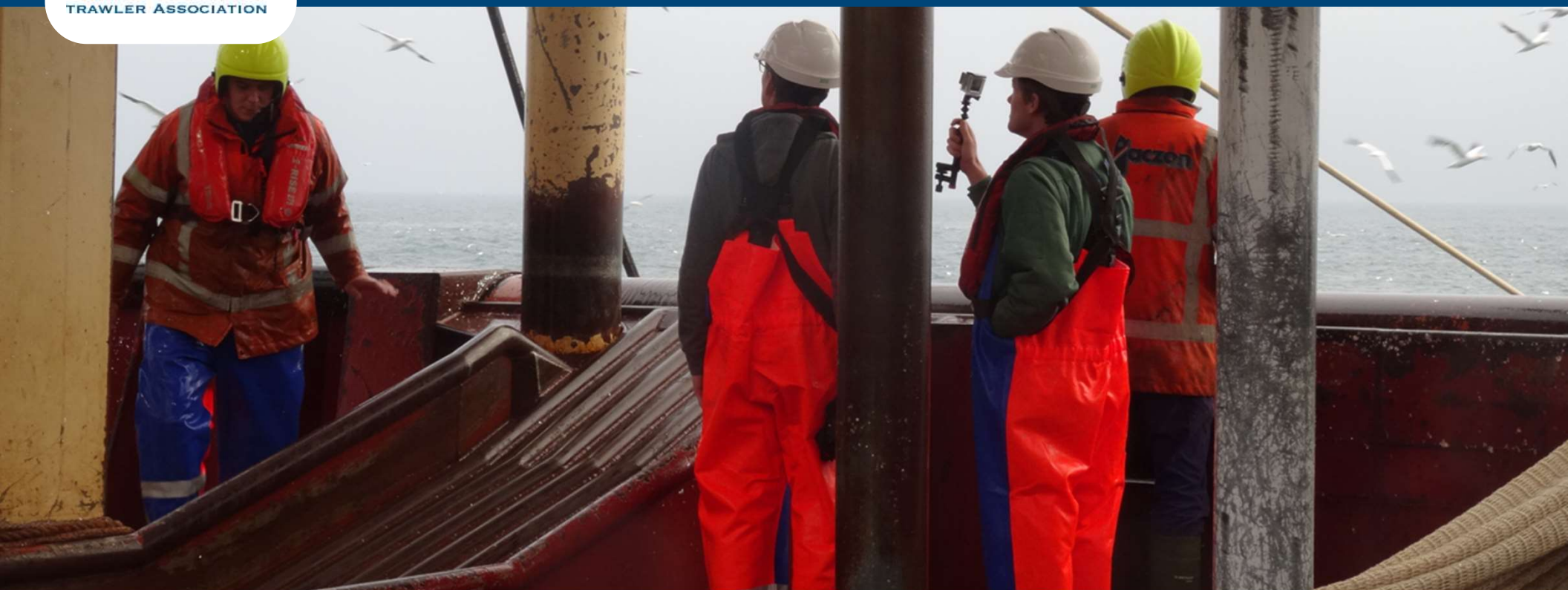




Sustainable, collaborative approaches between fishing industries and fisheries science

Martin Pastoors



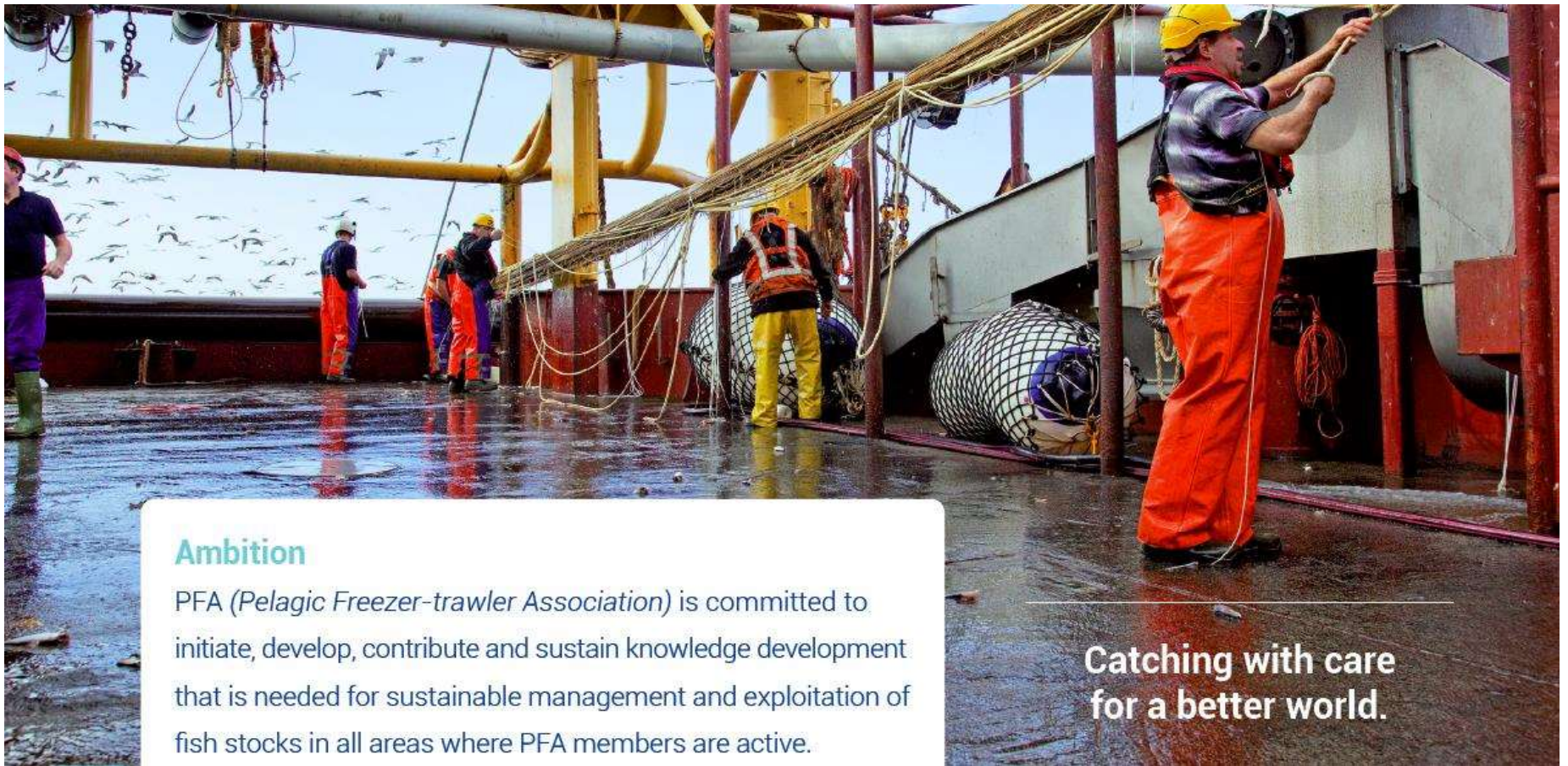
Small pelagic fish symposium, 8 November 2022, Lisbon



