

# Review of the tuna-dolphin purse seine fishery and dolphin abundance research in the ETP

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2nd Workshop on methods for monitoring the status of ETP dolphin populations  
Mexico City, Mexico, 9-10 May, 2024



# Outline

- Tuna-dolphin fishery in the ETP
  - Catch and effort trends
  - Spatial distribution
- Dolphin stocks in the ETP
  - Stock structure
  - Historic trends in absolute abundance and purse-seine mortality
- Dolphin abundance surveys in the ETP
  - Past: NMFS vessel-based surveys
  - Present: Proposed surveys
- Future: other approaches under consideration estimate dolphin abundance in ETP

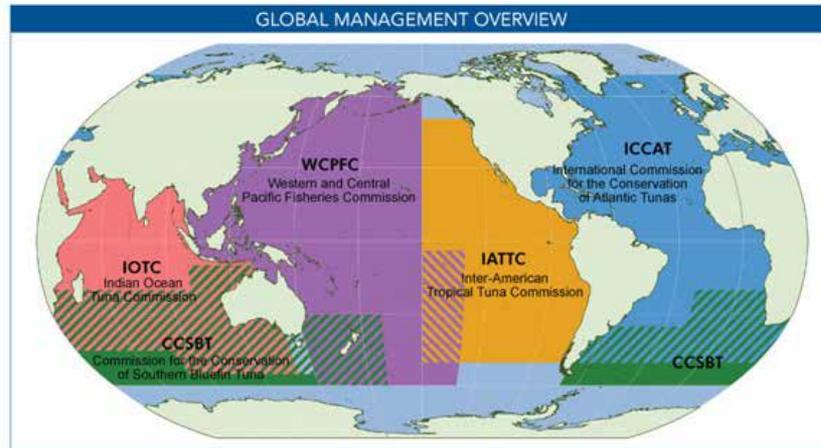


NMFS/SWFSC

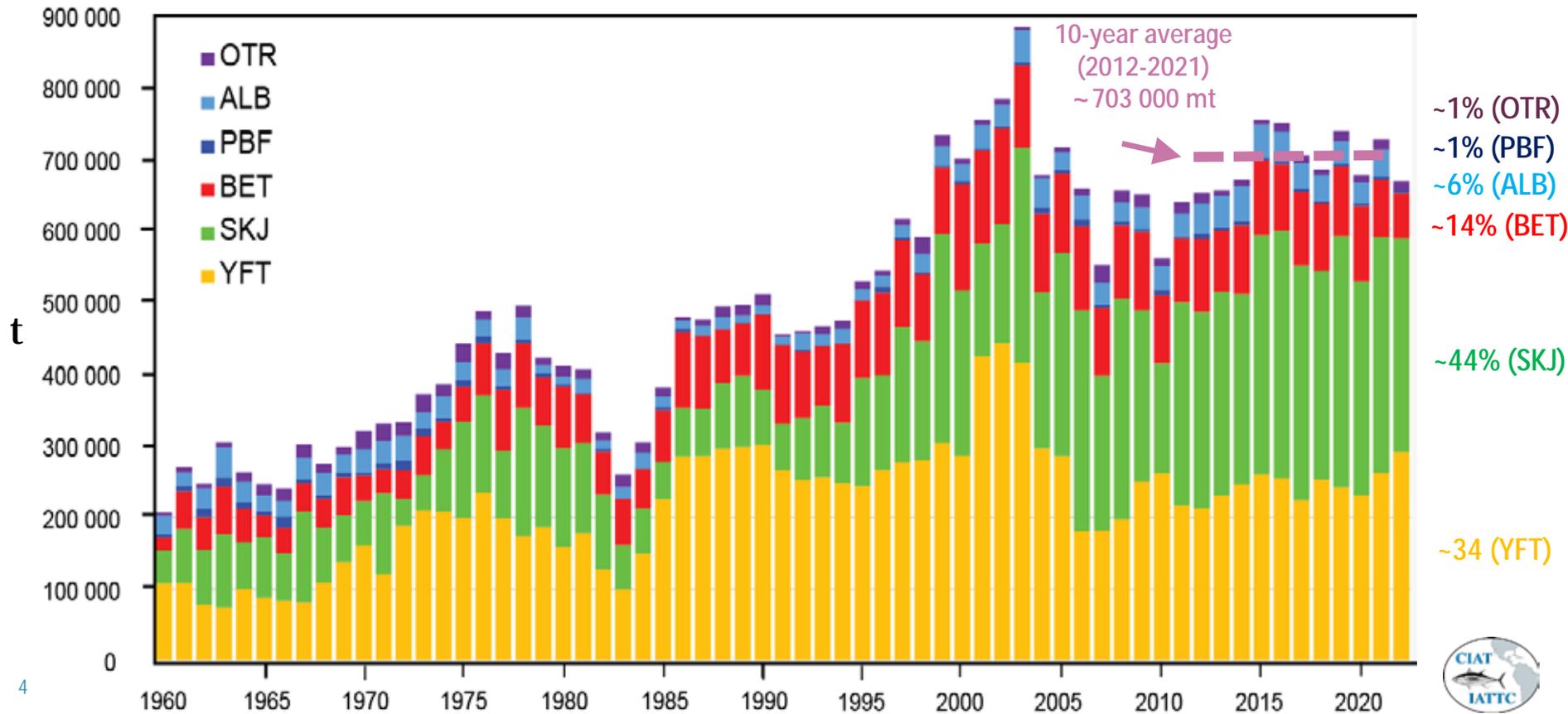


