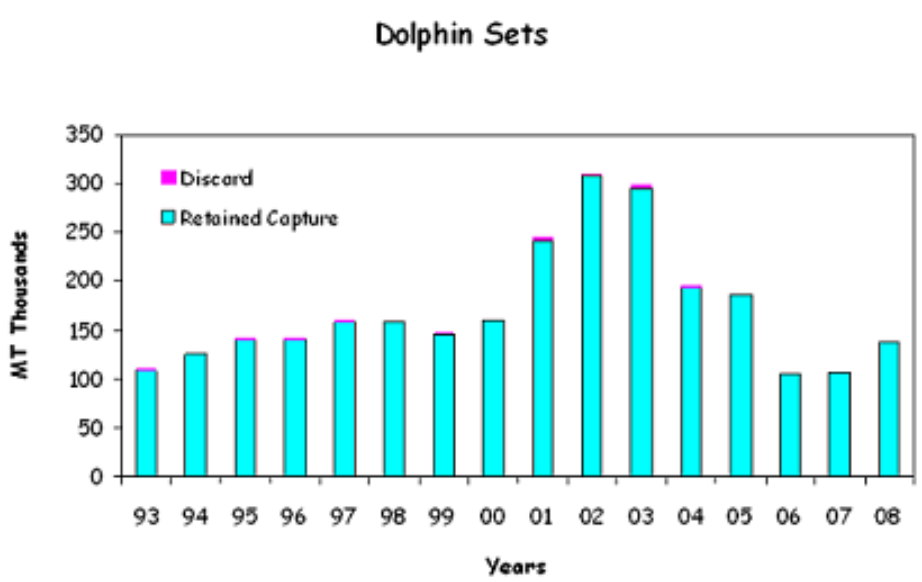
Vertical distribution of the three tuna species around drifting FADs (Matsumoto *et al.*, 2006)

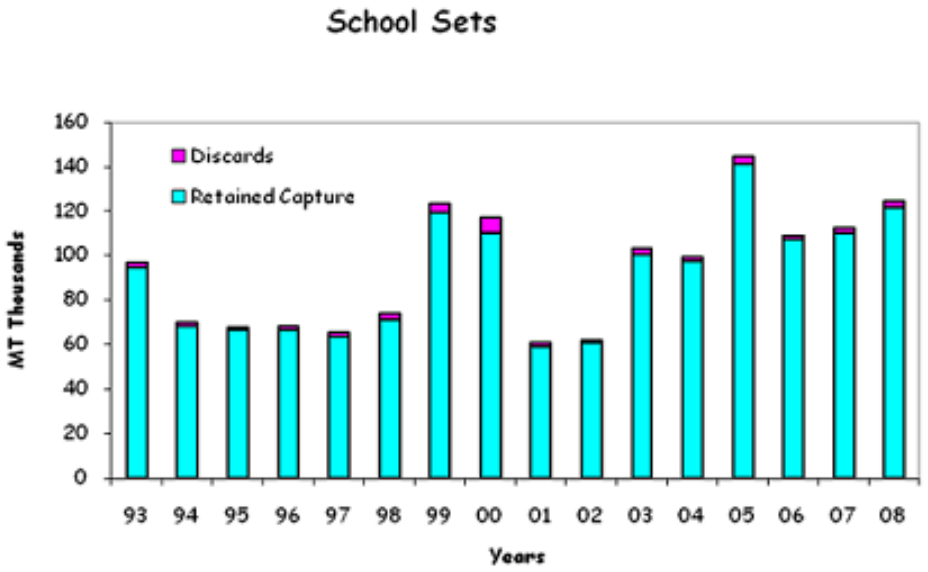


Source: Matsumoto et al. (2006)

FIGURE 59

Catches and bycatches (YFT, SKJ, BET) 1993 - 2008





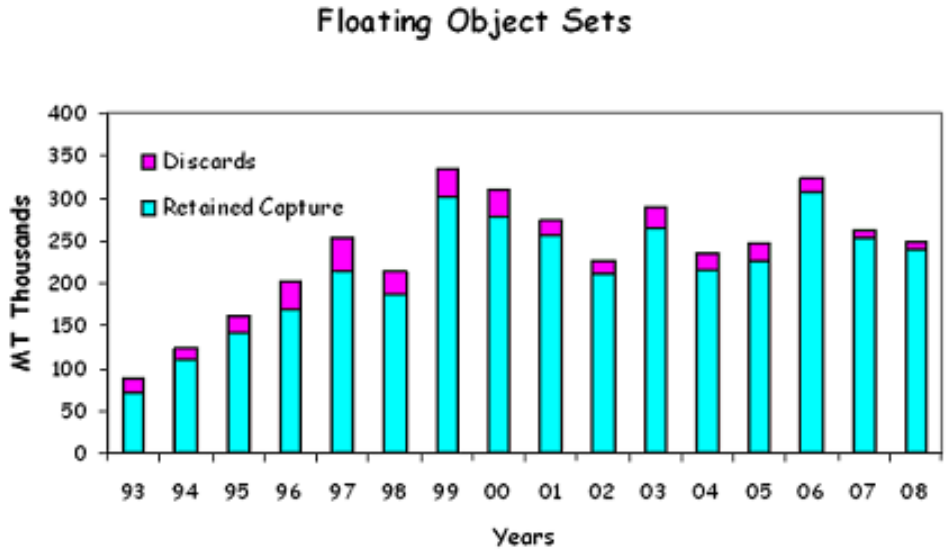


FIGURE 60

% (Capture of small tuna species/total tuna species) Sets on Floating objects (2001 – 2009)

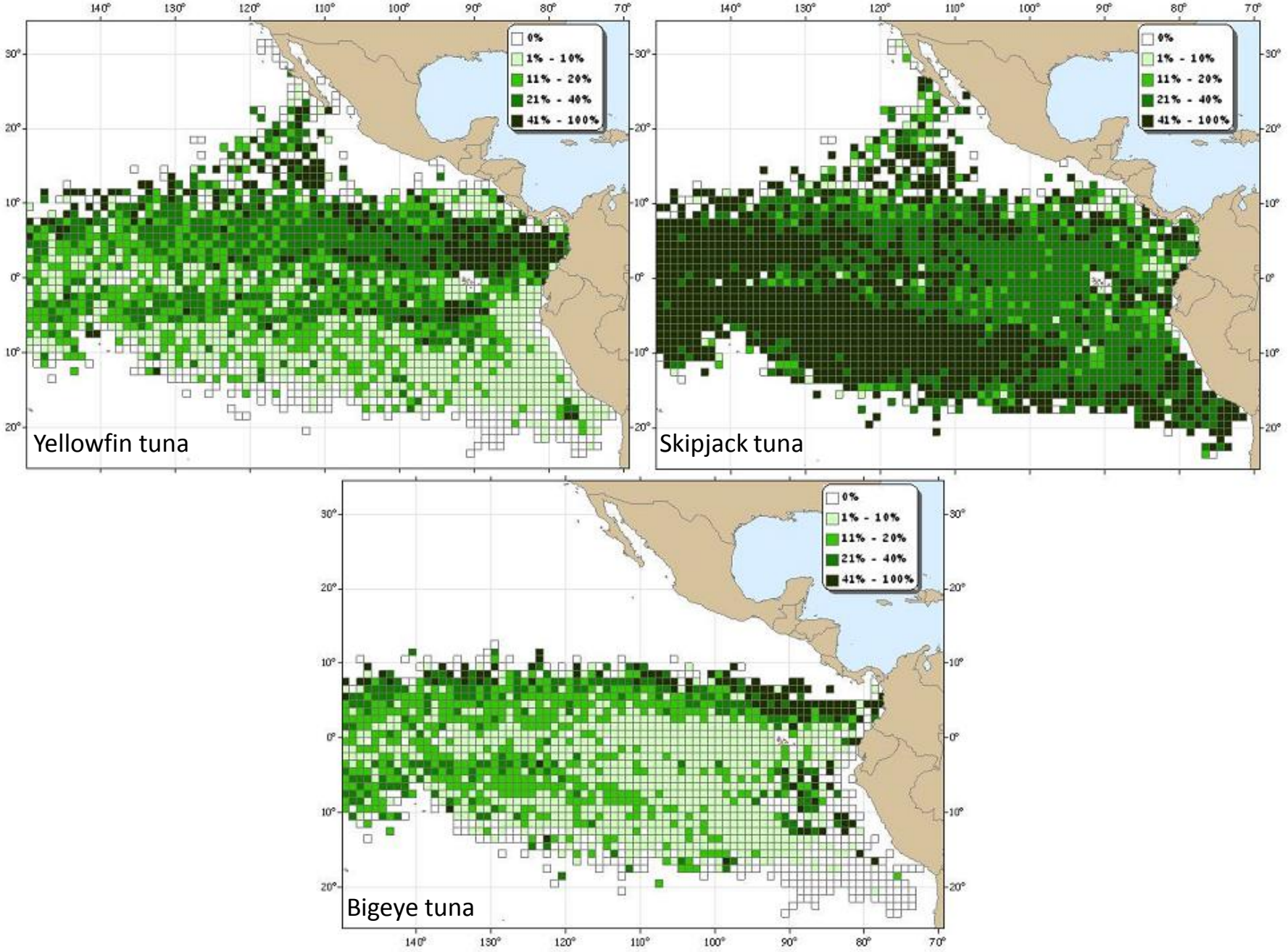
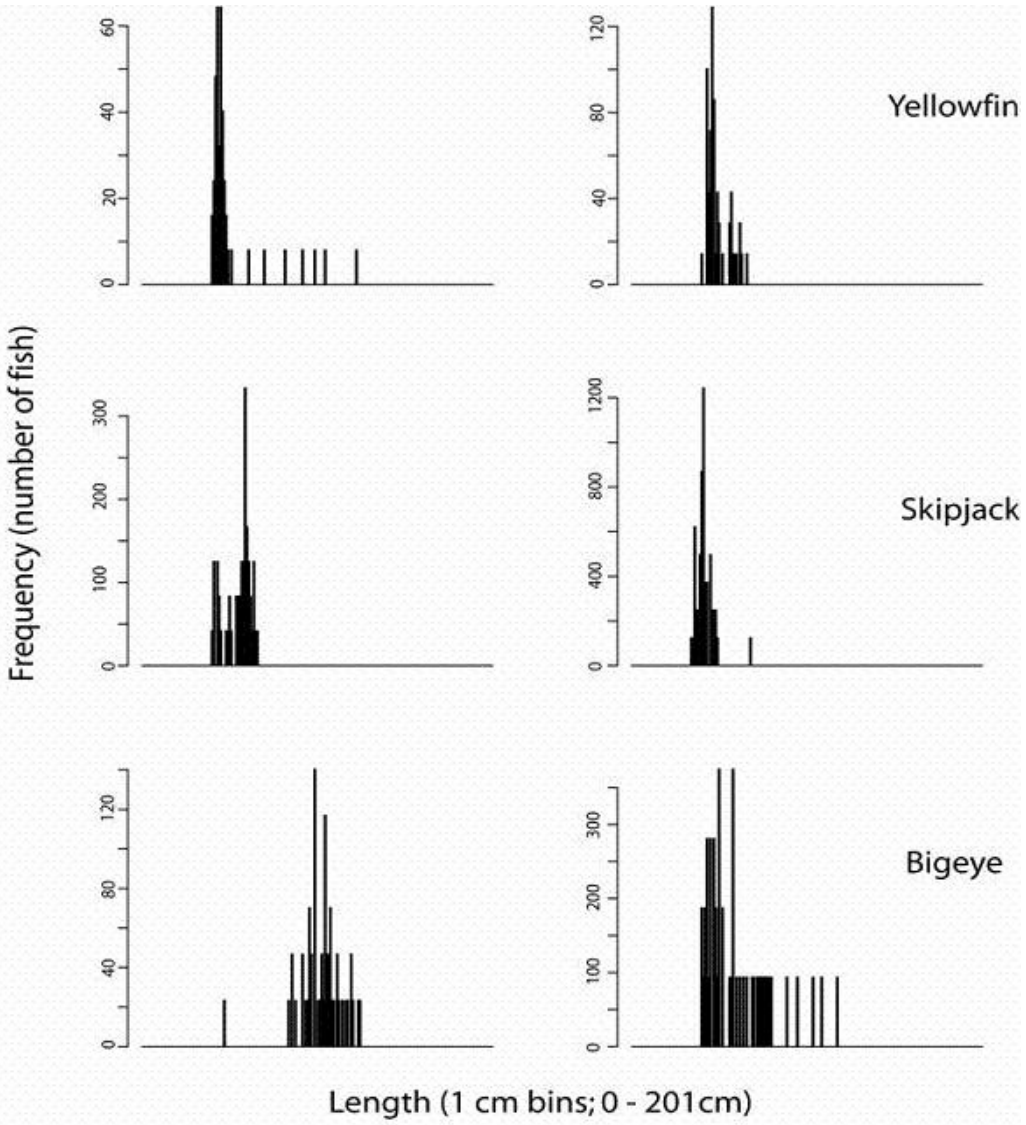


FIGURE 61

The selectivity dilemma: Two length frequency samples from sets on Floating objects - EPO



Two length frequency samples, each with the three species.
Both from floating object sets (class 6), but different vessels, areas.

