

Comisión Interamericana del Atún Tropical  
Inter-American Tropical Tuna Commission



## Mobulid rays

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# Species in the EPO



*M. birostris*



*M. tarapacana*

Disc width



*M. munkiana*



*M. thurstoni*



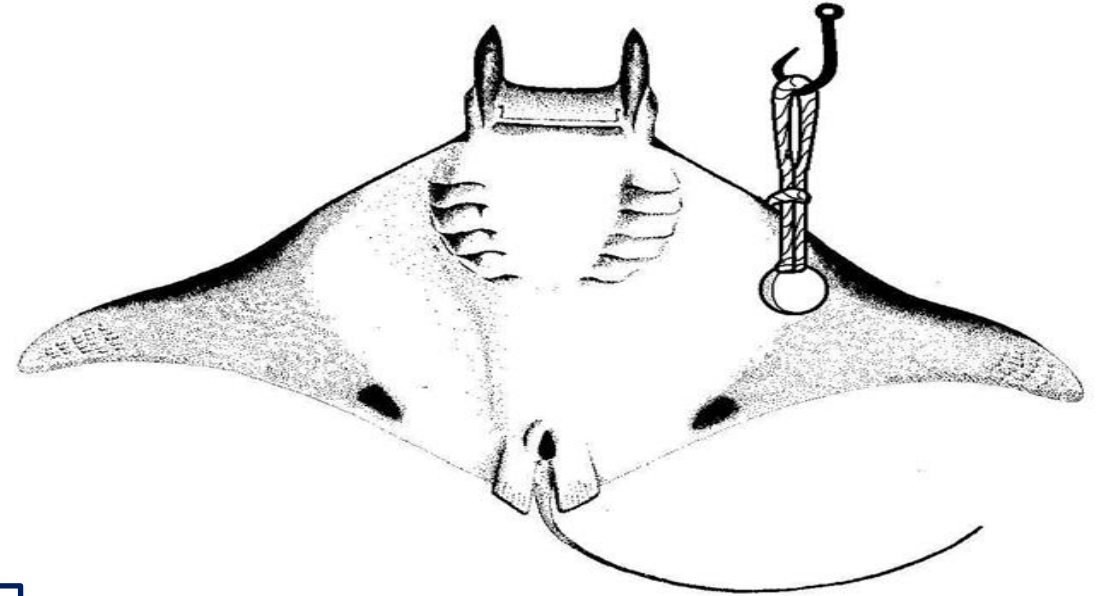
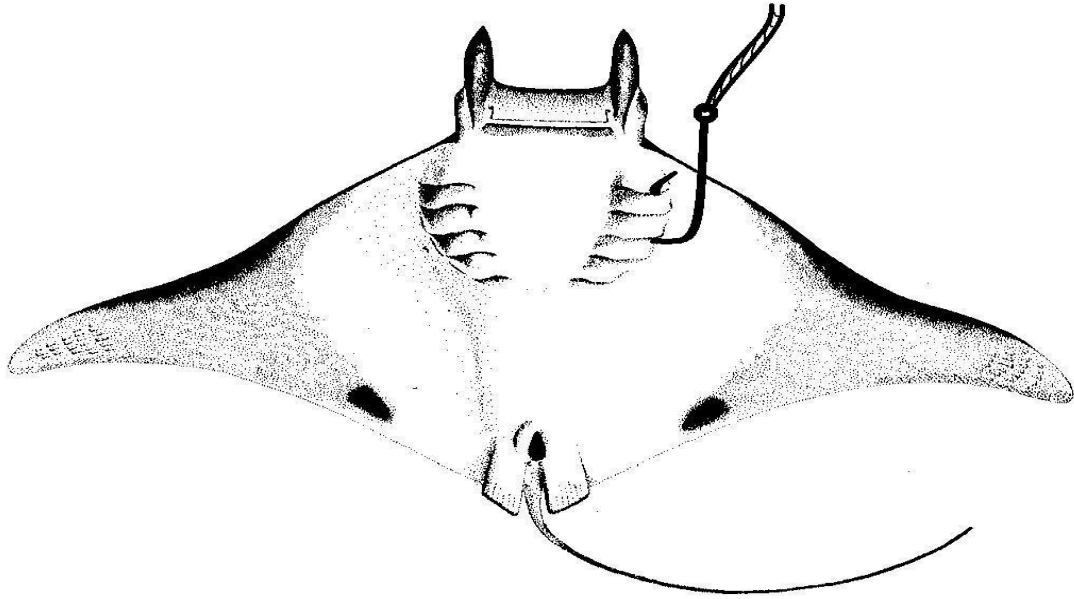
*M. mobular*

