

Key lessons for fishing industry self-sampling programs

Martin Pastoors



Small pelagic fish symposium, 10 November 2022, Lisbon



Sustainable, collaborative approaches be fishing industries and fisheries science

Martin Pastoors



Small pelagic fish symposium, 8 November



Martin Pastoors Pelagic Freezer-trawler Association (<u>PFA</u>)

Dr. Martin Pastoors is the Chief Science Officer at the Pelagic Freezer-trawler Association (PFA). In this role he initiates and coordinates research activities within the fishing industry and functions as the linking pin between fisheries science and fisheries practice. Based on the industry research activities, he provides scientific input to several international expert groups



2021 United Nations Decade of Ocean Science for Sustainable Development

Small Pelagic Fish: New Frontiers in Science

and Sustainable

Management November 7 - 11, 2022

Lisbon, Portugal

ENDORSED BY

on stock assessment. Previously, Martin was a Senior Researcher at RIVO/IMARES, Netherlands (1997–2014), with a specialization in fisheries science and advice, and marine governance. He has coordinated and participated in several European research projects on fisheries science, fisheries governance and marine spatial planning. Martin served as the Chair of the ICES Advisory Committee on Fishery ment (ACFM, 2006–2007) and Vice-Chair of the ICES Advisory Committee (A 2008). He has been a Chair and member of many ICES expert groups.

Talk [pdf, 4.5 MB]

Sustainable collaborative approaches between the fishing industry and fisheries science

https://meetings.pices.int/publications/presentations/2022-Pelagics/Plenary-General-Pastoors.pdf



April 2014: from research institute to industry researcher



Entering into a parallel universe ...





How can fisheries best contribute to science (and vice versa)

• Voluntary self-sampling programs

- Harmonize & Quality Control existing industry sampling programs

- Self-sampling as an "entry ticket"
 - Dedicated catch sample collection
 - Acoustics
 - Specific biological sampling
 - Information & knowledge exchange





Key elements in voluntary self-sampling programs

Harmonizing, standardizing & engaging

2. Quality controlling

3. Feedback & useable products



1. Harmonizing, standardizing and engaging

Step 1: understanding fishing practices



Step 2: assessing existing data collection procedures

The "many lists" problem

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Step 3: discussing opportunities & constraints





Step 4: harmonizing procedures & data capture

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2	ROS170	201709	1	10/08/2017	13:00	19:45	71°32'	N	003°18'	E	72°00'	N	003°02'	E	8.9	2.9	NE	3.0	410	1500	
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7	ROS170	201709	6	15/08/2017	00:10	19:55	72°44'	N	005°42'	E	72°24'	N	003°07'	E	9.6	2.8	SW	4.0	420	1500	
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13	ROS170	201709	12	21/08/2017	00:20	20:40	72°13'	N	006°16'	E	72°13'	N	006°56'	E	9.5	2.7	NE	5.0	430	1500	
14	ROS170	201709	13	21/08/2017	22:45	21:15	72°14'	N	006°47'	E	72°18'	N	005°56'	E	9.5	3.3	NE	3.0	430	1500	
15	ROS170	201709	14	23/08/2017	00:00	22:15	72°19'	N	006°24'	E	72°14'	N	005°46'	E	9.2	3.0	VAR	2.0	430	1500	
16	ROS170	201709	15	24/08/2017	00:30	20:45	72°14'	N	005°40'	E	71°50'	N	003°22'	E	9.2	3.8	VAR	2.0	410	1500	
17	ROS170	201709	16	24/08/2017	23:30	21:15	71°42'	N	003°52'	E	70°48'	N	006°05'	E	9.2	3.7	VAR	2.0	410	1500	
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26	ROS170	201709	25	02/09/2017	11:00	03:30	73°30'	N	008°06'	E	72°52'	N	008°23'	E	8.9	2.9		· L			
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Step 5: develop manuals and instructions

Methods and procedures manual for the Scottish pelagic self-sampling programme

K. Brigden¹, S. Mackinson², L. Clarke³



¹ Fisheries Scientist PANDORA Project

^a Chief Scientific Officer Scottish Pelagic Fishermen's Association

³ Senior Fisheries Statistician Marine Scotland Science



NAFC Marine Centre

University of the Highlands and Islands



Herring weight and length sampling protocol

Why? Measuring both the weight and length of fish at the same time provides information on their growth that can be used in assessing the state of the stock.

When? A sample of weight and length should be taken from every haul, and the details of the haul recorded so that the date and position can be linked to the sample details. A sheet for recording the haul data is provided.