C. Lennert-Cody

FIGURE 64
Diagram of sorting grid for tuna purse seine and proposed location

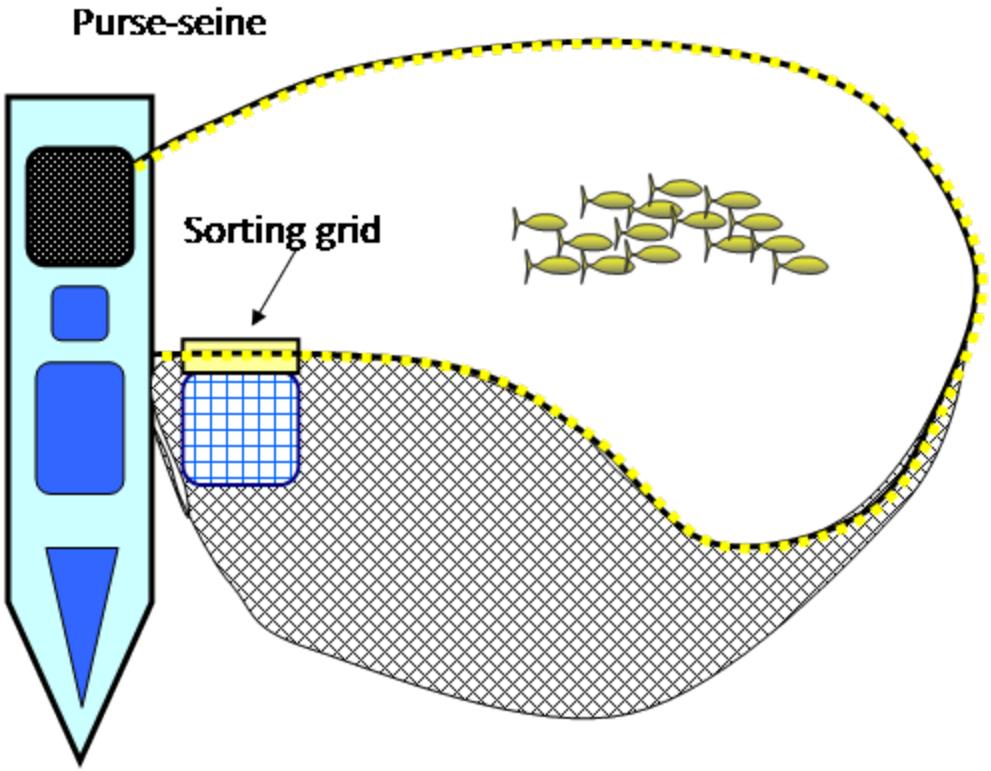


FIGURE 65
Flexible sorting grid going through the power block

FIGURE 66
Arrue's sorting grid. Details of construction

FIGURE 70
Nelson's design. Flexible PVC panels

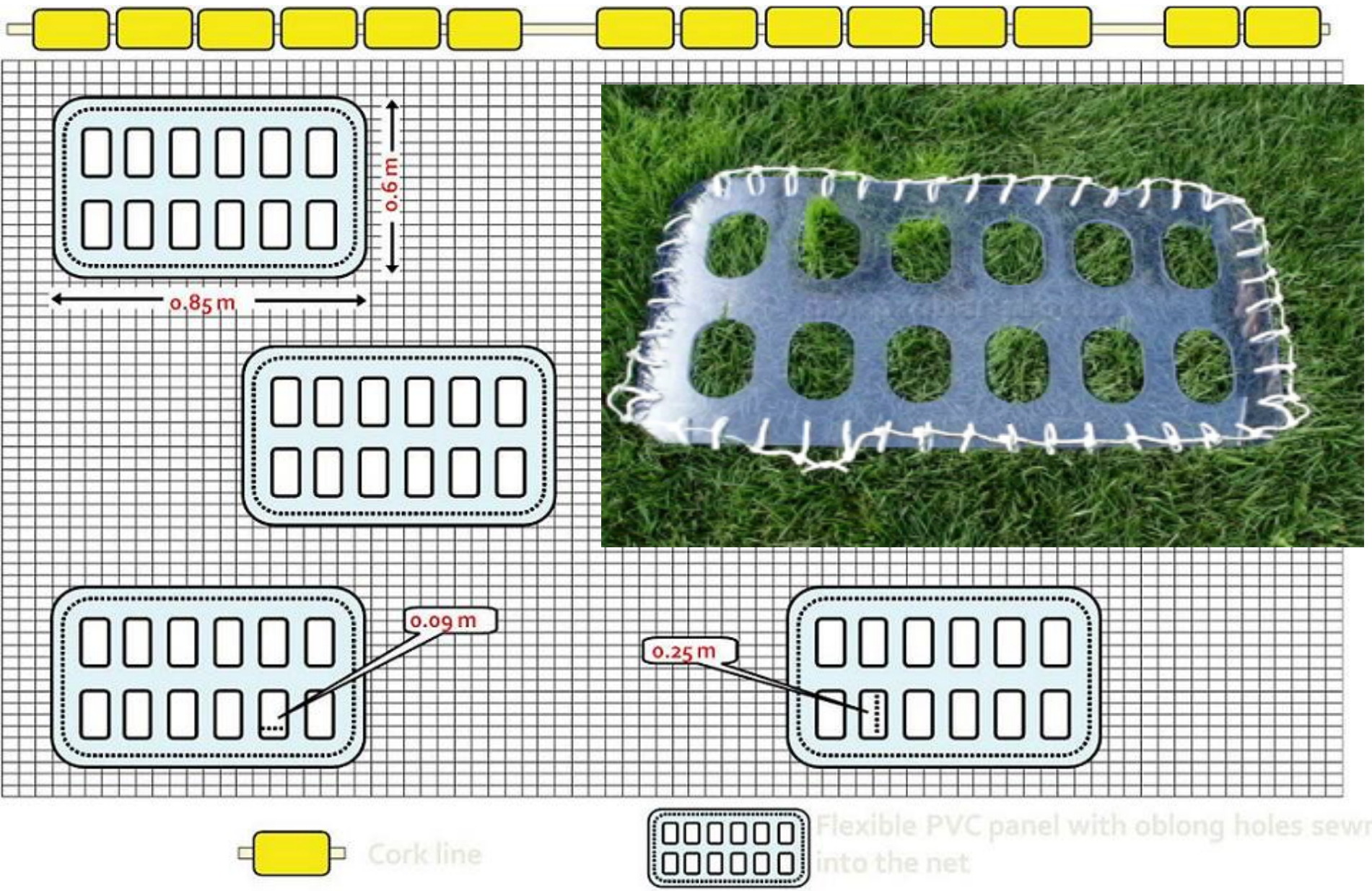
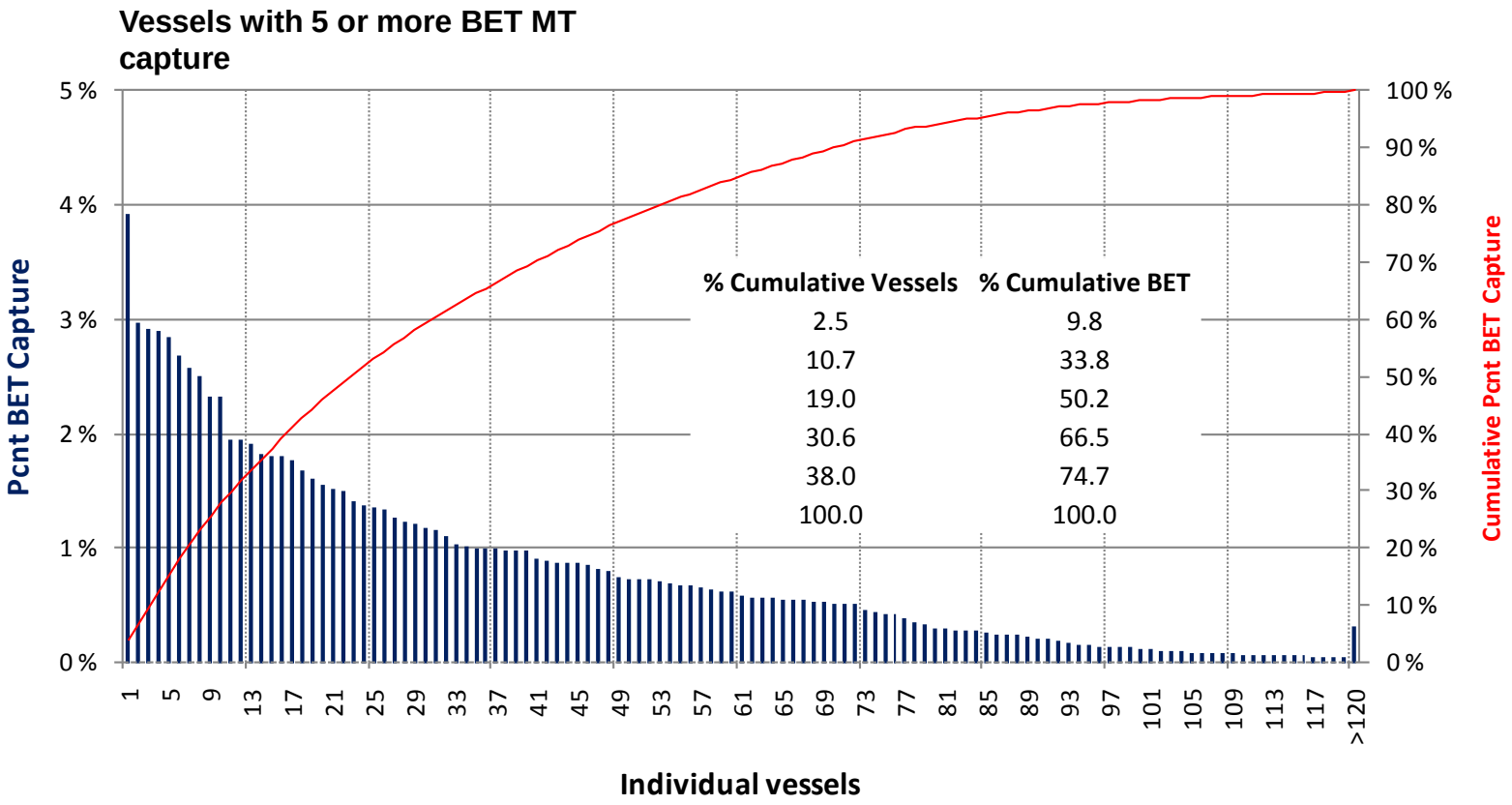


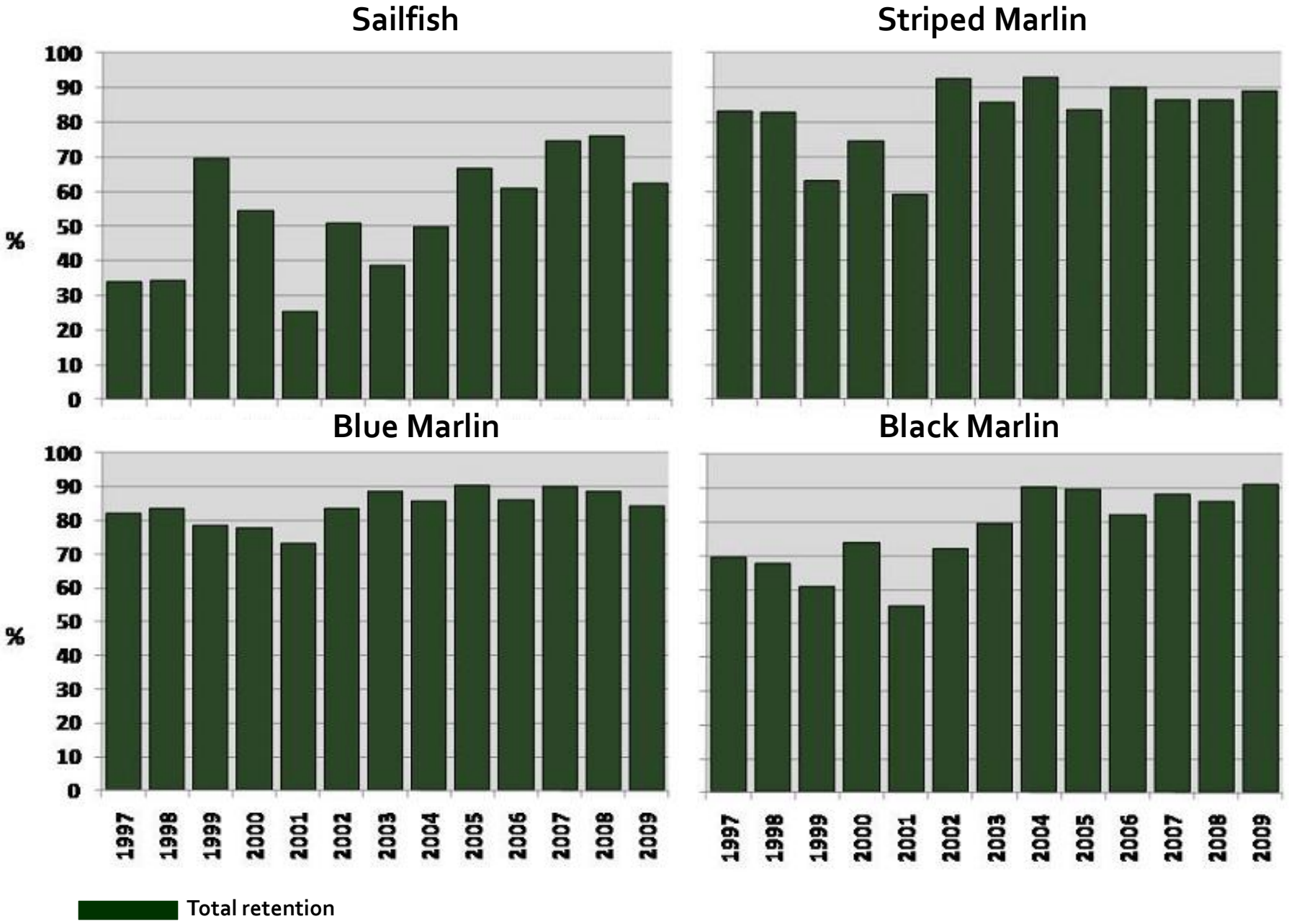
FIGURE 74
Zachariassen's grid used in trawls

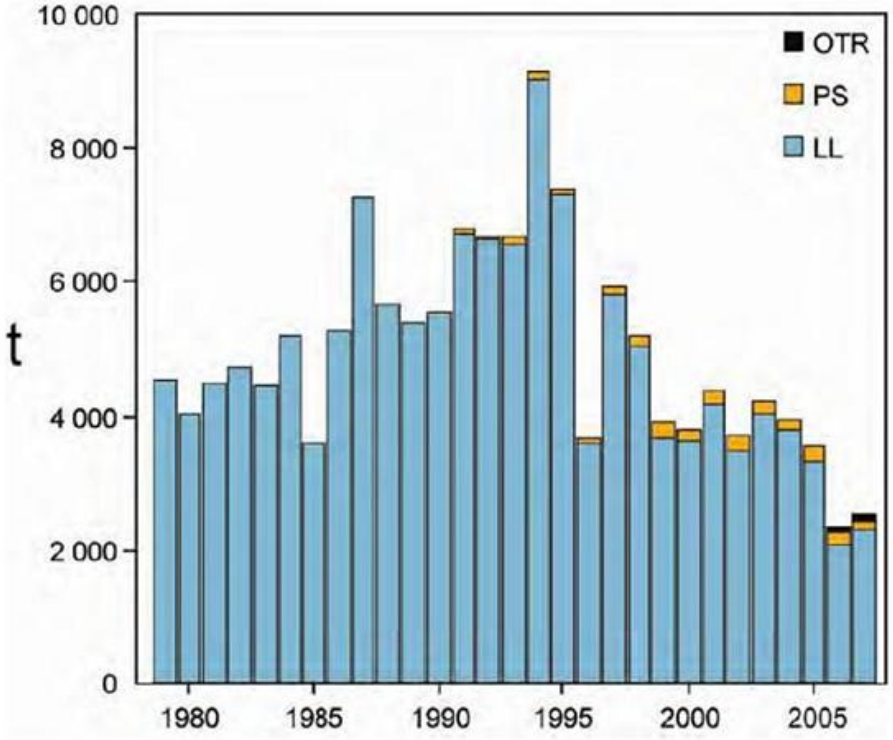
FIGURE 81
Proportion of total BET capture by vessels during 2005 – 2009 in the EPO




BILLFISHES

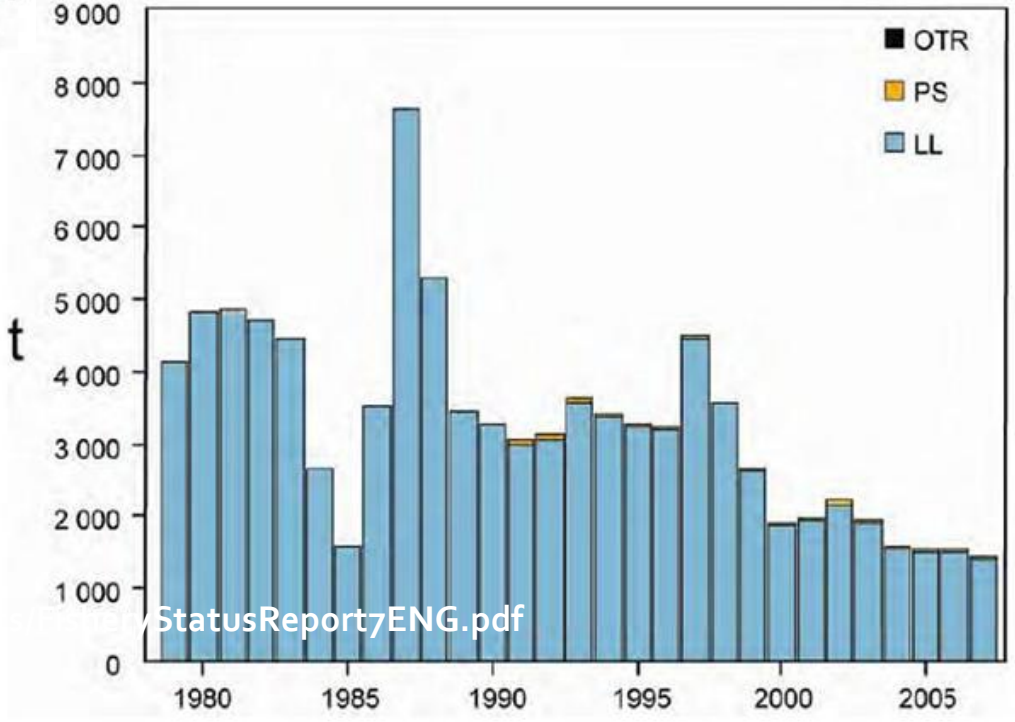
Percent retained of the billfish captures