# Changes in nomenclature

<b>Old name</b>	<b>New name</b>	<b>Common name</b>
<i>Manta birostris</i>	<i>Mobula birostris</i>	Giant manta now Giant devil ray
<i>Mobula japonica</i>	<i>Mobula mobular</i>	Spinetail devil ray
<i>Mobula thurstoni</i>		Smooth tail or Bentfin devil ray
<i>Mobula tarapacana</i>		Chilean devil ray
<i>Mobula munkiana</i>		Munk's devil ray

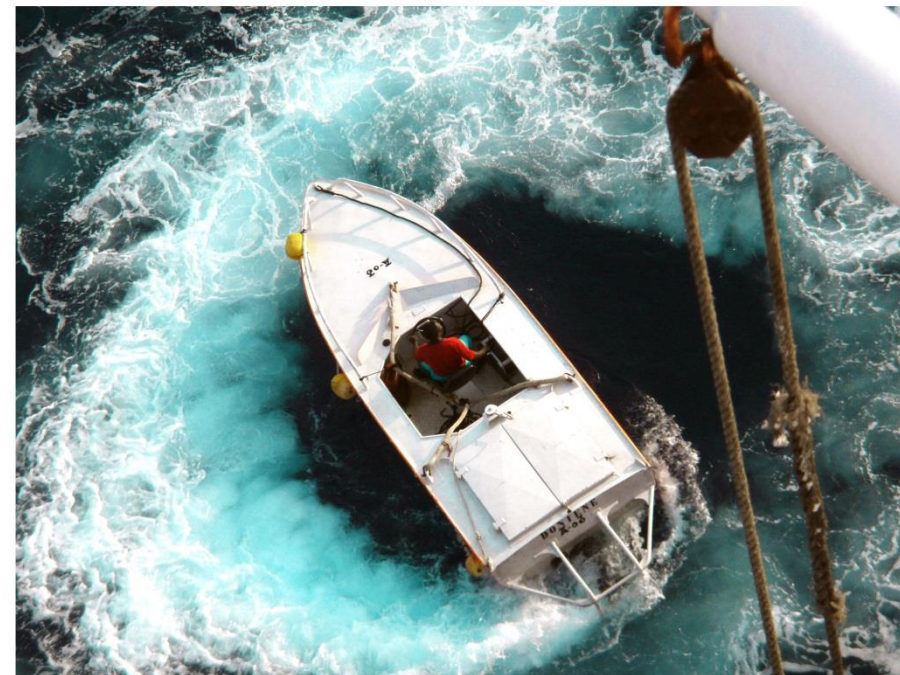
White et al. 2017

# Previous release methods



All mobulid bycatch numbers are considered as mortalities by the IATTC even if released

- The PS in the eastern Pacific Ocean captures an average of 1,500 mobulids per year, mostly in Dolphin and School sets
- Second largest bycatch in Dolphin and School sets



*Photo: Jon López*












# New data forms






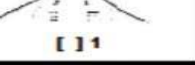

Inter-American Tropical Tuna Commission  
**RAY RECORD**

Trip Number	Record Number	Set Number	Species	Total number of rays

INDIVIDUAL RECORD					COLLECTIVE RECORD					
Disc width (cm)	Estimation	Sex			Fate (code)	Estimate by number of individuals				Fate (code)
		M	F	U		Small < 90 cm	Medium 90 - 150 cm	Large > 150 cm	Total	
	[ ]	[ ]	[ ]	[ ]	[ ]					[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]					[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]					[ ]
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**FATE CODES**  
1- Human consumption    3- Released alive    5- Unknown  
2- Discarded                4- Other