PFA Chief Science Officer



“fishers as the eyes, the ears (and hands) at sea”

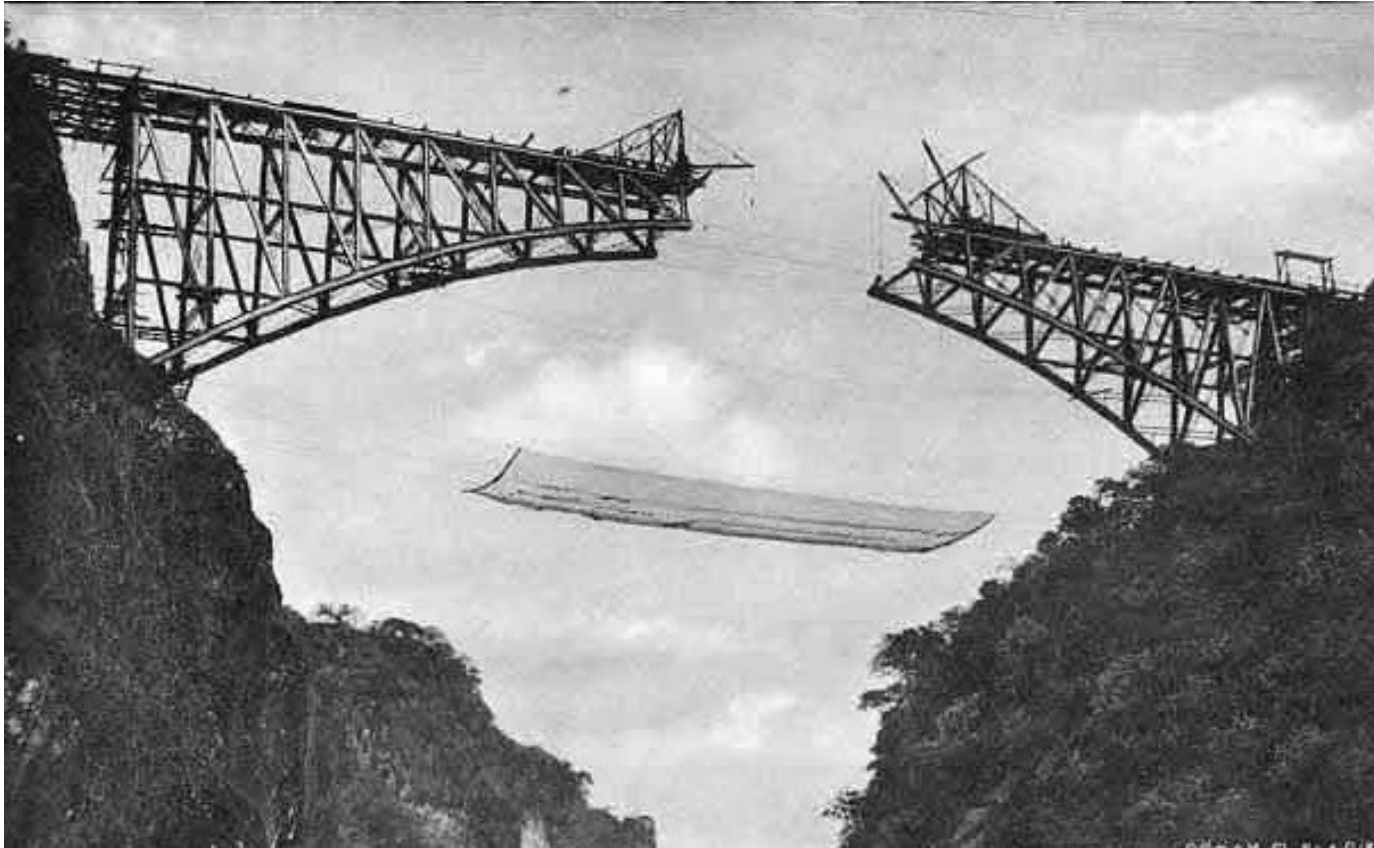


Ambition

PFA (*Pelagic Freezer-trawler Association*) is committed to initiate, develop, contribute and sustain knowledge development that is needed for sustainable management and exploitation of fish stocks in all areas where PFA members are active.

