

## **4th Meeting of the Stock and Ecological Risk**

### **Assessment Working Group (SERAWG4)**

**28 Feb -04 March 2022 (online)**

## Toothfish Tagging Methods

(Project SEC2021-08)

Relate to agenda item 5.3  
Working Paper

SIOFA Secretariat

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### **Abstract**

Following MoP instruction, the Secretariat prepared the SIOFA tagging method, that has been adapted from the methods of CCAMLR (available here <https://www.ccamlr.org/fr/node/85702>). Skate and Rays specifications have been removed.

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### **Recommendations** *(proposals and working papers only)*

The SC to finalize the methods for tagging toothfish, and to endorse the methods.

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CCAMLR

## Toothfish tagging methods



SIOFA | APSOI

Southern Indian Ocean Fisheries Agreement  
Accord relatif aux Pêches dans le Sud de l'Océan Indien



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# Tagging program purpose

- As for CCAMLR, SIOFA tagging programmes are essential for the stock assessment.
- Additional data on fish movements and growth are also utilized.
- Data quality is important as the respect of the requirement rate.
- This tagging programme has for goal to help any participant in the toothfish tagging program and to perform at best its task.

# Data quality

## **Do not waste your time and effort.**

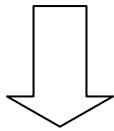
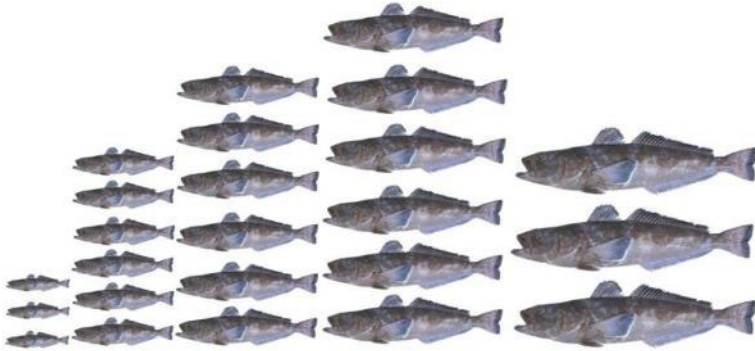
- Data that cannot be matched between release and recapture cannot be used.
- Recaptures are relatively rare, so every fish is important.
- Use a tag release data sheet to record data
- Accuracy is critical (tag code and length).
- Check data with observer records per shift.
  - Tag release sheets checked with tag codes used.
  - Notify observer of all recaptured tags and show them the fish before processing.
- Use comment field to identify any data issues.

# Requirements to tag

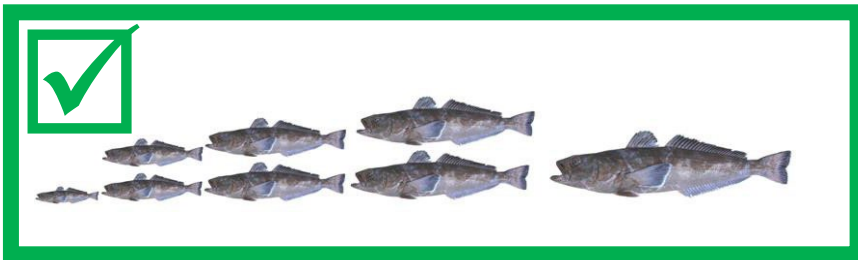
- Vessels must meet the required tagging **RATE**
- must match the **SIZE** distribution of captured fish;
- and accomplish this with **HIGH SURVIVAL** of tagged fish.

*These are requirements of the SIOFA CMM 2021-15 para 26.*

TOTAL CATCH

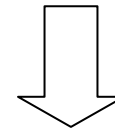
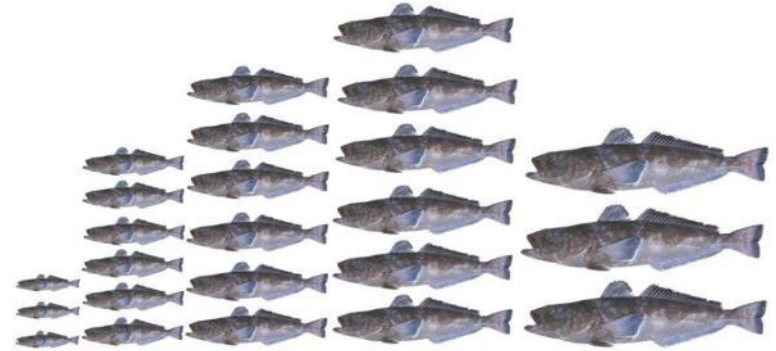


TAGGED FISH

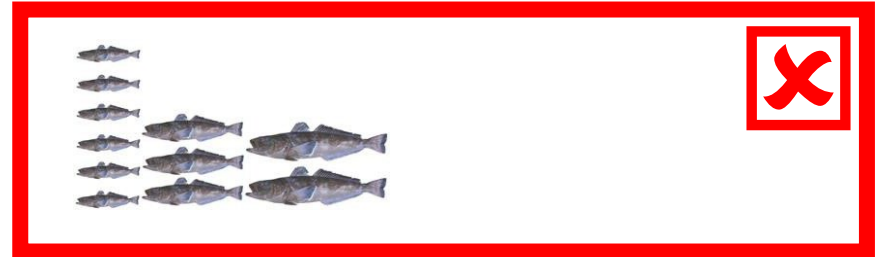


Proportion of sizes matches  
Total catch.