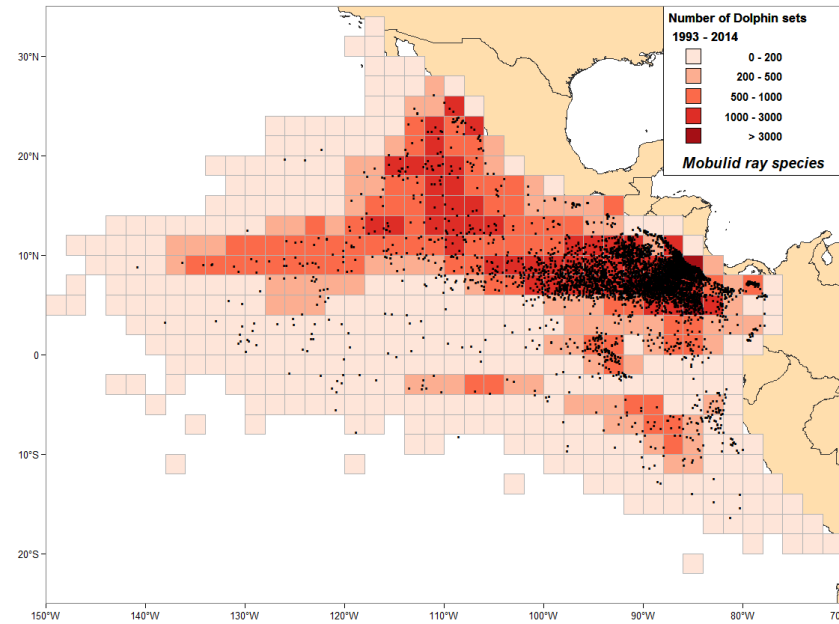
HEAD SHAPE (Drawings not to scale)		SPIRACLE POSITION	
 [ ]1	 [ ]2	 [ ]4.1	 [ ]4.2
 [ ]3	 [ ]4	 [ ]4.3	 [ ]4.4
 [ ]5	For option 4, complete the section to the right	 [ ]4.5	 [ ]4.6
None of these [ ]6	Could not determine [ ]7	None of these [ ]4.5	Could not determine [ ]4.6

MOUTH POSITION (ventral view)		TAIL SPINE	
 [ ]1	 [ ]2	 [ ]1	None of these [ ]4
 [ ]3	Could not determine [ ]3	 [ ]2	Could not determine [ ]5
 [ ]4		 [ ]3	