**Catching with care
for a better world.**

Building bridges between industry, science and management

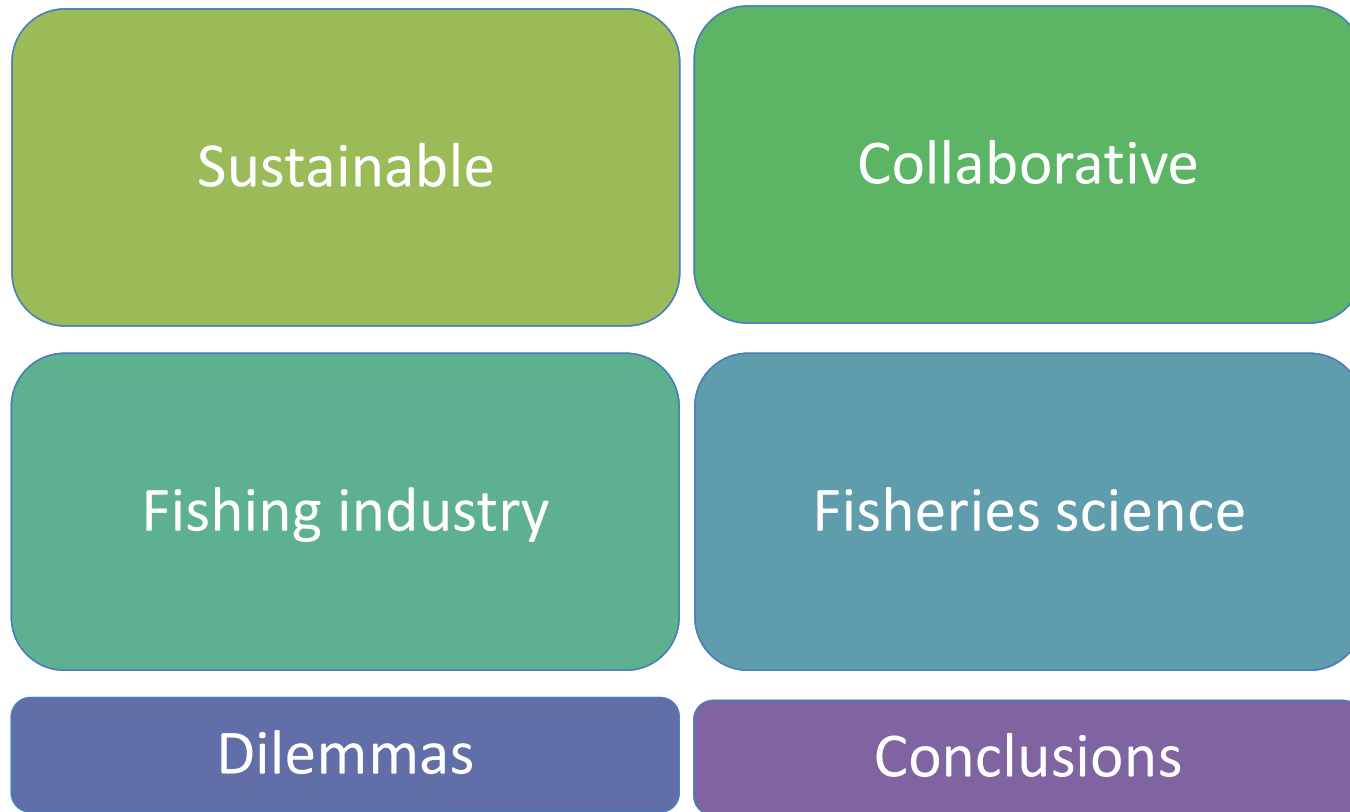


Sustainable, collaborative approaches between fishing industries and fisheries science

What makes collaborative approaches last?




Sustainable, collaborative approaches between fishing industries and fisheries science



Sustainable

sustainable

 sə-stā'nə-bəl

adjective

1. Capable of being sustained.
2. Capable of being continued with minimal long-term effect on the environment.
3. Capable of being sustained or maintained.

The American Heritage® Dictionary of the English Language, 5th Edition.



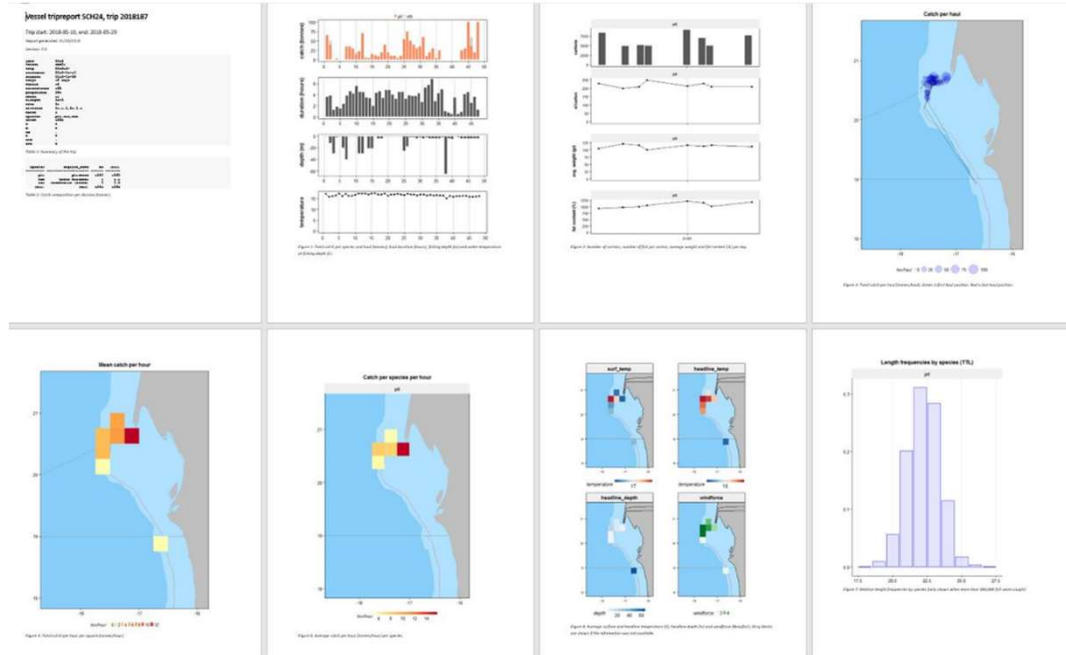


What makes collaborative approaches sustainable?

- Engaging (for scientists and fishers)
- Interactive
- Doable
- Financially acceptable
- Sharing realistic expectations
- Benefits (“something is in it for me”)

Feedback !
Feedback !
Feedback !
& results

Feedback mechanisms



Feedback and engagement - science and industry (scottishpelagic.co.uk)

Vessel reports Annual industry meeting Video presentations
 Meetings/conferences ICES WGs & Wks

Individual vessel - SS Vessel 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 analysed from the larger dataset collected across multiple vessels.

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

Working Document WG WIDE 2021
Overview of the Scottish Pelagic Industry Self-Sampling Programme with potential data opportunities relevant to stock assessment

K. BRIGDEN¹, S. MACKINSON², C. ANGUS³, E. CLARKE³, J. CRAIG³, C.C. PERT³

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 Marine Scotland Science (MSS) onshore sampling data for the same fishery/period.

This is a preliminary presentation of the work carried out by the Scottish Pelagic Industry Self-sampling Programme, to communicate its future data contribution to WG WIDE.

SPFA Science
 45 subscribers

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A MACKEREL FISHING TRIP BY THE RESOLUTE 5:25
 Resolute Mackerel Fishing SPFA Jan 2022

Self-sampling to enhance pelagic data collection 7:10
 How fisher self sampling can enhance pelagic fisheries...

Paving the yellow brick road to co-management 9:57
 Paving the yellow brick road to co management

Thursday 10 November, 11:10 (S6): Katie Brigden, Industry-science collaboration to enhance traditional fisheries data collection

Investing in sustainable relationships and feedback

Collaborative

collaborative



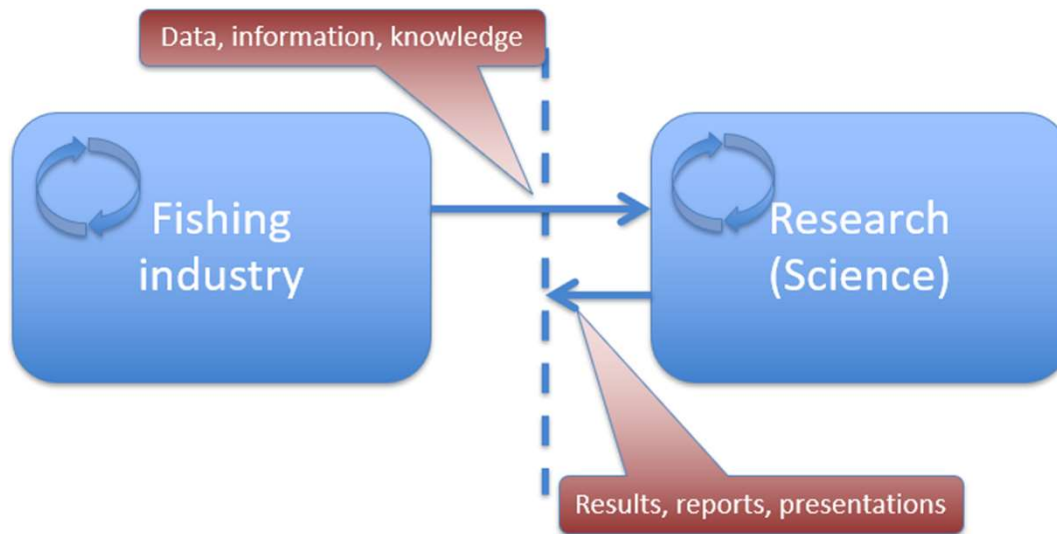
adjective

1. accomplished by collaboration; cooperative. Opposed to competitive.
2. Of, relating to, or done by [collaboration](#).
3. accomplished by collaboration

the GNU version of the Collaborative International Dictionary of English.