# The IATTC and the Antigua Convention

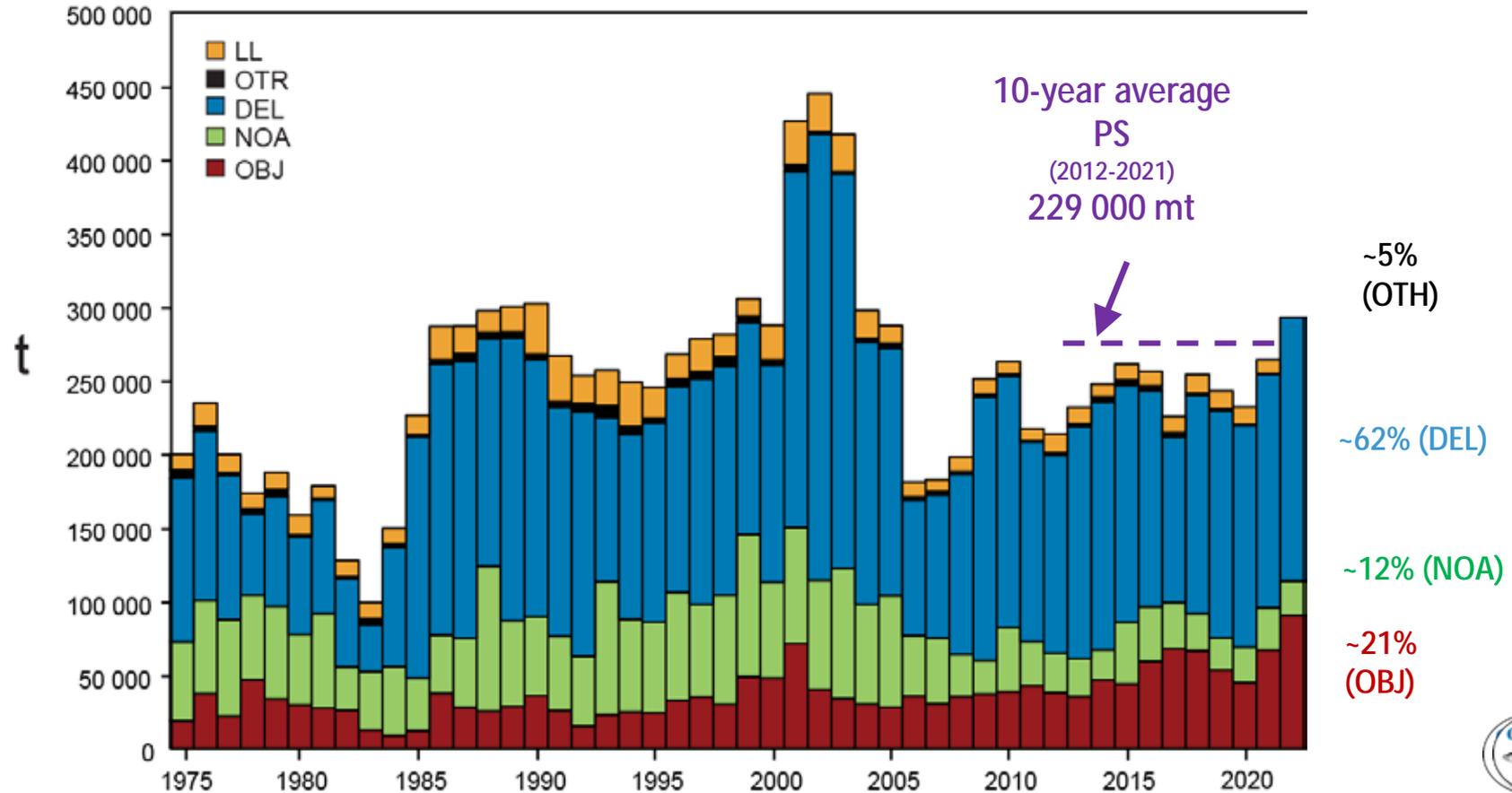
- Established in 1949 by Costa Rica and US to manage tuna fisheries in EPO
- 21 member countries, 5 cooperating non-members
- Antigua Convention (2010): ecosystem-based approach



# EPO retained catches of tunas - all gears



# EPO retained catches of tunas - all gears



# The tuna-dolphin association in the ETP

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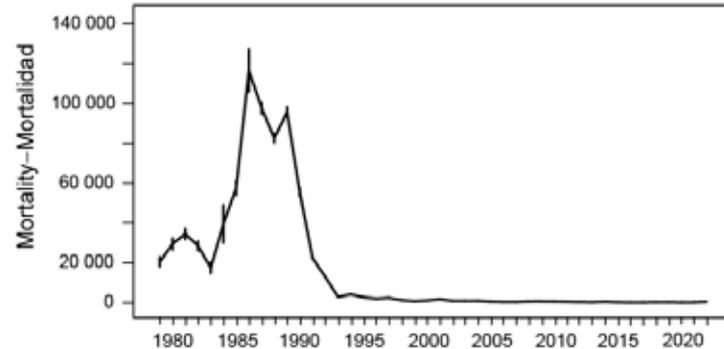
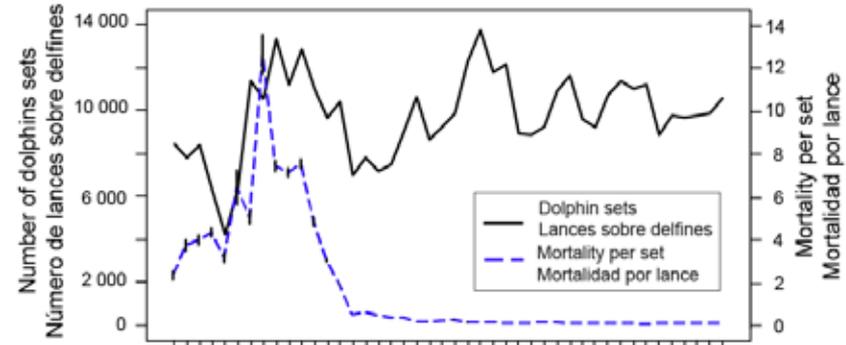
## Pelagic predator associations: tuna and dolphins in the eastern tropical Pacific Ocean

Michael D. Scott<sup>1,\*</sup>, Susan J. Chivers<sup>2</sup>, Robert J. Olson<sup>1</sup>, Paul C. Fiedler<sup>2</sup>, Kim Holland<sup>3</sup>

