

Cod tagging protocol (Mark-Recapture)

February 2022 (Updated March 2023)



Contents

Objectives	2
EQUIPMENT	2
FISHING	2
FISHING DETAILS	3
TAGGING & LENGTH FREQUENCY	3
Selecting fish for tagging	4
Fish handling	4
Tagging	4
Floy tagging	6
Release	7
Contact information	7

Objectives

- Deploy mark-recapture tags in Atlantic Cod $\geq 45\text{cm}$
- Collect length frequency for Atlantic Cod $< 45\text{cm}$
- Record length, location, and condition of any SARA species captured as bycatch

EQUIPMENT

Fishing	<ul style="list-style-type: none">• Handlines• Cod pots• Trawl or Longline (as needed)
Fish handling	<ul style="list-style-type: none">• Dip nets• Length boards• Gloves (rubber and cotton)• Thermometers/CTD
Floy tagging	<ul style="list-style-type: none">• Data sheets• Clip boards• Pencils• Tagging guns (two per tagging team [loaded with pink and yellow tags], plus spares)• Floy tags

FISHING

- **Fishing is not permitted in Marine Protected Areas or Marine Refuges.**
- If fishing by trawl or longline, holding/recovery tanks should be filled with seawater before fishing commences, and seawater should be left continuously running (flushing) through the tanks. If only one hose is available, alternate flushing occupied tanks at approx. 10 minute intervals (NOTE: if the holding tank is crowded, and the recovery tank has only a few fish, prioritize flushing the crowded tank).
 - If fishing by trawl, tows should be **10-15 minutes on bottom** (discretion of CO/fishing mate and PIC) and tow should be adjusted based catch size and what is observed on the sounder. **Tows cannot exceed 60 minutes. If you find a dense aggregation 1-2 minutes bottom time will be sufficient to fill the capture box.**
 - If fishing by trap or longline, soak time should be limited as much as possible reduce stress on the fish. Start with shorter soaks (4-8 hours) and only extend soak time as needed and if fish remain in excellent condition.

- Fish condition, depth, temperature and haul back speed will all influence the severity of barotrauma, so adjustments may be made as fishing progresses – please note these details in the bridge diary.
Regardless of depth or fishing gear, all fish should be brought to the surface slowly to reduce potential injury from barotrauma.
- **All by-catch must be released immediately, with the least amount of harm possible. If by-catch includes Species at Risk, please complete the SARA tracking form.**
- Encounters with marine mammals or turtles should also be recorded (position/description)
 - **Any incident that occurs with a dead or distressed SARA-listed marine mammal or turtle must be recorded and provided to the Species at Risk Program, DFO as soon as possible.**

FISHING DETAILS

- Record water depth, position and time at start and end of fishing.
- Include any notes on fishing protocol (i.e. reasons for shortening or extending tow time, haul back spend/safety stops, etc) in the bridge diary.
- Use a hand held thermometer to collect surface temperature. If available, a small CTD (ex. castaway) should also be used to collect bottom temperature.

TAGGING & LENGTH FREQUENCY

Tagging

Species	Objectives	Tag/Sampling	Record
Cod \geq 45cm	1000 per tagging area	Length 1 Floy tag (yellow or pink)	Set details (datasheet header) Length Floy # Presence of lerneae Running Male (RM) or Running Female (RF) Release time Release lat/lon
Cod <45cm		Length	Set details (datasheet header) Length

Wolffish must be measured and recorded on the SARA tracking form prior to release.

All other species can be released immediately without further sampling.

Selecting fish for tagging

Do not tag fish that shows signs of the following:

- stomach eversion
- protrusion of eyeballs or air inside eyeballs
- skin damage or scale loss
- bleeding
- soft to the touch
- do not swim down vigorously in recovery tanks
- inflated swim bladders and cannot swim down to bottom

Signs that you need to humanely euthanize the fish:

- excessive bleeding
- soft to the touch
- unable to move/appears unlikely to survive

Fish handling

At all times efforts should be made to minimize time fish are out of water. During tagging, each work station should have a team of 2-3: tagger, data recorder, and fish handler to provide support with fishing and release. Handle fish with the dip net or wet gloved hands. Try to limit the number of contact points/surfaces.