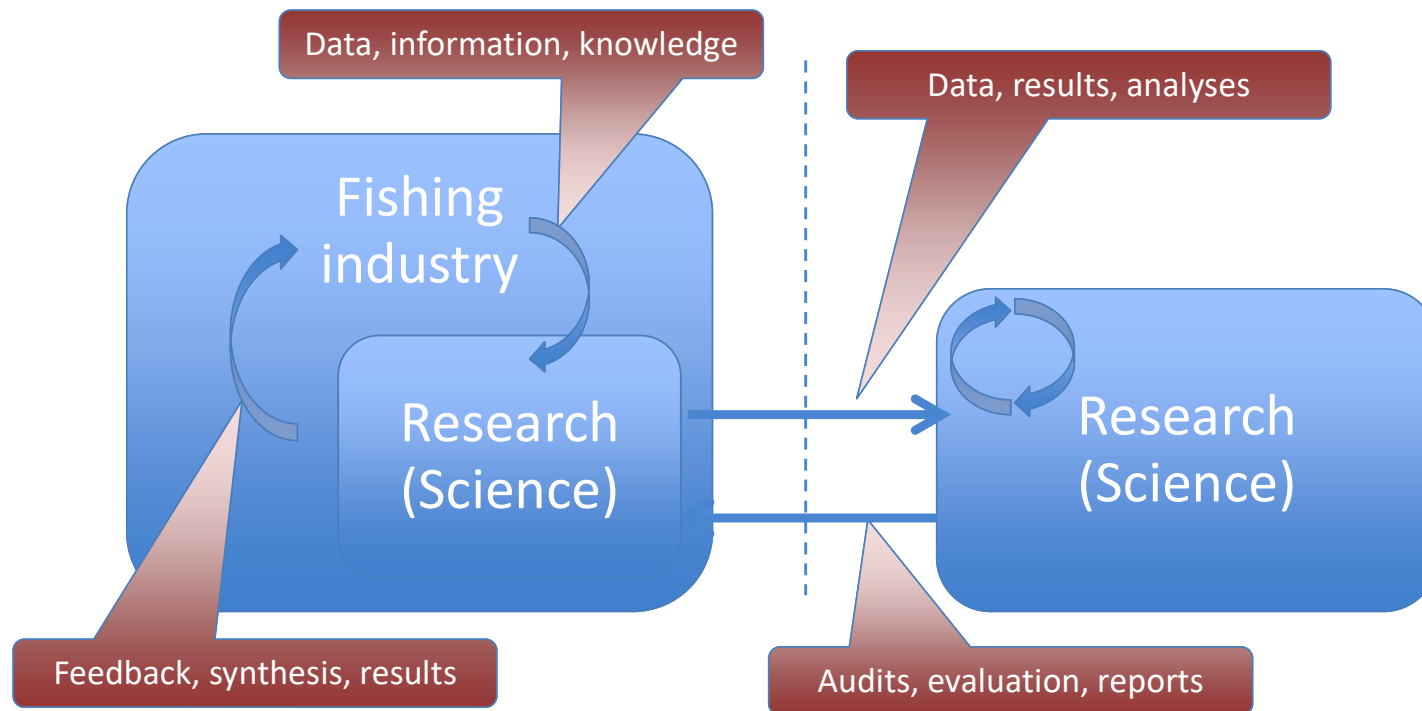
When is collaboration NOT collaborative?

- Complaints by fishing industries on collaboration with science: “we are willing, but it is hard to get any results back”

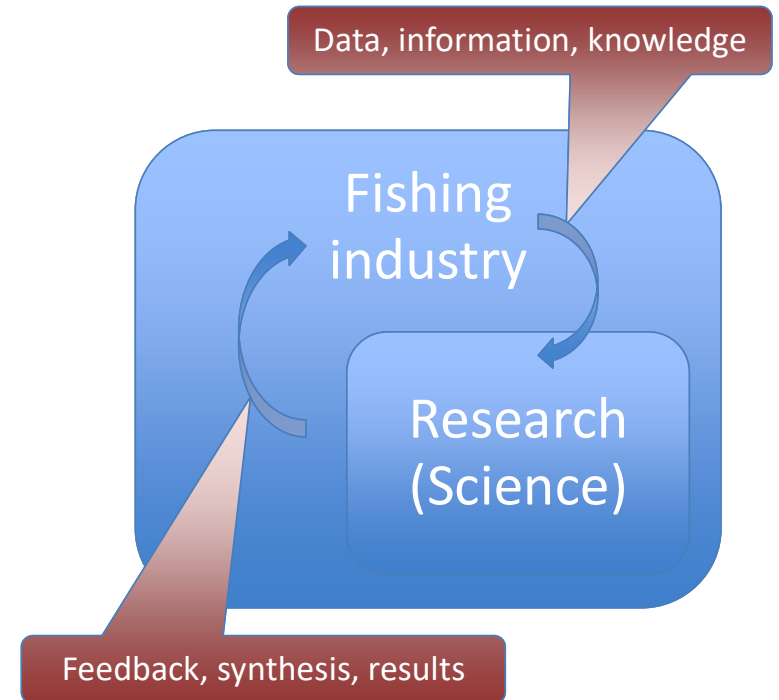


“Extractive collaboration”

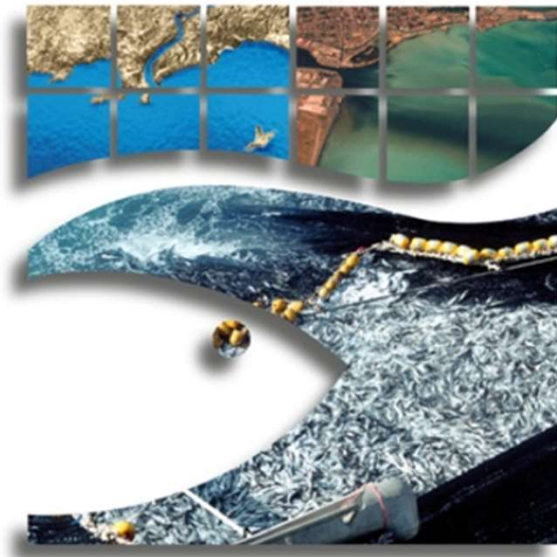
True collaboration: *Fishing Industry Science*