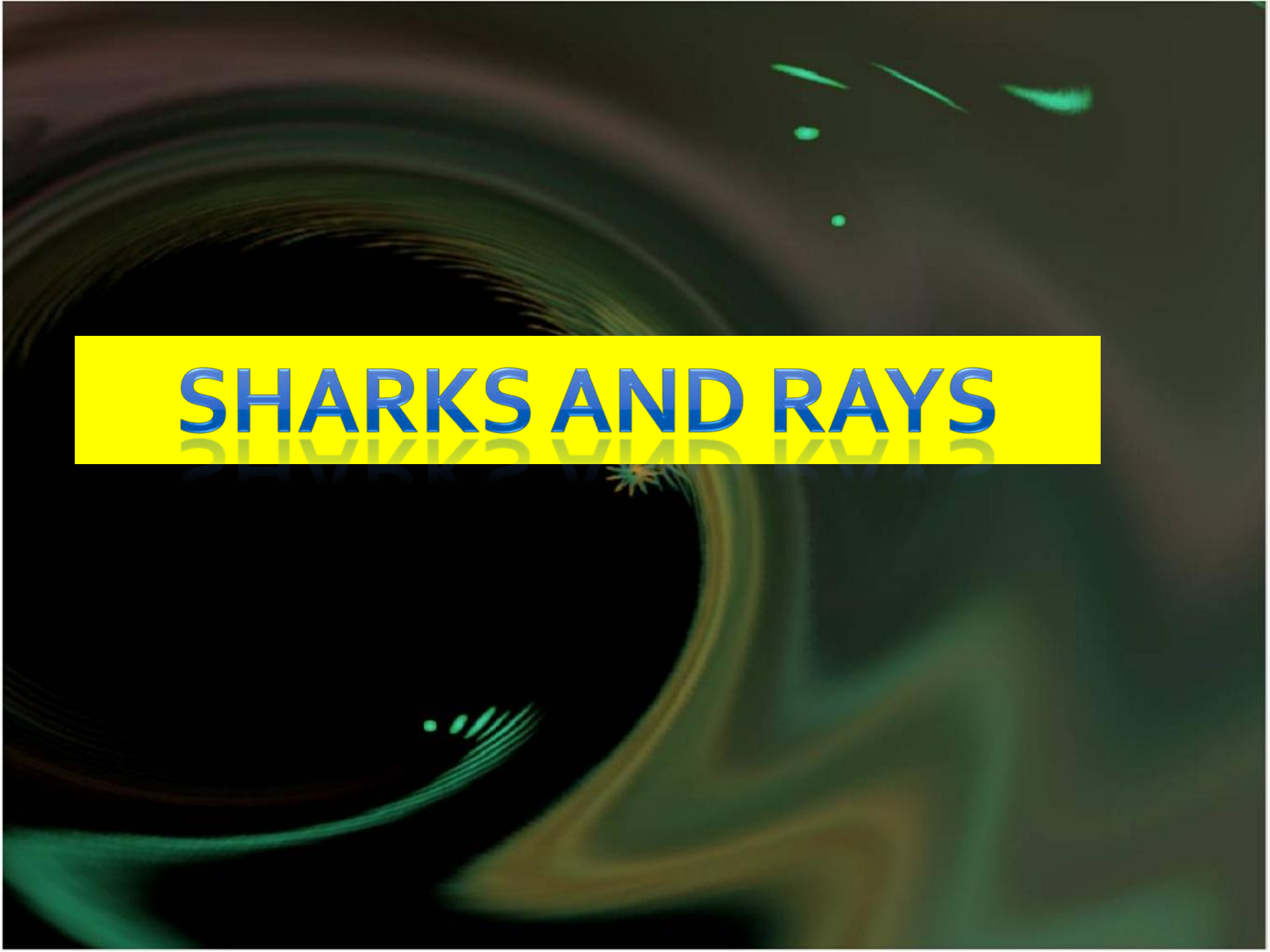


Retained catches of blue marlin by gear type EPO 1979 – 2007

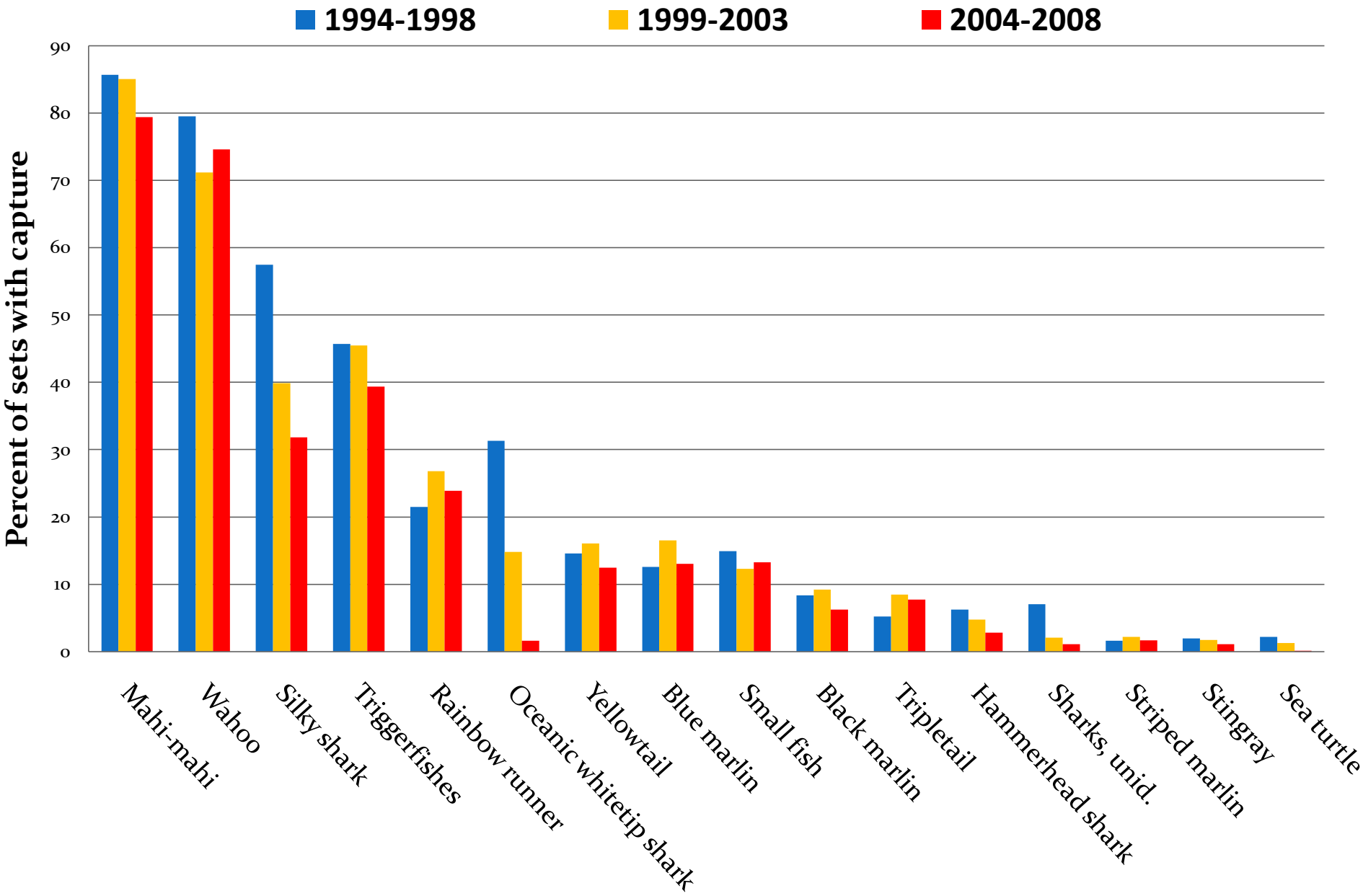
Retained catches of striped marlin by gear type EPO 1979 - 2007