TOTAL CATCH



TAGGED FISH



Proportion of sizes **DOES NOT** match  
Total catch.

# Tagging programme administration

SIOFA Tagging programmes are coordinated by the SIOFA Secretariat and coordinated with and adapted from the CCAMLR tagging programme (<https://www.ccamlr.org/fr/node/85702>)

- Method of supply of Tags and Tagging equipment for all Tagging operations carried out in the SIOFA area (SIOFA Circular 2021-36)
  - Protocols and Forms (See below, same as CCAMLR)
  - Data reporting
- All recaptured tags and unused tags should be returned to: SIOFA Tagging Program Coordinator, APSOI, s/c DAAF, Parc de la Providence- 97489 Saint-Denis cedex-LA REUNION.  
Your attention is drawn to the fact that this directive is different from the instructions on the CCAMLR issued tags. SIOFA will exchange each year with CCAMLR regarding the recaptured tags and unused tags in SIOFA area.
  - General requirements for tagging programmes figure in SIOFA CMM 2021-15 and information on the SIOFA tagging programme is available in the SC circulars (<http://www.apsoi.org/scientific-committee/sc-circulars>)



# Tasks

- **CCPs:**
  - Ensure vessel compliance
  - Report tagging programme data to the Secretariat concerned.
- **Vessel operators:**
  - Ensure tagging supplies are obtained
  - Ensure taggers are appropriately trained to tag fish
  - Ensure fish are tagged following protocols and SIOFA Conservation and Management Measures (Tagging suitability criteria, tagging rate and fish size as indexed by the tag size overlap statistic)
  - Check all fish for tags
  - Report tag release and recapture data to SIOFA Secretariat (Ref CMM 2021/02 data standards).
- **Observers:**
  - Keep a record of tag releases, tag recaptures, and tracking unused tags
  - Perform Biological sampling (length, weight, sex, gonad weight, otoliths extraction) of recaptured fish and manage collected tags and otoliths
  - Observers are responsible for returning recaptured tags and unused tags to SIOFA Secretariat.

# Tagging objectives

## Tagging needs to minimize

- Handling of the fish
- Time out of water

## While having

- Optimum tag placement
- No effect on fish health
- Accurate records



# Tagging supplies



# Station layout

## Location and layout for large fish handling

- Weather protection and stability
- Handling time and distance (including tank)

## Station layout

- Fixed measuring board (not a tape) wide enough for skates too.
- Pre-loaded tagging gun with sharp needle
- Tag release sheet
- Pencil

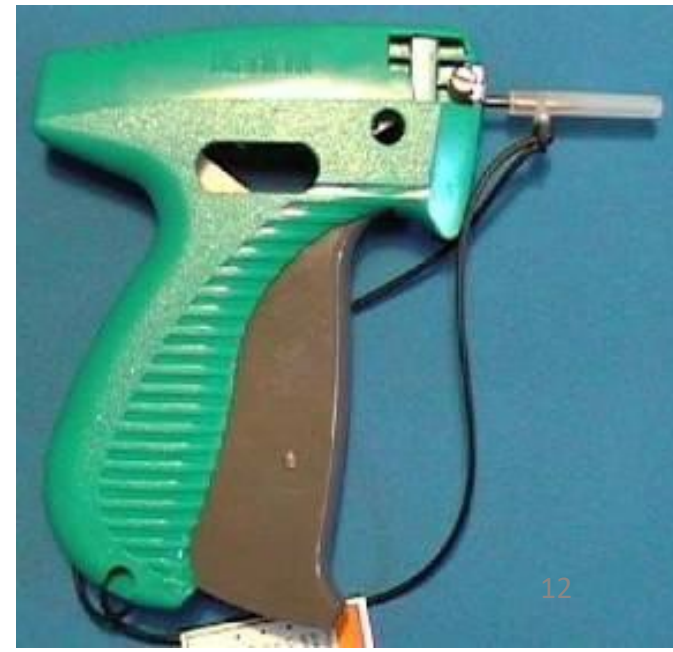
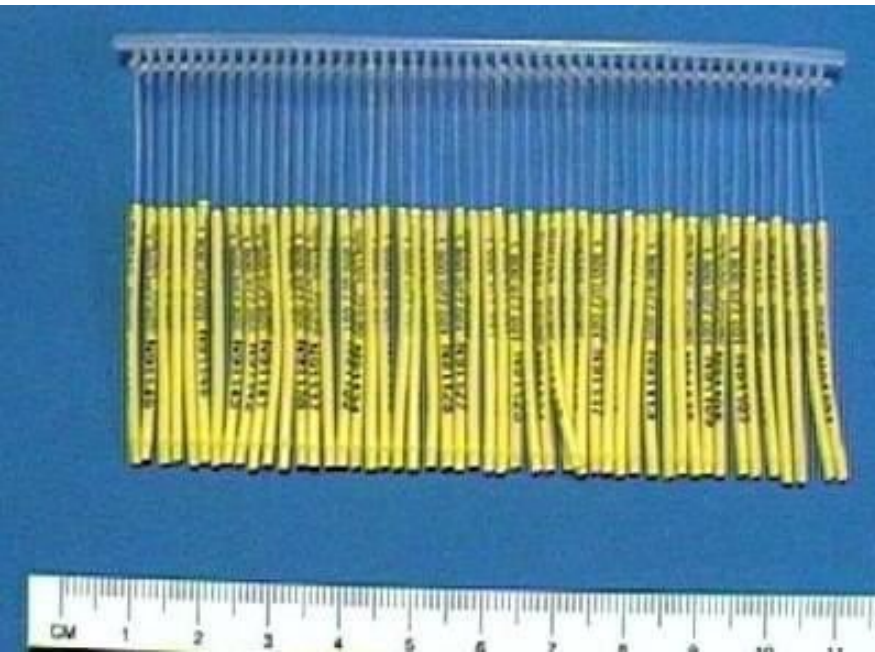
## Have nearby:

- Handling gear for large fish
- Tools for hook removal
- Haul number
- Storage place for broken tags
- Spare pencils and tag release sheets
- Tagging suitability checklist



# Applicator maintenance

- Tagging applicator must be kept clean, rinsed, free from tissue, blood, grease, or contaminants
  - Do not use oil-based lubricants on needle
- Replace dull needles with sharp needles
- Insert correct end of tag strip (colour it) into applicator





# Fish landing

- Identify the fish as a tagging target before it arrives (*i.e.*, “Decide to tag the next fish”)
- This prepares for:
  - no gaff, use net if fish is large
  - minimising time out of water,
  - gently handling the fish, and
  - immediately assessing suitability to tag.
- Once the fish is on board
  - Use wet gloves and surfaces (to reduce scale loss and abrasion)
  - Do not drop (minimize shocks)
- Avoid
  - Touching gills or eyes
  - Hanging fish vertically (stretches backbone)



# Landing large fish

- DO NOT GAFF!
- Use handling aids



- (knotless dip net, custom fish containers, slings)
  - Hold fish horizontally
  - Support length of fish
  - Caution bumping or dragging fish to the tagging station







# Getting large fish on board



# Good handling technique



# Poor handling technique





# Handling slings



# Holding tanks

## Pros/Cons

- Convenience
  - Batch tagging
  - Suitability assessment
  - Avoiding predators
  
- Poor design or operation can reduce survival



# Holding tanks



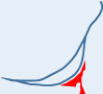


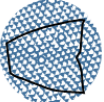
## Construction and operation

- Large clean tank (2x fish average fish length: 2+ m)
- Smooth walled
- Circular if possible
- Flow through with high rate of clean water
- Not crowded
- Short term (< 3 h)



