



# For seabird bycatch mitigation



Food and Agriculture Organization  
of the United Nations



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OCEANS  
PROGRAM

# Workshop objective and content

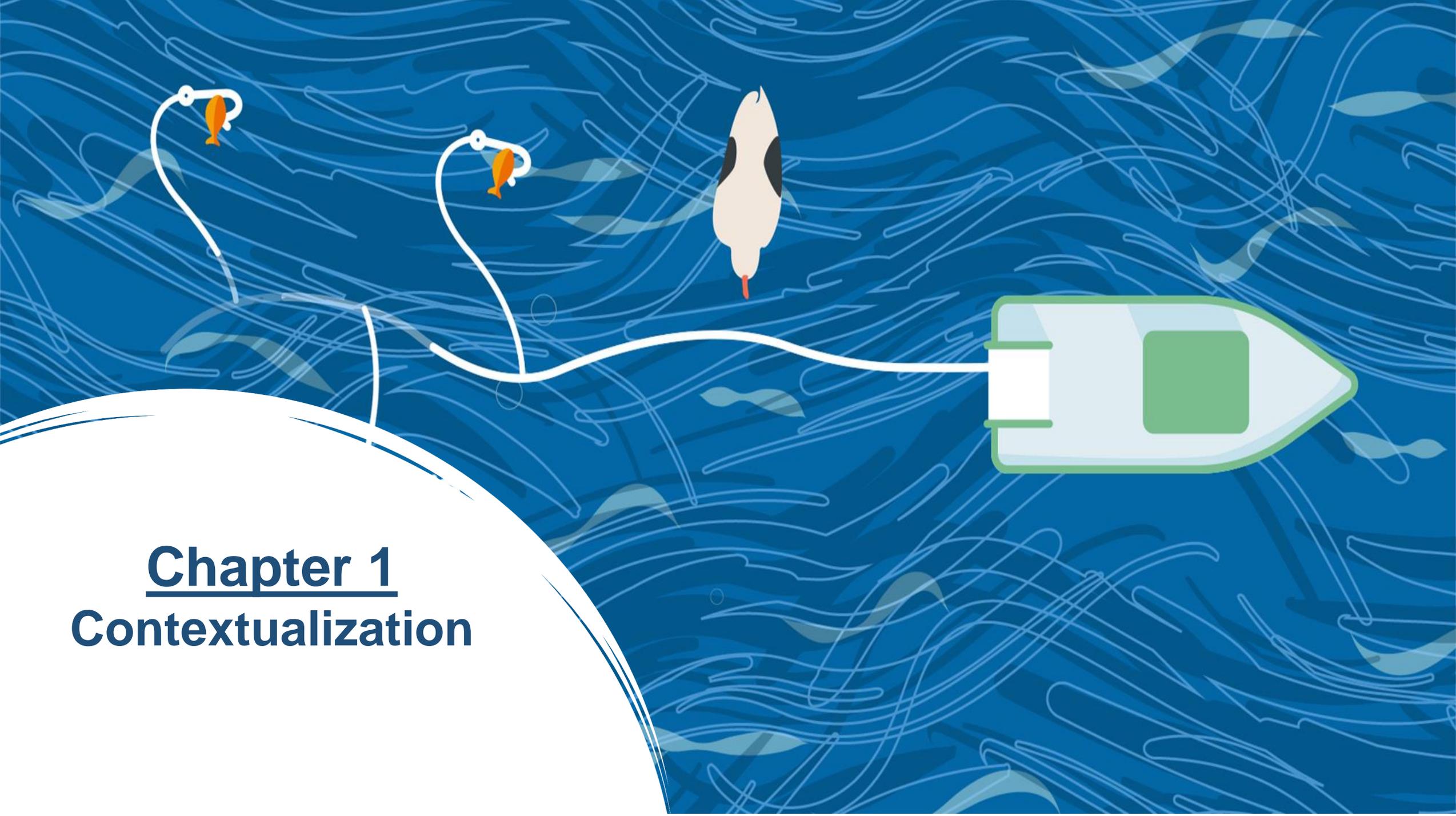
## Objective:

Increase awareness and promote uptake of seabird bycatch mitigation in CCSBT fisheries.

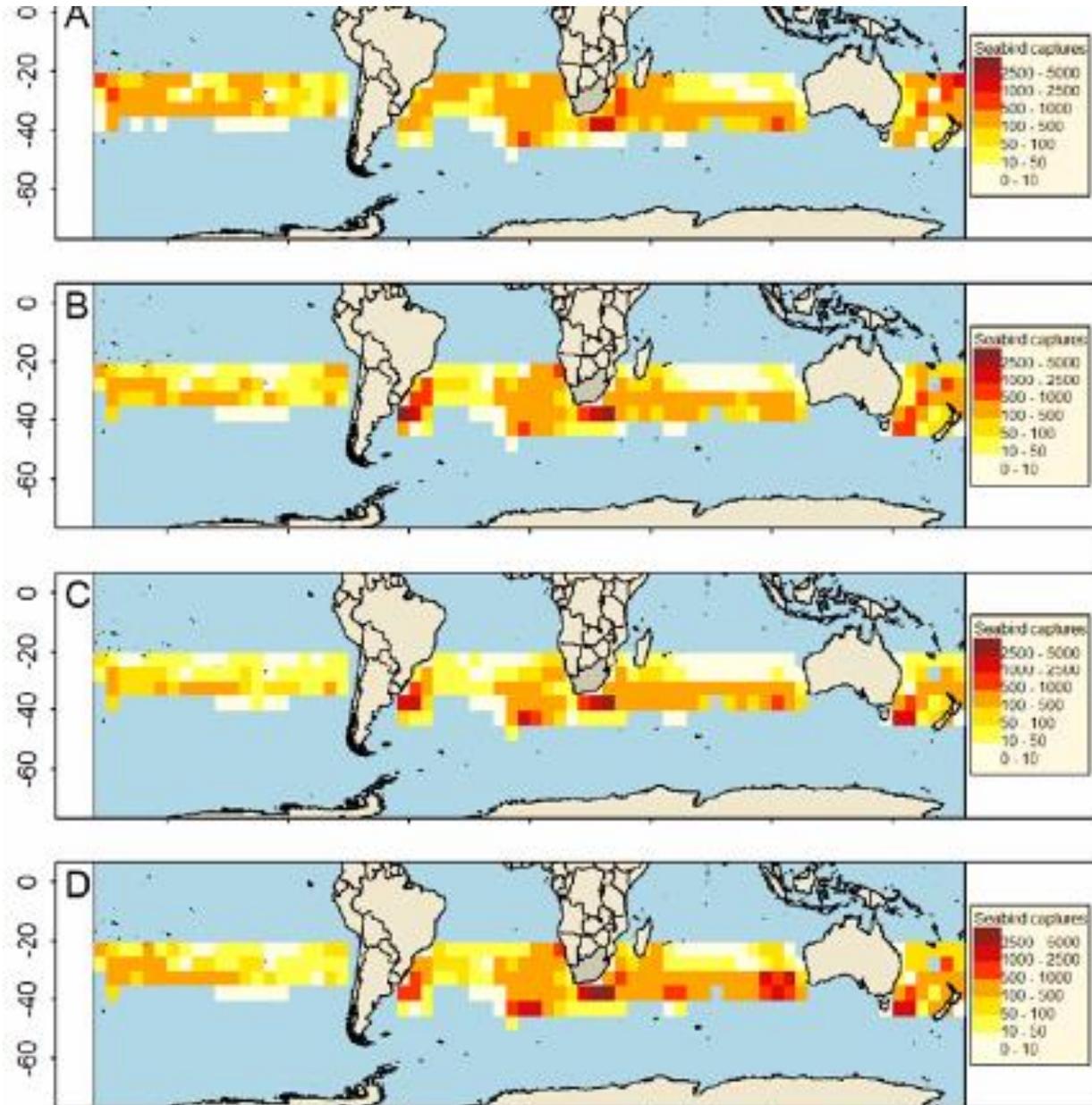
## Workshop content

- Chapter 1. Contextualization
- Chapter 2. Introduction to at-risk seabirds - albatrosses and petrels
- Chapter 3. Seabird bycatch
- Chapter 4. RFMOs mitigation measures requirements
- Chapter 5. Seabird bycatch mitigation measures
- Chapter 6. Handling and release of hooked or entangled birds

# Chapter 1 Contextualization



# Seabird bycatch in tuna longline fisheries



**30,000 to 40,000** seabirds estimated caught per annum in the Southern Hemisphere

*Abraham et al. (2019), FAO Common Oceans Report*



© Fabiano Peppes

# Albatrosses and large petrels are the most affected species

A combination of ecological and life history factors drives the higher susceptibility of albatrosses and large petrels to bycatch:

- Pelagic distribution
- Foraging behaviour
- Attraction to fishing vessels
- Life history characteristics

- 15 of 22 species of albatrosses are threatened
- 22 albatross plus 8 petrel species listed under the Agreement on the Conservation of Albatrosses and Petrels (ACAP)
- Conservation Crisis being declared by the ACAP in 2019