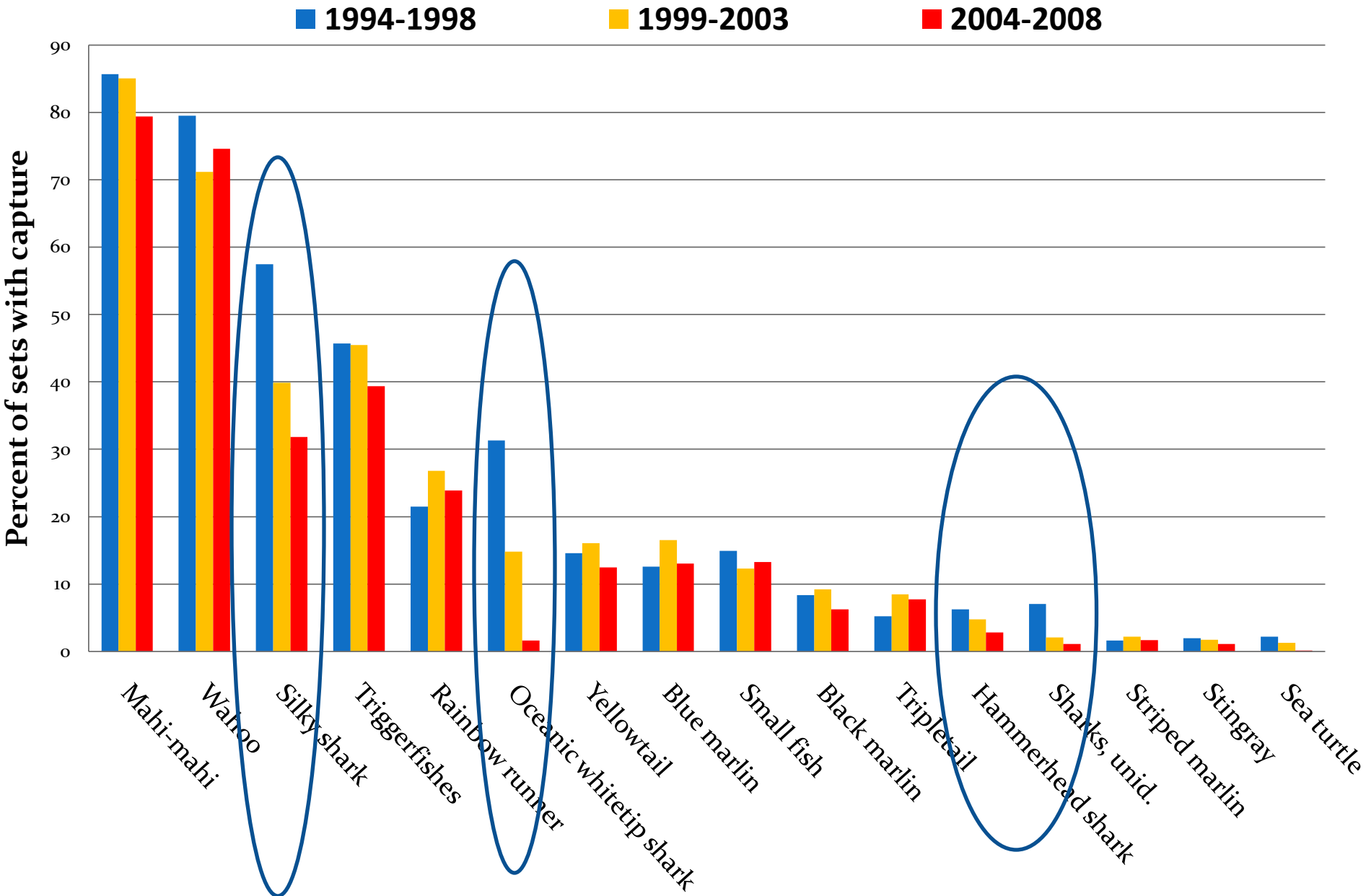
StatusReport7ENG.pdf

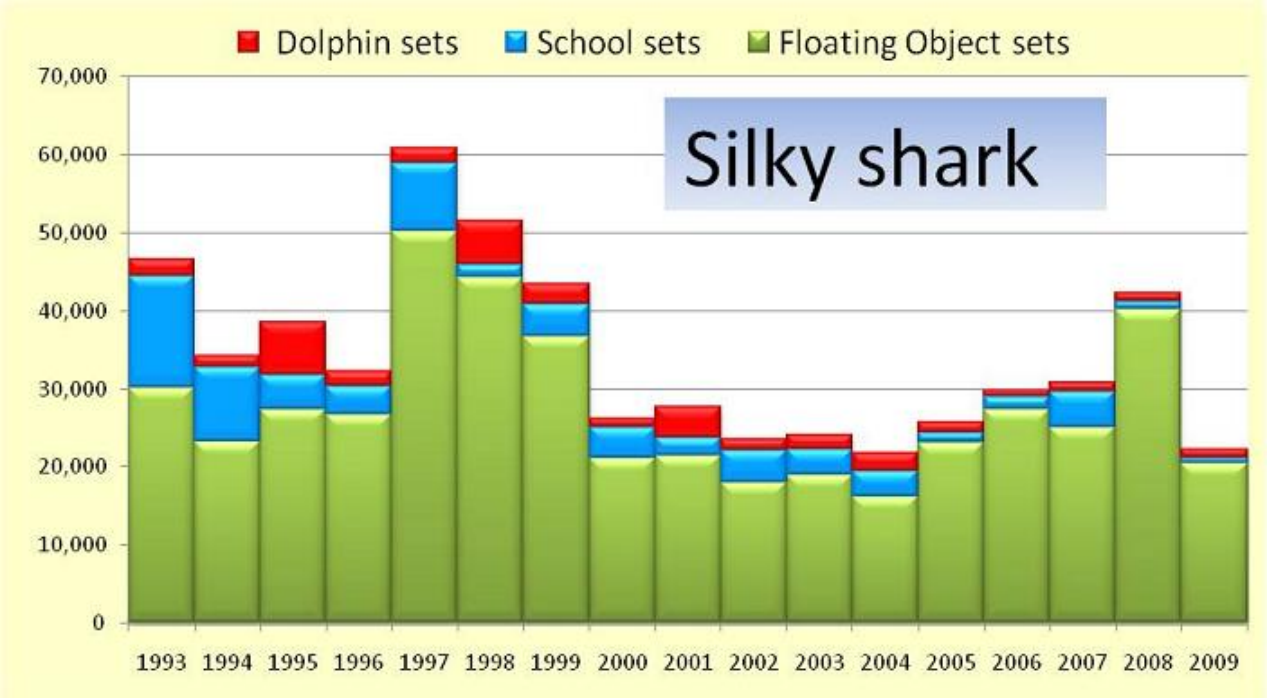

SHARKS AND RAYS

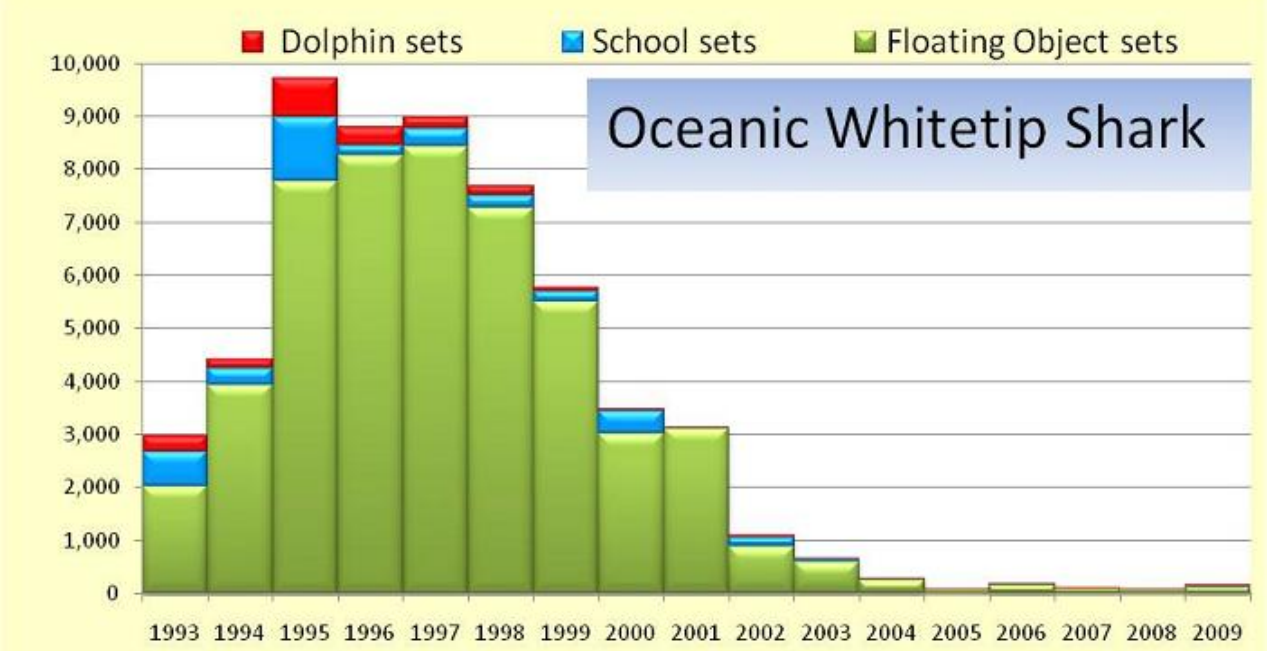
Capture probability: FAD sets



Capture probability: FAD sets



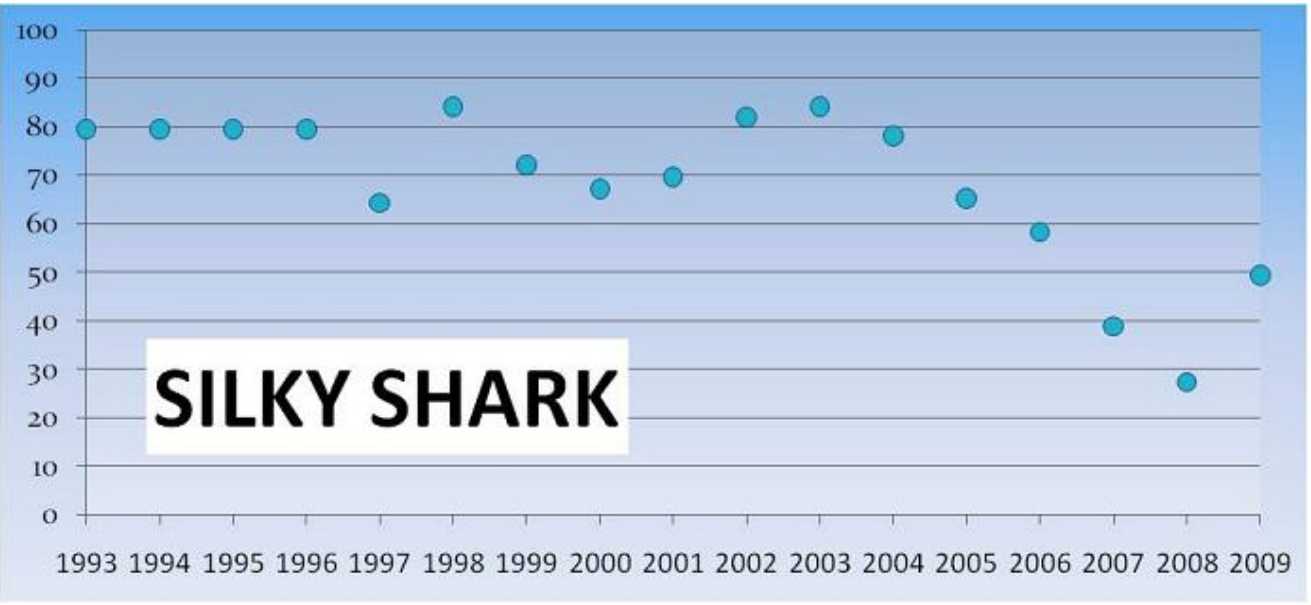


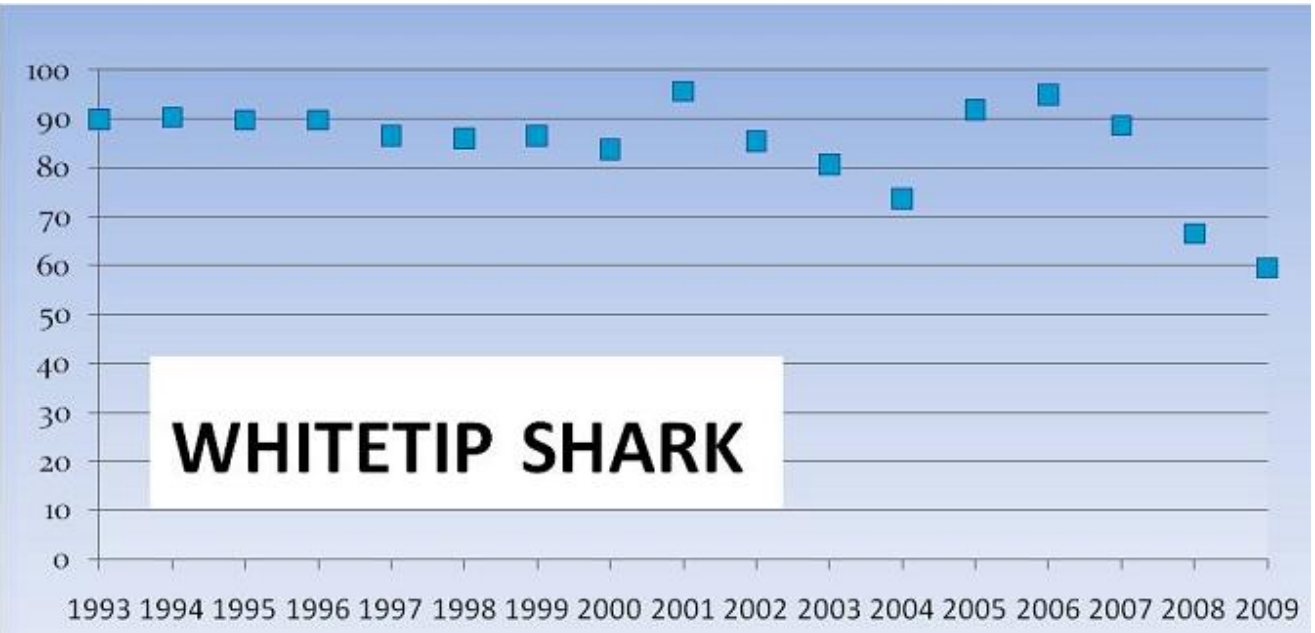


Annual shark captures in numbers

<u>Notice</u>
different scales

% discarded (Bycatch)

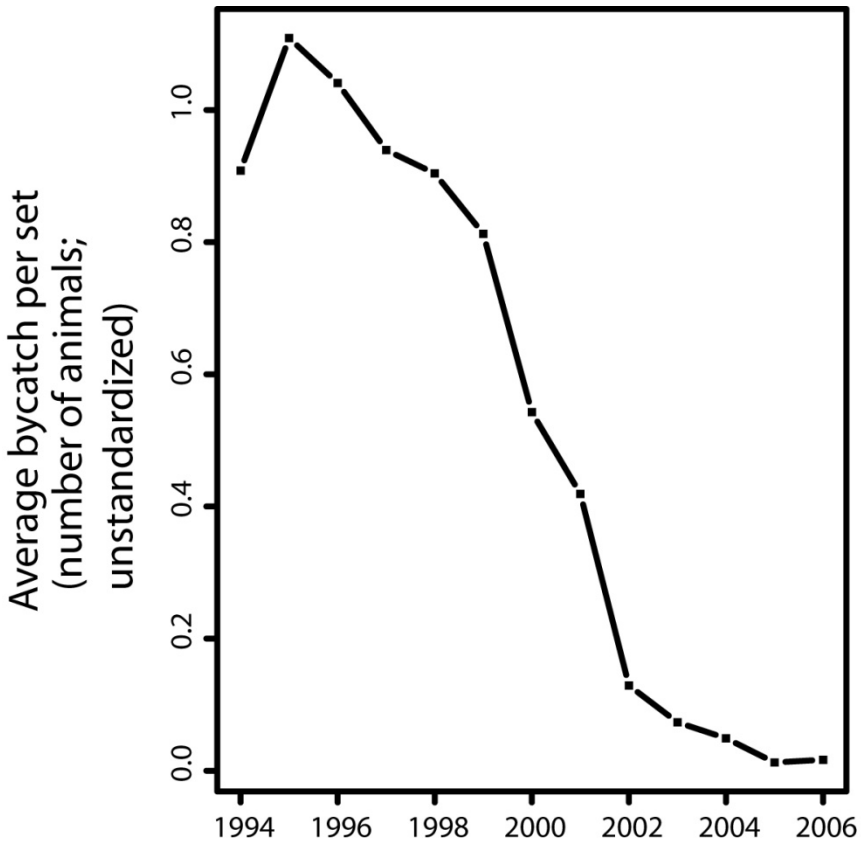


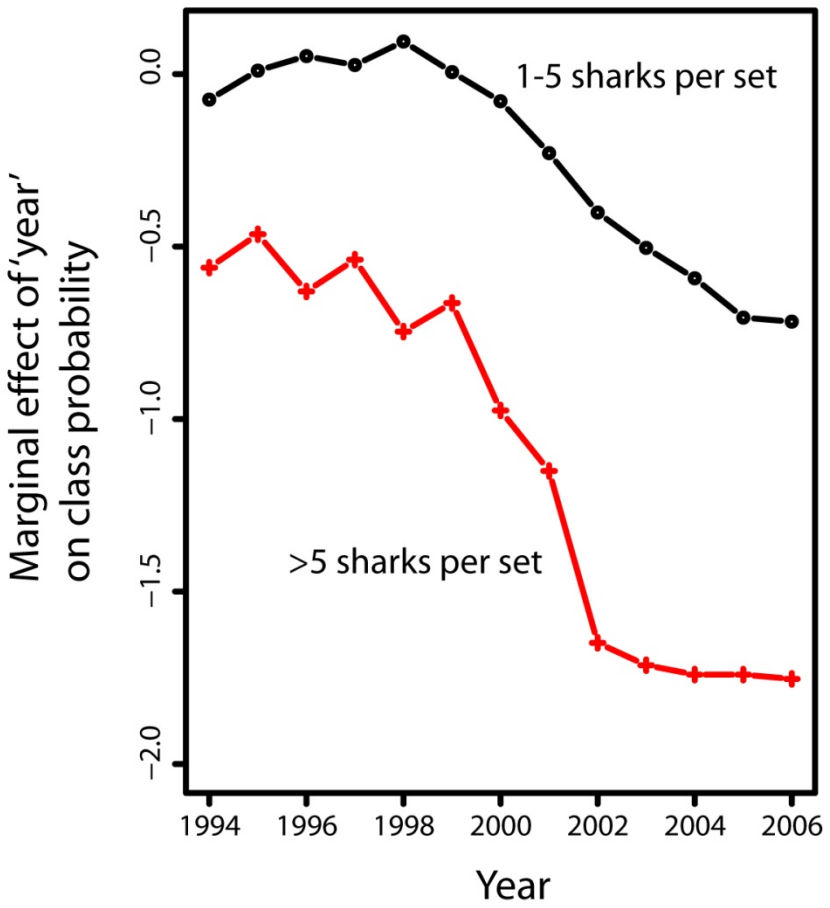


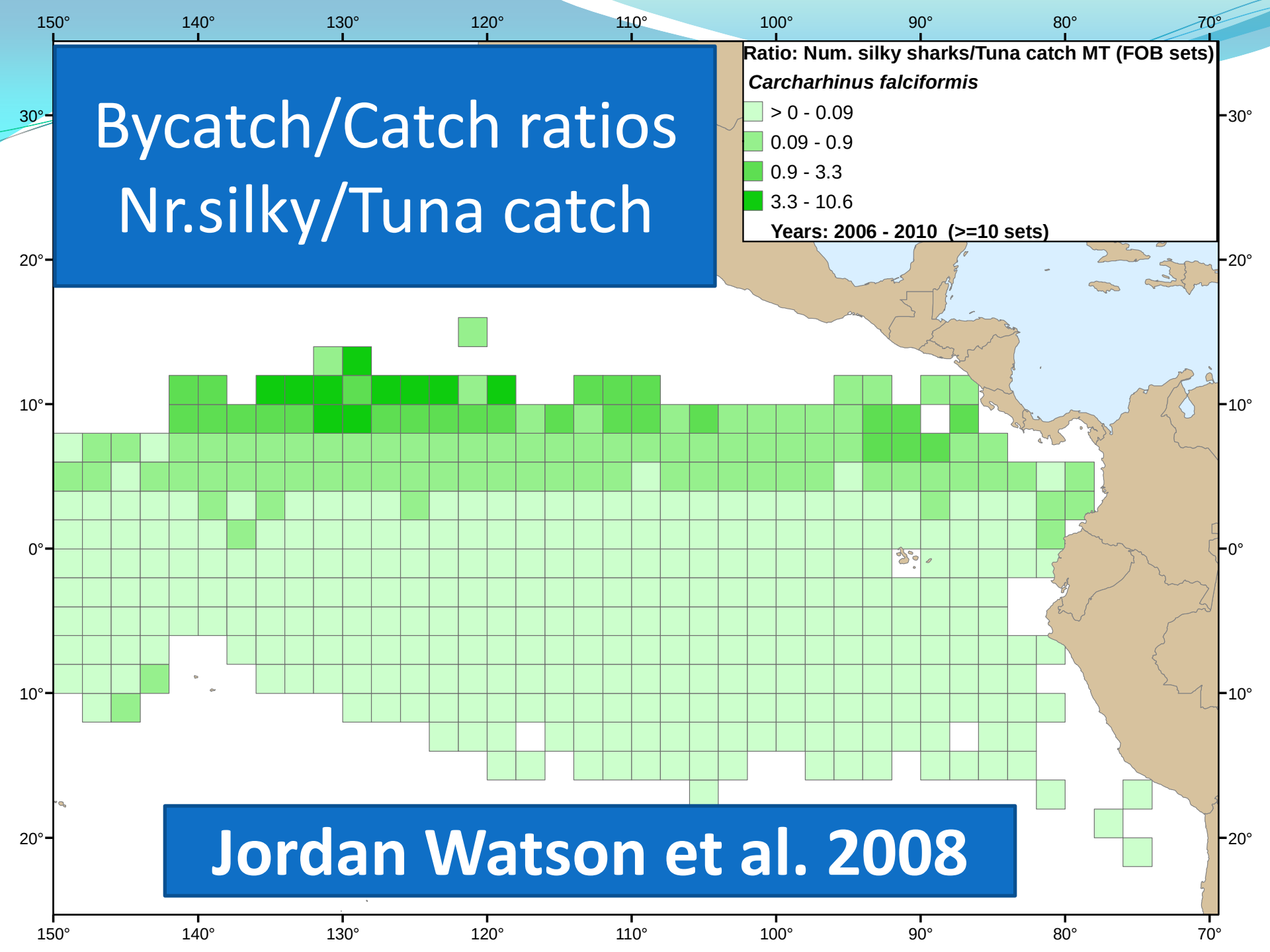
Oceanic whitetip shark (floating object sets)

C. Lennert-Cody

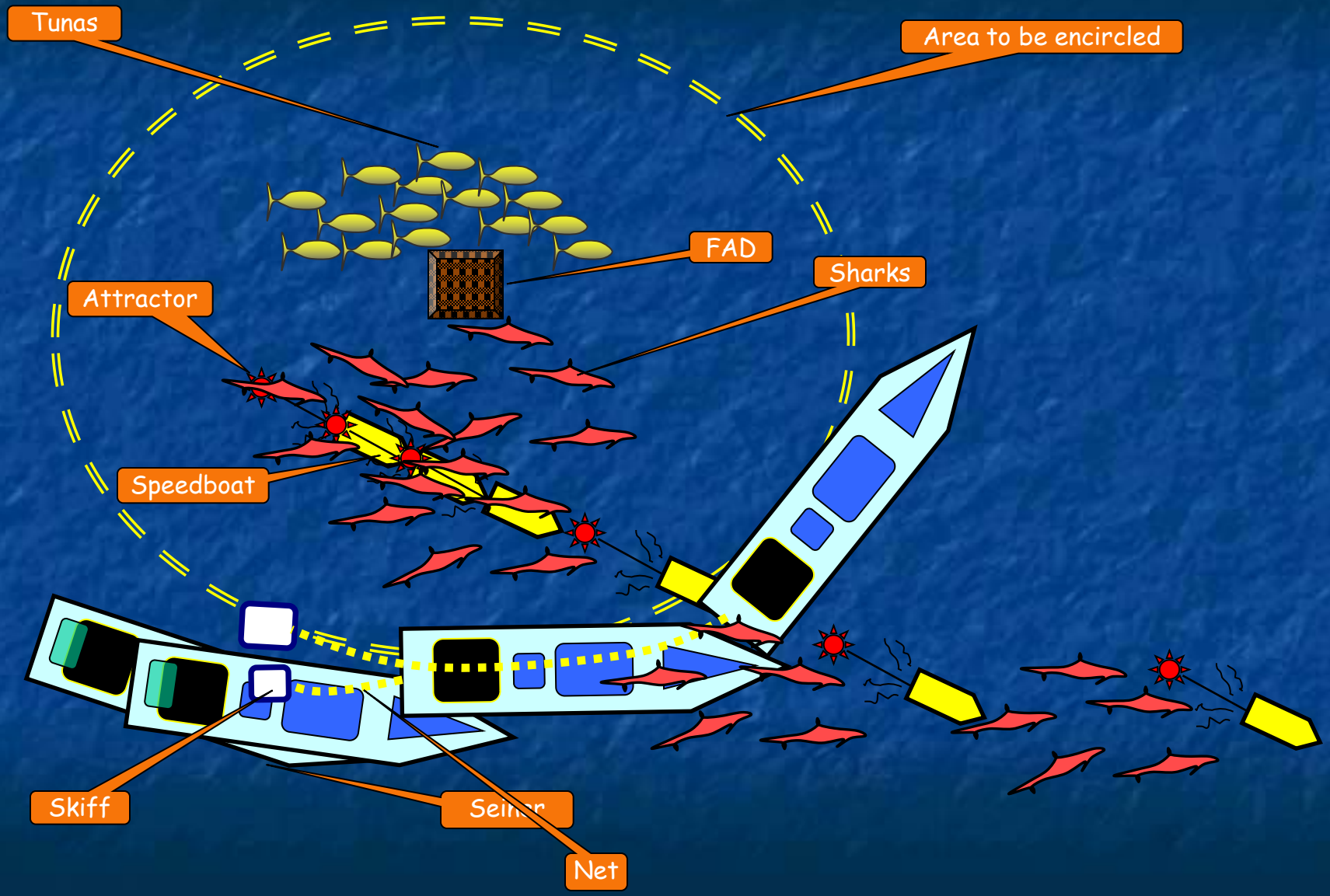
-90%






Bycatch/Catch ratios
Nr.silky/Tuna catch
Ratio: Num. silky sharks/Tuna catch MT (FOB sets)
Carcharhinus falciformis
> 0 - 0.09
0.09 - 0.9
0.9 - 3.3
3.3 - 10.6
Years: 2006 - 2010 (>=10 sets)
Jordan Watson et al. 2008
150°
140°
130°
120°
110°
100°
90°
80°
70°
30°
20°
10°
0°
10°
20°