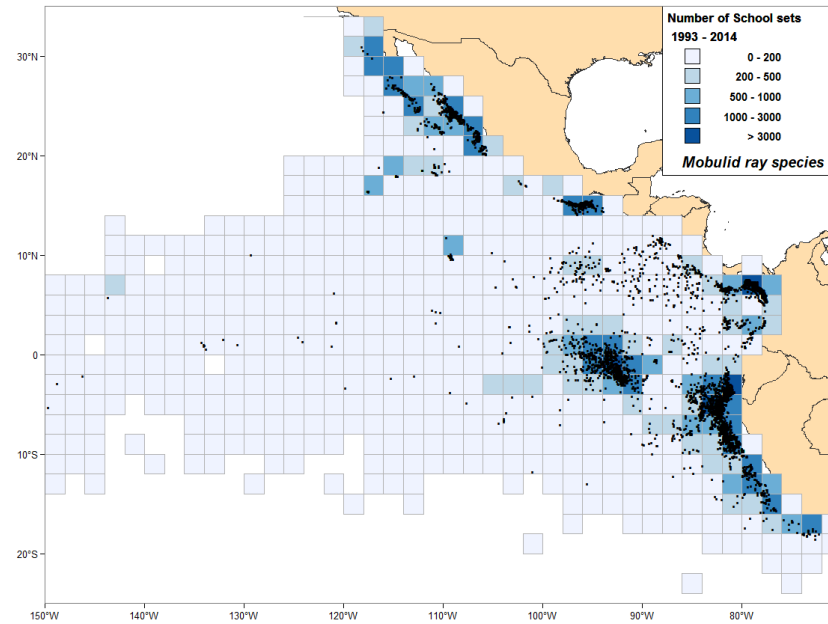
**COMMENTS**

# Spatial distribution in the different set types

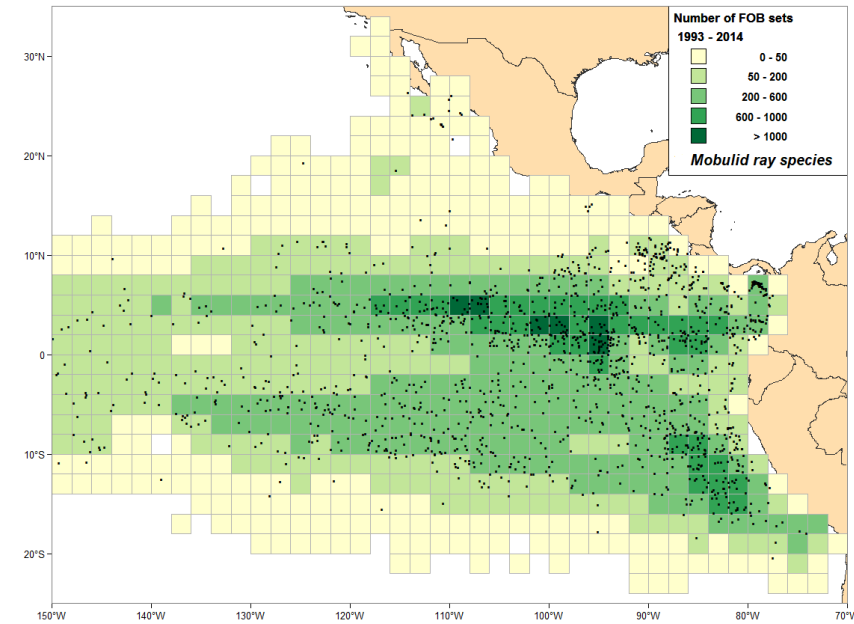
## Dolphin sets



## School sets



## Floating object sets

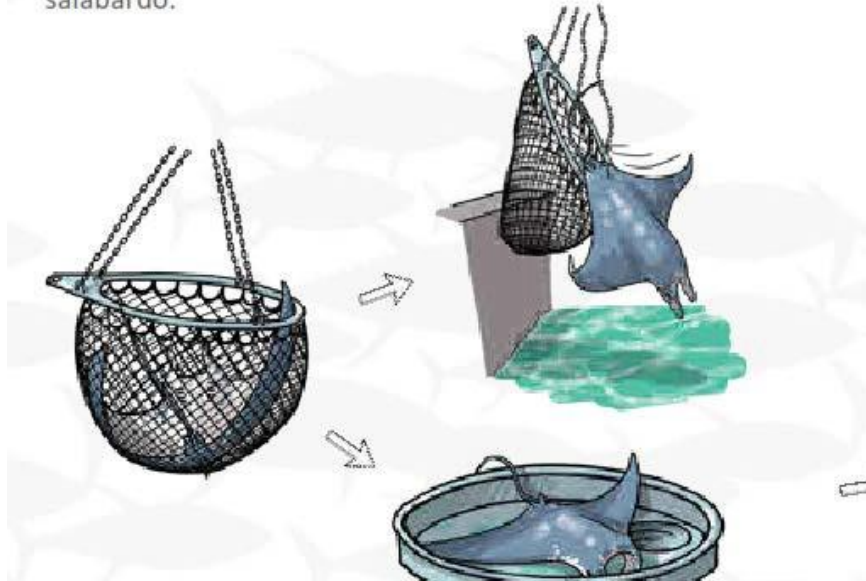


# Release methods

## Skipper's workshops ISSF – IATTC in the EPO

### ¿ CÓMO LIBERAR A UN INDIVIDUO DE TALLA GRANDE ?

Los peces grandes como los grandes tiburones, las mantarrayas o los peces luna pueden ser liberados directamente por medio del salabardo.





# Survival estimates: pilot project

Observers were trained to:

- Deploy survivorship tags SAFELY
- Collect relevant covariate data
- Collect a tail sample for genetic analyses
- Refresher course on mobulid species ID