A possible new mode: scientists working in industry



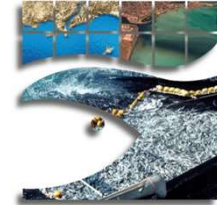
An example from Chile: INPESCA



Instituto de
Investigación
Pesquera



Director: Aquiles Sepúlveda, Chairman of the Board: Andres Daroch



Instituto de
Investigación
Pesquera

Initiating the INPESCA institute

- 1987: many juveniles of jack mackerel (*trachurus murphyi*) off South-Central Chile; how to sustainably manage the resource?
- 1989: INPESCA fisheries research institute is created by the fishing industry
 - main goal: connect scientists from the universities with fishing industry
- Further developments:
 - Establishing sampling protocols
 - Establishing biological assessment procedures
 - Diversify towards oceanography and other disciplines

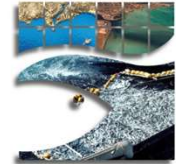
Combining fisheries research with fisheries services

Fisheries research

- Monitoring program
- Stock Assessment
- Fisheries Acoustics
- Fisheries Oceanography
- Fisheries Biology

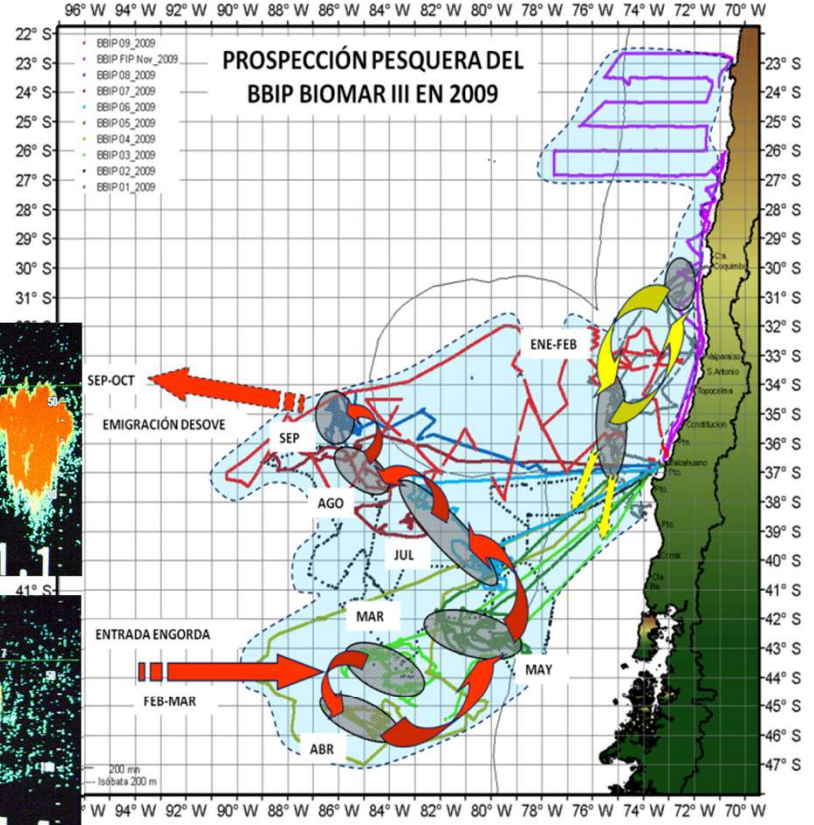
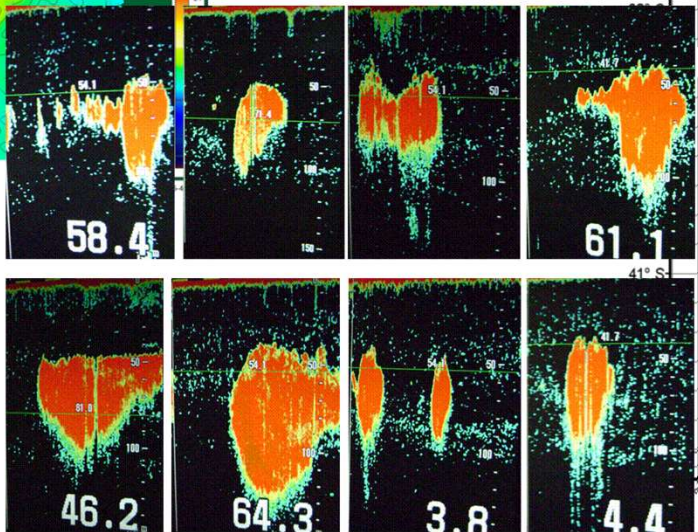
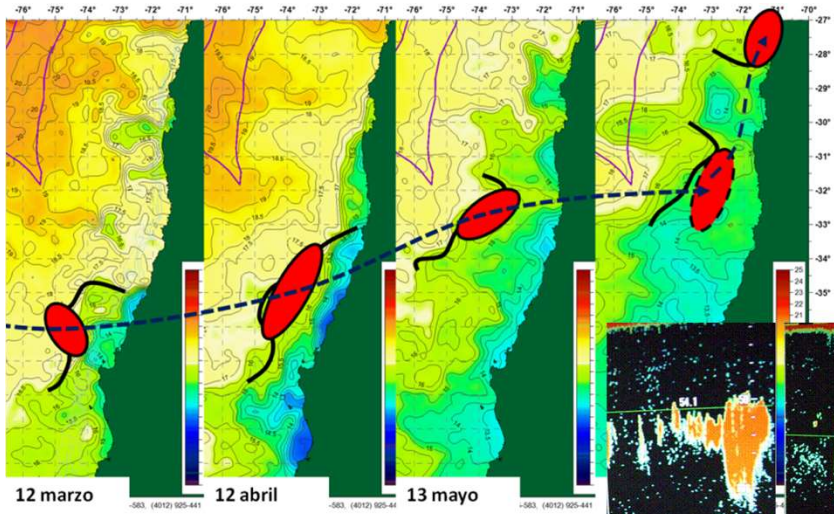
Fisheries services

- Obtain daily meteorological, oceanographic and fishery information
- Relate oceanographic features with fishery events
- Provide real-time information about potential fishing grounds