To reduce shark bycatches



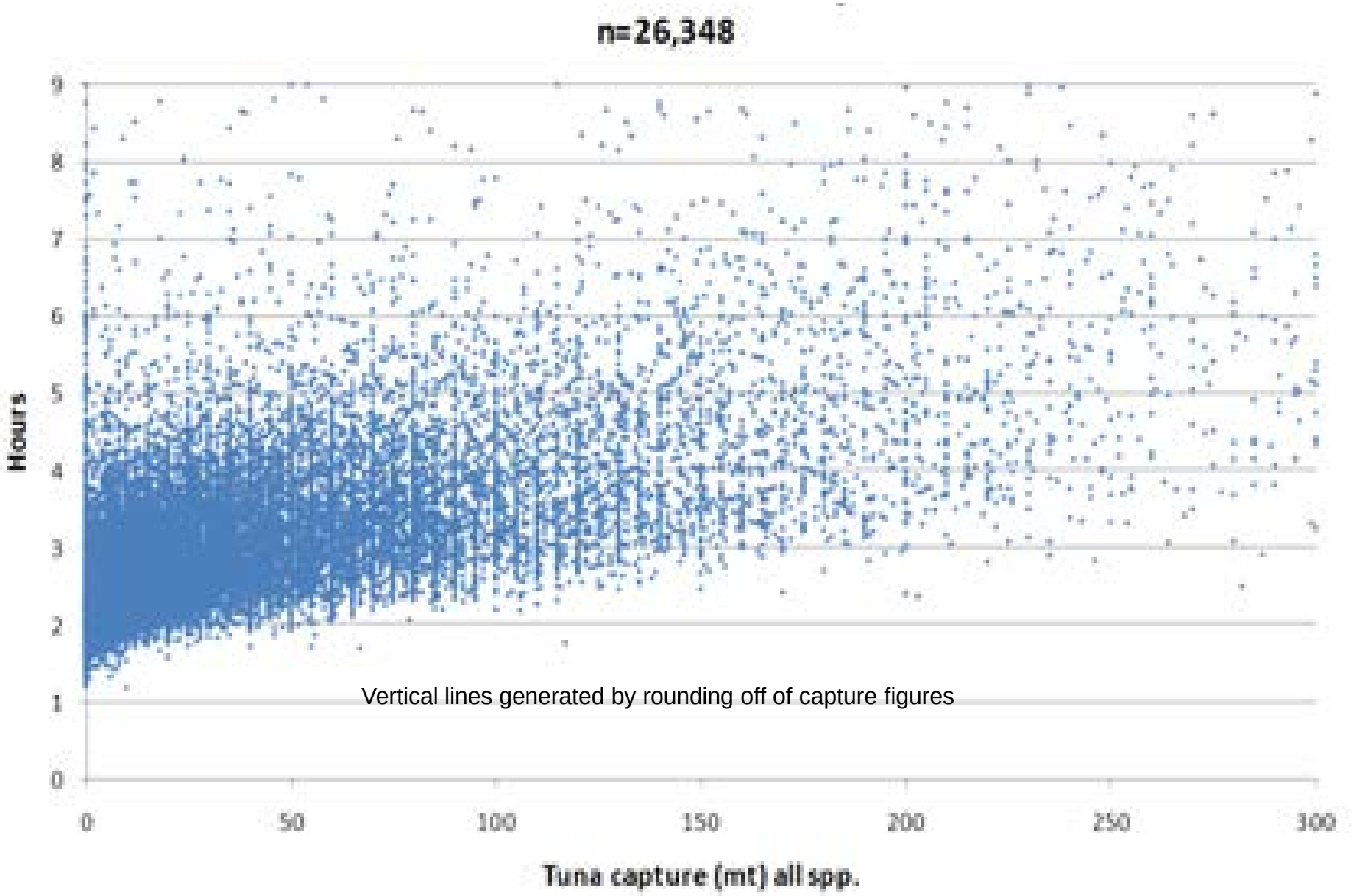
Other options

- Improving conditions in net
- Releasing from deck

  –Tracking released sharks

FIGURE 40

Duration of FAD sets as a function of tuna capture (2004 – 2008)



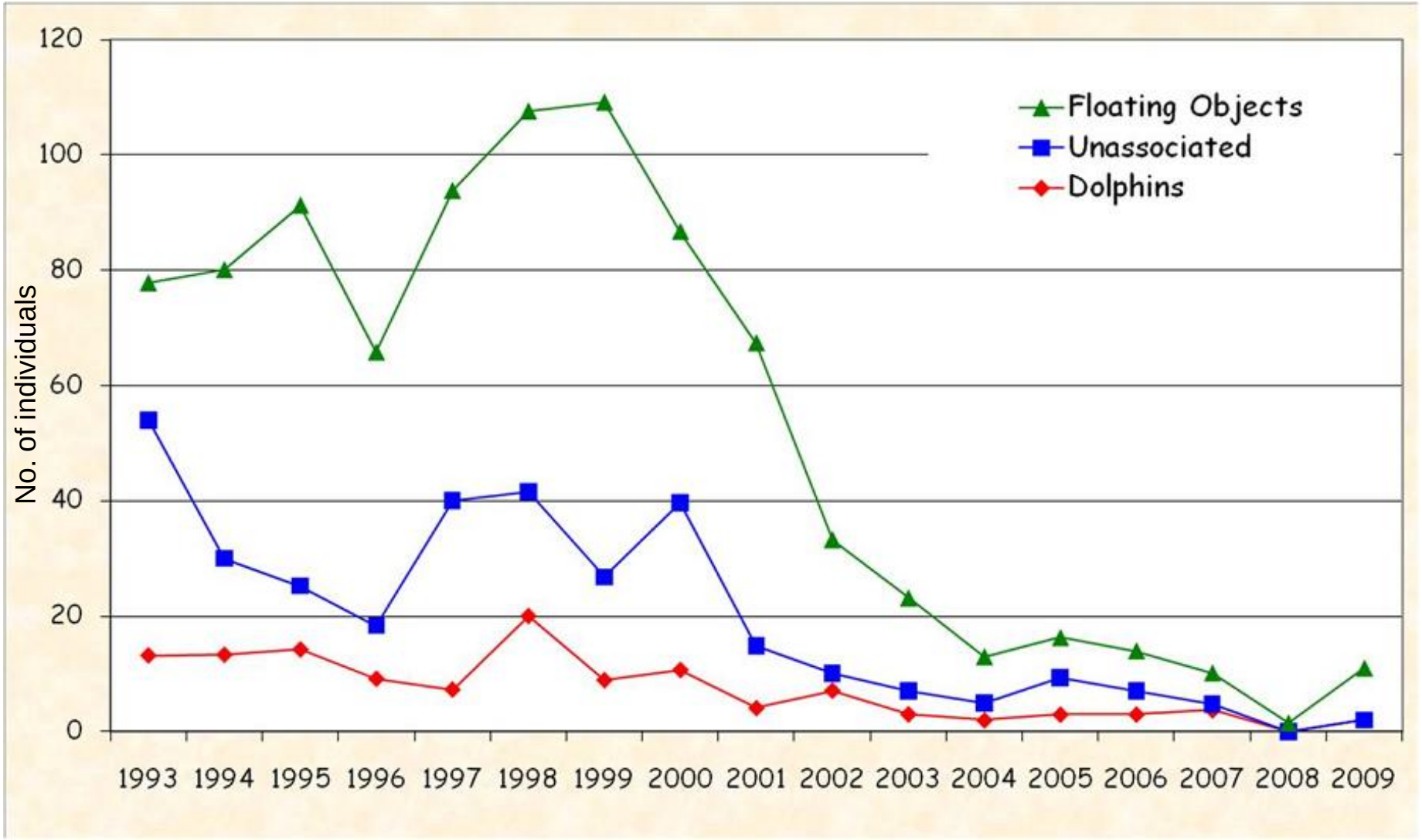
Returning to the sea

Sorting the capture

Source: ISSF Meeting – 24-27 Nov 09 – Sukarrieta (L. Dagorn)


SEA TURTLES

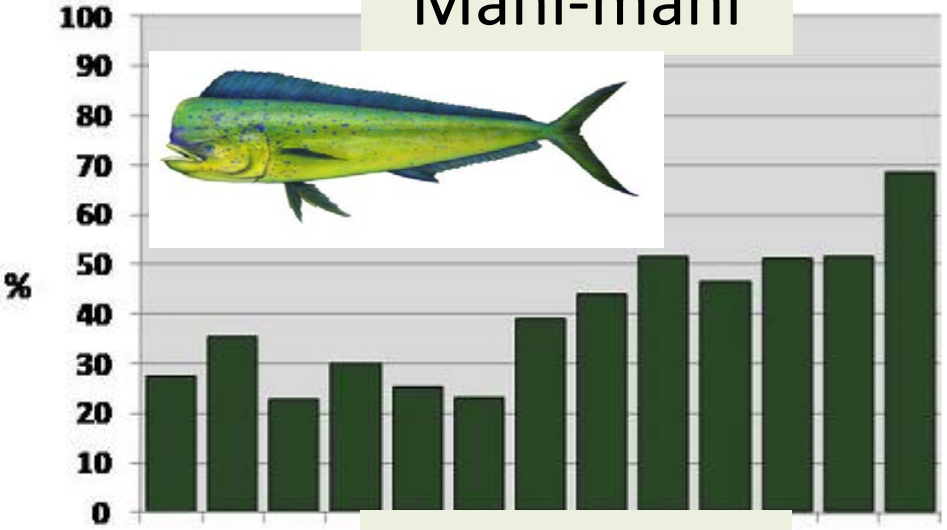
Bycatches of Sea Turtles
Estimate yearly average (1993-2009)



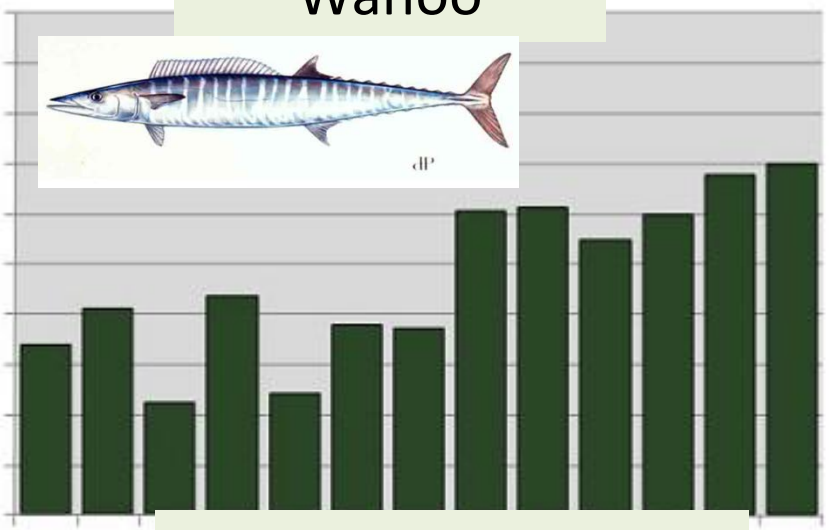
LARGE PELAGIC BONY FISHES

Percent retention of the captures

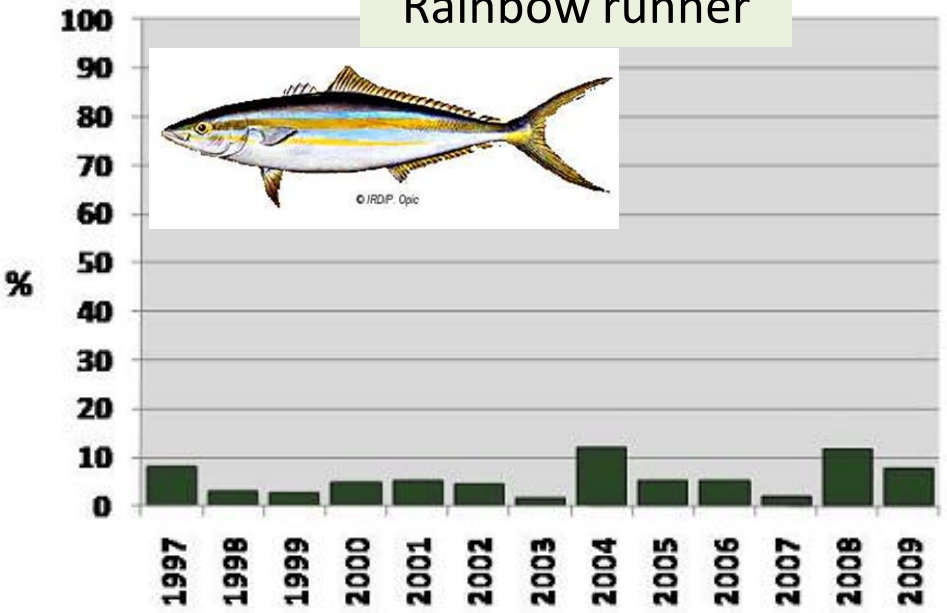
Mahi-mahi



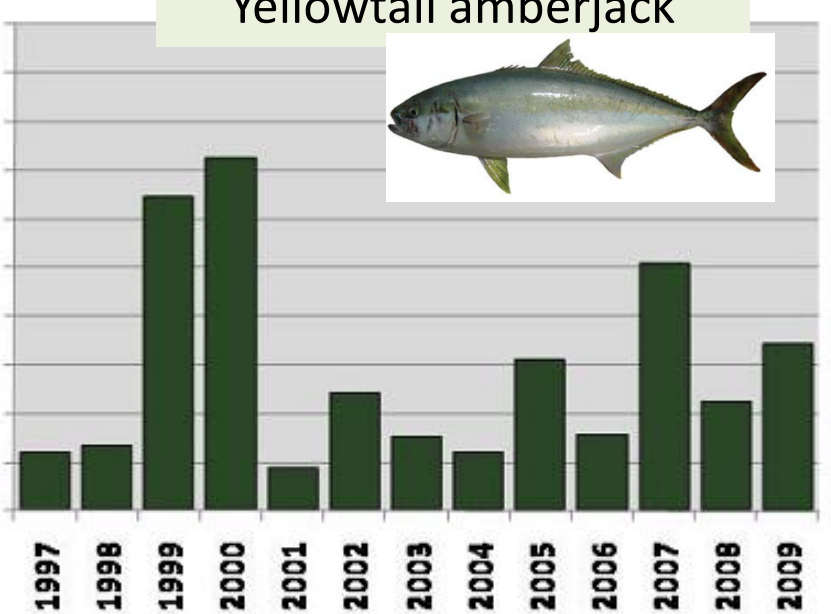
Wahoo



Rainbow runner



Yellowtail amberjack



Total retention

SUMMARY

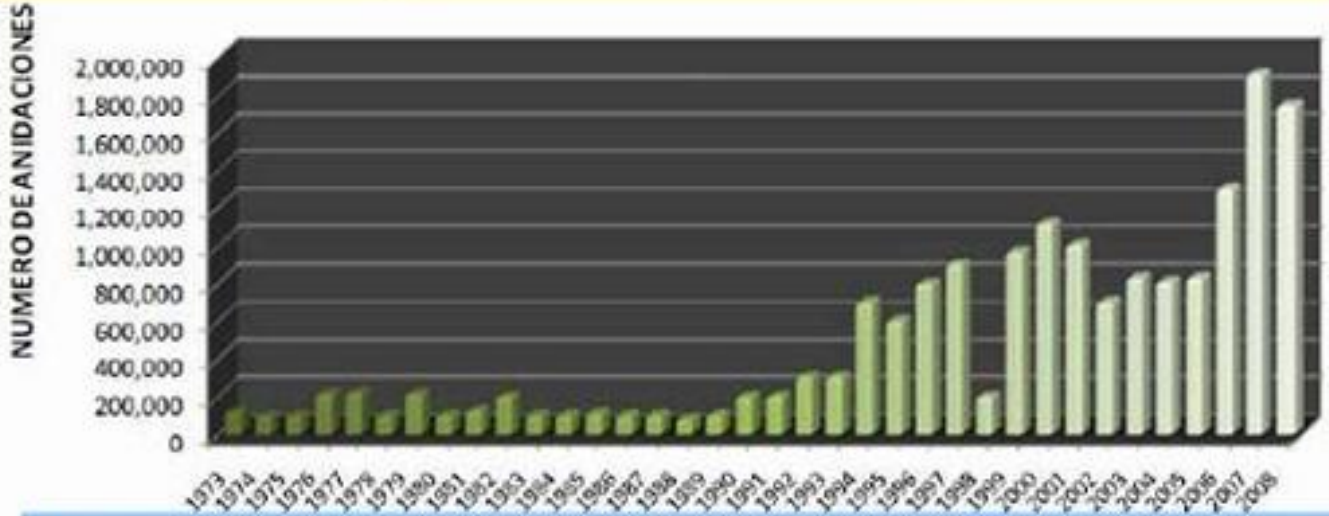
Billfishes	not significant
Sea turtles	not significant, minor impact of entanglement in FAD netting
Bony fishes	probably not significant, but no SA available
Sharks	small % of total takes, but critical situation for some species
Oceanic whitetip	steep decline, serious conservation issue
Silky shark	important decline, serious conservation issue
Manta rays	no data available on population sizes, species involved may have local impacts
Small tunas	SJ not significant, YF ?? , BE ??