## Chapter 2

**Introduction to at-risk  
seabirds: albatrosses  
and petrels**

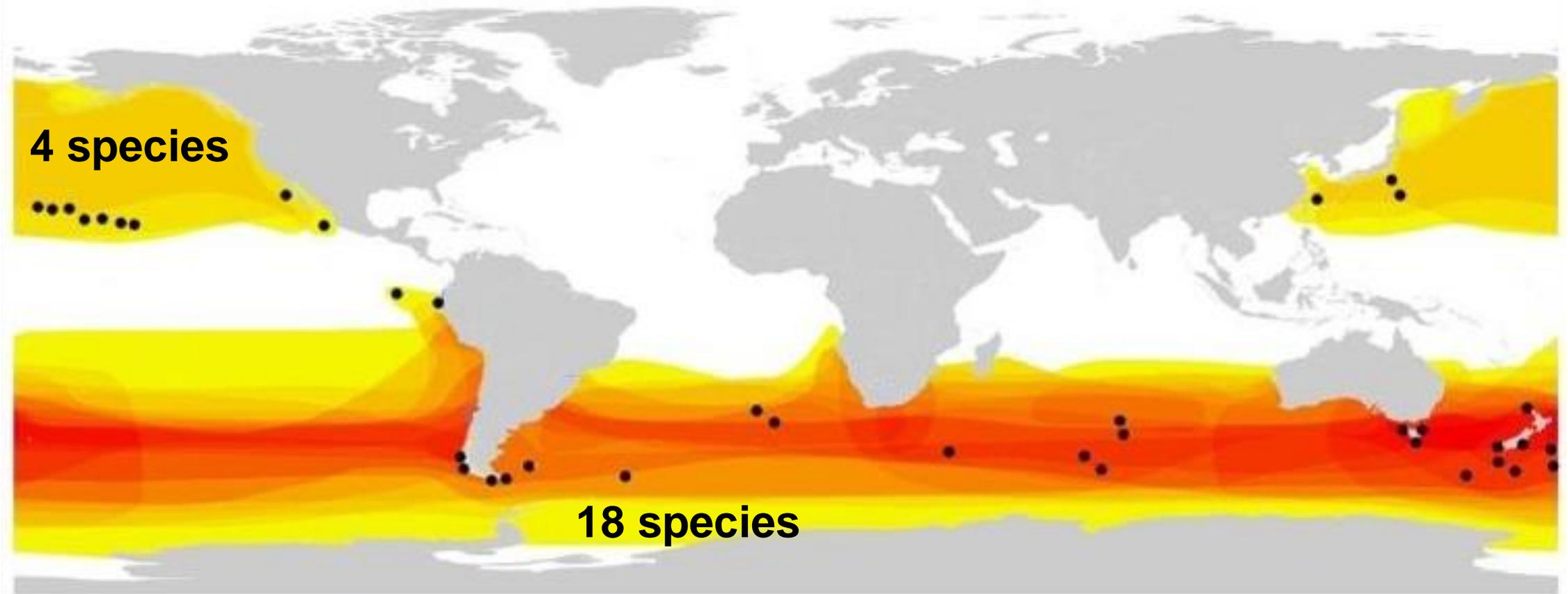
# Introduction to albatrosses and medium/large petrels

- Highly oceanic birds, spend most of their lives at sea, visiting land only for breeding
- Albatrosses are huge (up to 3,5 m wingspan)
- Breed in remote islands and forage across the vast expanses of the oceans
- Travel long distances searching for (scarce) food on the sea's surface



# Albatrosses and petrels distribution and breeding sites

## 22 albatross species



Number of Albatross Species



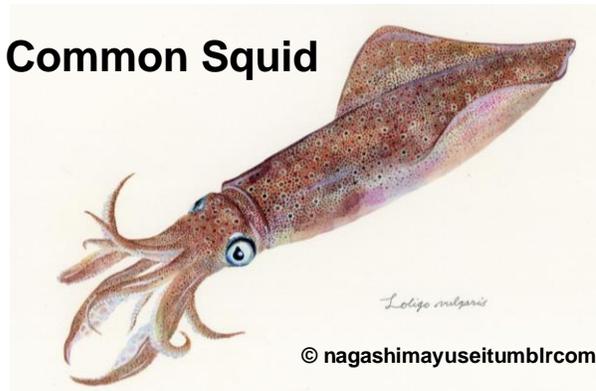
• Main albatross breeding sites

# Foraging

## Food

- Squid
- Small pelagic fish
- Krill
- Scavenge on the sea's surface (any carcass or remains)

Common Squid



Sardines



Antarctic krill



Lobster krill



© Natureducecom

© Maria Stenzel

Strreaked Shearwater *Calonectris leucomelas*  
Off Iwaki, Fukushima. © Hiroyuki TANOI  
(C) Hiroyuki TANOI

# Foraging

- Search for scarce food across the oceans surface
- Rely heavily on their sense of smell, **can detect fishing vessels 30 km away**
- Can reach the speed of 100 km/h
- Can fly over 1,000 km per day



# Foraging

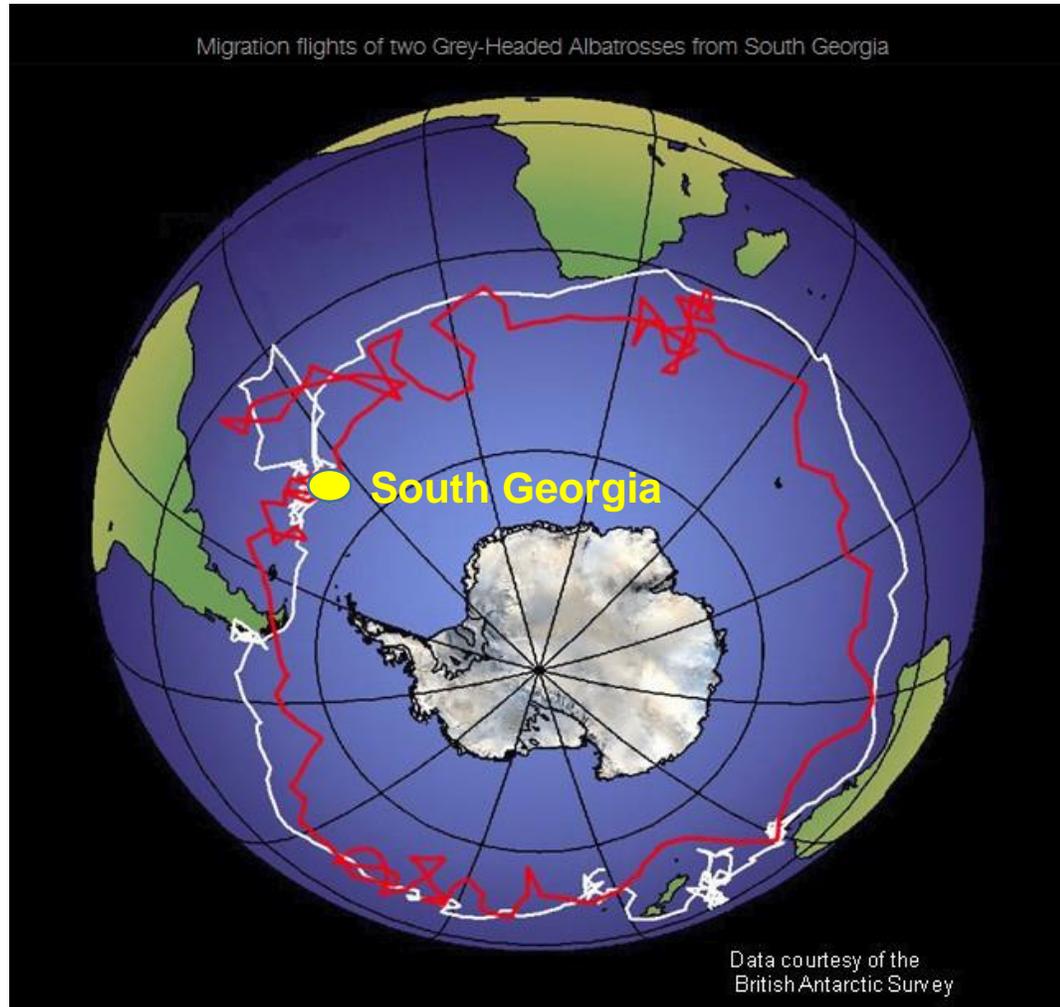


© Dimas Gianuca



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# Foraging



Non-breeding grey-headed albatross flew **around the world in just 46 days.**  
This is the current world record!  
*Croxall et al (2005), Science 307: 249-250*

# Tuna vs Albatross life history

## ALBATROSS

- Form breeding pairs
- Extensive post-fertilisation parental care
- Late maturity (~10 years old in great albatrosses)
- Low birth rate (one egg every 2 years in great albatrosses)
- Long-lived (50 to 75+ years)
- Small population sizes (most albatross populations are in thousands, some <100 pairs)

## TUNA

- Broadcast spawn
- Zero parental care
- Several spp. breed at 3 years old
- Extremely high birth rate (many thousands of eggs each season)
- Short-lived – 20-40 years
- Abundant (population measured in millions of individuals/tons)