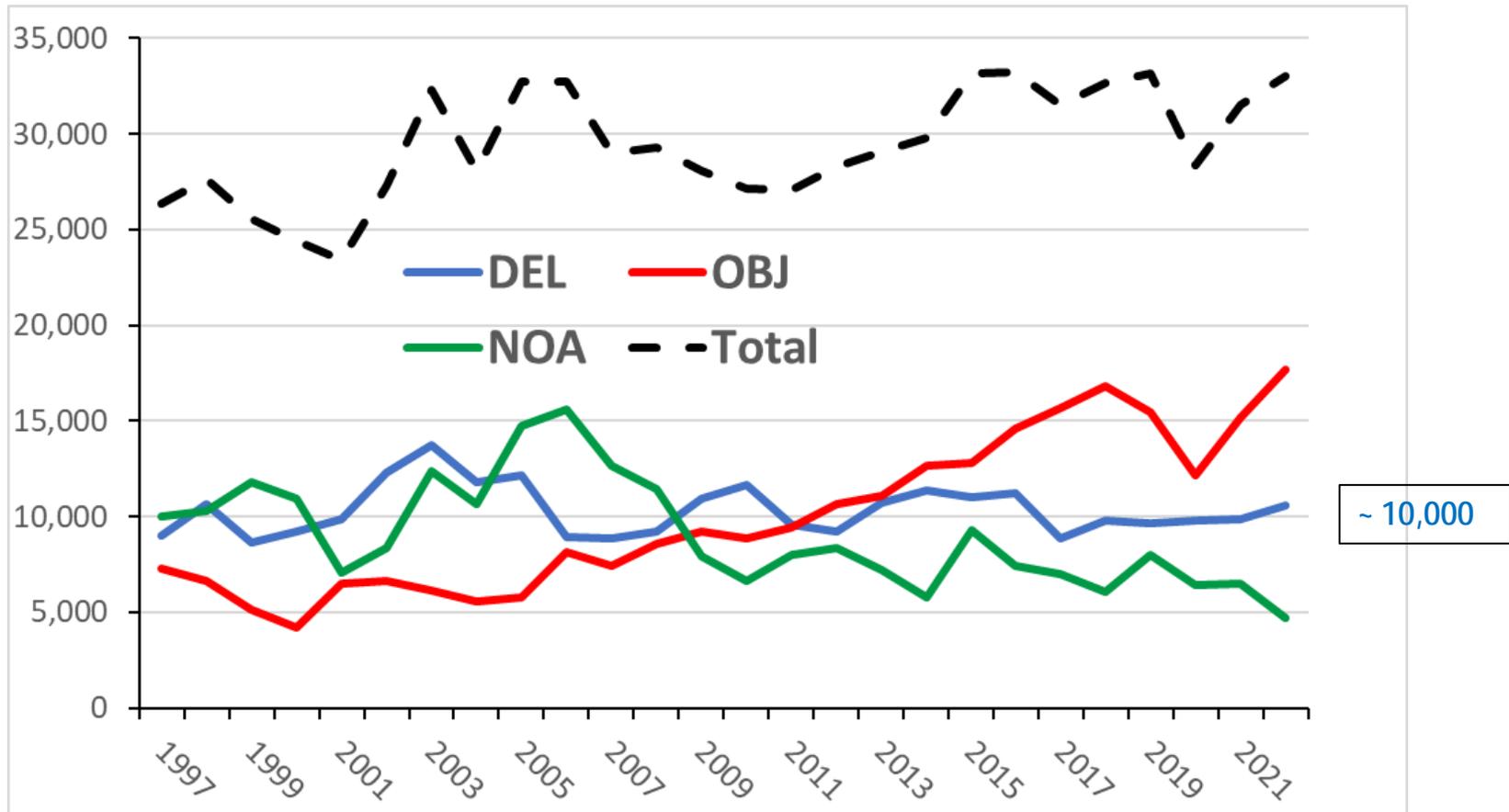


# The Agreement of the International Dolphin Conservation Program (AIDCP)

- Since the 1950s, purse-seine sets are made around dolphins to catch YFT in the ETP
- The resulting high mortality lead to strong declines in some of the dolphin stocks
- 1992: La Jolla agreement
- 1999: AIDCP enters into force
  - Dolphin Mortality Limits (DMLs)
  - On-board Observer Program
  - Operating requirements
  - Training and qualifications of fishing captains
  - Compliance monitoring