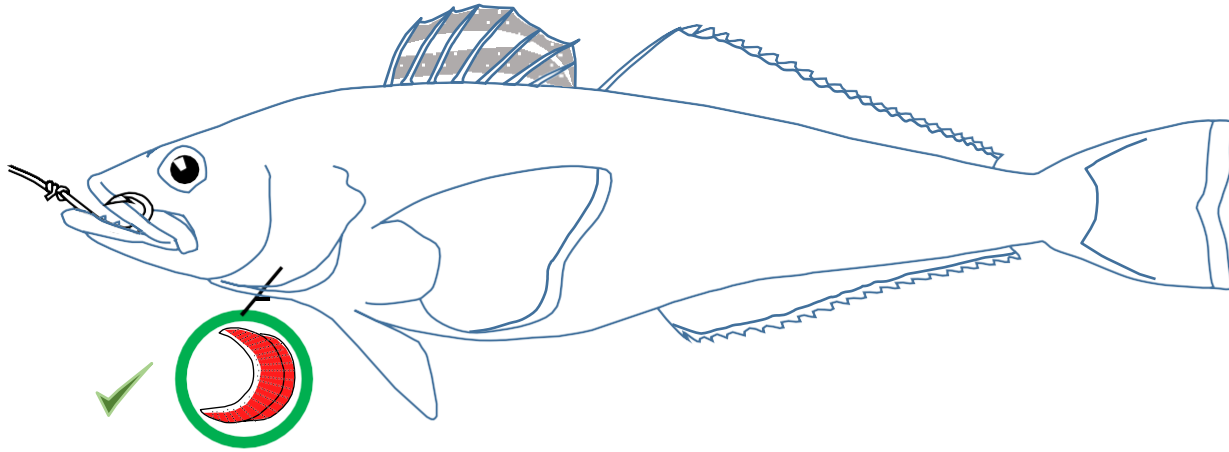


# Suitability assessment

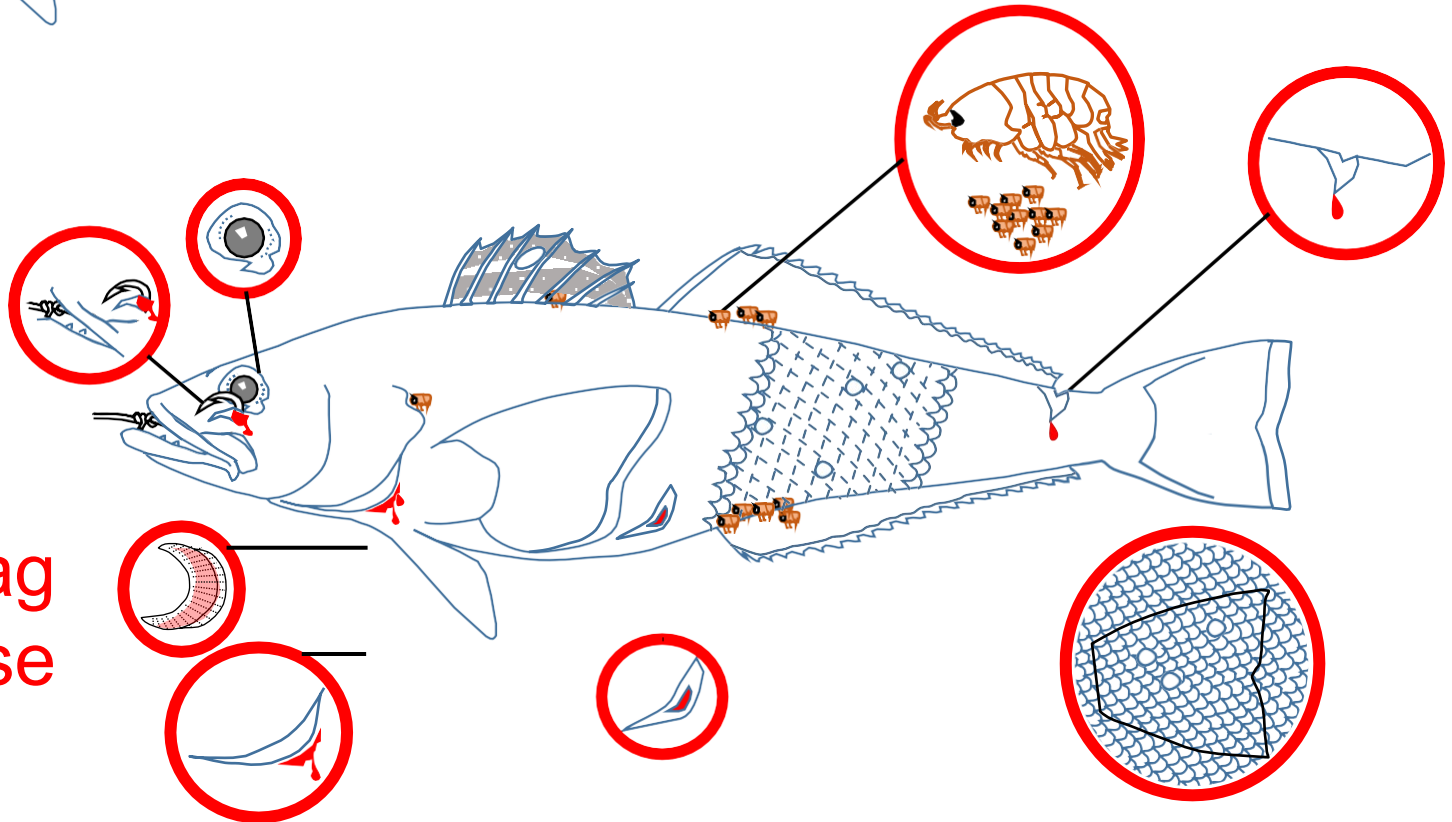
	Assessment category	Do not tag
	Hook injuries	Hook injury outside the mouth area (outside the lips, jaw, or cheek), or in the back of the mouth.
	Gills	Gills pink or white
	Bleeding	Any visible bleeding from gills, or excessive bleeding elsewhere
	Body	Visible damage to fish body with open wounds
	Organs	Visible damage to eye or penetration of body cavity, including by crustaceans (amphipods/lice)
	Scales	Abrasions or single area of recent scale loss equal to or exceeding the area equivalent to the fish tail



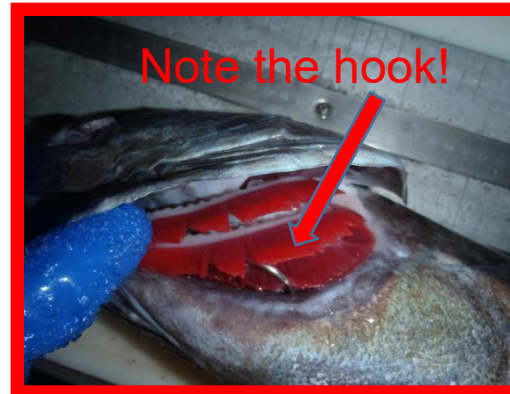
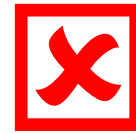
# Identify fish with no serious injuries