**Highly vulnerable to additional factor for mortality (including fisheries bycatch)**

**Can withstand high levels of mortality, if fishery well-managed**

# Chapter 3 Seabird Bycatch

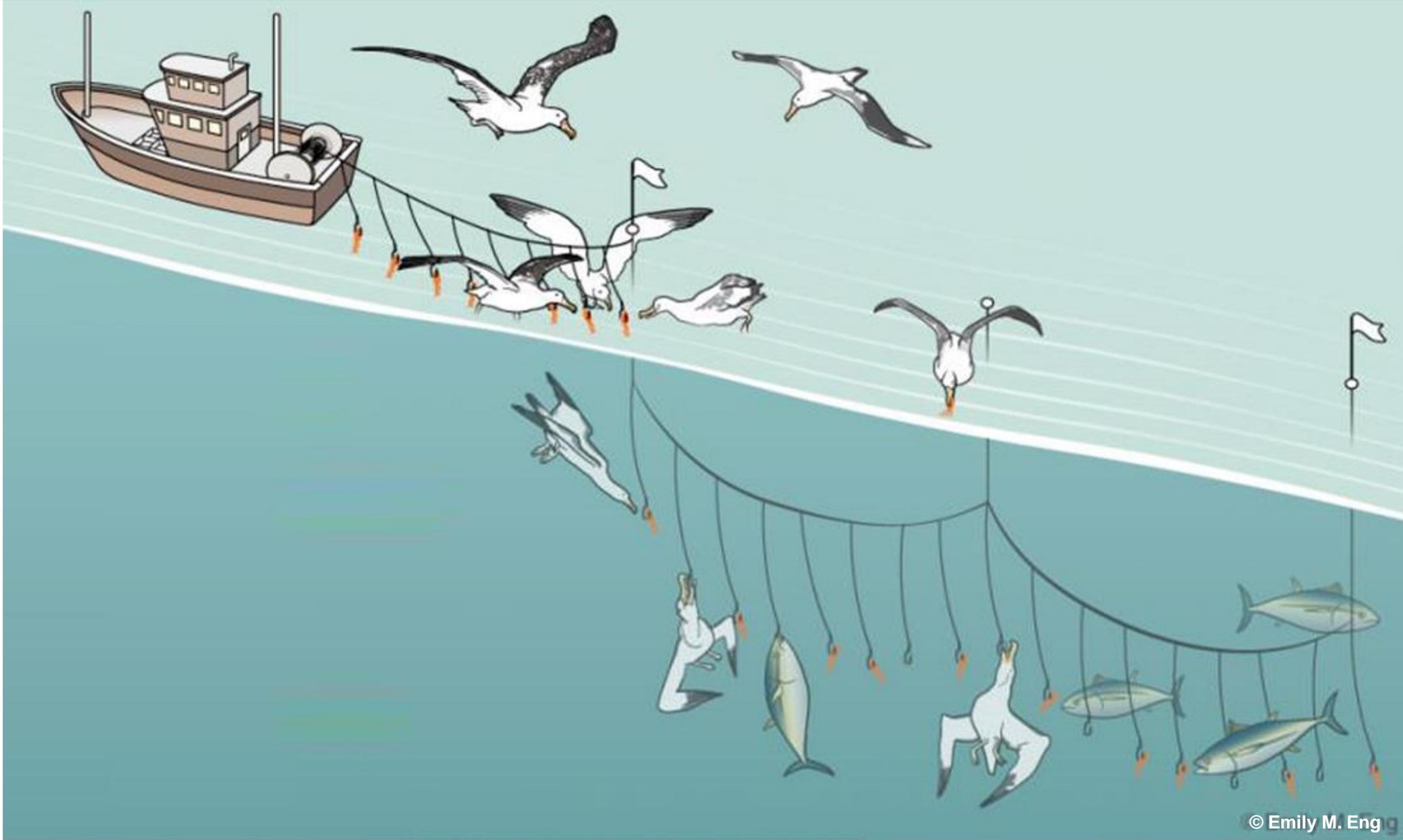


# Attraction to fishing vessels



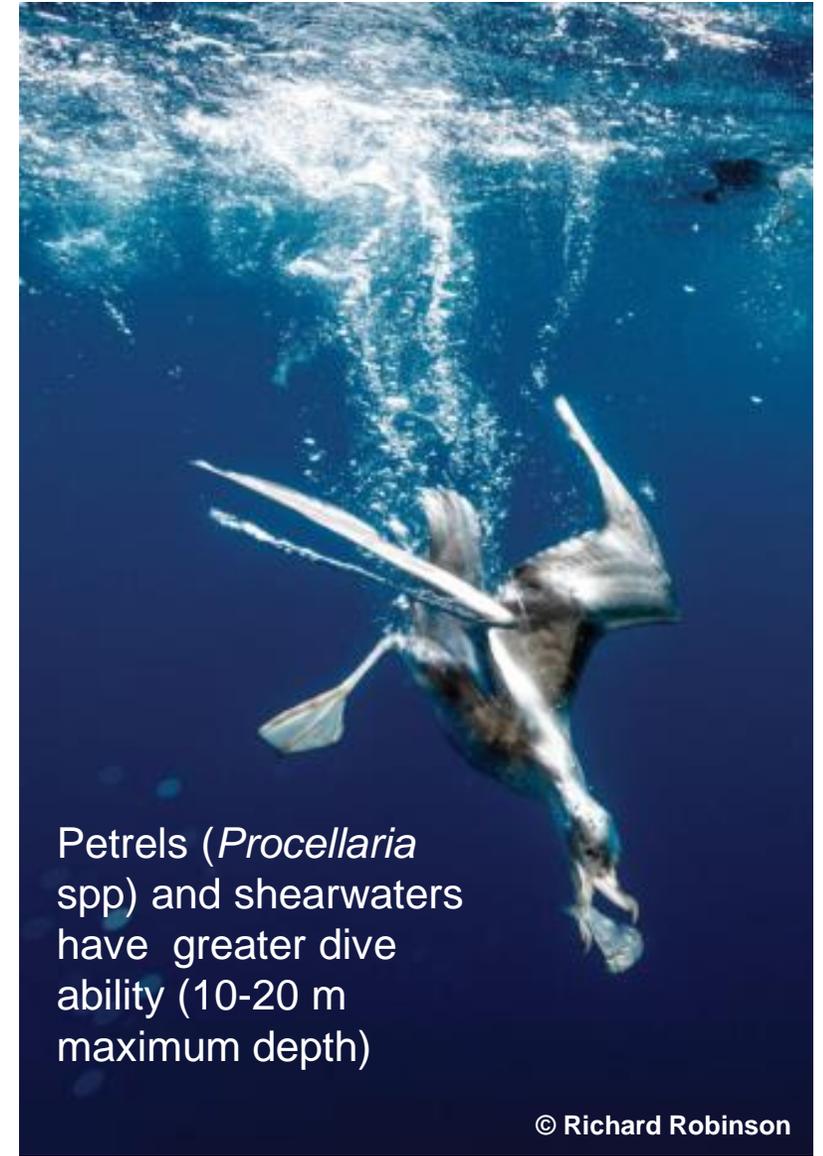
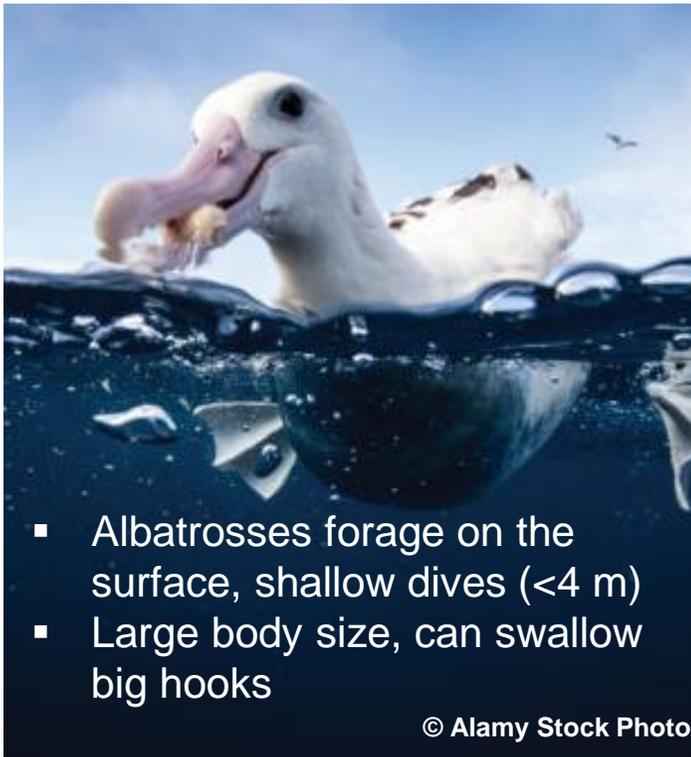
Seabirds are attracted to fishing vessels to feed on baits, offal and discards

# How seabirds die in the longlines



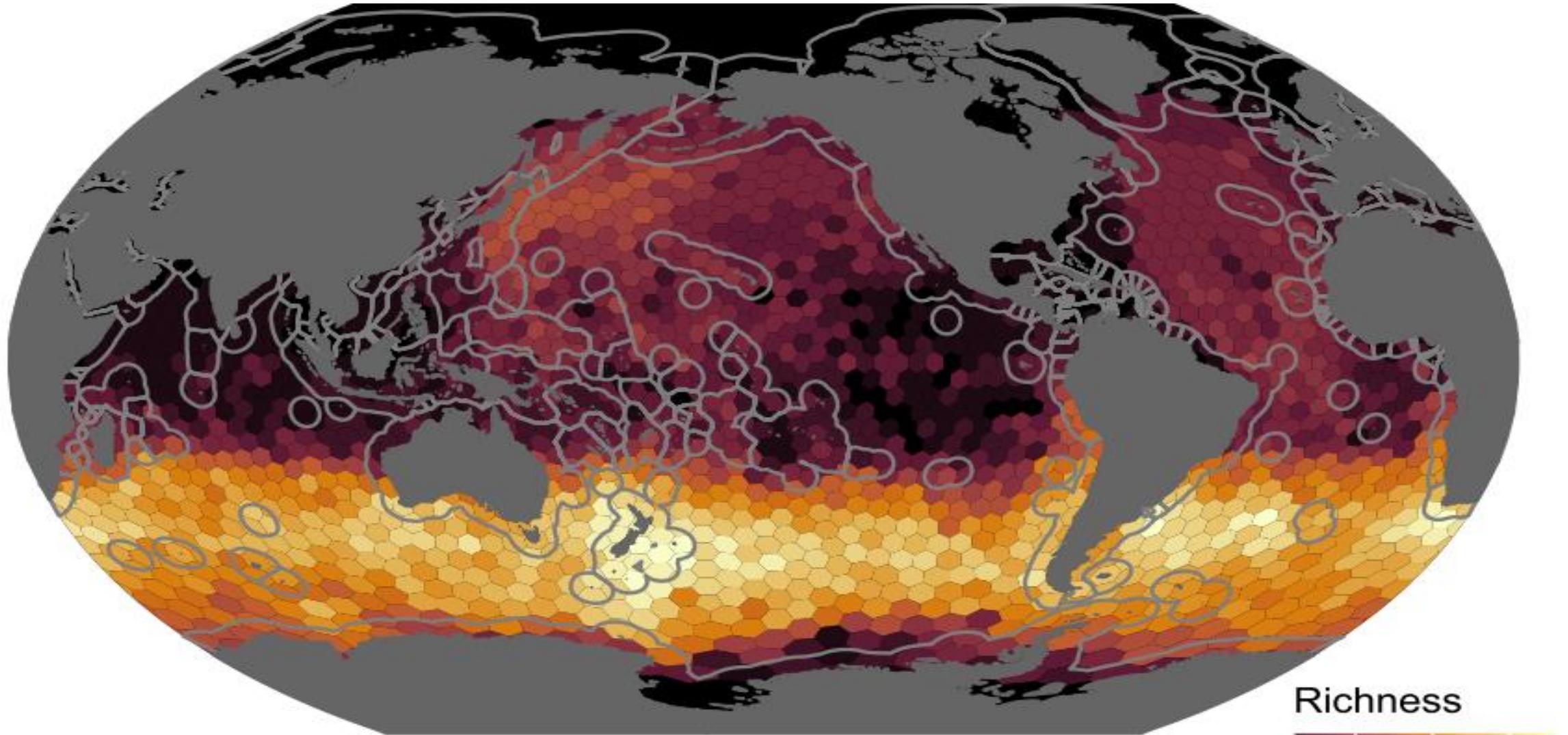
# Bird size and dive ability influence bycatch risk

- Petrels and shearwaters with high diving ability facilitate the catch of albatrosses in tuna longline fisheries
- **Different areas has different species composition**
- Mitigating seabird bycatch is more challenging in areas with **high seabird density and the presence of diving petrels/shearwaters and albatrosses**
- **Southern Hemisphere**