# Fishing effort: Purse-seine fishery, number of sets



# DEL sets in ETP (2013-2022)

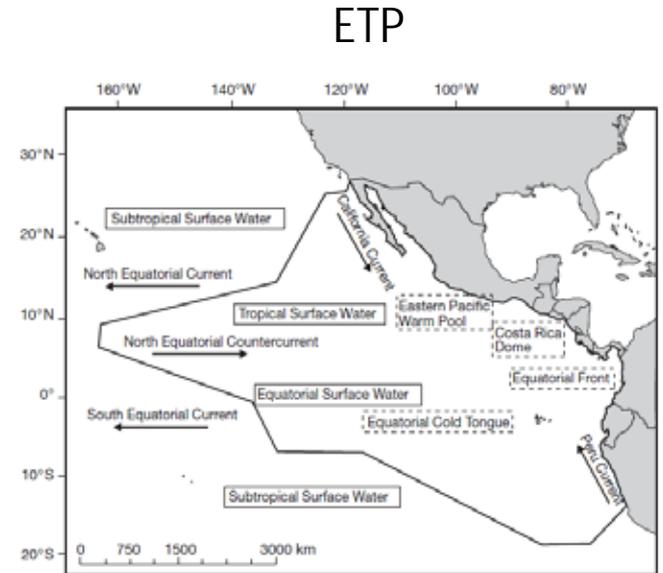
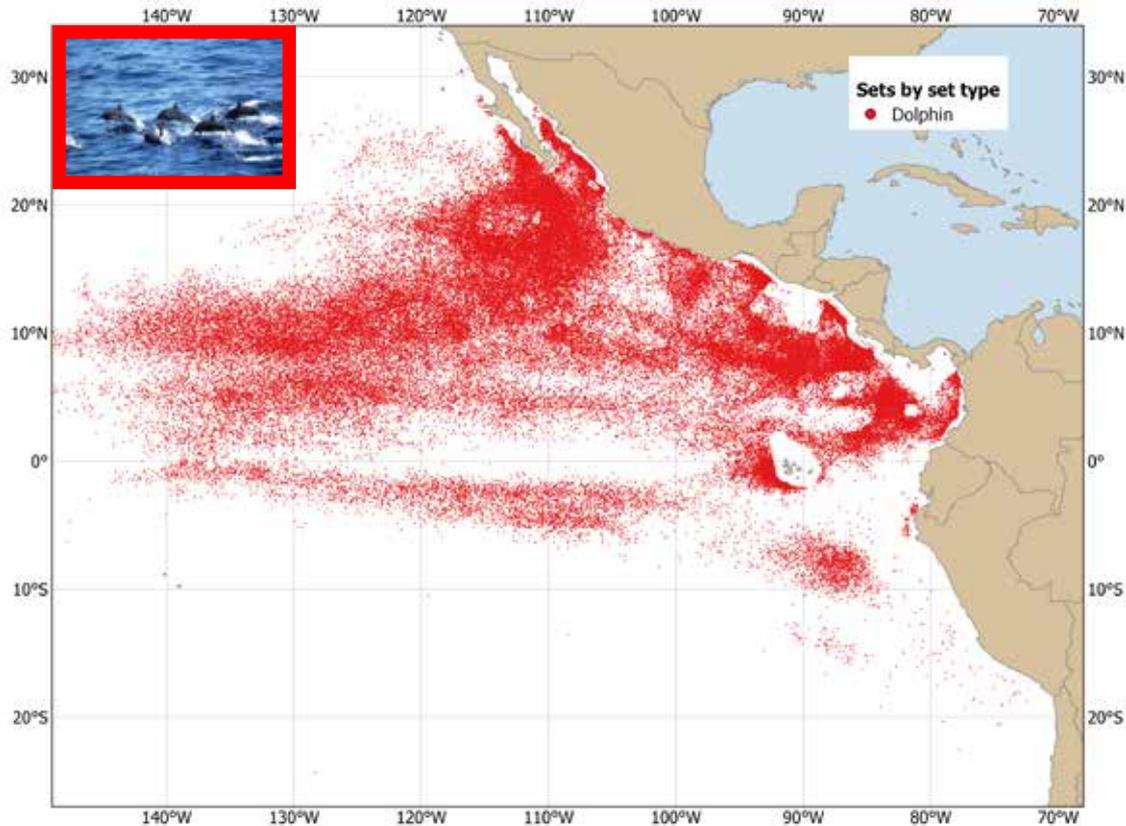
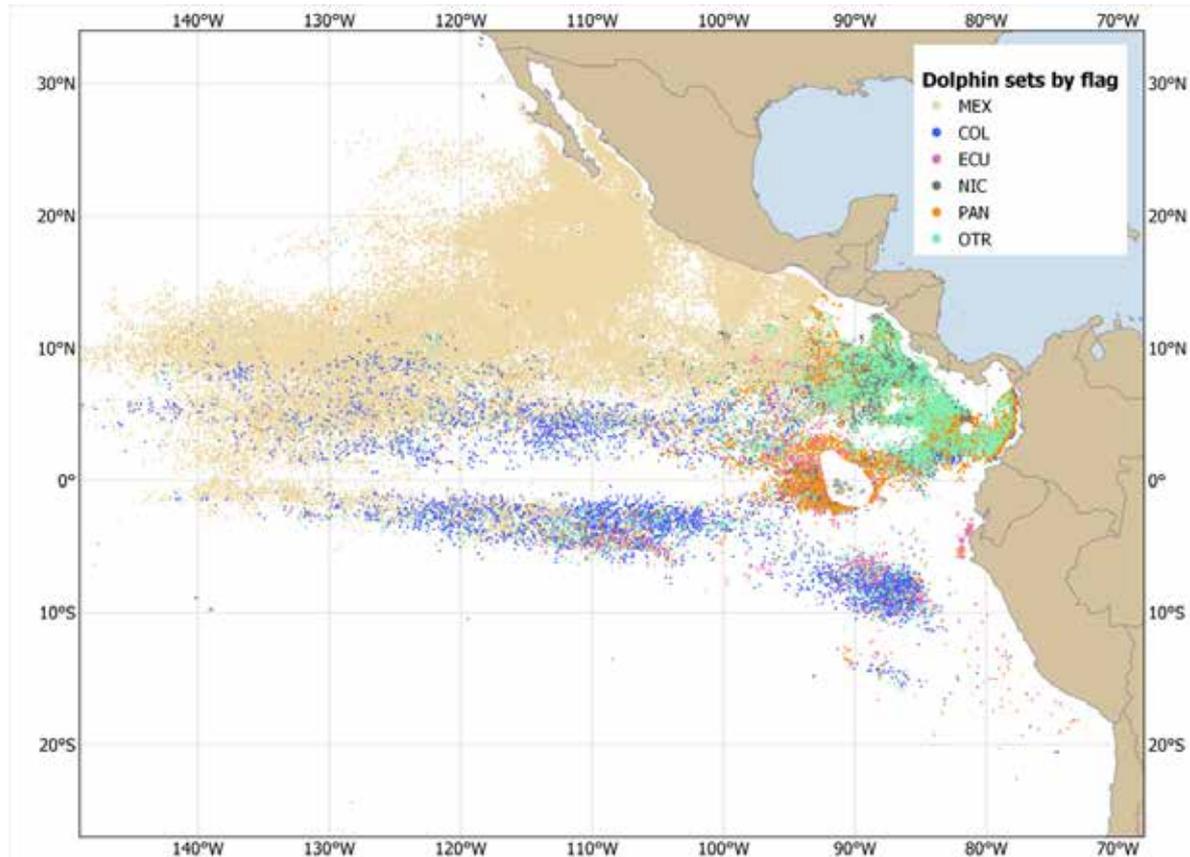
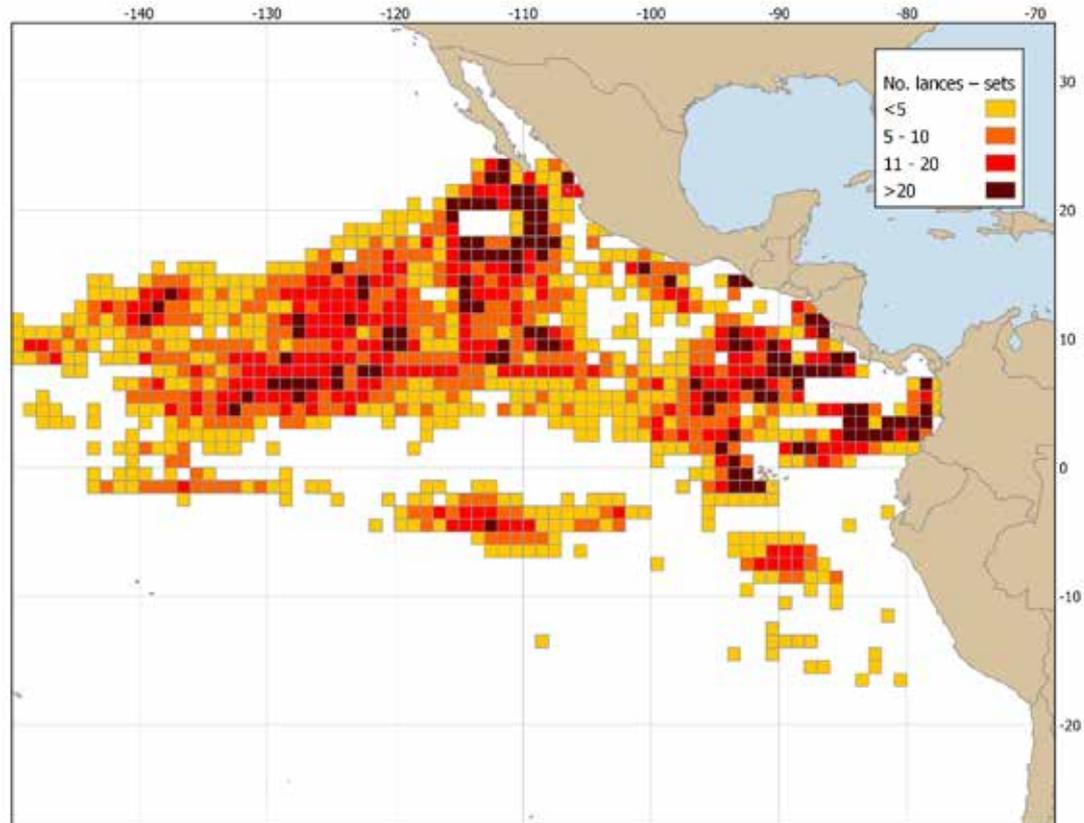


Fig. 1. Primary oceanographic features in the eastern tropical Pacific Ocean (ETP) that influence dolphin habitats. Study area is shown by the thick black line; water masses are identified by solid boxes; currents are shown with an arrow indicating the direction of flow, and other important features are identified by dashed boxes (adapted from Wyrтки 1966, 1967, Fiedler & Talley 2006)