Do not tag  
with these  
injuries



# Gills



# Hooking injuries





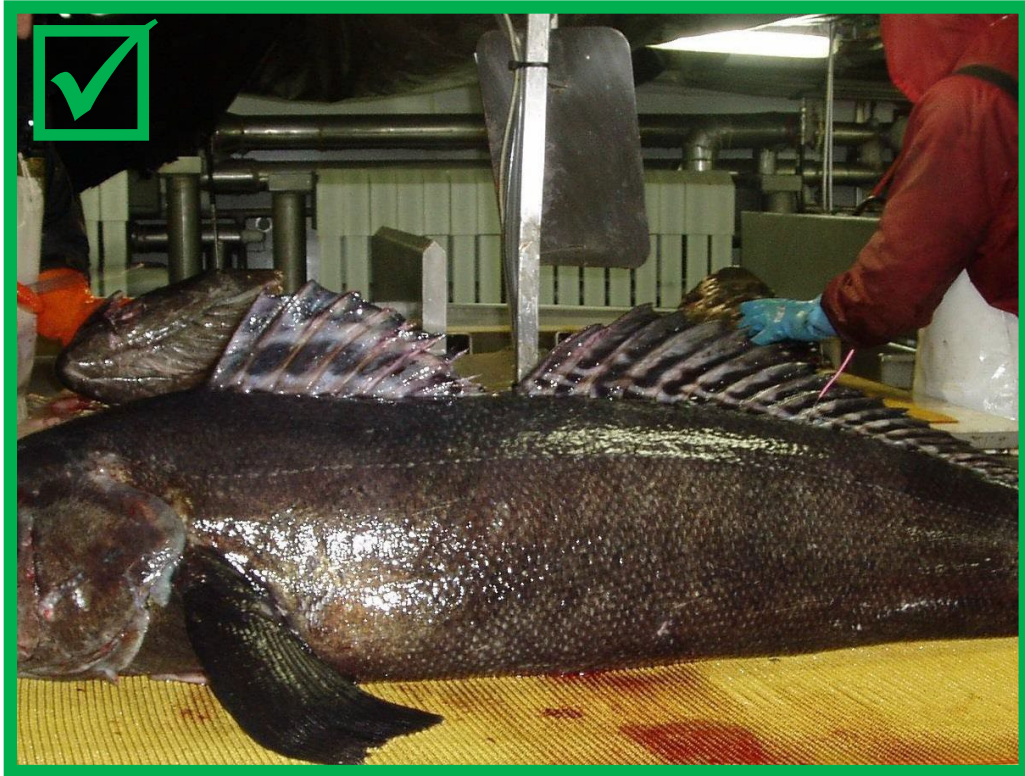
# Bleeding



Pic of  
bleeding  
needed

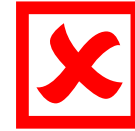


# Organs





# Scales





# Removing the hook

Have appropriate tool ready to remove hook.