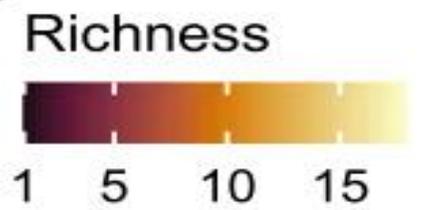


# Bird size and dive ability influence bycatch risk

**39 species:** 22 albatrosses and 17 petrels



Beal et al (2021), *Science Advances* 7: eabd7225



# Bird size and diving ability influence bycatch risk

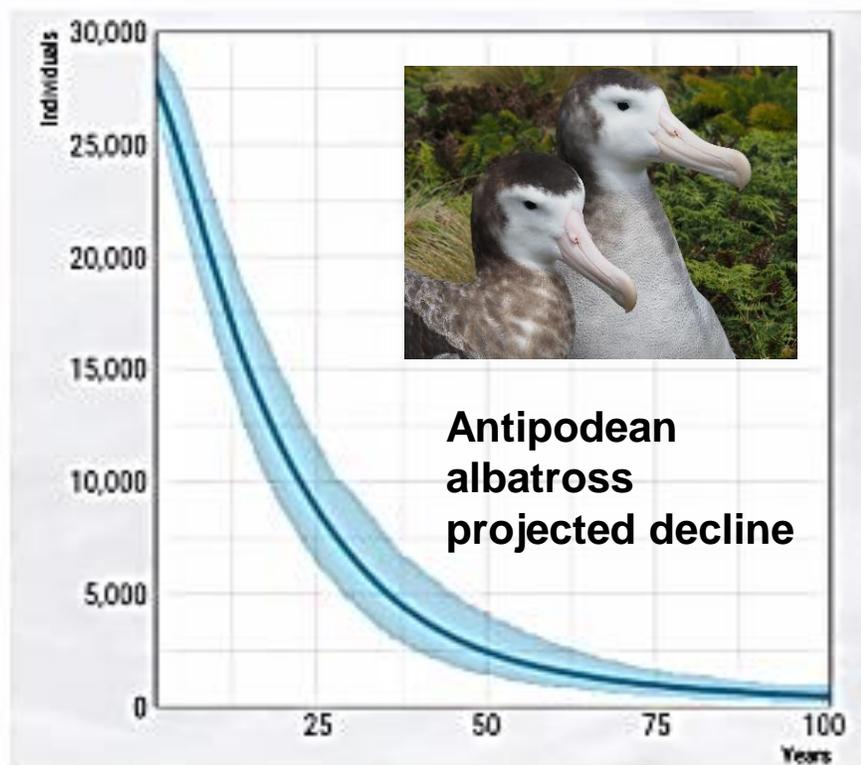
White-chinned petrel  
(*Procellaria aequinoctialis*)

Black-browed-albatross  
(*Thalassarche melanophris*)

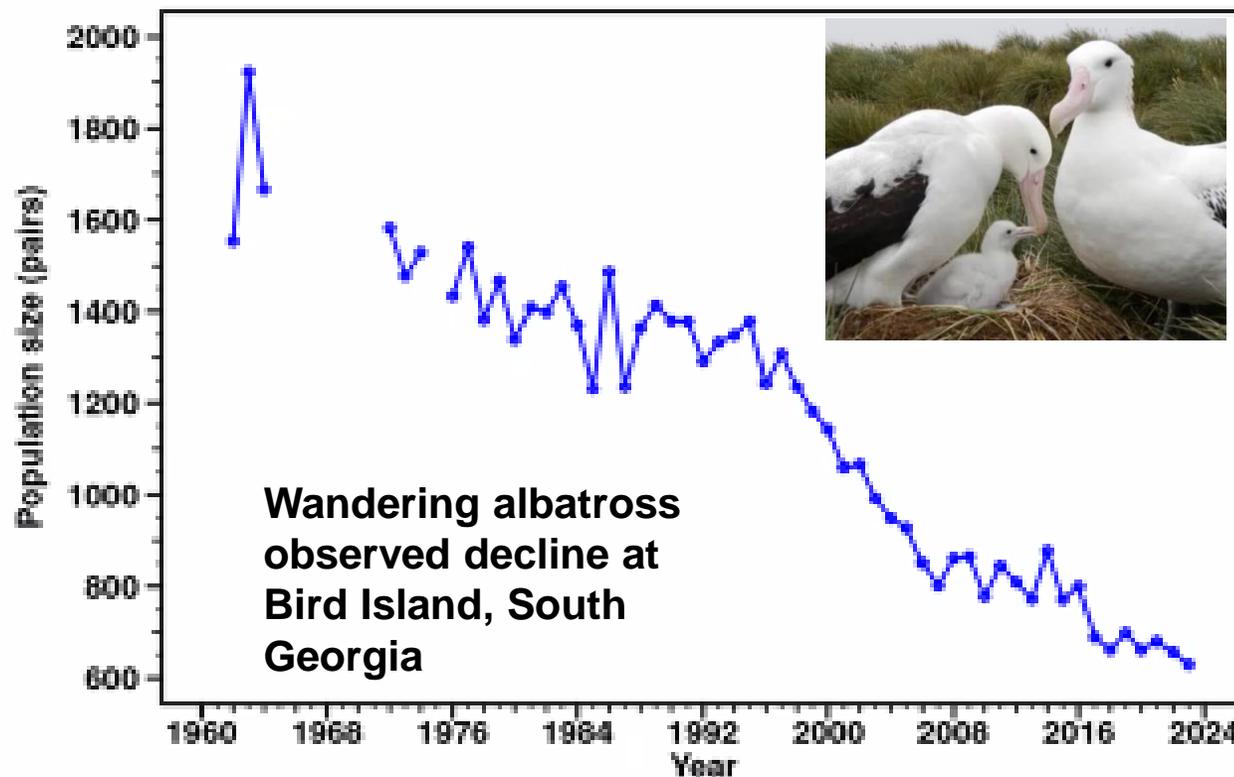
Spectacled petrel  
(*Procellaria conspicilata*)

# Unsustainable population declines

- Bycatch in tuna longline fisheries is one of major drivers of unsustainable population declines
- **15 of 22 species of albatrosses threatened with extinction**
- International Conservation Crisis in 2019\*



*Dragonfly (2023), Unpublished data*



*British Antarctic Survey (2023), Unpublished data*

\*ACAP – Agreement on the Conservation of Albatrosses and Petrels, an inter-governmental agreement

# The role of seabirds in marine ecosystems and fisheries

- Albatrosses and petrels mostly scavenge – like vultures, they ‘clean’ the ocean
- Fertilize” oceans by spreading nutrients across vast areas
- **Marine systems and tuna food webs are healthier and more productive with seabirds**



# Inter-governmental efforts to reduce seabird bycatch

## Regional Fisheries Management Organizations (RFMOs)



## Agreement on the Conservation of Albatrosses and Petrels (ACAP)

- Multilateral agreement which seeks to conserve listed albatrosses and petrels species
- 13 States are Party to ACAP
- Co-financing partner in Common Oceans Program



## FAO



Food and Agriculture Organization of the United Nations

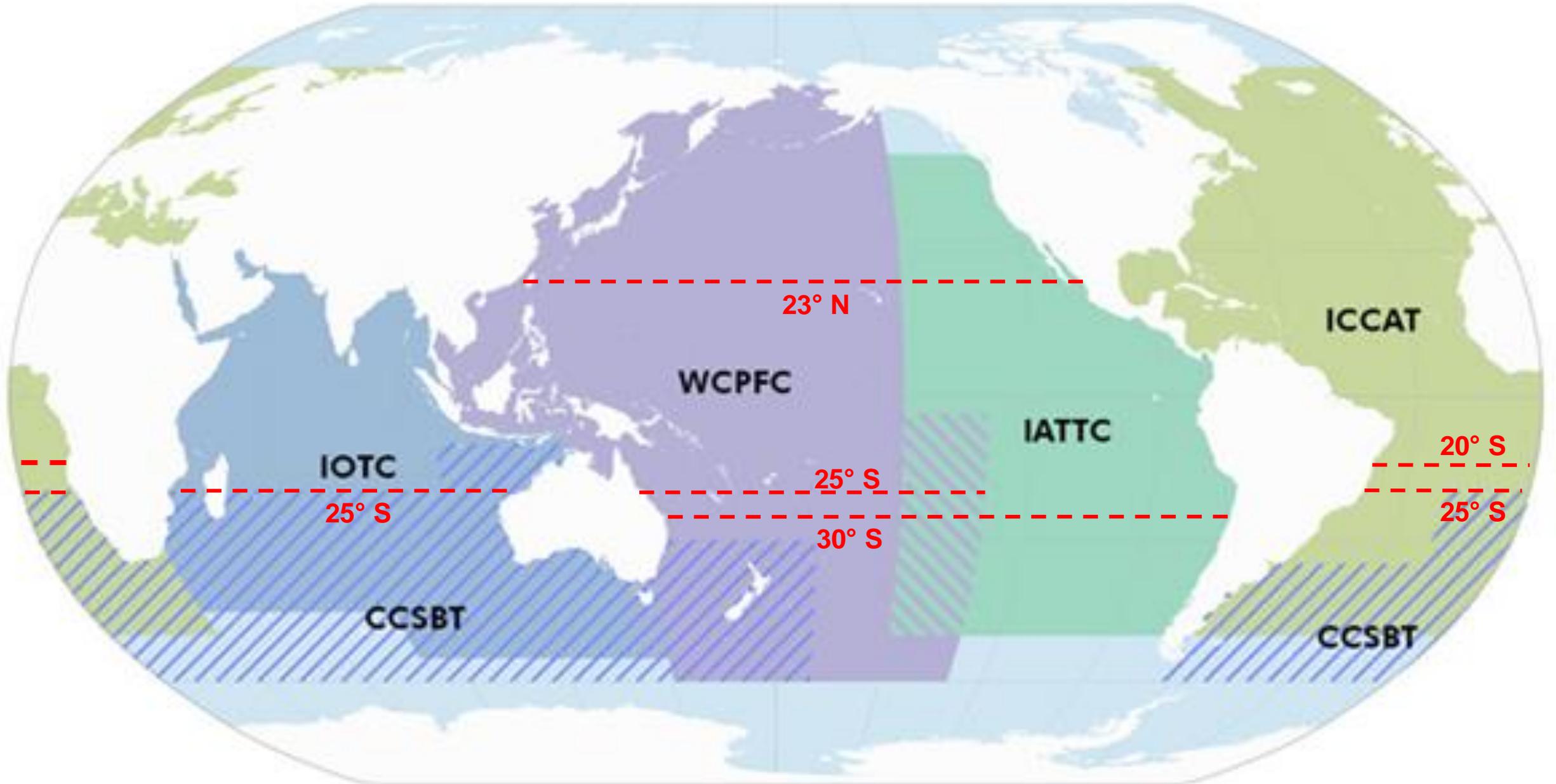
- Developed and promotes the IPOA-seabirds
- Executes the Common Ocean Program including the CCSBT Seabird Projects

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Chapter 4  
RFMOs mitigation  
measures requirements