What? The sample needs to be representative of overall catch, so fish for the sample need to be taken at different times during pumping. We will use the start, middle and end.

How?

- During pumping, take 1/3rd of a basket of fish at the start, middle and end, and put them to one side until the fishing work is done. The order of the baskets doesn't matter because all the fish will be weighed and measured. The three baskets together should be around 25-30kg.
- Take each fish and <u>measure its length</u> (see diagram) to the <u>nearest lowest</u> <u>½ cm</u> (for example, if it is 37.7cm, write down 37.5 cm. If its 37.4 cm, write down 37), then <u>measure its weight in grams</u>.
- Record the measurements of <u>all</u> the fish in the basket on the recording sheet provided. Use a separate sheet for each haul.
- Enter the data from the paper copy into the spreadsheet sent to the skipper. The file is called 'Length-Weight Data Entry sheet_SPFA.xlsx'





Step 6: implement quality control procedures

• E.g. outlier detection





Step 7: developing feedback & products



Step 8: talk about it, frequently









2. Quality controlling

Quality control of self-sampling methods

- 1. Data checks on incoming data
- 2. Inter-vessel comparisons
- 3. Comparisons between regular "sampling" and self-sampling
- 4. Comparisons between observer trips and self-sampling



Data checks

- Prevent erroneous data to be entered (data model)
 - Commas, dots, degrees, spaces, spelling variants,
- Assess whether data is within bounds
 - E.g. define maximum weight for a fish species
 - Check units being used!!
- Assess consistency within the data
 - E.g. are times and positions consistent and feasible between hauls
 - E.g. can catch compositions be compared from different sources
- Assess occurrence of outliers and check them



Inter-vessel comparisons

• Vessel in same area/season with comparable results?



– Not trivial to interpret!



Comparisons with different sampling programs

With catch sampling



SPFA-Marine Scotland comparison

With observer trips





A transparent and clear quality control program is an important requirement for self-sampling



3. Feedback and useable products

Tripreports: immediate feedback (& conversation)



Individual vessel - SS Vssl Report - MAC - 20 - Nov

Self-Sampling Report

Vessel: Vessel name Fishery: Mackerel Period: Oct. Nov. 2020

Graphs of length and weight distributions (Figures 1a and 1b) provide information on the size structure and age composition of the catch. When more than one age group ('cohorts') of fish are dominant in the catch, they appear as separate peaks in the graphs.



Figure 1: Left panel, a) number of sampled fish in each length category. Right panel, b) number of sampled fish in each weight category

The relationship between the length and weight of a fish (Figure 2) is an indicator of fish condition, and changes over time. Fish condition will be further <u>analyzed</u> from the larger dataset collected across multiple vessels.



Figure 2: Fish length-weight relationship from all hauls (coloured by date/haul no.)



Overview reports: what is happening in the fishery



Working Document WGWIDE 2021

Overview of the Scottish Pelagic Industry Self-Sampling Programme with potential data opportunities relevant to stock assessment

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¹ Shetland UHI (formerly NAFC Marine Centre, Shetland) ² Scottish Pelagic Fishermen's Association (SPFA), Fraserburgh ³ Marine Scotland Science (MSS), Aberdeen

1. Purpose

Data collected by industry has the potential to provide data to stock assessment and contribute to the quality of stock assessment and ICES advice. This working document provides:

- An overview of the Scottish pelagic industry self-sampling programme.
- A summary of the Scottish pelagic industry self-sampling data collected since 2018 for mackerel, herring and blue whiting.
- Example data: distribution maps of self-sampling / co-sampling and the biological data available for mackerel in 2021, alongside Ma SPFA Science S same fishery/period.

HOME

This is a preliminary presentation of the wor Programme, to communicate its future data (

VIDEOS PLAYLISTS CHANNELS



45 subscribers



SPFA Jan 2022

enhance pelagic fisheries... to co management

ABOUT



Talking points with skippers / experts

What is happening in the fishery?

- Distribution of herring in 2022 very different from previous years?
- Season for fishing mackerel is changing?
- Only large blue whiting in particular area?

Analyze data and report back *or* Setup new research project



Key lessons

Key lessons

- Explicit strategy to involve crews in setup and results of sampling
- Provide immediate feedback to crews
 - quality control & engagement
- Implement documented quality control mechanisms
- Self-sampling as powerful mechanism for real-time information

 high spatio-temporal resolution
- Through engagement, create potential to address other biological and ecological questions (e.g. growth, condition, reproduction acoustics, ...).