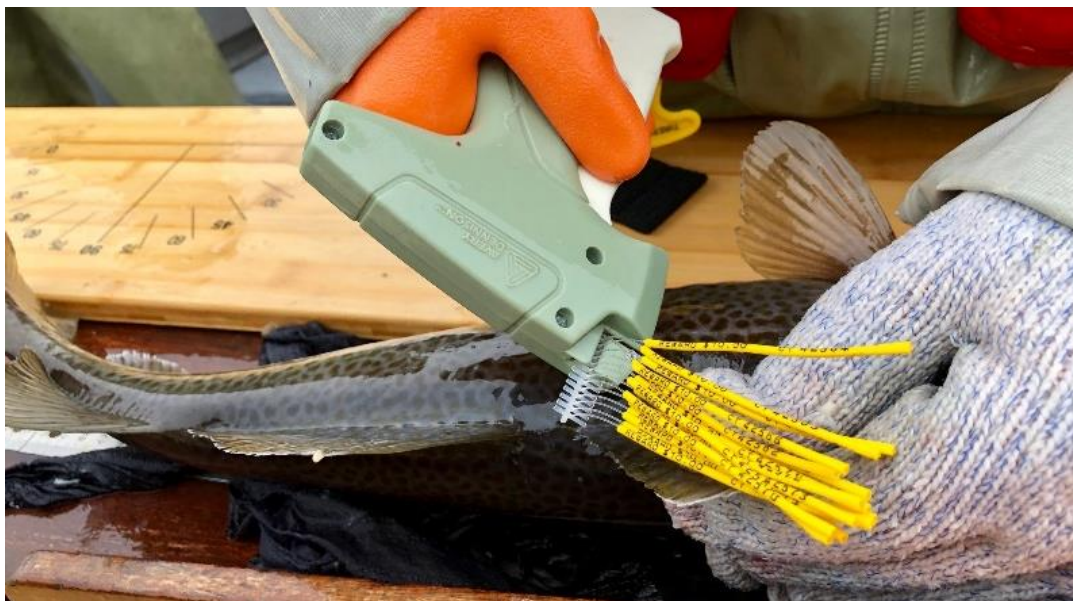
The lead tagger and fish handler should assess fish together. Making good decisions about which fish are in suitable condition for the procedure is important to the longterm success of the project.

- In cold conditions (i.e. air temperature below **0 °C**) fish need to be flushed with seawater or in holding tanks almost continuously, and covered with damp rags during surgery.
- In warm conditions (i.e. water temperature **> 10 °C** or air temperatures **> 20°C**) fish should be observed closely and work should be ceased if fish show signs of thermal stress (ex. flared gills, failure to swim upon release).

Tagging

The tagging station should be ready with all needed material within arm's reach, guns loaded with appropriate tags, and data sheets ready for recording **before** the first fish is presented to the tagger.

Before tagging, double check that the data sheet header is filled with the tow start/end time and coordinates, set #, date, NAFO Div, water depth, tank temperature, tag prefix (for floy tags) and the initials of the tagger and recorder.

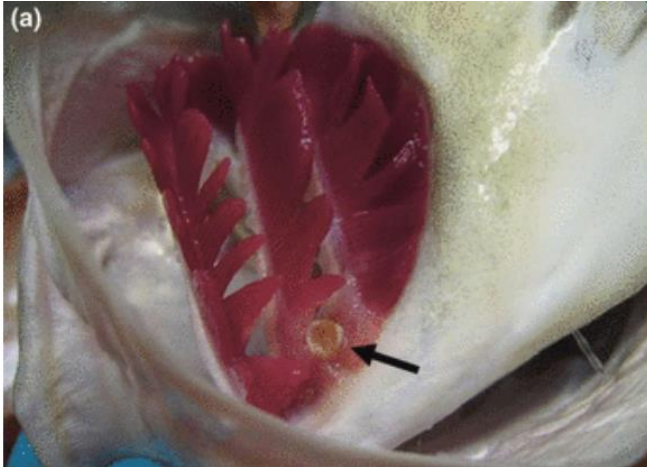


Floy tagging

1. Select a fish and place it on the length board
2. Tagger calls out the length in cm to the data recorder.
3. If the fish is less than 45cm, record it on the undersized data sheet.
4. If the fish is ≥ 45 cm, proceed with tagging:
 - a. Insert the tag at the base of the first dorsal fin angled so that it sits in the dorsal muscle between the finrays and points slightly backward so that the tag lays along the body when the fish is swimming. Squeeze the trigger to deploy the floy tag.
 - b. Gently remove the gun (you may want to hold the tag in place with one finger as you slide the gun away).
 - c. If the gun gets jammed or the tag does not insert correctly, you can front load the same tag into a spare gun and try again. If the tag is damaged, set it aside to return to the office, record which tag numbers are damaged and move to the next in sequence.
 - d. Double check that any changes in tag sequence are captured on the datasheet.
5. Tug the tag gently to ensure it is inserted properly.
6. Tagger calls out the tag number and the recorder should repeat the tag number back.
7. Tagger will examine the gills and call out the number of lernaeocea parasites.
8. If milt or eggs are released from fish during tagging make sure this is noted alongside the tag number for each fish on the tagging sheet (RM for running males, RF for running female recorded in the "MAT" column).
9. Fish that only receive floy tags can be released right away. Record the release time and coordinates (from handheld GPS or consult with the bridge for position).

Floy tags are deployed in a ratio of 2 pink (high reward, \$100) tags followed by 8 yellow (low reward, \$10 or \$25) tags. Each data sheet has space for 20 tagged fish, with rows following this high/low reward deployment schedule. **The recorder should also give the tagger advanced warning when the time comes to insert pink tags so that the tagger can switch to the appropriate tagging gun.**

If a tag is lost, damaged or destroyed during the tagging process, it should be recorded in the notes field of the data sheet.



Release

Fish should be released from a stationary vessel (or very slow moving, < 2 knots), at or near the site of capture. However, if another fishing set is underway, do not release fish in case of recapture. When working from high sided vessels, a release chute with running water OR a release basket should be used to reduce impact of the fish at the surface.

Contact information

Emilie Novaczek (DFO)

Emilie.Novaczek@dfo-mpo.gc.ca

709 330 8319

Dwayne Pittman (DFO)

Dwayne.Pittman@dfo-mpo.gc.ca

709 693 9470