Instituto de
Investigación
Pesquera

Fisheries services based on fisheries research



A collaborative approach requires collaboration

Fishing industry

Fishing industry

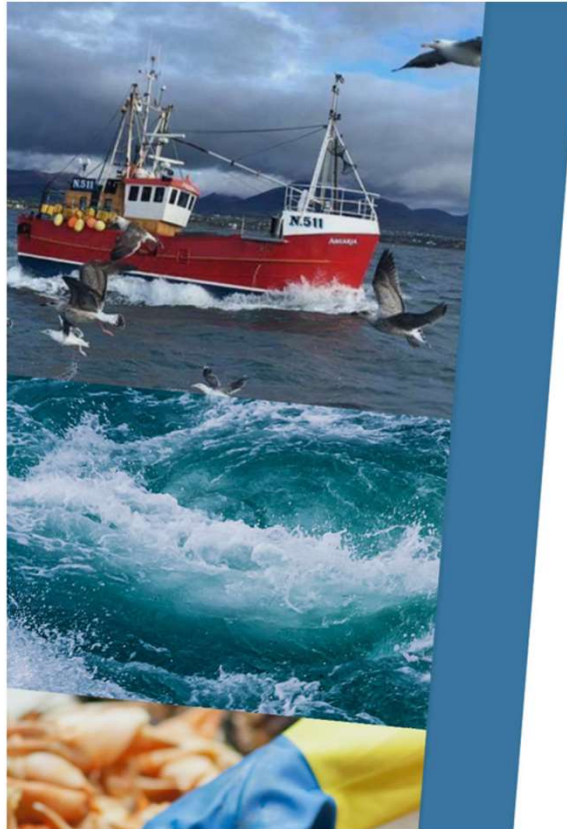
The fishing industry includes any industry or activity concerned with taking, culturing, processing, preserving, storing, transporting, marketing or selling fish or fish products. It is defined by the Food and Agriculture Organization as including recreational, subsistence and commercial fishing, and the related harvesting, processing, and marketing sectors. [Wikipedia](#)



Does this approach only work for pelagics?

- No. Maybe it is more of a mind-set?
- ICES WKEVUT 2022
 - Workshop to Evaluate the Utility of Industry-derived data for enhancing scientific knowledge and providing data for stock assessments
 - Many examples on self-sampling and collaboration between science and industry: pelagic, demersal, small-scale.
 - Downside: feedback mechanisms often not too strongly developed.

Example: Scottish demersal bycatch app

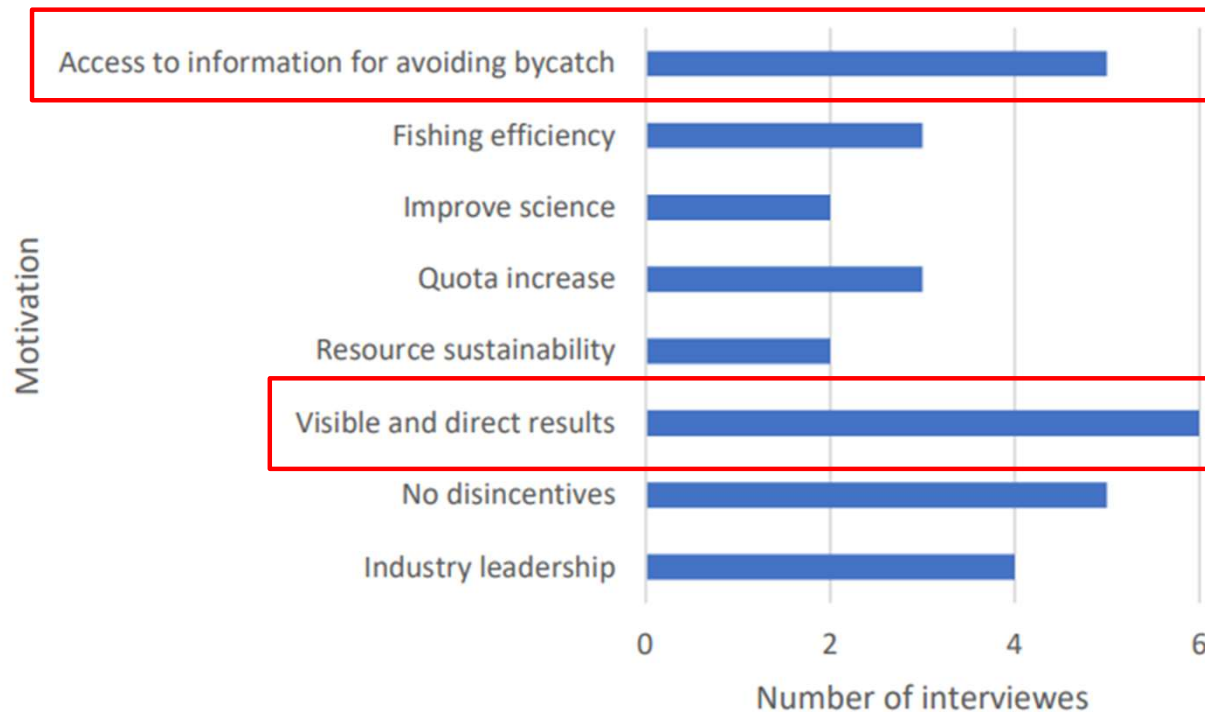


BATmap 
log. map. decide.

**DESIGN, DEVELOPMENT AND
DEPLOYMENT OF A SOFTWARE
PLATFORM FOR REAL-TIME
REPORTING IN THE WEST OF
SCOTLAND DEMERSAL FLEET**

FIS032

Participating skippers see value and feel valued



Collaborative approaches can be done in all fisheries

- Requires: mind-set of collaboration
- Show benefits to all involved

Fishing industry

The fishing industry includes any industry or activity concerned with taking, culturing, processing, preserving, storing, transporting, marketing or selling fish or fish products. It is defined by the Food and Agriculture Organization as including recreational, subsistence and commercial fishing, and the related harvesting, processing, and marketing sectors. [Wikipedia](#)



Fisheries science

Linking fisheries information to fisheries science

- Detailed sampling of **fishing activity** and **catches**
 - Optimizing “routine” sampling by better engagement: “catch lottery”
- Fisheries **acoustics** to support scientific surveys
- Fisheries data collection on **genetics** to support stock identification
- Fisheries data collection on **gonads** to support egg surveys
- Fisheries data collection on **environmental** variables