PS SOLUTIONS

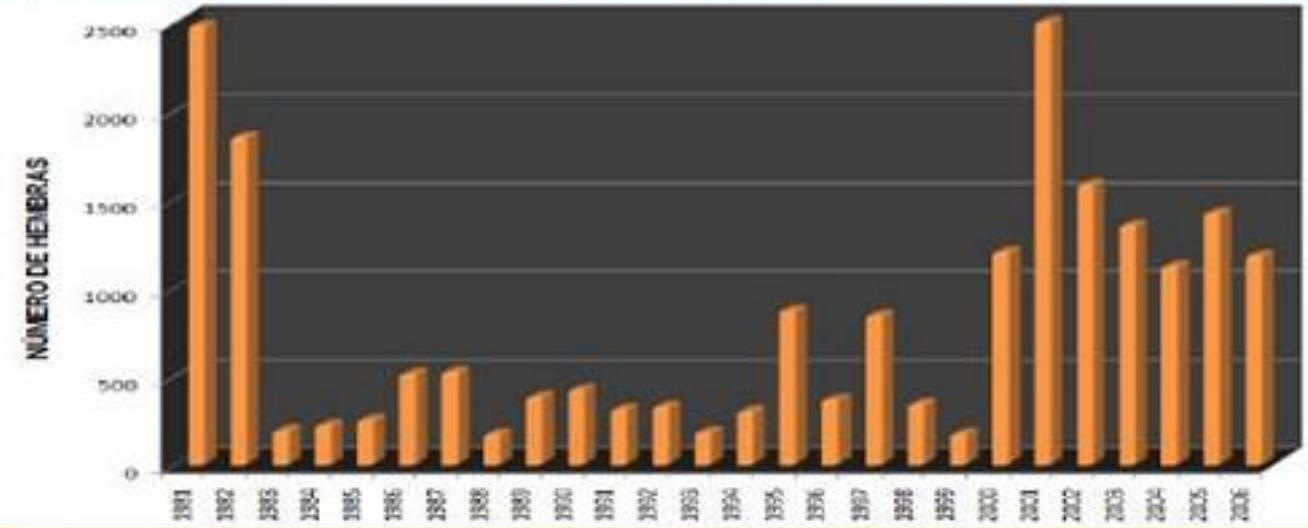
Billfishes	accounted for in SA -- management
Sea turtles	design changes in FADs
Bony fishes	sorting grid to release small individuals
Sharks	
Oceanic whitetip	immediate release, handling improvement
Silky shark	spatial closure, handling improvement
Manta rays	improve IDs, focused research
Small tunas	BE management – individual vessel limits
	acoustics for size discrimination
	total retention


LONGLINE BYCATCHES

Nr. Olive ridley's nests La Escobilla, Mexico

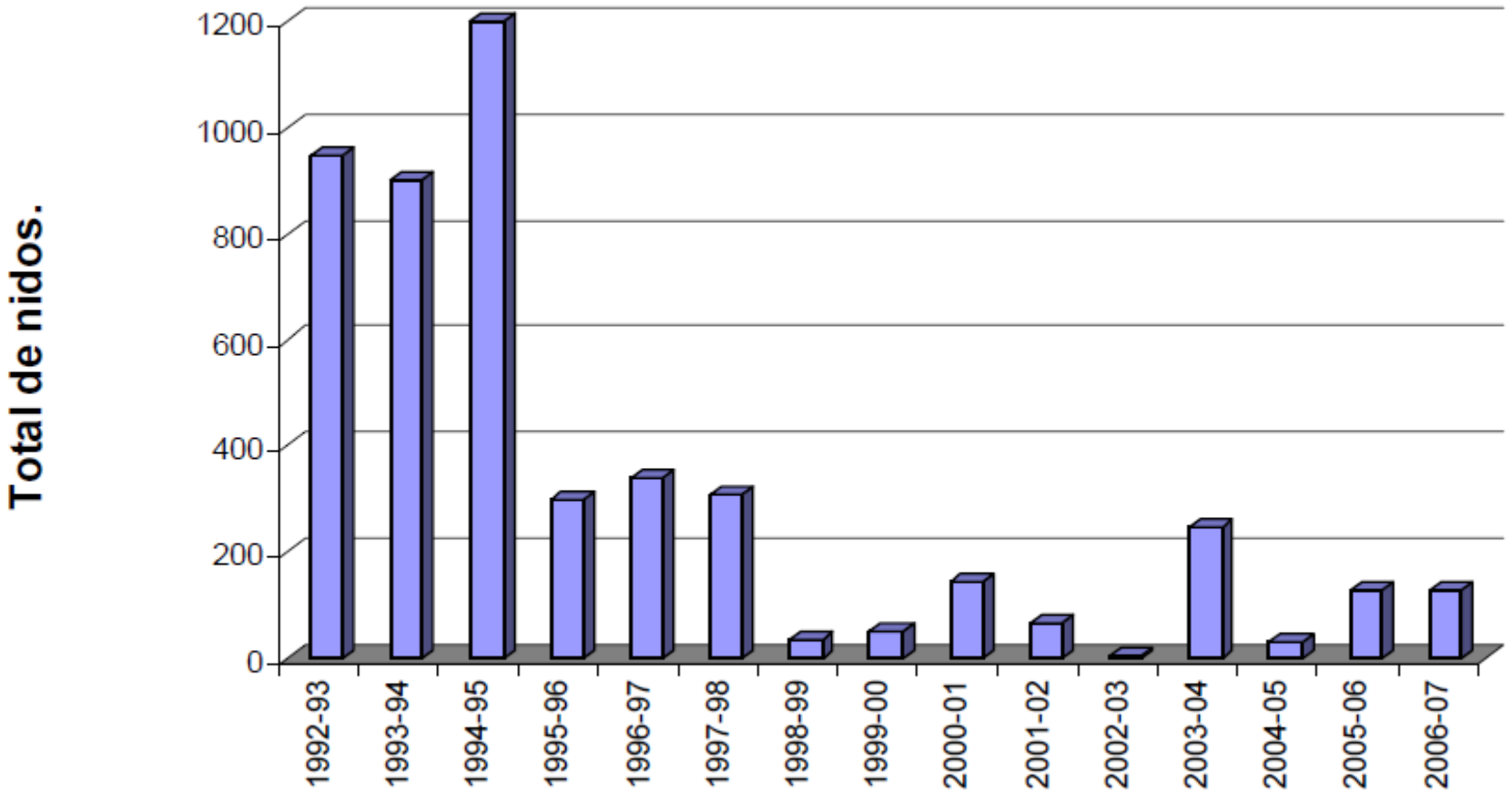


Fuente: Programa Nacional para la Conservación de las Tortugas Marinas/CMT/CONANP 2008.



Nr. Femeales nesting Colola Beach, Mexico

Nr of nests Leatherback sea turtle Barra de la Cruz, Mexico



Nesting season

Data: SAGARPA - Mexico

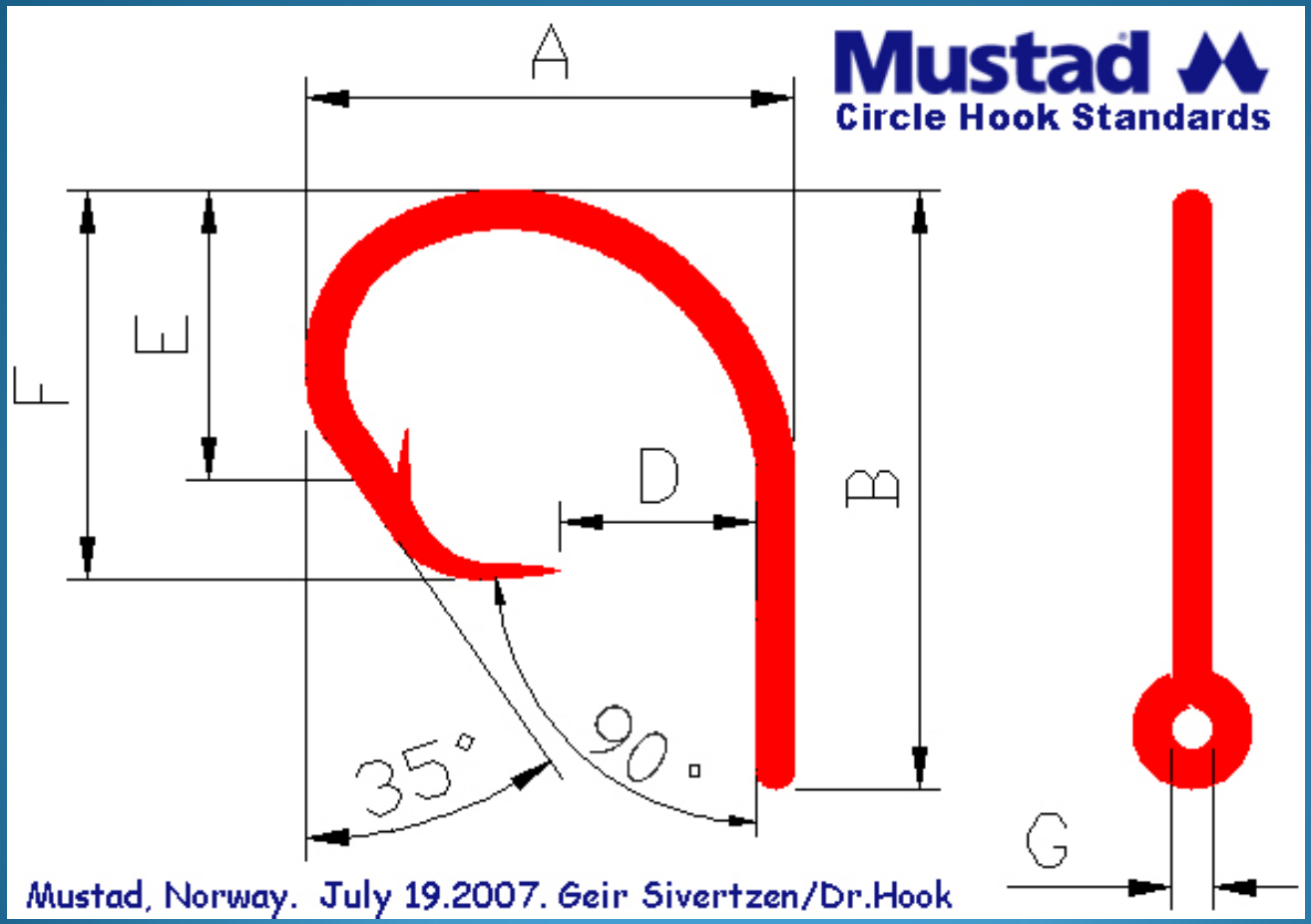
Circle Hook Symposium

- Steering Committee

- Regional sea turtle program presented:
- 5 oral presentations and 3 posters from Ecuador, Colombia, Panama. Costa Rica, Nicaragua, Mexico

Defining what is a "True Circle"

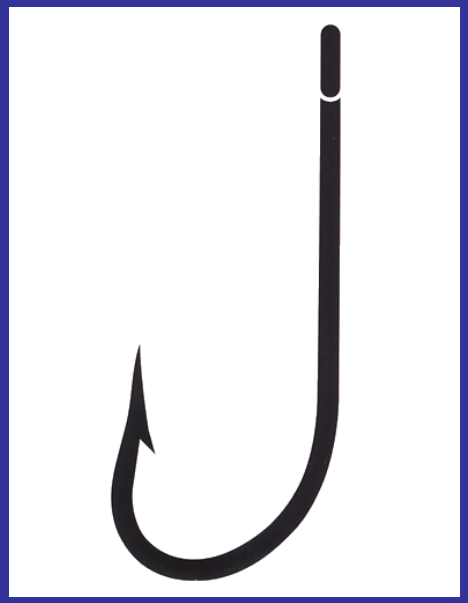
Point angle needs to be **MINIMUM** 90 degrees to the shank



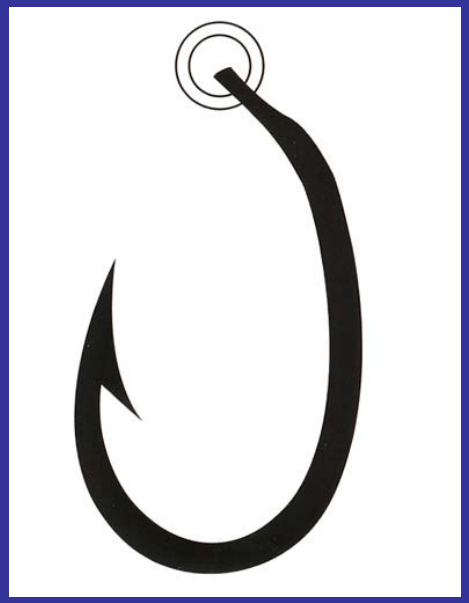
Dr.Hook of Norway

Tipo de anzuelos utilizados en palangres de la región

Anzuelo "J"



Anzuelo recto

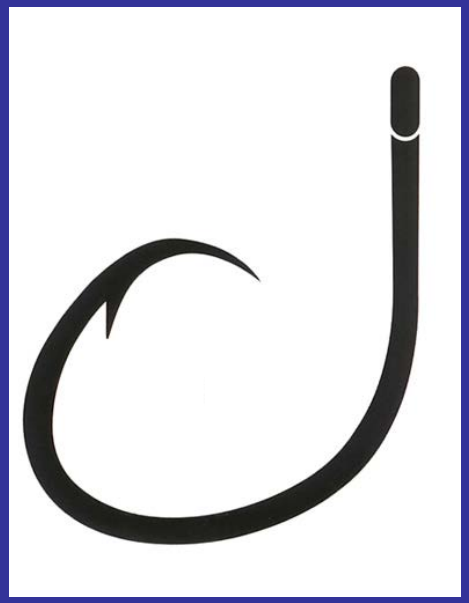


Tuna hook

Anzuelo chino

Anzuelo japonés

Anzuelo circular

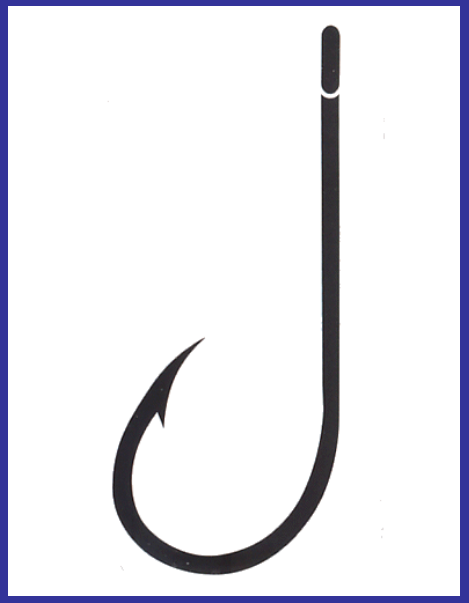


Anzuelo circular

Anzuelo curvado

Garra de aguila

Anzuelo E-Z baiter



Media Garra de aguila

Catálogo Regional de Anzuelos

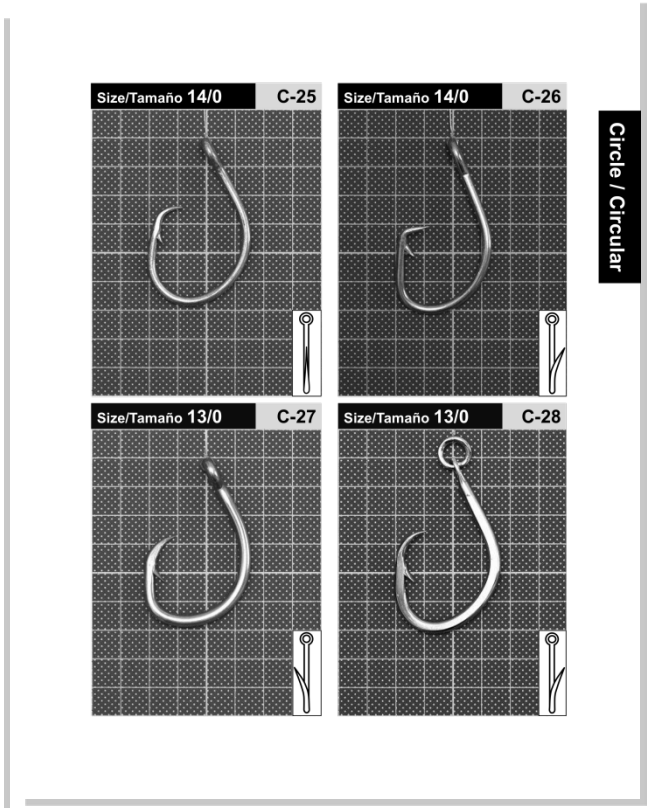
Hook ID: 033
Manufacture: Unkown
Hook name: Unkown
Standard size: 9
Product Reference Number: Unkown
Material: Carbon steel
Hook eye: Ring
Shank cross section: Forged
Shank thickness: 3.7 mm x 4.8 mm
Straight total length: 77 mm
Straight total width: 42 mm
Minimum total width: 39 mm
Maximum total width: 81 mm
Front length: 41 mm
Minimum inner width: 30 mm
L-W ratio: 1.8
Max-Min ratio: 2.1
Incurved point angle: --
Point: Straight
Offset angle: $\theta \approx 0°$
Offset width: --
Weight: 18.0 g
County of manufacture: Unkown
Note:

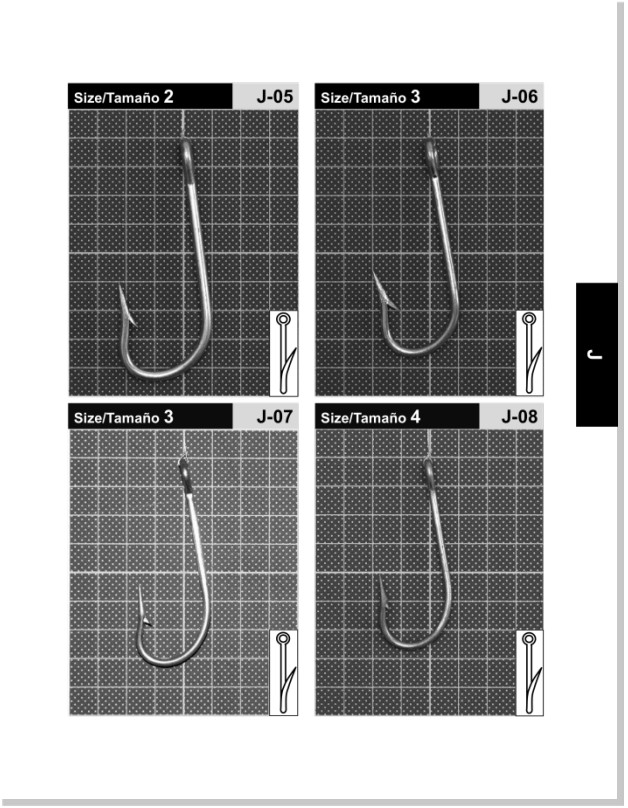
Hook ID: 034
Manufacture: Unkown
Hook name: E-Z BAITER HOOK
Standard size: 11/0
Product Reference Number: Unkown
Material: Carbon steel
Hook eye: Ring
Shank cross section: Regular
Shank thickness: 2.2 mm
Straight total length: 52 mm
Straight total width: 24 mm
Minimum total width: 21 mm
Maximum total width: 54 mm
Front length: 22 mm
Minimum inner width: 12 mm
L-W ratio: 2.2
Max-Min ratio: 2.6
Incurved point angle: 25° (approx.)
Point: Kirbed
Offset angle: $\theta \approx 5°$
Offset width: 0 mm
Weight: 2.9 g
County of manufacture: Korea
Note: Sold as "Anzuelos Media Garra - Size 6" in Puerto San Jose, Guatemala

Hook ID: 009
Manufacture: KING FE Enterprise
Hook name: Circle hook
Standard size: 16/0
Product Reference Number: Unkown
Material: Stainless steel
Hook eye: Hole
Shank cross section: Partially forged
Shank thickness: 5.5 mm
Straight total length: 64 mm
Straight total width: 51 mm
Minimum total width: 43 mm
Maximum total width: 73 mm
Front length: 38 mm
Minimum inner width: 25 mm
L-W ratio: 1.3
Max-Min ratio: 1.7
Incurved point angle: 50° (approx.)
Point: Reversed
Offset angle: $5° \leq \theta < 10°$
Offset width: 0.0
Weight: 22.2 g
County of manufacture: Taiwan
Note:

Hook ID: 010
Manufacture: Unknown
Hook name: Unknown
Standard size: 16/0
Product Reference Number: Unkown
Material: Carbon steel
Hook eye: Ring
Shank cross section: Regular
Shank thickness: 5.2 mm
Straight total length: 68 mm
Straight total width: 56 mm
Minimum total width: 51 mm
Maximum total width: 79 mm
Front length: 47 mm
Minimum inner width: 21 mm
L-W ratio: 1.2
Max-Min ratio: 1.6
Incurved point angle: 75° (approx.)
Point: Kirbed
Offset angle: $0° \leq \theta < 5°$
Offset width: 1.0 mm
Weight: 27.3 g
County of manufacture: Unkown
Note:

Longline hook list (Latin America)





En IATTC website

http://www.iattc.org/Downloads.htm

PALANGRES ARTESANALES DE LA REGION PACIFICO ORIENTAL

- Resultados del Estudio Comparativo -

Mexico

Taka Mituhasi (OFCF),
Martín Hall (CIAT),
Instituciones nacionales

México	CONAPESCA
Guatemala	UNIPESCA
El Salvador	CENDEPESCA
Nicaragua	INPESCA
Costa Rica	INCOPESCA
Panamá	ARAP
Ecuador	SRP
Perú	IMARPE
	FONDEPES-PAITA

Guatemala
El Salvador
Nicaragua
Costa Rica
Panamá
Ecuador
Perú

8 países, 88 puertos/caletas pesqueros

México (04/10/09 - 18/10/09)

- Pichilingue, San Juan de la Costa, Sausal, Sargento, Mazatlan (Playa norte), Isla de la Piedra, Bahia de Banderas, Nuevo Corral de Risco, Sayulita, Rincon de Guayabito, La penita, Jaltemba, Chacala, San Blas, Manzanillo, Calla de Campos, Acapulco, Zihutanejo, Boca del cielo, Salina Cruz, La Ventosa, Huatulco, Puerto Angel, Puerto Escondido, Corralero, Puerto Madero

Guatemala (06/10/08 - 11/10/08)

- Tilapa, Champerico, Sipacate, Puerto de San José, Buena Vista, Las Lisas

El Salvador (15/10/08 - 19/10/08)

- Acajutla, Las Blancas, Herradura, La Libertad, Puerto El Triunfo, Tamarindo

Nicaragua (11/10/08 - 11/15/08)

- Jiquirillo, Corinto, Masachapa, San Juan del Sur

Costa Rica (03/02/09 - 08/02/09)

- Cuajiniquil, Playa de Coco, Manzanillo, Puntarenas, Tárcoles, Quepos, Golfito

Panamá (09/02/09 - 11/02/09)

- Puerto de Vacamonte, Puerto Caimito, Nueva Gorgona, San Carlos, Boca de Palita, El Rompio, Guarraré, Búcalo, Puerto Mútis

Ecuador (14/01/09 - 19/01/09, 02/03/09 - 06/03/09)

- San Lorenzo, Santa Rosa (Prov. Esmeralda), Rocafuerte, Esmeraldas, Muisne, Pedernales, El Matal, Jaramijó, Manta, San Mateo, Santa Marianita, Labra, Puerto López, Santa Rosa (Prov. Santa Elena), Anconsito, Puerto Bolívar

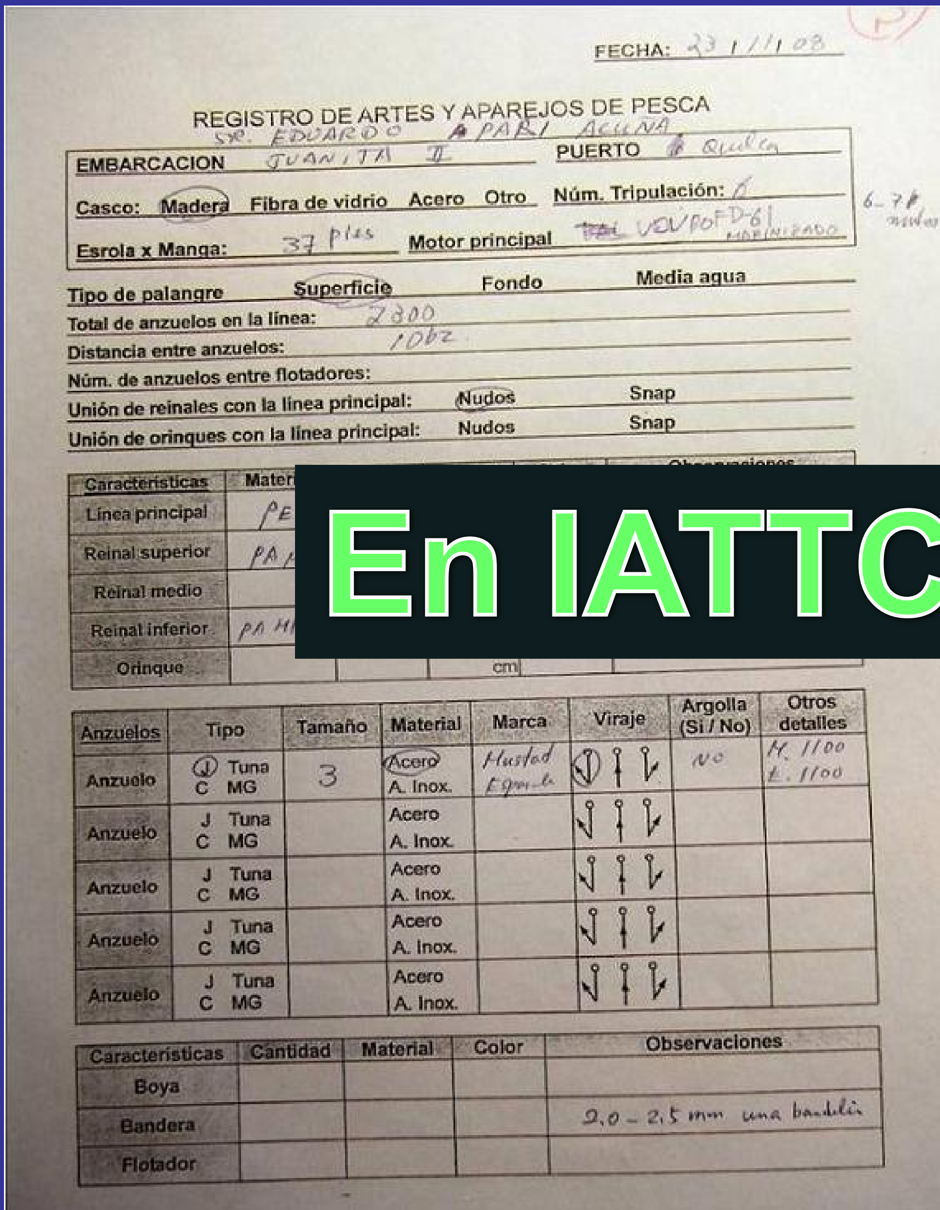
Perú (12/11/08 - 26/11/08)

- Puerto Pizarro, Mancora, Cancas, Cabo Blanco, Paita, Salaverry, Chimbote, Huacho, Ancón, Pucusana, La Planchada, Quilca, Matarani, Ilo, Morro Sama, Vila vila

Items de investigación

1. Artes y Métodos de Palangres Artesanales
   - Configuración de palangre
     (materials, tipo y tamaño de anzuelos, armado de arte, etc.)
   - Modo de operaciones
   - Temporada de pesca, Número de lances por día, Horario de lance etc.
   - Carnada (Especies y tamaño, Cómo se consigue? etc.)
   - Sitio de pesca (distancia desde puerto/caleta, profundidad, etc.)
2. Embarcaciones
   Characteristicas, Maquinaría, Equipos elecrónicos, etc.
3. Anzuelos u otros aparejos de pesca en el mercado
   - Tipos de anzuelos disponibles en el mercado
   - Colección de muestras de anzuelos para el Catalgo de anzuelos
4. Información sobre capturas incidentales de tortugas marinas
6. Conocimientos y Experiencias de pescadores
   (Ej. Presencia de tortugas, Herramientas para desengaches, etc.)

Formatos estándalizados para la recopilación de datos



FECHA: 23 / 1 / 08

REGISTRO DE ARTES Y APAREJOS DE PESCA

Sr. EDUARDO APARI ACUÑA

EMBARCACION: JUANITA II PUERTO: Quilca

Casco: Madera Fibra de vidrio Acero Otro Núm. Tripulación: 6

Esrola x Manga: 37 pies Motor principal: VOLVO PENTA D-61 MARINIZADO

Tipo de palangre: Superficie Fondo Media agua

Total de anzuelos en la línea: 2300

Distancia entre anzuelos: 10 bz

Núm. de anzuelos entre flotadores:

Unión de reinales con la línea principal: Nudos Snap

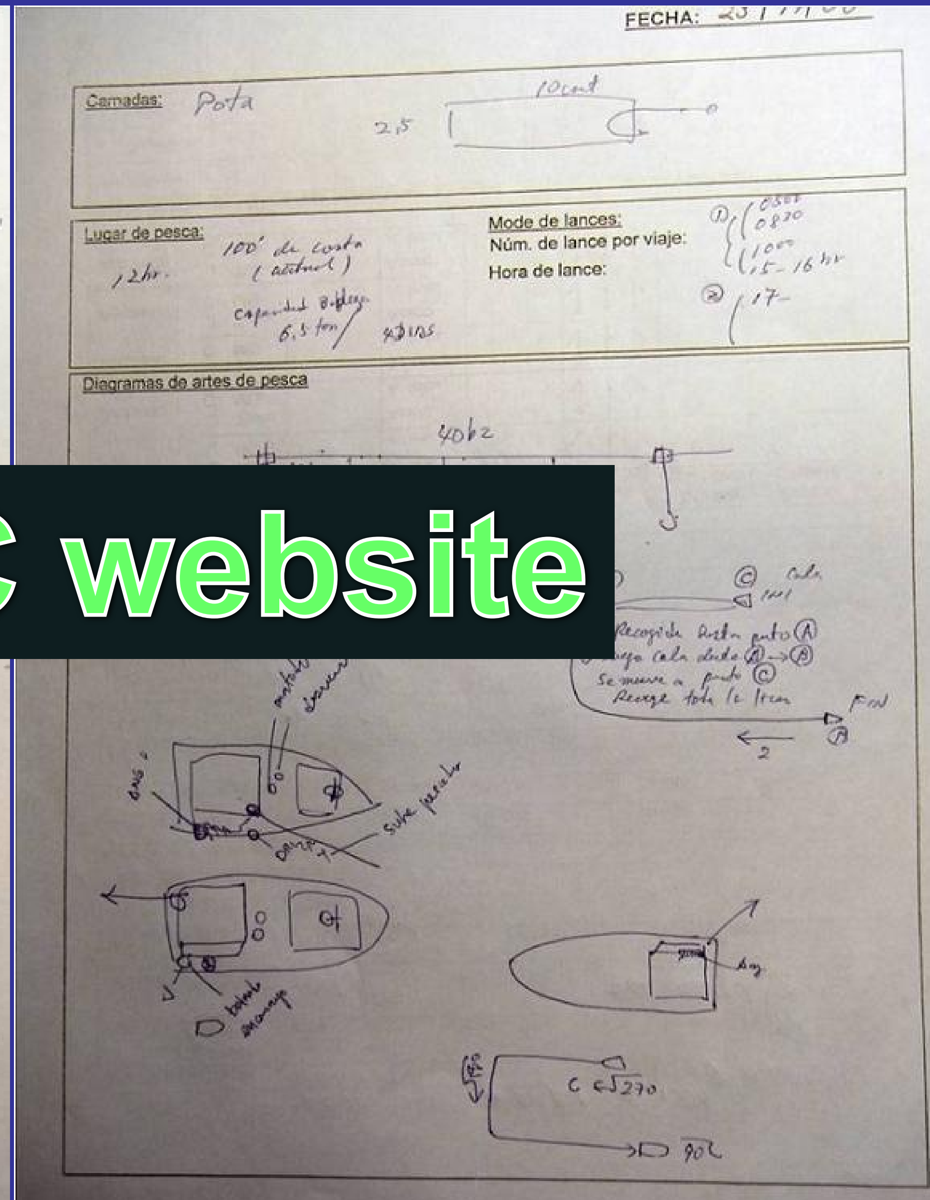
Unión de orinques con la línea principal: Nudos Snap

Características	Material				Observaciones
Línea principal	PE				
Reinal superior	PA				
Reinal medio					
Reinal inferior	PA				
Orinque			cm		

Anzuelos	Tipo	Tamaño	Material	Marca	Viraje	Argolla (Si / No)	Otros detalles
Anzuelo	J Tuna C MG	3	Acero A. Inox.	Mustad Española		No	H. 1100 L. 1100
Anzuelo	J Tuna C MG		Acero A. Inox.				
Anzuelo	J Tuna C MG		Acero A. Inox.				
Anzuelo	J Tuna C MG		Acero A. Inox.				
Anzuelo	J Tuna C MG		Acero A. Inox.				