# DEL sets in ETP (2013-2022), by flag

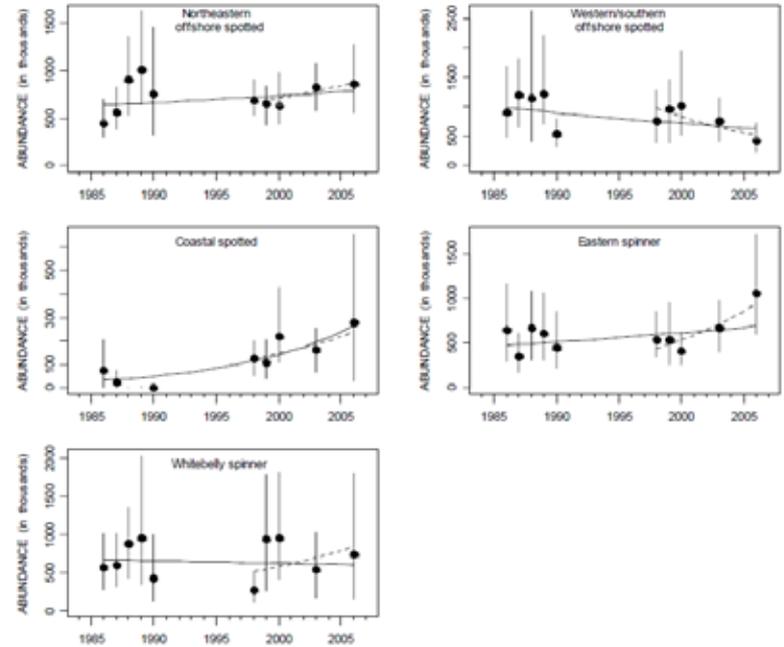
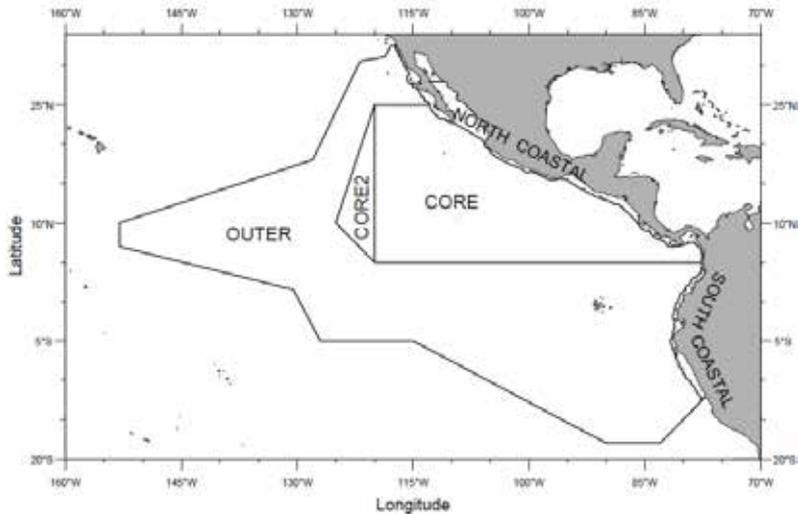


# DEL sets in 2022



# Dolphin abundance surveys in ETP

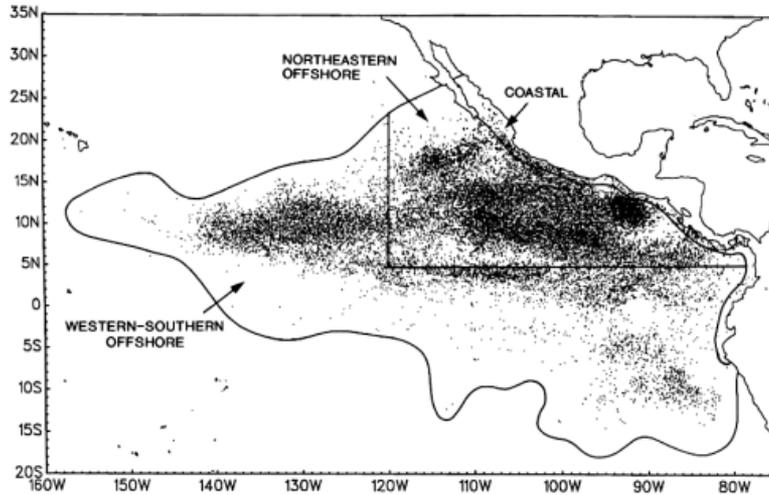
- Historically, ship-based line-transect surveys were used for estimating abundance for ETP dolphins
- Conducted by NMFS (1986-1990, 1998-2000, 2003, and 2006)
- Hiatus of surveys in 2006



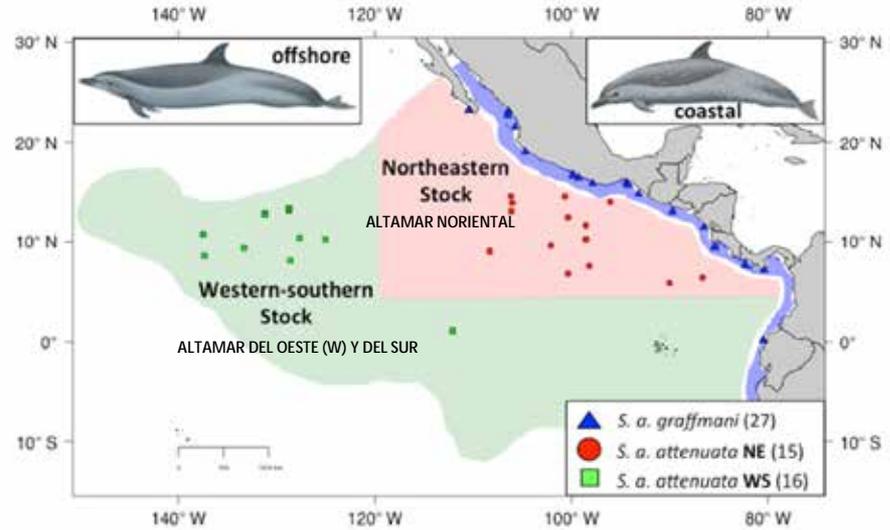
Gerrodette *et al.* (2008)

# Spotted dolphin – delfin manchado (*Stenella attenuata*)

## Stock structure



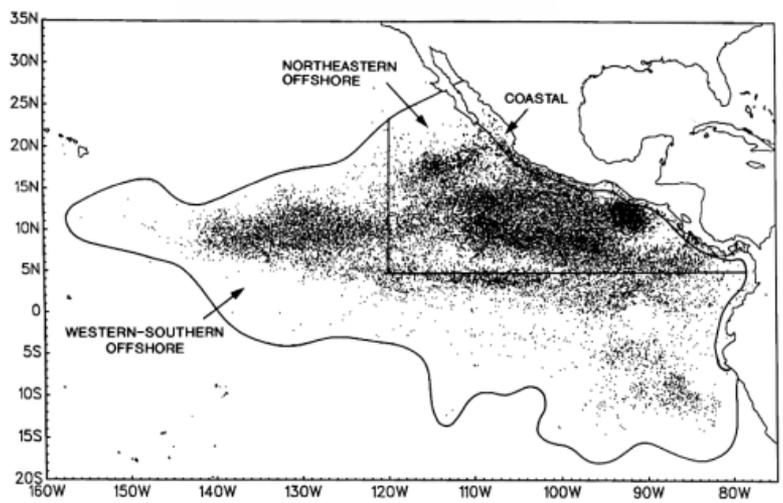
Dizon *et al.* 1994



Leslie and Morin (2016)

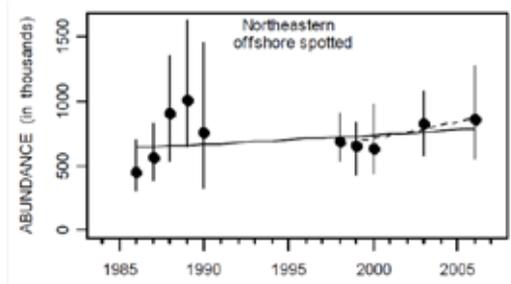
# Spotted dolphin – delfin manchado (*Stenella attenuata*)

Northeastern offshore stock – abundance and purse-seine mortality



Dizon *et al.* 1994

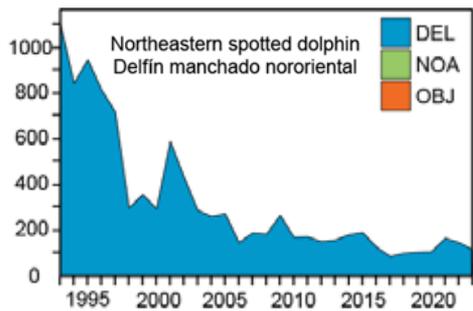
## Abundance (1000s)