Fishers committed to stop maneuvers during tagging

# Survival estimates: pilot project

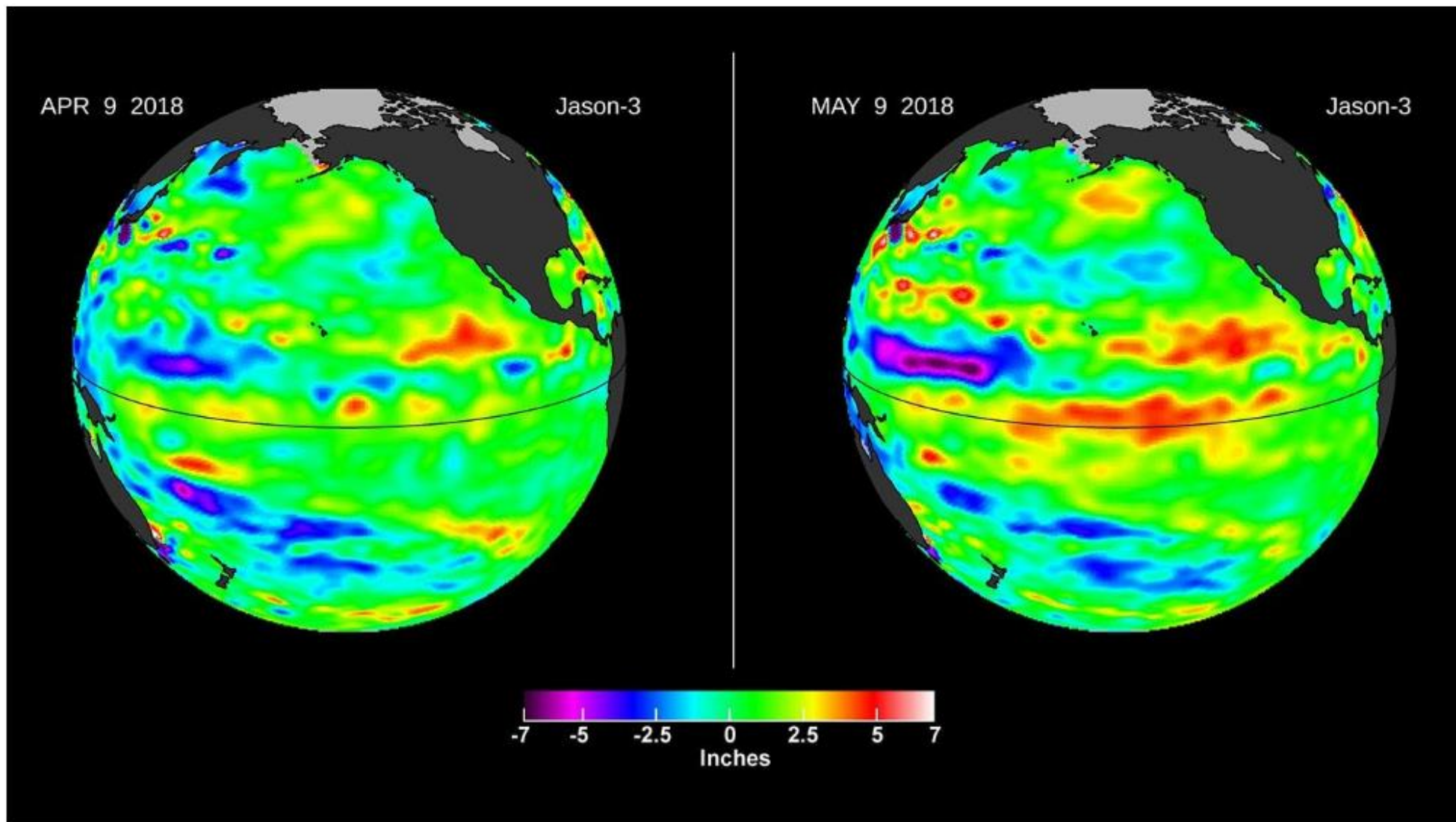
IATTC had problems with observer safety

but fishers were committed to stop maneuvers during tagging

Program now is continued by TUNACONS and OPAGAC vessels,

# Survival estimates may be affected by many factors

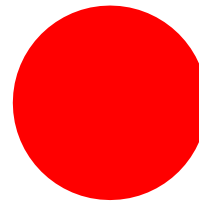
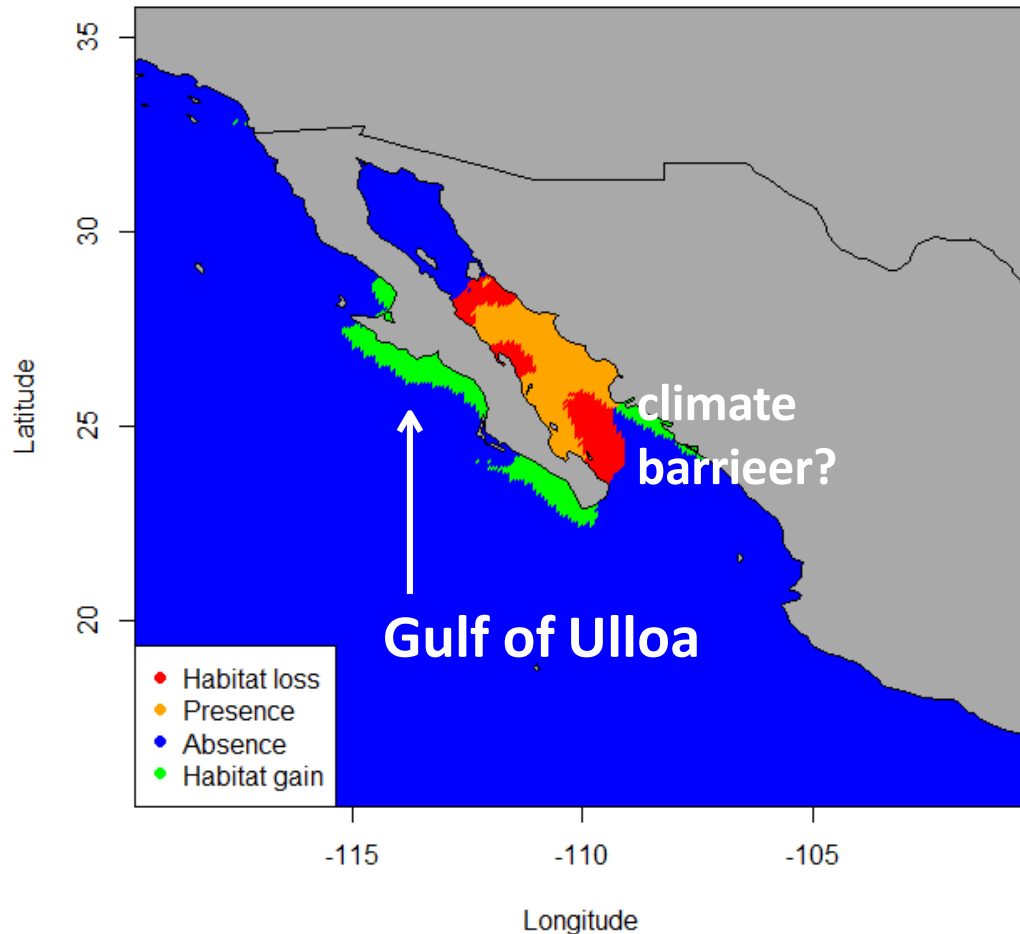
- SPECIES
- SIZE
- SEX
- TIME IN NET
- TIME ON DECK
- BRAILER SEQUENCE
- BRAILER SIZE
- POSITION ON BRAILER
- SEA SURFACE TEMPERATURE
- WEATHER CONDITIONS
- BODY CONDITION BEFORE RELEASE
- **RELEASE METHOD**
- TUNA CATCH QUANTITY
- TYPE OF SET



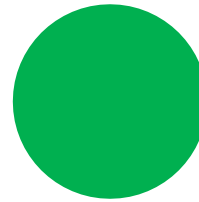
Left, in April, the Jason-3 satellite shows most of the Pacific Ocean at neutral heights (green). In May, a Kelvin wave (red) appears on the equator. Credit: NASA/JPL-Caltech

# Climate change and habitats

Effect of climate change on *Mobula mobular* by 2100



**Habitat loss: >20%**



**Habitat gain: 5%**

**Gulf of Ulloa:** potential habitat also for turtles and marine mammals (*Etnoyer et al. 2016*)

The habitat of *Mobula mobular* could be affected by the effect of climate change

# Future directions and Recommendations

- **Deploy survivorship tags (See research proposal)**
  - Evaluate post release mortality of different species and set types
  - Develop best practices handling and release guidelines based on results
  - Use archival tag data from surviving mobulids to study horizontal and vertical movements, habitat use, and mobulid hotspots
- **Genetic analyses from tail samples**
  - Improve species identification, sex determination and verify observer ID
  - Population abundance estimation with close kin mark recapture
  - Evaluate population structure throughout the eastern Pacific

**Begin to study the impact of climate changes in target and bycatch species**

# Partners/Collaborations

- AZTI
  - Nerea Lezama-Ochoa (habitat models & climate change)
- NOAA & Manta Trust
  - Joshua Stewart (mobulid ecology and telemetry)
- UC Santa Cruz
  - Donald Croll (mobulid ecology & telemetry)
  - Kelly Newton (mobulid ecology & telemetry)
  - Giacomo Bernardi (genetics)
- Monterey Bay Aquarium (funder of pilot study)
  - Salvador Jorgensen (elasmobranchs & telemetry)
  - John O'Sullivan (mobulid husbandry & survival)