# Tuna RFMOs



# RFMOs mitigation measures requirements in CCSBT areas of operation



**WCPFC**

## South of 30°S

- **Two from**
  - Tori line
  - Line weighting
  - Night setting
- **Or** hook-shielding devices (**Hookpods**) alone

## Between 25°-30°S

- **one of:**
  - Tori line
  - Line weighting
  - Hookpods

**IOTC**

## South of 25°S

- **Two from:**
  - Tori line
  - Line weighting
  - Night setting
- **Or** hook-shielding devices (**Hookpods**) alone

**ICCAT**

## South of 25°S

- **Two from:**
  - Tori line
  - Line weighting
  - Night setting

## Between 20°-25°S

- Tori line

**IATTC**

## South of 30°S

- **Two of eight**, including at least one from Column A:

### **Column A**

- Tori line
- Line weighting
- Night setting
- **Side setting**

### **Column B**

- Tori line
- Line weighting
- Underwater bait setter
- **Blue baits**
- **Deep setting line shooter**
- **Offal management**

**In areas south of 30°S  
that are not covered by tuna RFMOs – Tori line**

**Chapter 5**  
**Seabird bycatch  
mitigation measures**

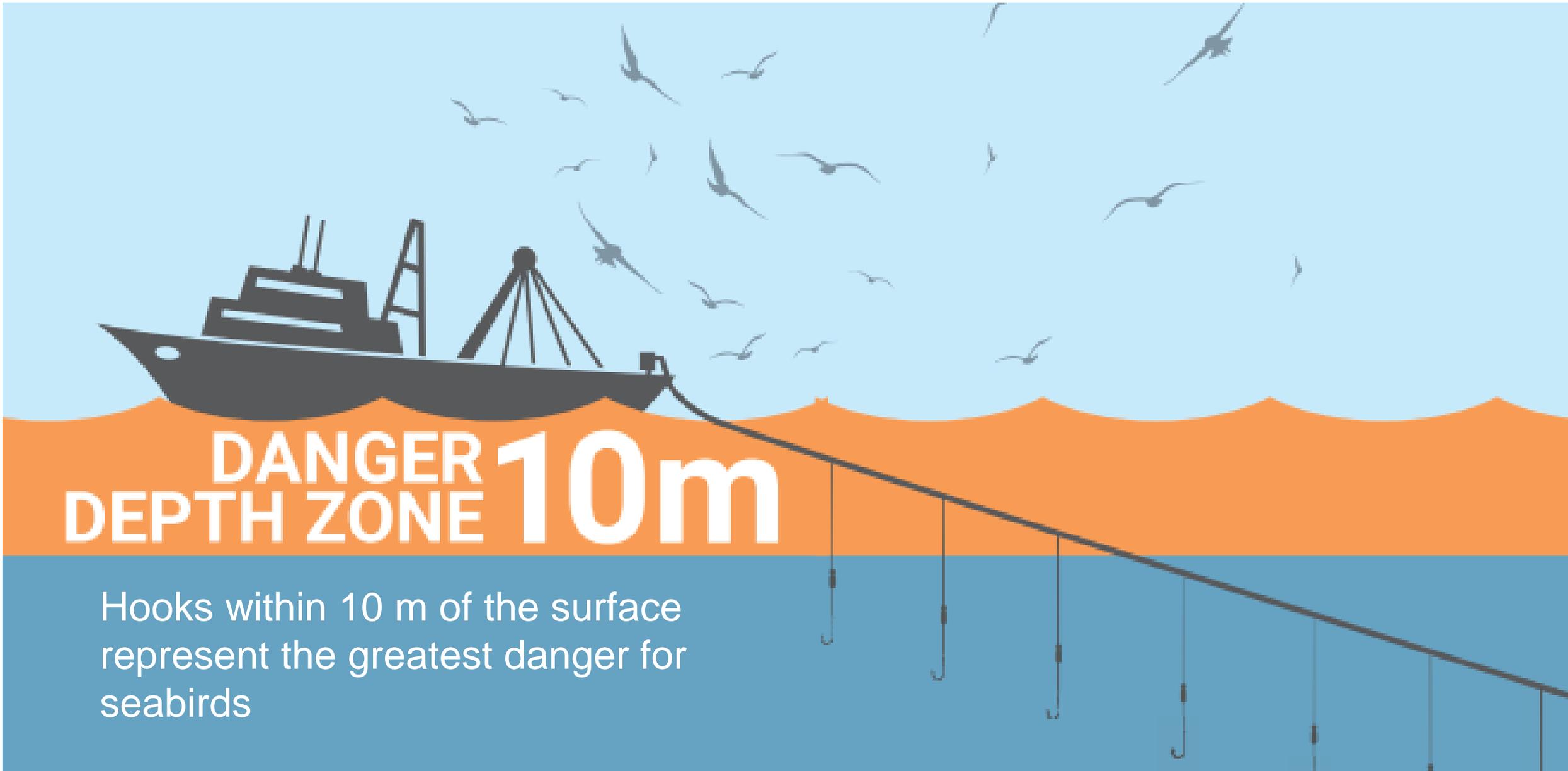


## Solutions to bycatch problem

Minimizing access of seabirds to baited hooks is a win-win case, because this avoid bait losses to the seabirds and reduce the seabird mortality



# Solutions to bycatch problem



The diagram illustrates a fishing vessel on the left, with a line extending from its stern towards the right. A horizontal orange band, representing a 'DANGER DEPTH ZONE', is shown between the surface and a depth of 10 meters. Below this zone, the water is depicted in a darker blue, with several fishing hooks hanging from the line. The sky above is light blue and contains numerous silhouettes of seabirds in flight. The text 'DANGER DEPTH ZONE 10m' is prominently displayed in white on the orange band.

**DANGER DEPTH ZONE 10m**

Hooks within 10 m of the surface represent the greatest danger for seabirds

# Solutions to bycatch problem

**Research, development and scientific/experimental testing of seabird bycatch mitigation measures since 1990s**

**Broadly speaking, mitigation measures in RFMOs' CMMs required in the southern hemisphere are:**

- Based on comprehensive review of scientific literature and recent research
- Shown to be effective with scientific evidence
- Assessed regularly against several criteria
- Only mandatory in areas where fishing effort overlaps with seabirds vulnerable to bycatch

# Solutions to bycatch problem

## Mitigation measures broadly considered by RFMOs

### Scientifically proven

- Tori line/Bird-scaring line
- Night setting
- Weighted branch lines
  
- Hookpod
- Underwater bait setter

Requires 2 used  
simultaneously

Can be used  
alone

# Solutions to bycatch problem

**The following slides describe important aspects for effective implementation of three commonly used mitigation measures:**

- Tori line/bird-scaring line
- Night setting
- Line weighting

# Bird-scaring line (BSL)

Bird-scaring line (BSL), also known as **Tori line**, is a line (often >100 m long) that is towed from a high point near the stern, with brightly colored streamers attached to it



# Bird-scaring line (BSL)



Birds displaced  
further astern

Longline mainline

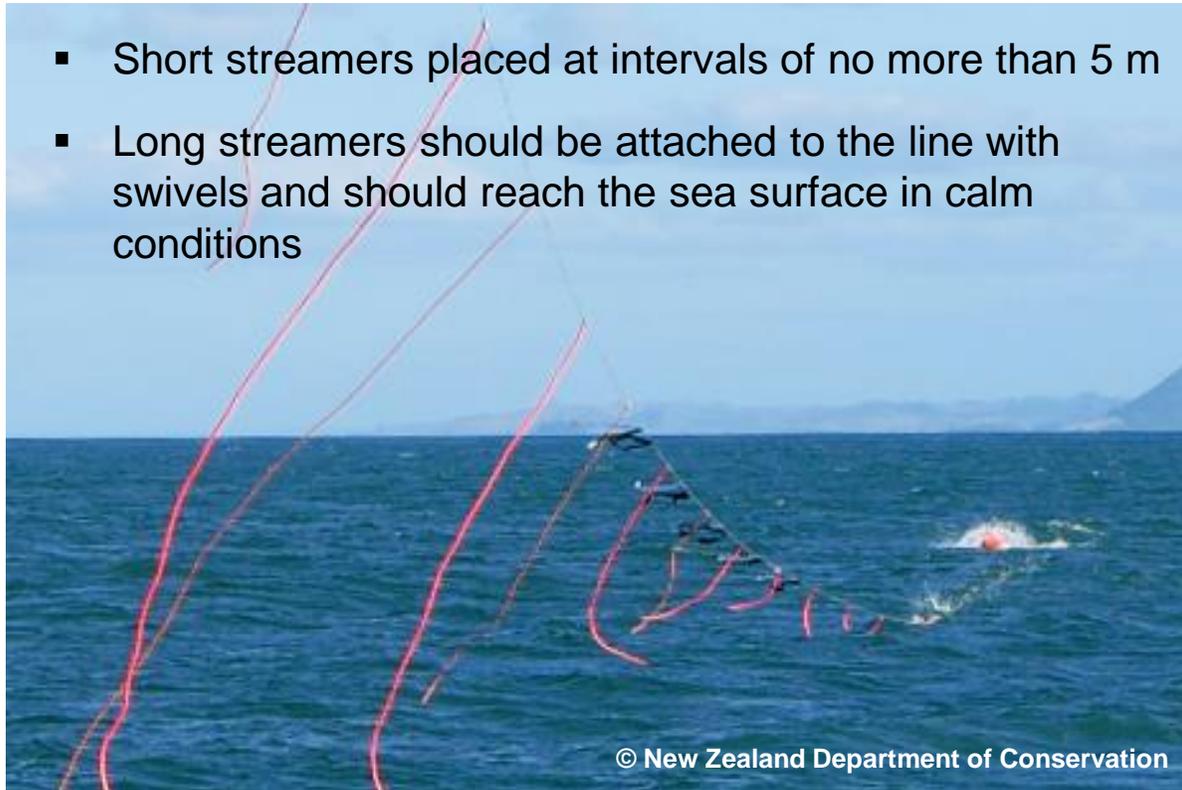


# Bird-scaring line (BSL)

## Vessels $\geq 35$ m total length

- The use of at least one BSL  
(used of two BSLs simultaneously, one on each side of the longline, can improve maximum protection)
- Should be attached to a point  $\geq 7$  m above the water
- A design with a mix of long and short streamers

- Short streamers placed at intervals of no more than 5 m
- Long streamers should be attached to the line with swivels and should reach the sea surface in calm conditions