N=857,884 (CV=0.23)

Gerrodette *et al.* (2008)

## Purse-seine mortalities



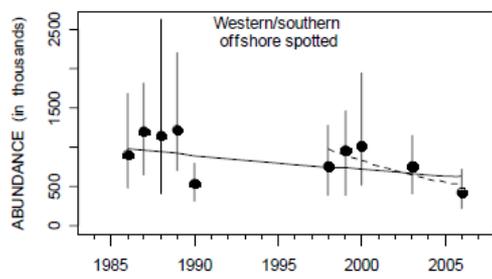
Mort 2007=187 (h=0.02)



# Spotted dolphin – delfin manchado (*Stenella attenuata*)

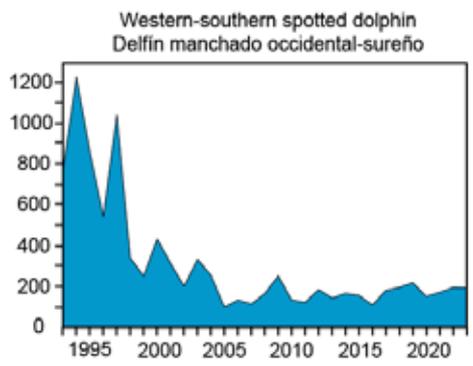
Western-southern offshore – abundance and purse-seine mortality

Abundance (1000s)

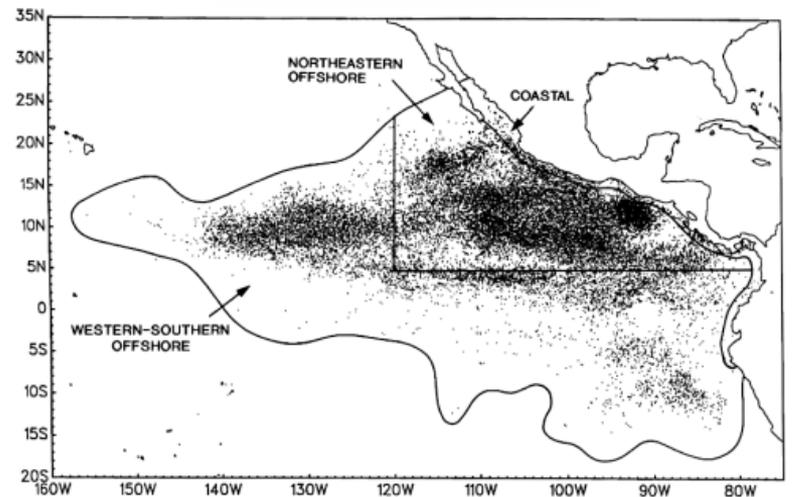


N=439,208 (CV=0.29)

Purse-seine mortalities



Mort 2007=116 (h=0.03)

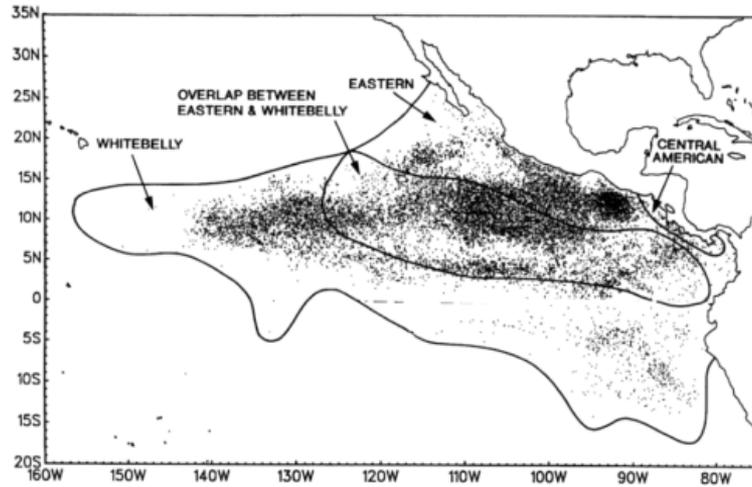


Dizon *et al.* 1994

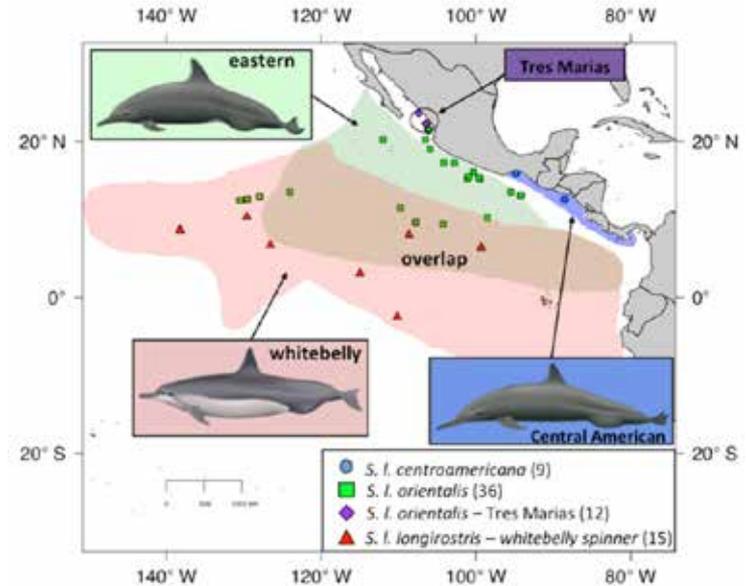


# Spinner dolphin– delfin tornillo (*Stenella longirostris*)

## Stock structure



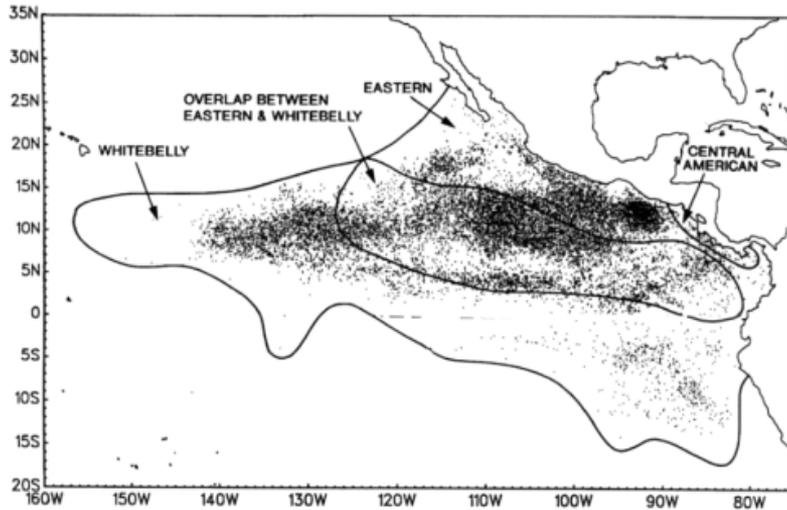
Dizon *et al.* 1994



Leslie and Morin (2016)