Características	Cantidad	Material	Color	Observaciones
Boya				
Bandera				2.0 – 2.5 mm una bandelin
Flotador				

En IATTC website



FECHA: 23 / 1 / 08

Carnadas: Pota

Lugar de pesca: 100' de costa (actual); 12 hr.; capacidad bodega 6.5 ton

Modo de lances:

Núm. de lance por viaje:

Hora de lance:

Diagramas de artes de pesca

Palangre de polopropileno (dorado), Paita, Peru

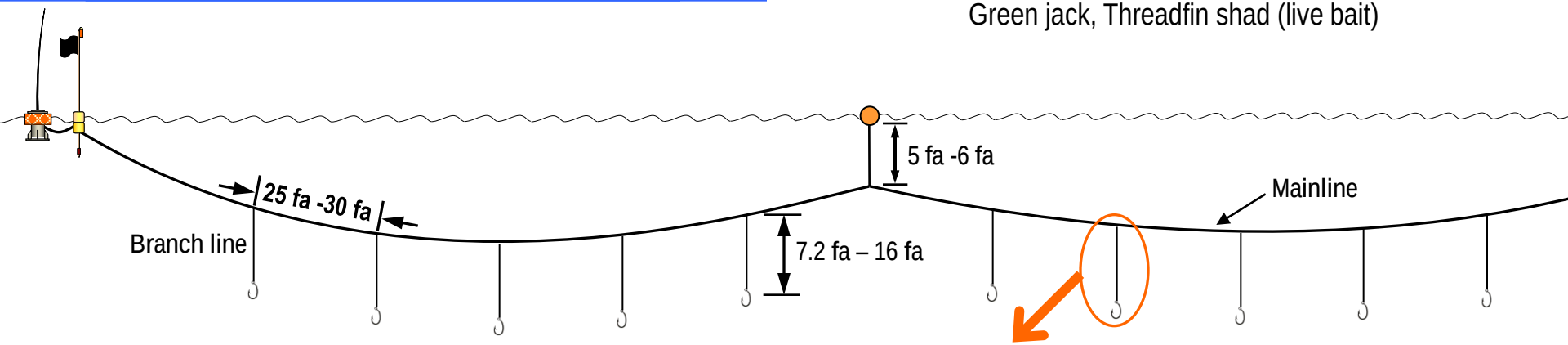
Palangre de monofilamento, Golfito, Costa Rica

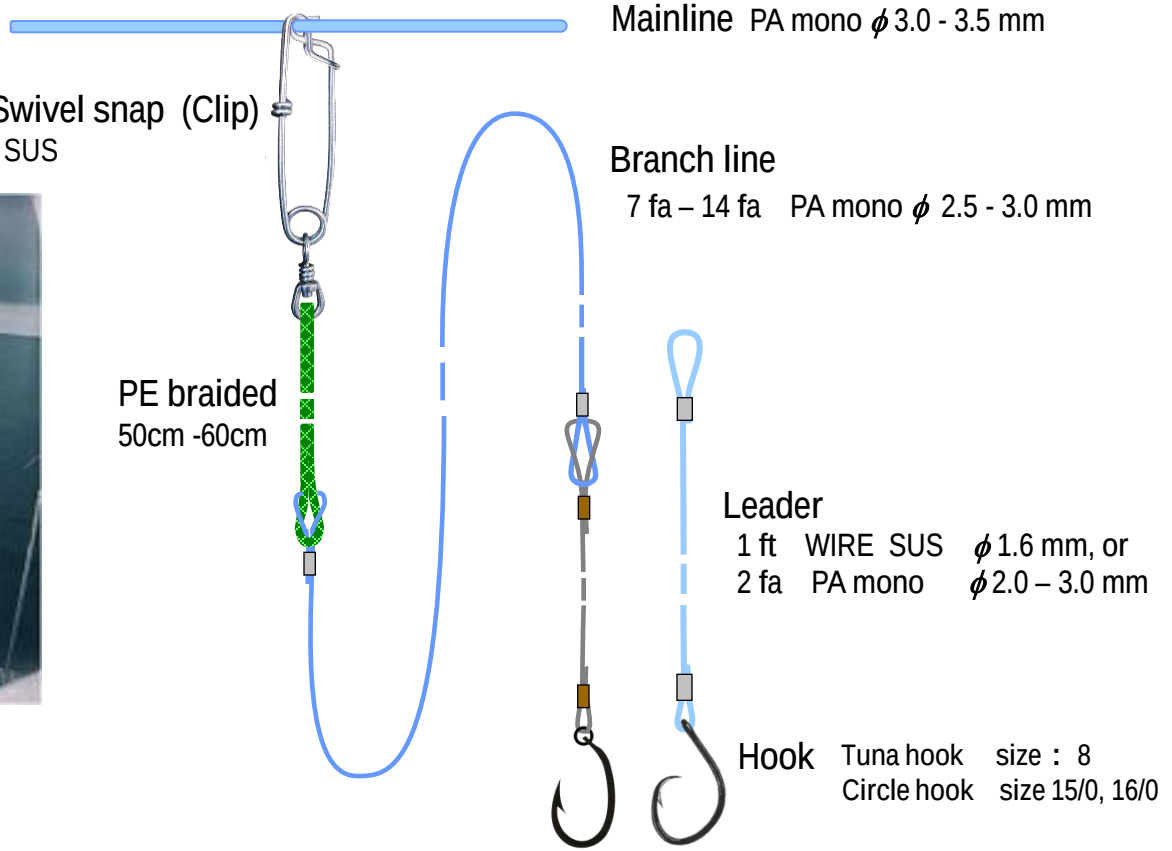

Type of Surface longlines
Tunas
Sharks / Billfishes
Mahi mahi
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2009 Europa Technologies
© 2009 Tele Atlas
© 2009 DMapas
2499 キロメートル
1° 10.276' S 88° 26.270' W
高度 0 メートル
高度 4787.9

4

Type: Drifting longline
Main target species: Yellow fin tuna
Port and Country: Vacamonte, Panama

Number of hook deployed per set: 1000 -1500
Number of hooks between floats: 5 - 6
Bait: Sardine, Squid (frezen, but thawed before use)
Green jack, Threadfin shad (live bait)

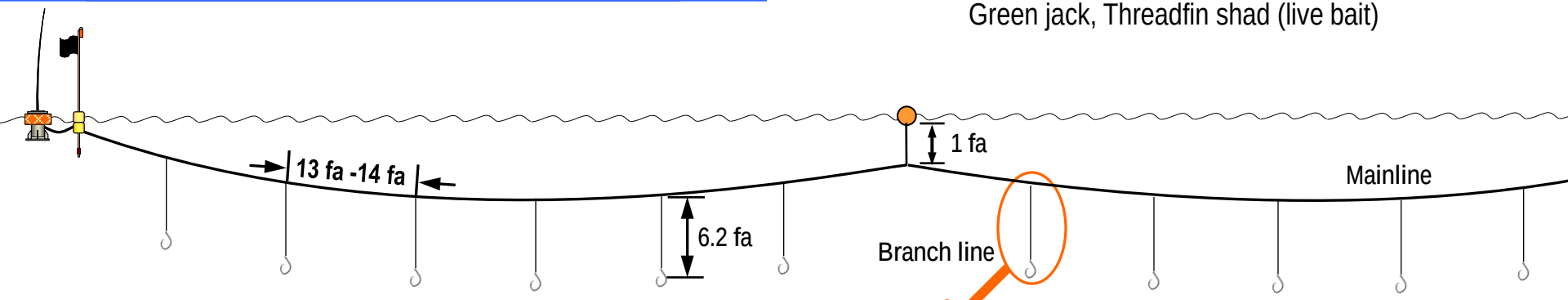


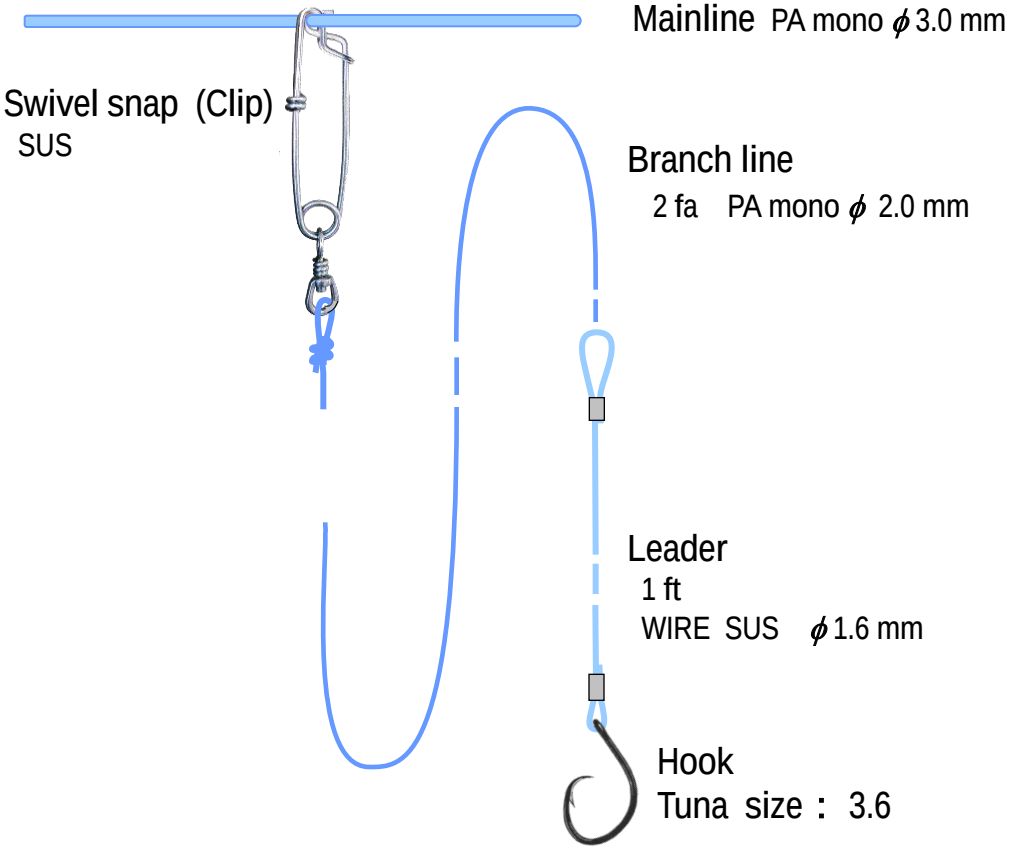


5

Type: Drifting longline
Main target species: Dolphin fish (Mahi mahi)
Port and Country: Vacamonte, Panama

Number of hook deployed per set: 700 - 1200
Number of hooks between floats: 5 - 7
Bait: Sardine, Squid (frezen, but thawed before use)
Green jack, Threadfin shad (live bait)

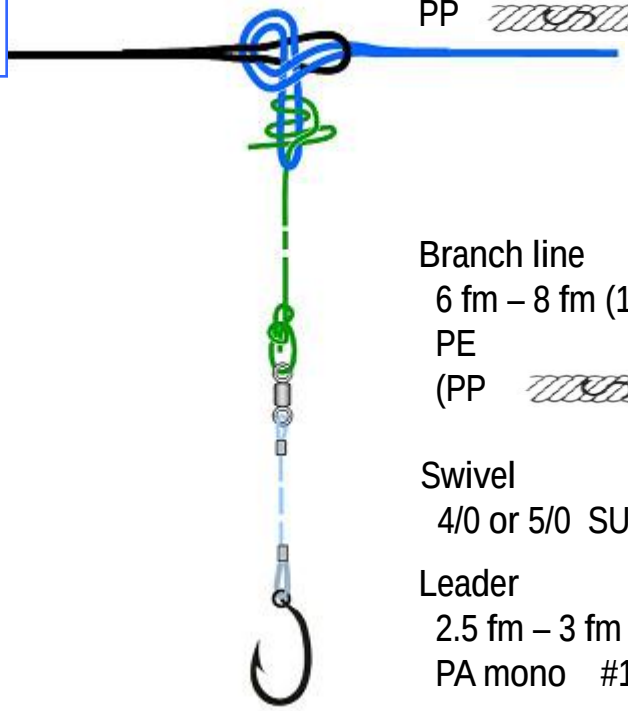




6

Type: Drifting longline
Main target species: Dolphinfish (Mahi mahi)
Port and Country: Manta, Ecuador

5-6 hooks between floats



Mainline
PP ϕ 3.2 mm

Branch line
6 fm – 8 fm (10.80 – 14.40m)
PE ϕ 2.2 mm -2.8 mm
(PP ϕ 3.2 mm)

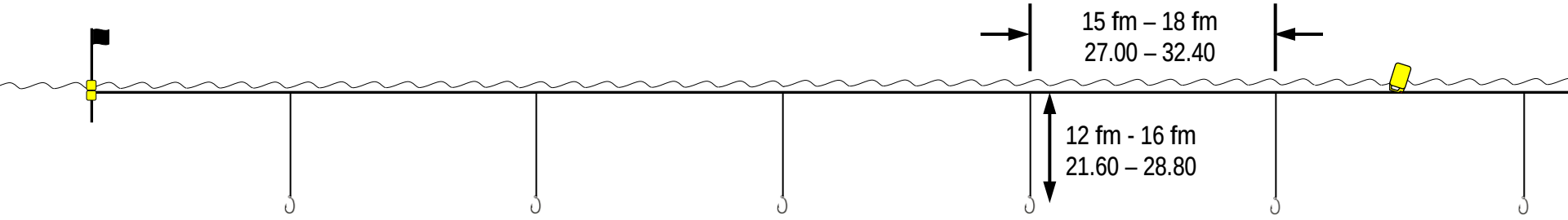
Swivel
4/0 or 5/0 SUS

Leader
2.5 fm – 3 fm (4.50 - 5.40m)
PA mono #160-180

Hook

Hooks currently used

Circle hook
Size: 16/0



	Catch higher	Catch same	Catch lower
Sea Turtle Bycatch higher	Ineffective	Ineffective	Hard sell
ST Bycatch same	Ineffective	Ineffective	Hard sell
ST Bycatch lower	Easy to sell, but ???????	EASY CHOICE	Hard sell

	Bycatch B higher	Bycatch B same	Bycatch B lower
Sea Turtle Bycatch higher	Bad Choice	Ineffective	??????
ST Bycatch same	Ineffective	Ineffective	??????
ST Bycatch lower	??????	EASY CHOICE	EASY CHOICE

J vs C18 TBS fishery

Species or group of especies.	**CPUE J hook**	**CPUE C18 hook**	***Z***	***p-valor***
Thunnus albacares	0,42	0,68	1,10	0,308
Coryphaena hippurus	3,40	3,01	-0,27	0,806
Xiphias gladius	0,52	1,03	2,02	**0,037**
Istiophorus platypterus	1,05	1,22	0,17	0,869
Other billfishes	0,76	0,76	-0,01	0,993
Prionace glauca	1,39	2,20	1,56	0,126
Carcharhinus falciformis	15,55	25,36	2,99	**0,002**
Alopidae	0,79	0,87	0,39	0,694
Sphyrnidae	0,71	0,92	1,81	**0,036**
All fishes and condrictios	**24,79**	**36,68**	3,25	**0,001**
Chelonia mydas mydas/agassizii	0,50	0,03	-3,75	**0,000**
Eretmochelys imbricata	0,03	0,00	-------	-------
Lepidochelys olivacea	0,79	0,33	-2,44	**0,012**
All turtles	**1,31**	**0,35**	-3,54	**0,000**

Can shorter sets and circle hooks help reduce shark bycatches ??