Linking fisheries information to fisheries science

Fishing activity

Catch compositions

Acoustics

Genetics

Gonads

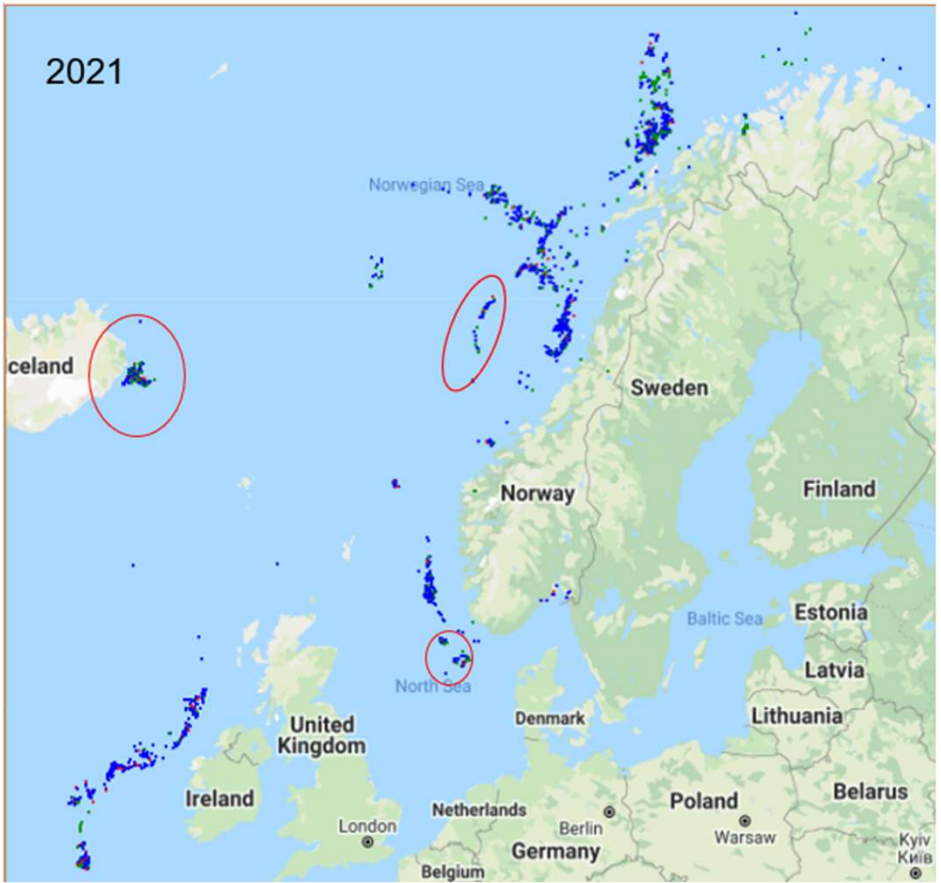
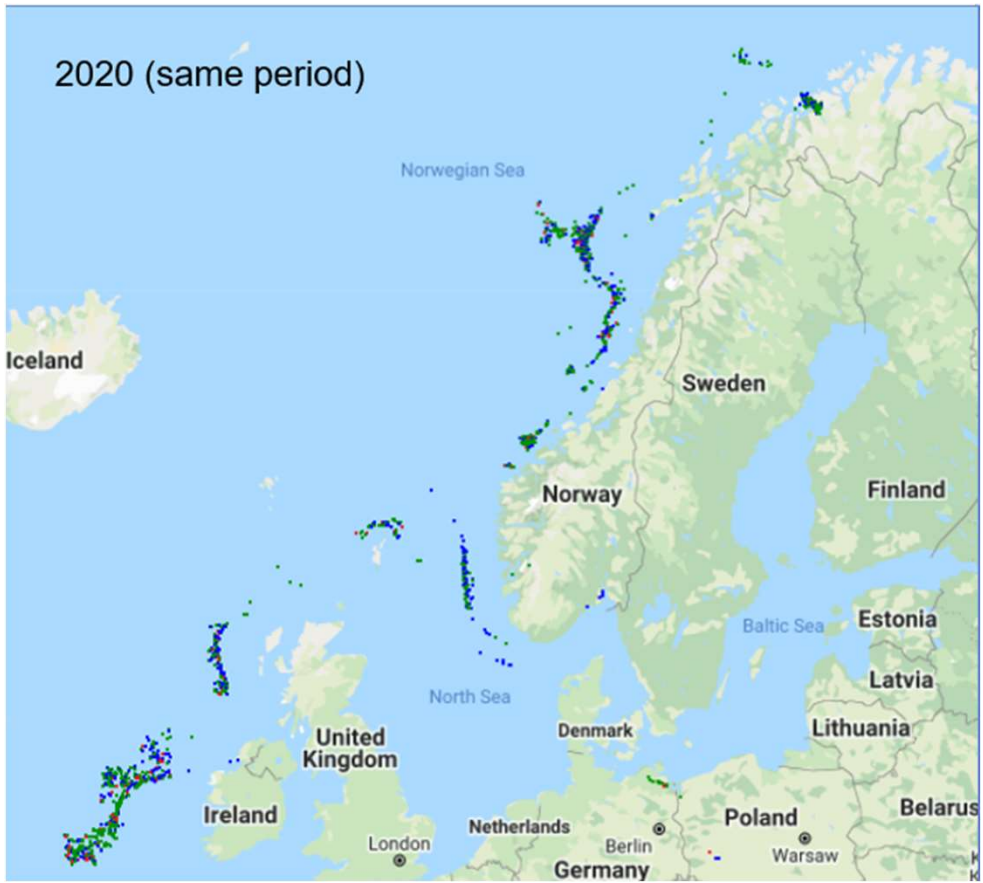
Fat contents

Environmental variables

Catch compositions: Norwegian catch lottery approach

- Aim: improve catch sampling by using probabilistic sampling by haul
- Required: strong cooperation between fishing industry and science
- Method: electronic logbook with **two-way** communication
 - Vessel leaves port
 - Vessel reports haul (species, catch)
 - Secure sample yes/no
 - If yes, deliver sample to ...

Efficient coverage of the fishery through collaboration



<https://www.sildelaget.no/no/kvoter-og-fangst/fangst/fangstproevelotteriet/>



Acoustic data from commercial vessels

- Upcoming talks on scientific surveys
 - *Friday 11 November, 11:20 (S5): Steven Mackinson, Ready for industry-led pelagic acoustic surveys?*
- Upcoming talks on acoustic data collection from fishing vessels
 - *Friday 11 November, 11:20 (S5): Benoit Berges, Processing and interpretation of opportunistic acoustic data collected by Dutch fishing vessels*

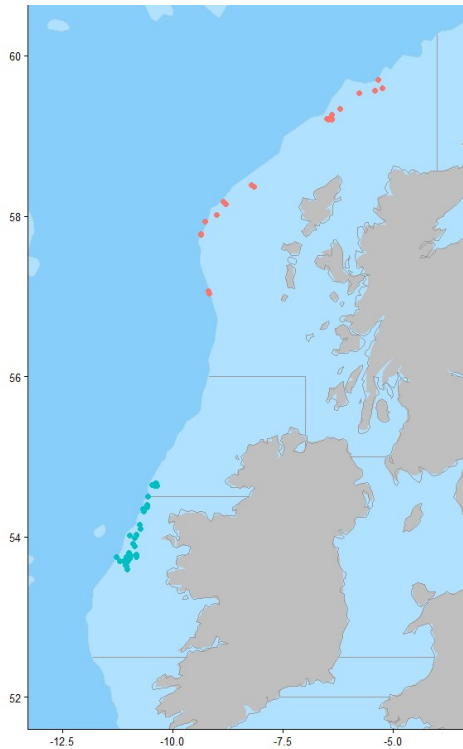
Example: collecting gonad samples for egg survey

- Triennial mackerel-horse mackerel egg survey in Northeast Atlantic
- Large survey effort in catching eggs
- Difficulties in catching sufficient females for potential fecundity est.
- Solution: collect gonads during commercial fishing trips