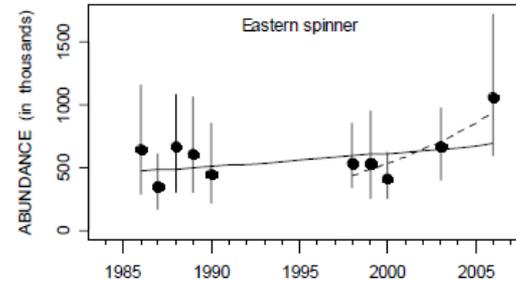
# Spinner dolphin– delfin tornillo (*Stenella longirostris*)

Eastern stock – abundance and purse-seine mortality



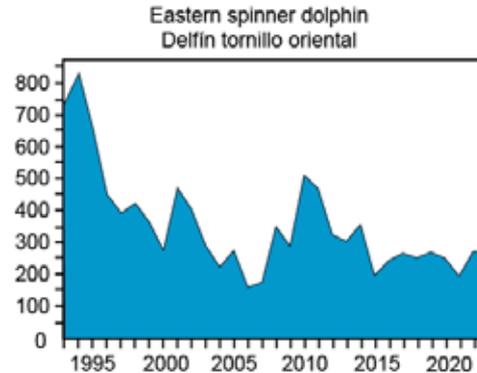
Gerrodette *et al.* (2008)

Abundance (1000s)



$N=1,062,879$  (CV=0.26)

Purse-seine mortalities

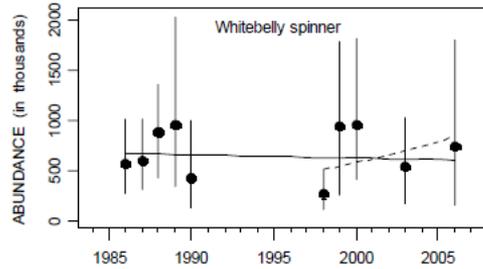


Mort 2007=175  
( $h=0.02$ )

# Spinner dolphin– delfin tornillo (*Stenella longirostris*)

## Whitebelly – abundance and purse-seine mortality

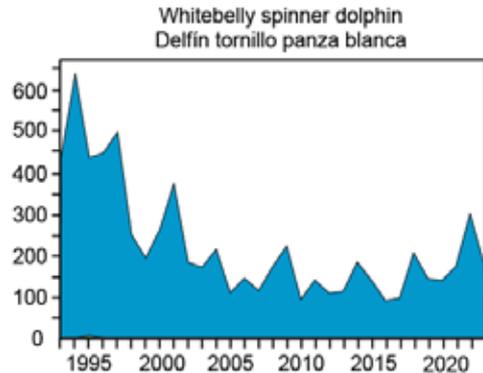
Abundance (1000s)



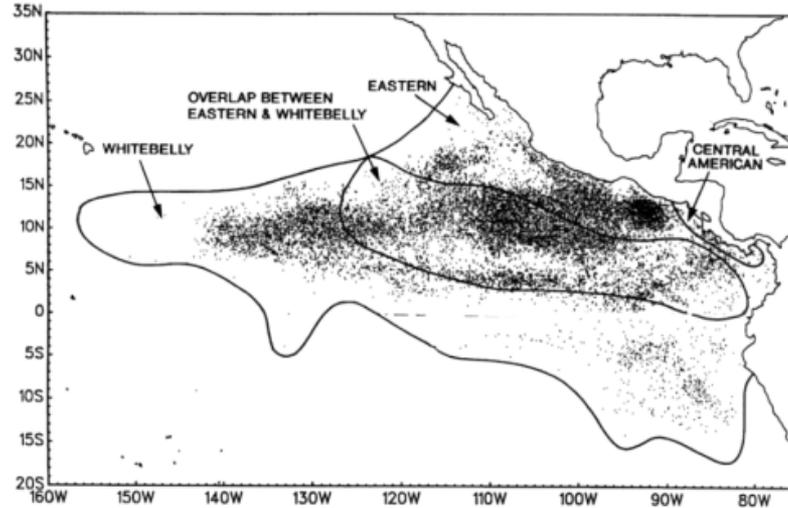
$N=734,837$  (CV=0.61)



Purse-seine mortalities



Mort 2007=113  
( $h=0.02$ )



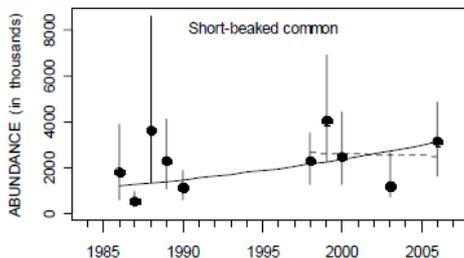
Gerrodette *et al.* (2008)

# Common dolphin – delfin comun (*Stenella longirostris*)

Stocks combined

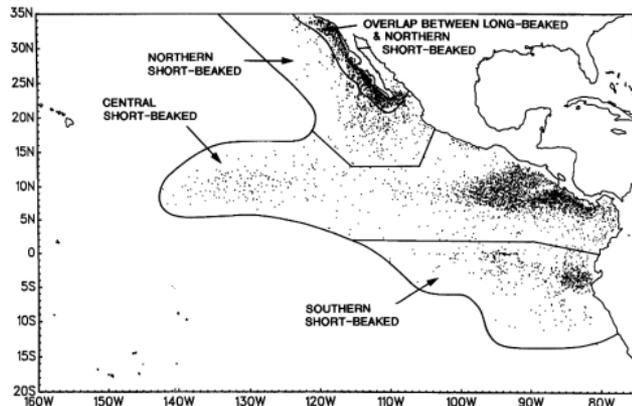


Abundance (1000s)

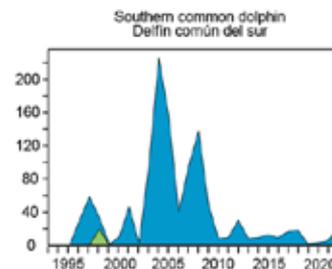
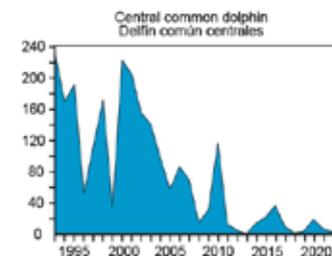
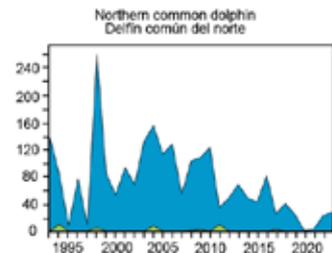


$N=3,127,203$  ( $CV=0.27$ )