Note: If hook is in gills or throat – DO NOT TAG



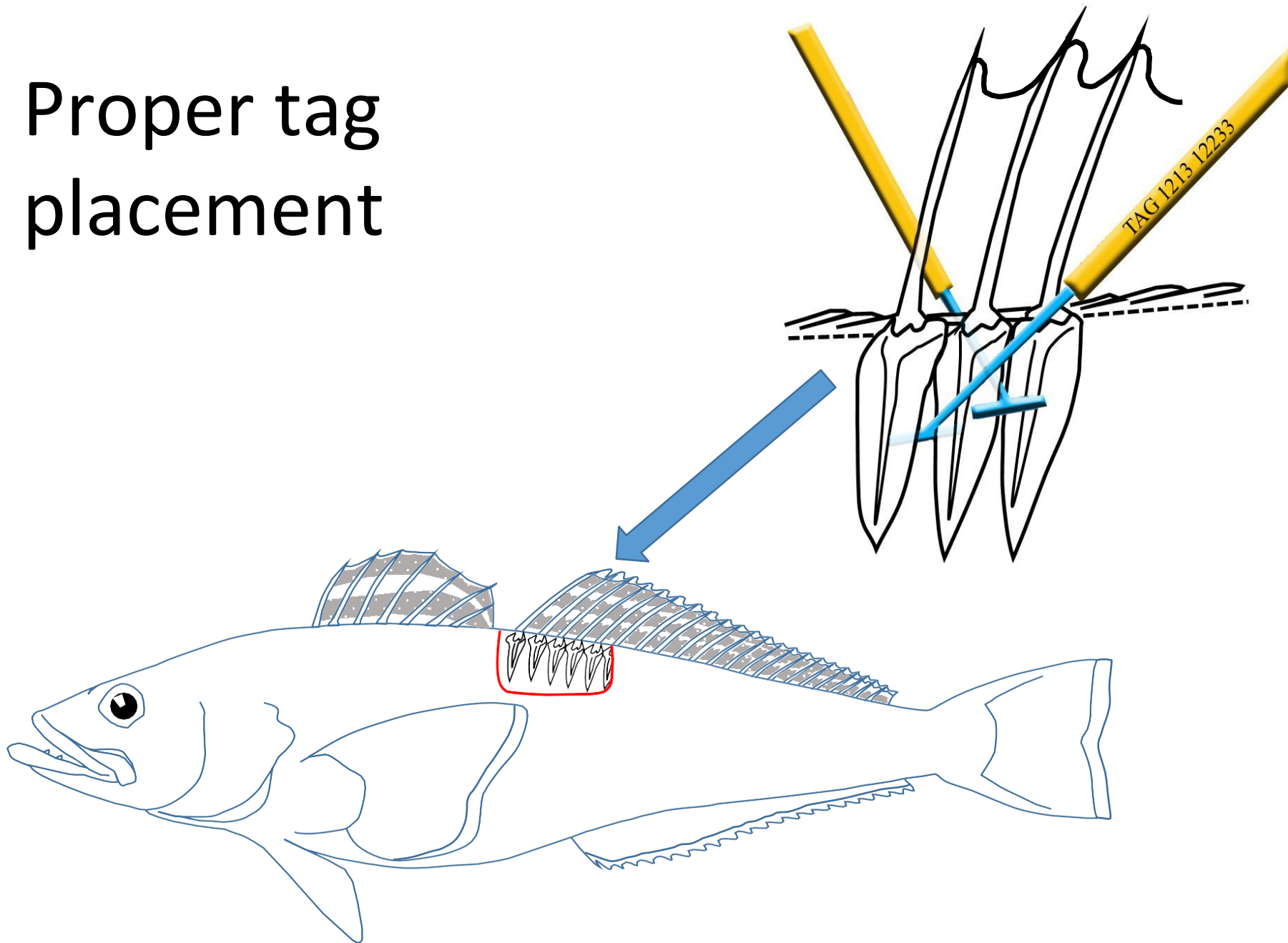


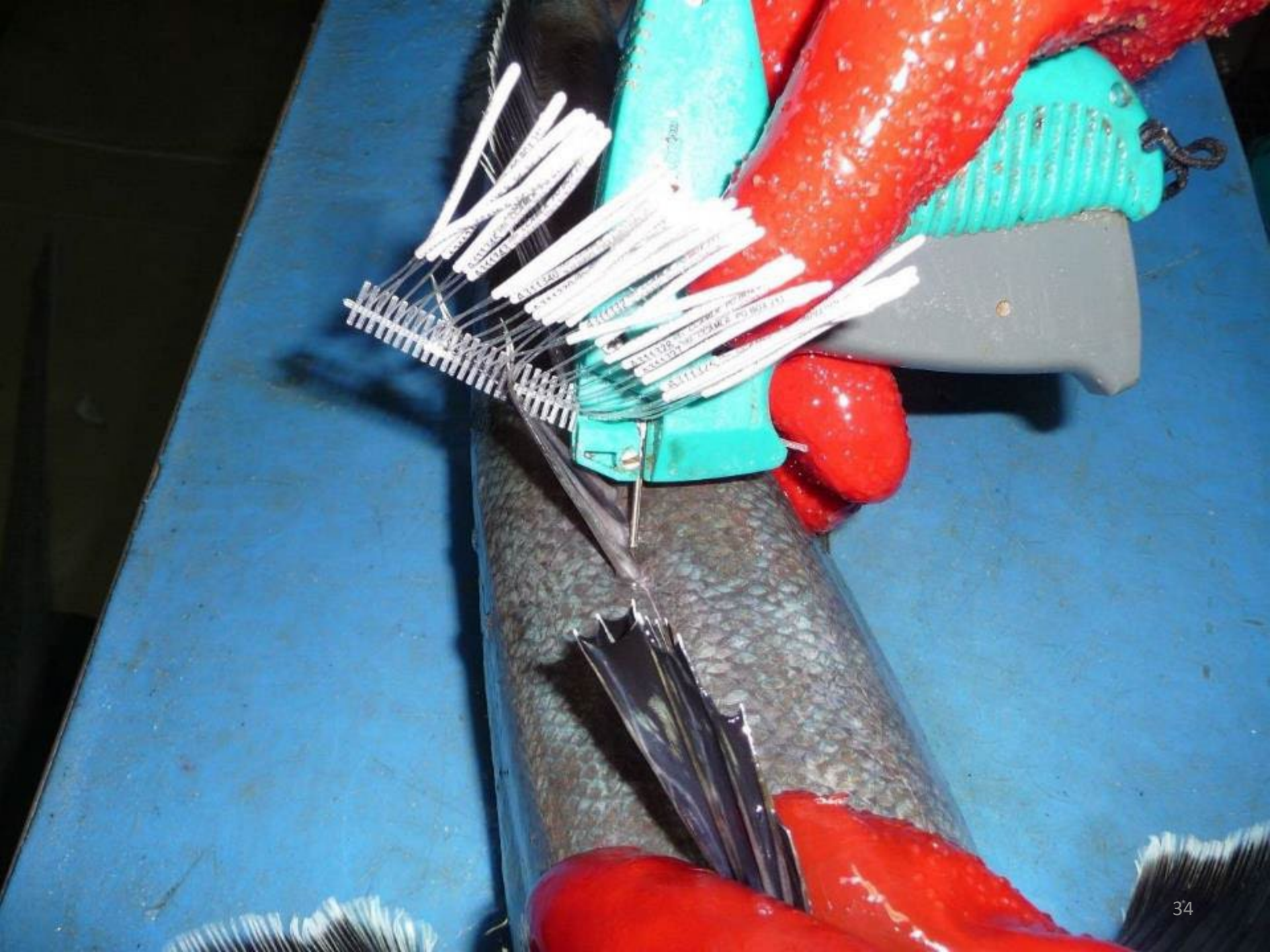


# Applying tags

- Memorize a routine
  - Evaluate suitability to tag
  - Record length
  - Apply two tags
  - Record tag codes, fish length
  - Double check tag codes
  - Release fish
  - Record remaining information or use 2 people
- Using an applicator gun, insert tags into the dorsal muscle at the dorsal fin angled downward so that the bar is firmly lodged behind the forward edge of the second dorsal fin rays, and backwards to reduce effects of drag on the tag.
- Pull trigger, rotate applicator  $\frac{1}{4}$  turn, withdraw needle.