# Bird-scaring line (BSL)

## Examples of towed object/section for drag

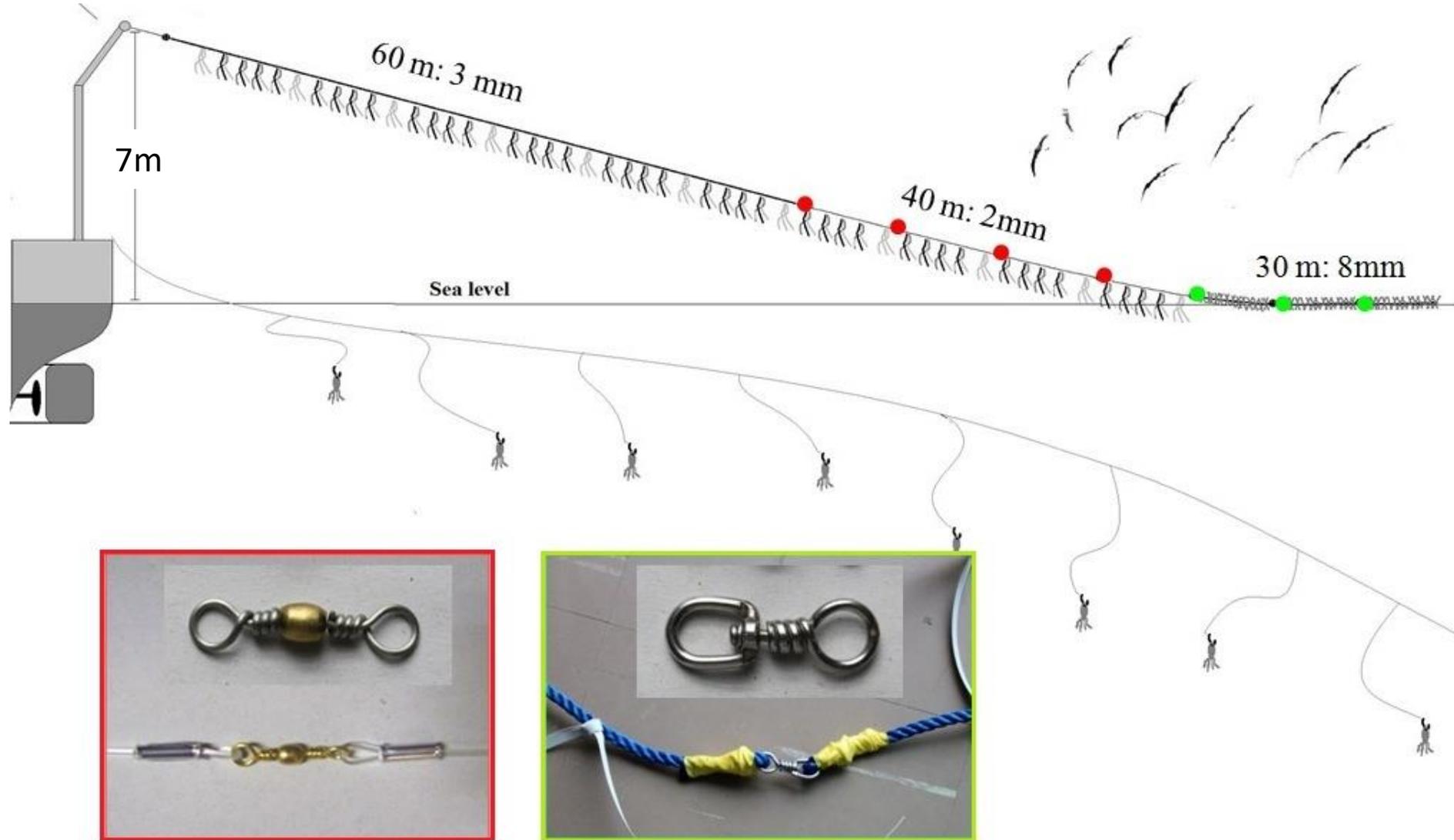
- Very important to **create tension and maximize aerial extent**
- Buoys
- Road cones
- Rope with packaging straps

After setting, stop the vessel to release the tension and haul the BSL effortless



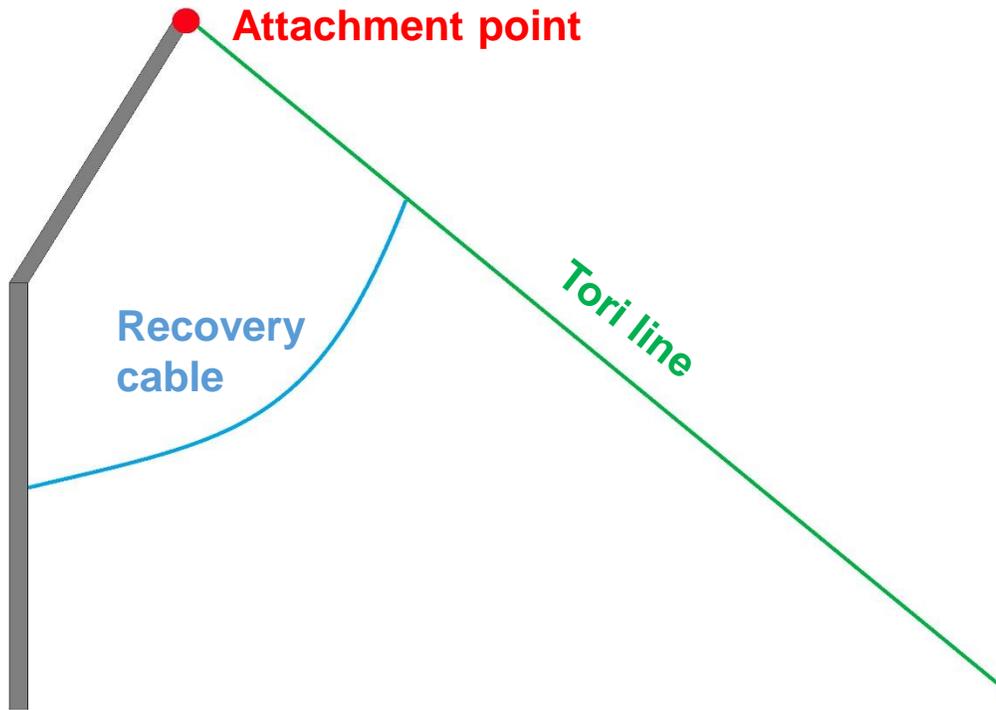
# Bird-scaring line (BSL)

It is important to place **barrel swivels** through the BSL to reduce rotation of the line from torque (twisting) created as it is dragged behind the vessel



# Bird-scaring line (BSL)

**BSL attached to end of the pole**, recovery cable needed to reach the BSL



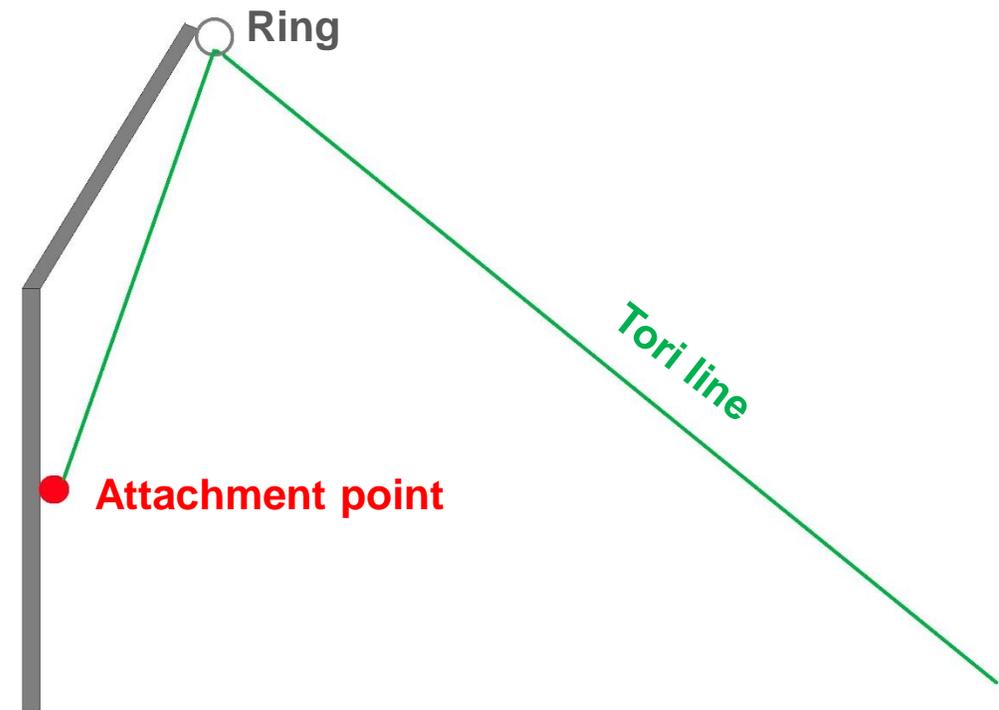
## Pros

- Suitable for short and long streamers

## Cons

- More difficult to operate and replace the BSL
- BSL lay on the water during deploying and hauling

**BSL attached to the base of the pole**, passing through a ring at the end



## Pros

- Easier to replace the BSL (no need to climb the pole)
- BSL never lay on the water during deploying or hauling

## Cons

- Potential challenges with long streamers

# Night setting

- Night setting means **no setting between nautical dawn and before nautical dusk**
- This is defined as when the sun is below  $12^\circ$  BELOW the horizon – well after sunset
- Deck lighting should be kept to a minimum



© Dimas Gianuca

**Night setting is significantly less effective on clear nights with a full moon**



© Dimas Gianuca

# Weighted branchlines

**Weighted branchlines sink faster and reduce time for seabirds to access the bait**

## **Three options for line weighting in IOTC and ICCAT:**

- At least 45 g within 1 m of the hook
- At least 60 g within 3.5 m of the hook
- At least 98 g within 4 m of the hook