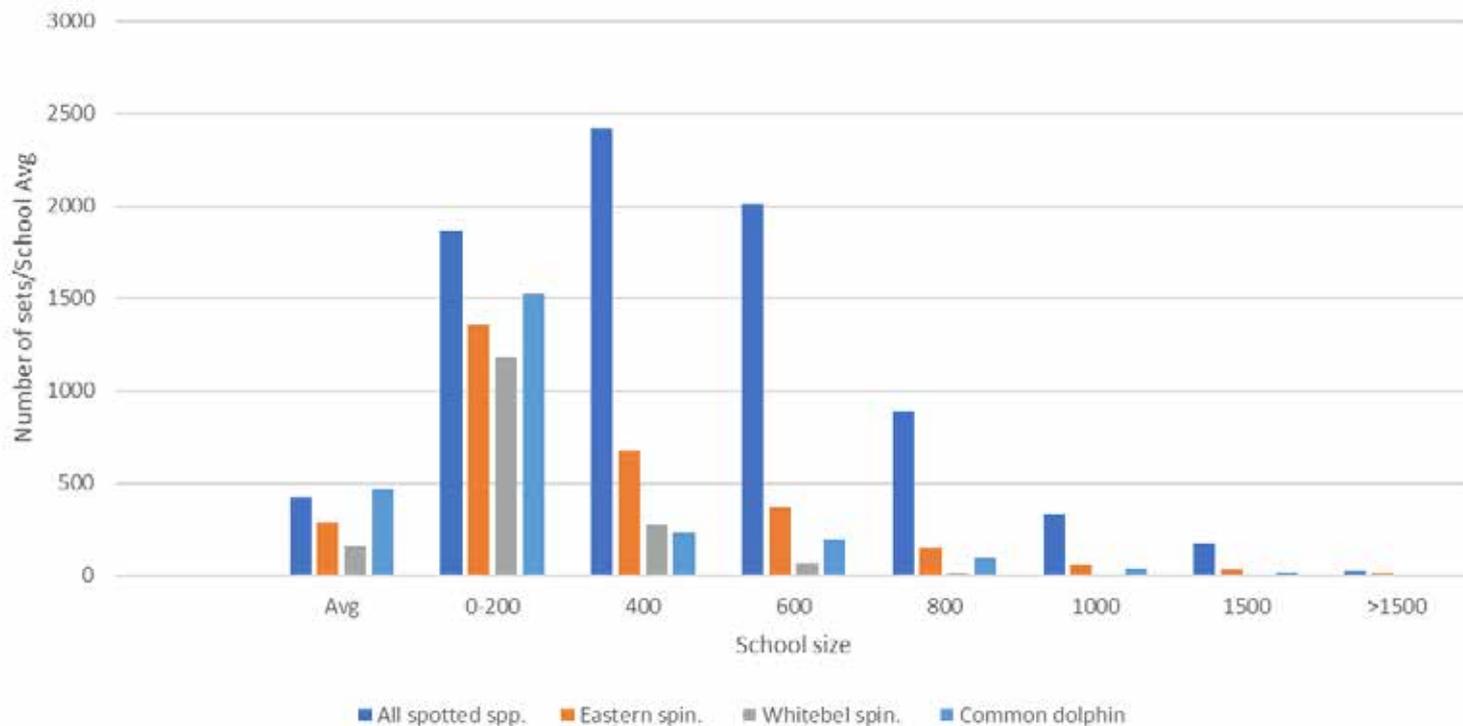
Mort 2007=219



Purse-seine mortalities



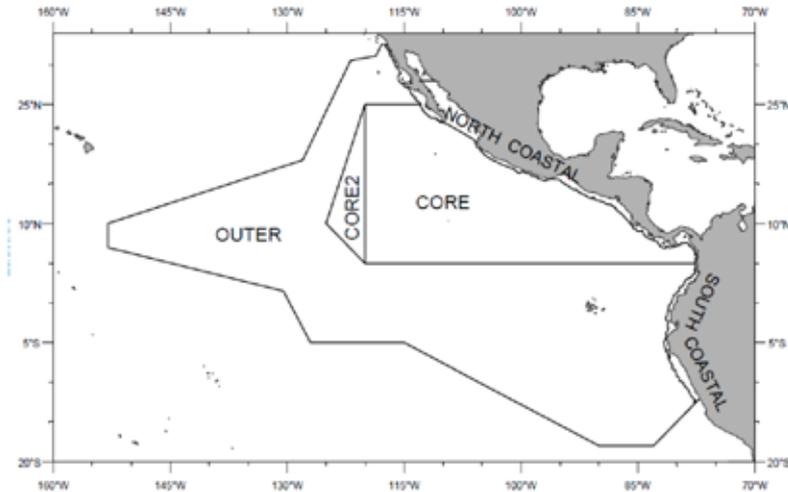
2023 dolphin sets data - School sizes of captured schools by species or stock



## DOCUMENT MOP-37-02

### DESIGN OF A SURVEY FOR EASTERN TROPICAL PACIFIC DOLPHIN STOCKS

Cornelia S. Oedekoven<sup>1</sup>, Stephen T. Buckland<sup>2</sup>, Laura Marshall<sup>3</sup> and Cleridy E. Lennert-Cody<sup>2</sup>



**FIGURE 1.** Strata for the STAR06 cruise (from Gerrodette, T., Watters, G., Perryman, W., Ballance, L. 2008. Estimates of 2006 dolphin abundance in the eastern tropical Pacific, with revised estimates from 1986-2003. NOAA-TM-NMFS-SWFSC-422).

- Absolute abundance for 10 stocks (Gerrodette et. al. (2008))
- Two vessels at 120-days each (1-2 drones)
- Same strata as in NMFS 2006 survey

14-day trial	Main survey 2 ships
O Starr	O Starr + O Titan
In-kind	O Starr + In-kind
2.2 M	15.4 M
1.4 M	10.6 M

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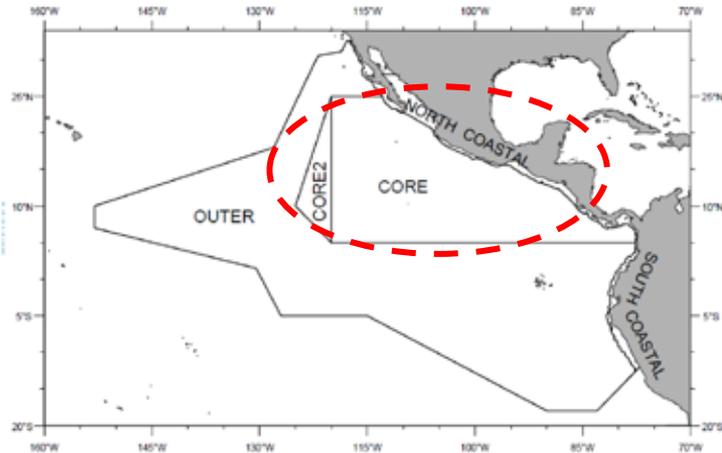


FIGURE 1. Strata for the STAR06 cruise (from Gerrodette, T., Watters, G., Perryman, W., Ballance, L. 2008. Estimates of 2006 dolphin abundance in the eastern tropical Pacific, with revised estimates from 1986-2003. NOAA-TM-NMFS-SWFSC-422).

- NE offshore spotted dolphin and eastern spinner (listed as depleted by the MMPA)
- CORE, CORE2 and NORTH coastal areas of last 2 surveys

	14-day trial	Main suvey 1 ship
O Starr	2.2 M	7.1 M
In-kind	1.4 M	4.3 M

# Other approaches under consideration

- Close-kin mark recapture (CKMR)
- Aerial surveying
- Satellite imagery (spatiotemporal modeling with auxiliary data)

# Research proposal concept notes

- Key opportunities and challenges (pros and cons)
- Aspects of relevance to fishing operations, if affected
- Timeline considerations (proposed project staging)
- Preliminary budget



Questions?