# Proper tag placement







Note tags insert at dorsal fin





**Proper tag  
placement**





AT 15095 HOBBART 7002 AUSTRALIA

# Tag placement problems

- Common problems tagging
  - Scale interference
    - Inappropriate placement
      - Angle
      - Depth too shallow
      - Location
    - Applicator tissue damage
  - Broken or immediately shed tags



# Video guide to tagging toothfish





# Tagging a large fish





# Handle fish Properly







2007 / 2 /

# Headfirst into the water





# Release with a sling



Watch the fish swim away



# Tagged fish fate

- Leave blank if all was OK
- If tagged fish does not swim away, choose appropriate code:
  - S: Seal Predation
  - T: Both tags detached
  - D: Dead at surface but no predator
  - K: Killed by whale
  - If code used, make note in comment field

# Recording data

Unless accurate tag data are recorded there is nothing gained from tagging a fish.

- Use two people if at all possible – one recording and checking data, one completing the tasks.
- Evaluate each tagging suitability criterion, but quickly.
- Double check tag codes, length, and haul number.
- Release gently, headfirst, into water.
- Note fate at release only if not successful.
- Do not release tagged fish if predator is present
- Compare logbook and used tags each shift.



# Use tagging release sheet

Rev.Jan.2022			<b>SIOFA tag release sheet</b>				Release Fate (Seal, Killer Whale, Tags detached, Died)	
Starting tag#:			Tag Colour:					
Set Number	Species Code	Tag1 ID	Tag2 ID	Tagger (Obs#/Crew)	Hook removed? (Y/N)	Total Length (cm)	Fate (S,K,T,D) ?	Comment
001	TOP	A123456	A123457	crew	Y	111	S	eaten

# When things go wrong

- Stuck or broken tags
- Dropping or injuring the fish
- Forgetting tag codes
- Predation or attack on release



**WRITE IT DOWN!**



# Tag recaptures

- Examine every fish for tags
  - Note pink tags may resemble bruised fin rays
- Not reporting tags does NOT mean a larger future catch limit.
- Fewer tag returns CAN mean more fish need to be tagged.