Successful collaboration between industry and science

Fishing locations



Ripe gonads



Gonad sampling



Trip 1: 52 out 800

Trip 2: 327 out 1400

Fat content analysis based on commercial data



Mark	Aantal cartons	Voorraad in (m3)	Tijd in tank	Stuksallen per p	Stuks per kg	Sorterklasse	Kwaliteit	Sorteringswijze	Voedsel	Textuur	Model	Bulkvulling	Homokuit	Beschadigd	andere vis
ARU010	5667	20	0 - 12uur	60/80	3 a 5	A	2	A	0	B	A	A	A	AB	
ARU011	2030	20	0 - 12uur	40/60	2 a 3	A	2	A	0 - 1	B	AB	AB	AB	AB	
WHB012	1360	20	0 - 12uur	120/160	4 a 7	AB	2/3	AB	0	B	C	A	A	B/C	
WHB013	1664	20	0 - 12uur	180/220	5 a 9	AB	2/3	AB	0	B	C	A	A	B/C	
ARU014	2435	20	0 - 12uur	60/80	3 a 5	A	2	A	0	B	A	A	A	AB	
WHB015		30	0 - 12uur	300 *	13 a 16	AB	2	A	0	B	C	A	A	B/C	
WHB018		30	0 - 12uur	220/260	8 a 11	AB	2	AB	0	B	C	A	A	B/C	
WHB019	5023	30	0 - 12uur	120/160	4 a 7	AB	2	AB	0	B	C	A	A	B/C	
WHB021		30	0 - 12uur	180/220	6 a 10	AB	2	AB	0	B	C	A	A	B/C	
WHB022	4992	30	0 - 12uur	260/300	10 a 13	AB	2	AB	0	B	C	A	A	B/C	
ARU023	1543	20	0 - 12uur	40/60	2 a 3	A	2	A	0 - 1	B	AB	AB	AB	AB	

- Tuesday 8 November, 15:30 (S2): Susan Kenyon, Fat dynamics of Atlantic herring at the onset of sexual maturation: The dual-fuel powering used by “maatjes herring”

In collaborative mode, much is possible !



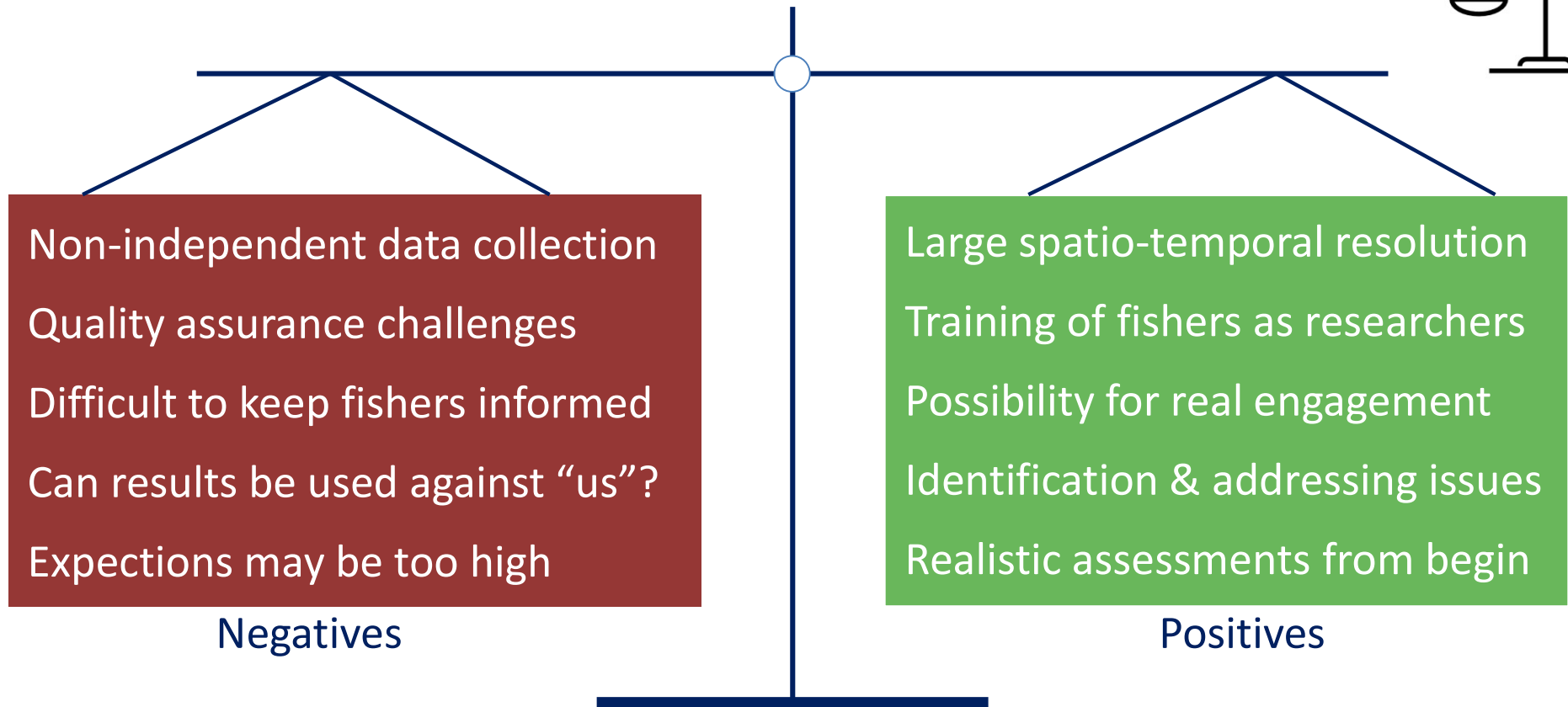
Dilemmas

Dilemmas of collaborative research approaches



<https://www.forbes.com/sites/rodgerdeanduncan/2014/10/14/is-there-an-elephant-in-the-room-name-it-and-tame-it/>

Dilemmas of collaborative research approaches



Addressing the dilemmas of collaborative research

1. Be clear about objectives and awareness of individual goals
2. Jointly agree on research approach (and why)
3. Be clear about different roles of different parties
4. Manage expectations in uptake of results
5. Allocate sufficient time (!) for communication
6. Develop a communications protocol
7. Address 'elephants in the room' by making dilemmas explicit
8. Involve potential end-users from the outset
9. Don't try to collect (and share) what is strongly disputed

Conclusions

To take home

- Sustainable & Collaborative are two sides of the same coin
 - requires investment in relationships and feedback
- Not restricted to large-scale fisheries
 - but does require a mind-set of collaboration
 - where possible: solve fisheries challenges
- May contribute to several new sources of data
 - fishing activities, catch, acoustics, genetics, gonads, fat, environment
- Be aware of dilemmas and elephants
 - be explicit about motivations and rules of the game

33 years of INPESCA is showing the way to go!





PELAGIC FREEZER-
TRAWLER ASSOCIATION

Fishing Industry Science: to improve science and management



mpastoors@pelagicfish.eu