In addition, in WCPFC fishers can chose to use 40 g within 0.5 m of the hook



**Leaded swivel**

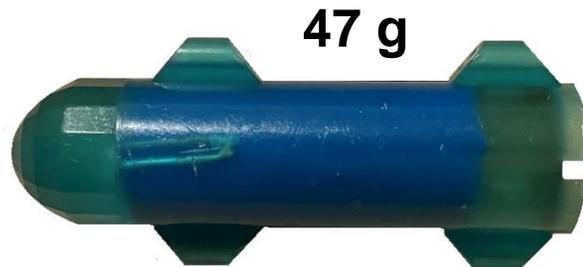
**Lumo lead**

# Weighted branchlines

**Electronic fishing lights are not always the same as required weights**

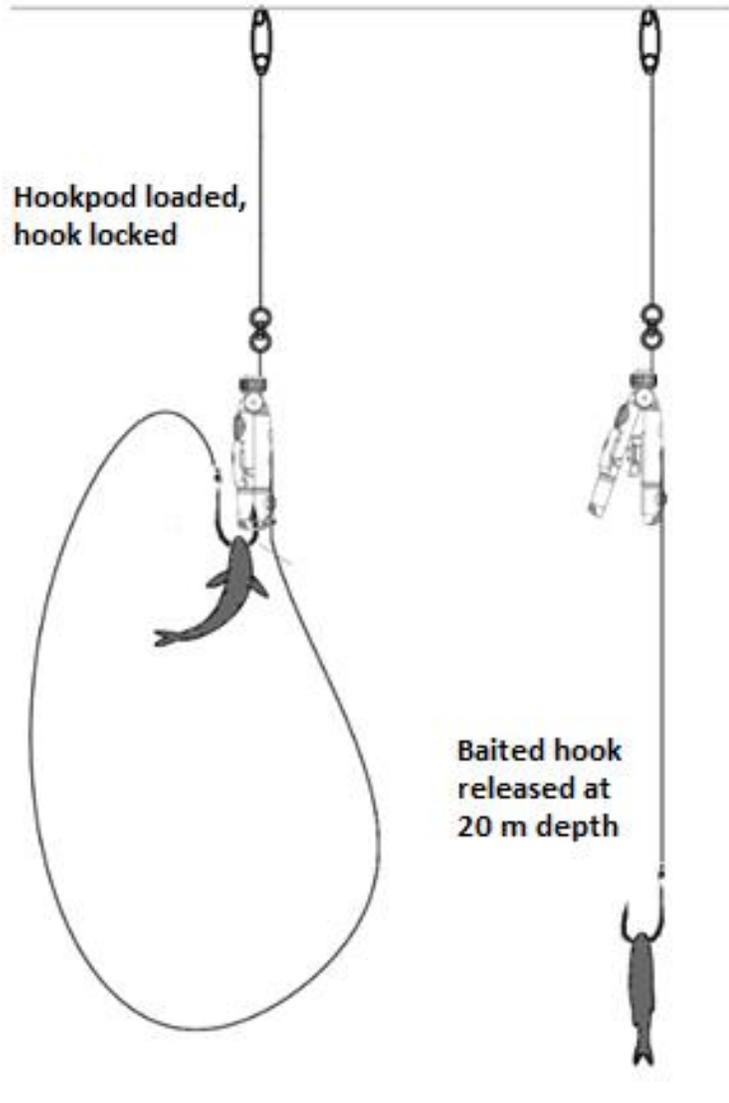
**Fishers must take great care to confirm that**

1. Weights added as required (if not, electric lights may float or cause hooks to sink slowly)
2. Weights are placed within the required distance from the hook



# Hook-shielding devices – Hookpod (stand-alone measure)

The Hookpod is a capsule that encases the tip and barb of baited hooks (preventing anything from becoming hooked), releasing the hook at 10 or 20 m depth



Hookpod LED  
(65 g)



Hookpod-mini  
(48 g)



**No impact on target species catch rates**



# ACAP Best Practice Advice

ACAP Best Practice Advice recommends the simultaneous use of the three commonly used mitigation measures: **Tori line + Night setting + Line weighting**

- All three recommended measures are demonstrated to be effective; however, each have limitations when used alone.
- There is a period of time when hooks are accessible to birds even when branch lines are weighted.
- Night setting used alone is less effective at reducing seabird bycatch for nocturnally active birds and during bright moon light conditions.
- Bird scaring lines used alone can rarely protect baited hooks beyond the aerial extent of the line.
- Consequently, the simultaneous use of the three ACAP recommended seabird bycatch mitigation measures compensate for these limitations.



# ACAP Best Practice Advice

## Hook-shielding devices

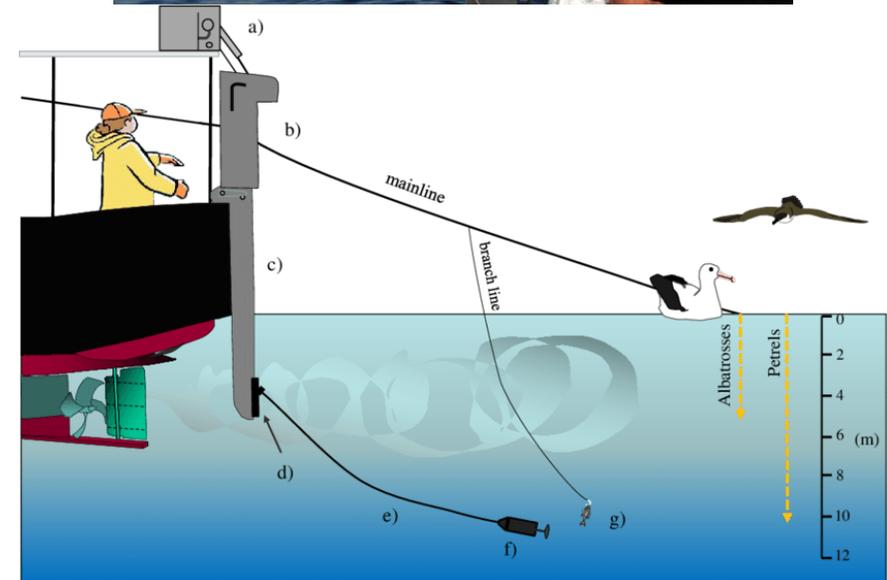
Hookpod LED  
(65 g)



Hookpod-mini  
(48 g)



## Underwater bait setter ("The Capsula")



# ACAP Best Practice Advice

## Line weighting



### ACAP

≥40 g within **0.5 m** of the hook

≥60 g within **1 m** of the hook

≥80 g within **2 m** of the hook

### ICCAT, IOTC, WCPFC, IATTC

≥ 45 g within **1 m** of the hook

≥ 60 g within **3.5 m** of the hook

≥ 98 g within **4 m** of the hook

- The use of **lighting devices or other fishing accessories as weights is not recommended** unless they achieve the sink rate criterion (**0.5 m/s to 5 m depth**).



# ACAP Best Practice Advice

- Measures that are **NOT RECOMMENDED** to mitigate seabird bycatch during logline setting operations are
  - Line shooters
  - Olfactory deterrents
  - Blue dyed bait
  - Bait thaw status
  - Laser technology
  - Offal management
- The use of **lighting devices or other fishing accessories as weights is not recommended** unless they achieve the sink rate criterion (**0.5 m/s to 5 m depth**).





**Chapter 6**  
**Handling and  
Release of Hooked  
and Entangled Birds**

# Handling and Release of Hooked and Entangled Birds

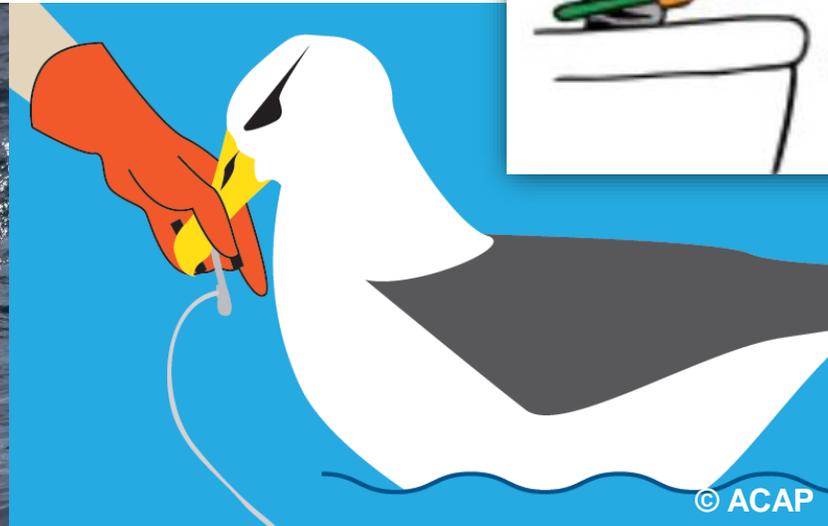
## Current CCSBT Action: make every effort to release alive and remove hooks, noting

- Birds are terrified and confused when hauled aboard
- Crew should remain calm and not shout unnecessarily
- The bird thinks crew are trying to hurt it, so it may try to bite or run away or both!
- Seabirds are very weak compared to a man, so crew should be firm but gentle, even with the biggest albatross
- The sharp, hooked beak is the seabird's main defence; to avoid being hurt, crew should
  - quickly hold the bird
  - grab the back of the head, or the beak
  - fold and hold the wings carefully

# Handling and Release of Hooked and Entangled Birds

## Bring bird aboard

- Slow or **stop hauling** and slow or **stop vessel** to release line tension
- Retrieve the bird as safely and quickly as possible
- If practical, **use a landing net** to lift the bird
- Never grab by the wing