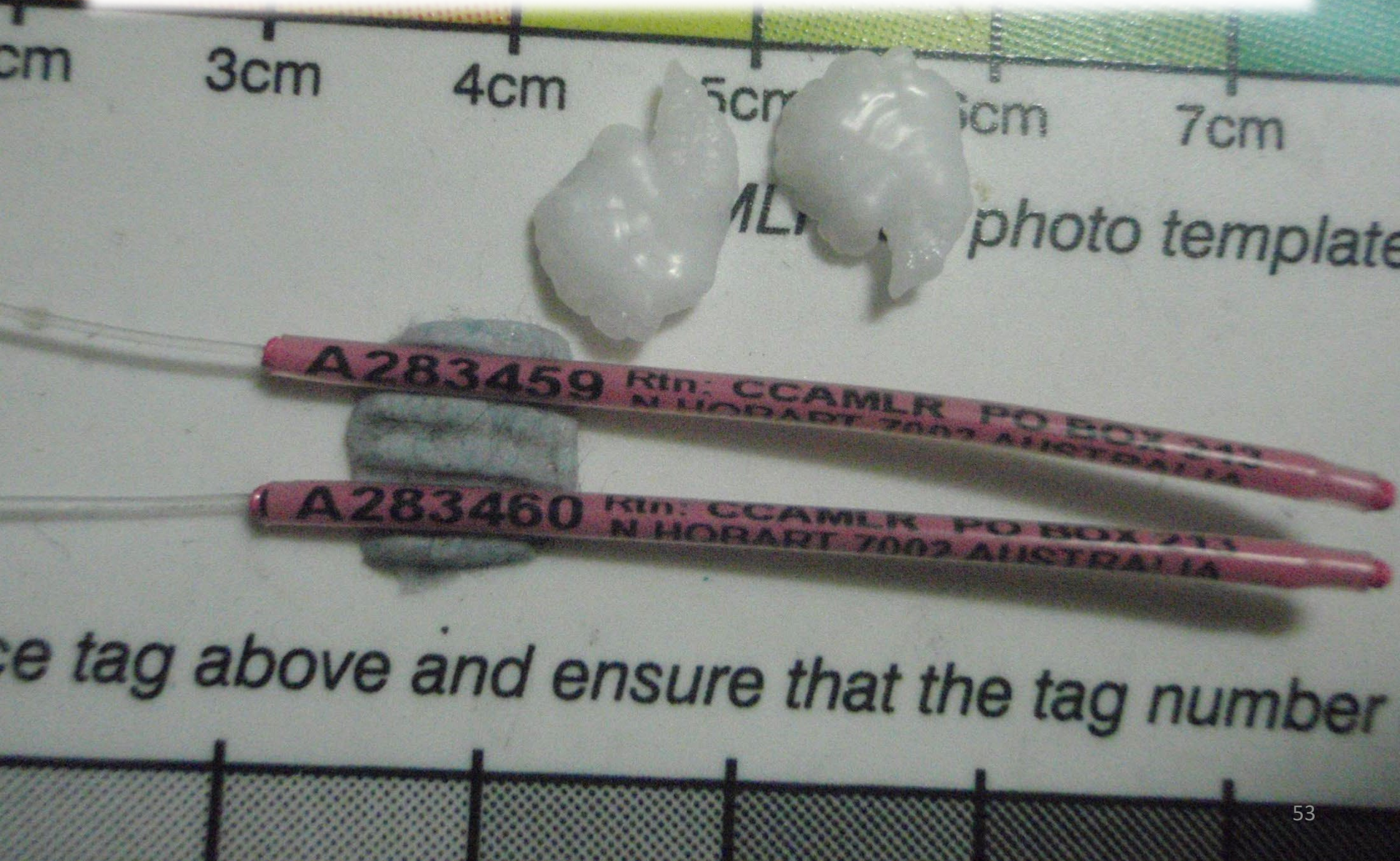
# Tag recapture tasks

- **Crew and observers:** Develop a routine to thoroughly examine every fish for tags.
- **Vessel operators:** Provide incentives for tags to be recaptured. Make it important to crew. Note that statistical methods now exist to compare recapture rates among vessels.
- **Crew:** When a tag is discovered, leave the tag in the fish and notify an observer for sampling.
- **Observers:** Check logbook after each haul. Coordinate the return of physical tag and otoliths to SIOFA Secretariat.

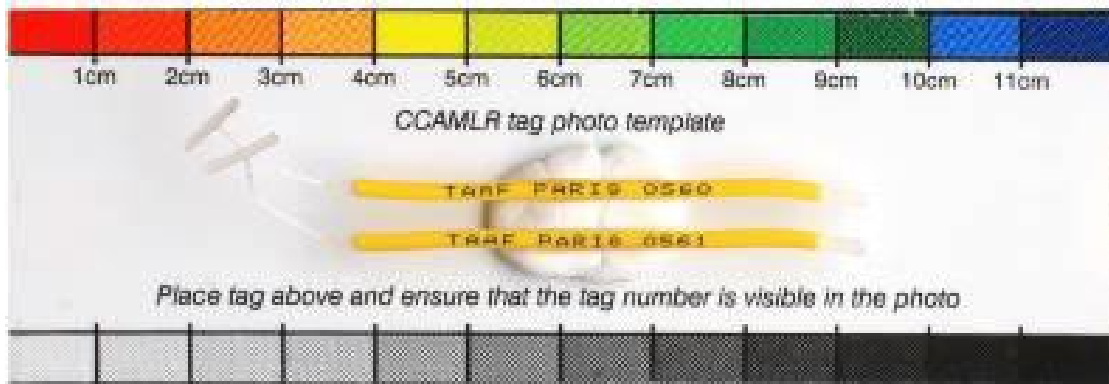
# Tag recapture sampling

- Observer samples recaptured fish.
- Record Observer ID if tag found by “Observer”, otherwise “crew”.
- Record tag codes and colour for all tags present.
- Record Trip and Haul.
- Toothfish: Record Length, Weight, Sex, Gonad weight, collect both otoliths.
- Skates: Record Total length, Pelvic length, Wingspan, Weight, Sex, Gonad stage.

# Arrange your photograph



# Documenting a tag recapture



Name the picture file: "Colour"\_"Tag\_code\_Cruise\_Haul".jpg"



# Look for other tag types

- Stomach tags
- PIT tags (just behind head in muscle)
- Archival tags
- Satellite tags
- Fish with these tags should also have a normal tag
- These tags should have a return address printed on them



# When things go wrong: Recaptures

For example, what if:

- A loose tag is found
- Tag is found in fish but after processing
- Tagged fish cannot be linked to a haul
- A tag is lost after the fish is sampled

## What you should do:

If tag is available: Record vessel name and the date found, report likely source haul, return tag to CCAMLR.

If tag is lost: Record vessel, likely date or haul number, report likely source, and state that no tag returned.

# Summary

- Proper tagging and tag recapture are very high priorities for every toothfish fishery.
- Tag reward scheme

# Photo and video credits

Judith Brown, UK

Nicolas Gasco, H. Vermande, A. Dervaux, G. Duhamel, France

Dirk Welsford, Australia

Chris Heinecken, South Africa

James Andrew, Dave Bilton and Jack Fenaughty, Steve Parker, New Zealand

Roberto Sarralde, Spain

Alan Hart drew the toothfish and skate diagrams

Also:

CCAMLR's Fish Stock Assessment Working Group and the CCAMLR Secretariat have provided several reviews of this training module.