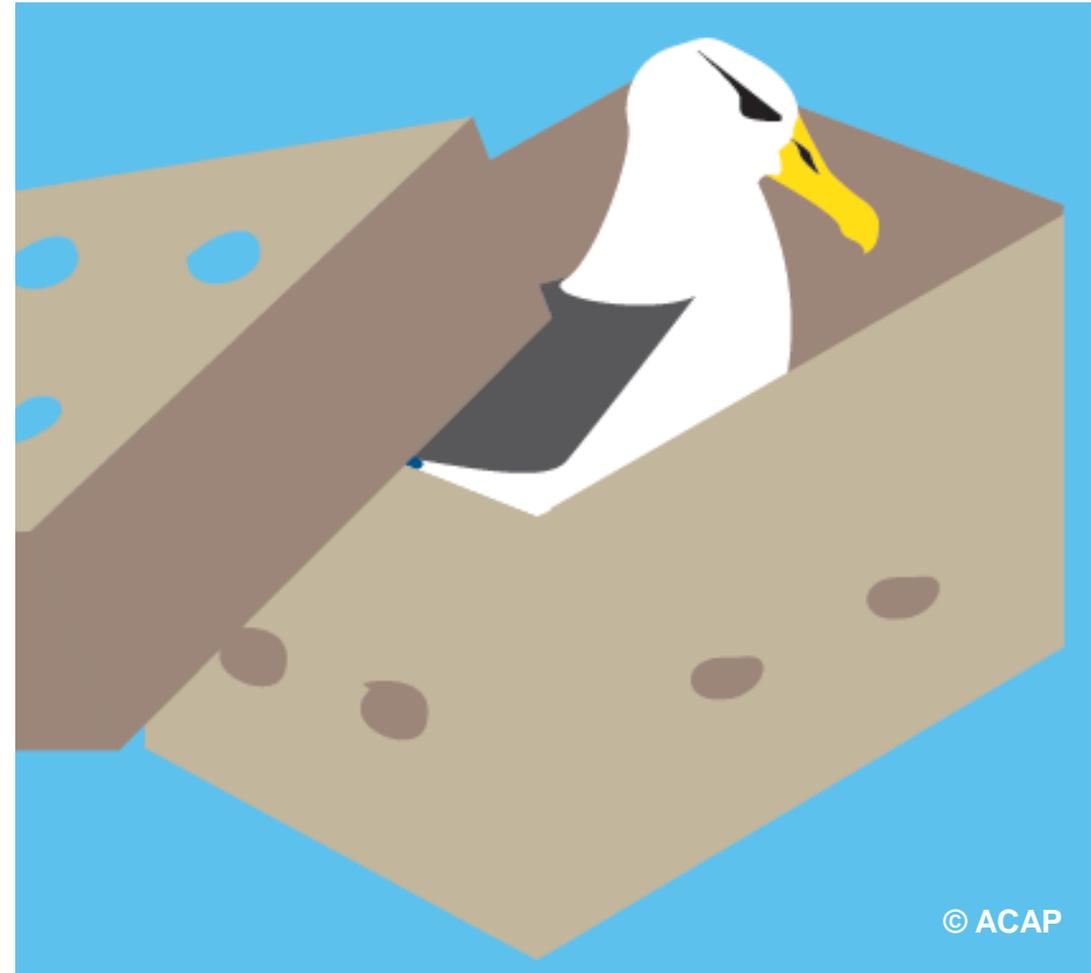


# Handling and Release of Hooked and Entangled Birds

If the bird is strong and mostly dry, release it immediately after hook removal.

## If the bird is exhausted or waterlogged

- Put the bird in a ventilated box to recover
- Otherwise, contain the bird in a quite dry area, **away from oil**
- The bird is ready for release when the feathers are dry, bird is alert and able to stand



# Thank you



**Seabird  
project**

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Partnership for  
**nature and people**

Presenter: Dr Dimas Gianuca  
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Food and Agriculture Organization  
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# Handling and Release of Hooked and Entangled Birds

## Catch and hold securely

- Carefully fold the wings into the bird's body
- Wrap the bird in a towel/blanket (not too tightly)
- Make sure the seabird doesn't come into contact with oil on deck

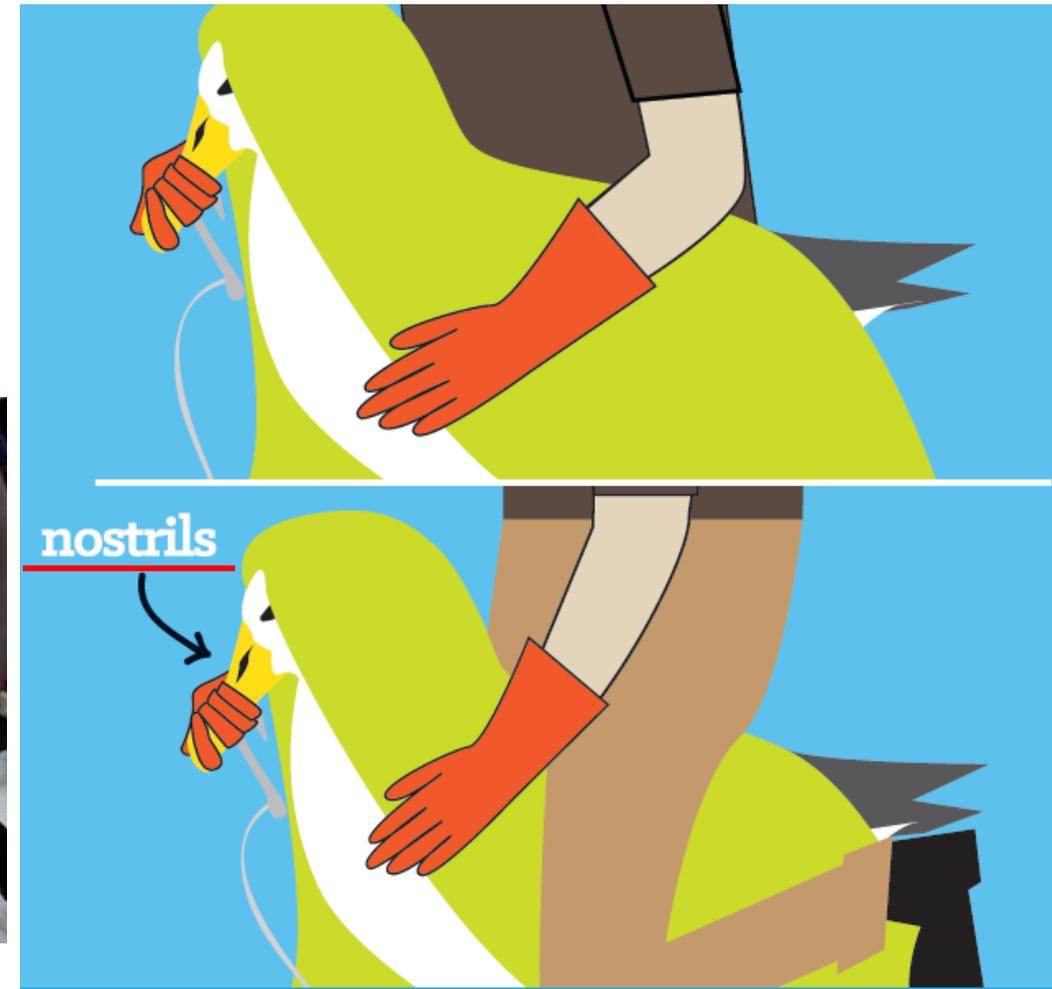
How **NOT** hold a bird



How to **CORRECTLY** hold a bird



- For large birds that you cannot manage under your arm, hold it between your legs
- Do not cover the nostrils



# Handling and Release of Hooked and Entangled Birds

## Remove the hook

### If hook is visible

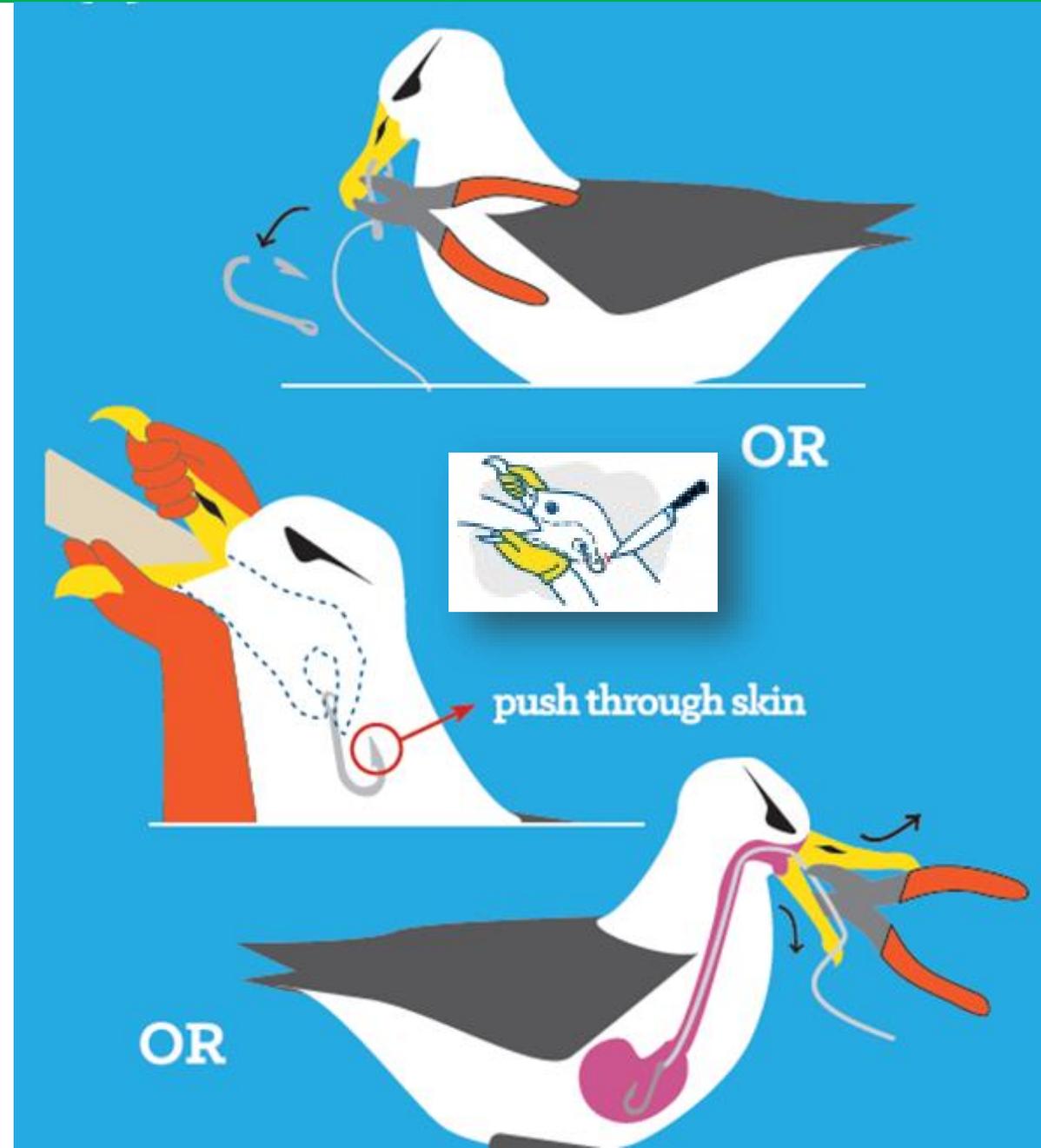
- Use pliers (or bolt cutters) to cut through the hook shaft (or **flatten the barb**)
- Pull the hook back out of the bird

### If hook is swallowed or removal isn't possible

- A second person can find the hook position externally by feeling along the neck, or internally by following the line to the hook
- If safe and possible, push the tip of the hook through the skin and remove
- **Never try to extract the hook backwards**

### If the hook removal is not possible

- Cut the line as close to the hook as possible and leave the hook in the bird



# Handling and Release of Hooked and Entangled Birds

## Release the bird

- Check that the bird seems healthy and is dry
- Grab the beak, lift the bird and slowly lower it to or towards the water, letting go of the beak last
- Where birds cannot be lowered directly onto the water, lift and release the bird from the side of the vessel into the wind letting go of the beak at the same time

