FISHERIES COMMITTEE

09:00 28th September 2022
Venue: Fisheries meeting room

AGENDA

PART 1

1.	**Apologies for absence:**	
2.	**Declarations of interest:**	
3.	**Confirmation of the Minutes of the meeting held on 9th June 2022.**	
4.	**Matters arising from the Minutes of the meeting held on 9th June 2022**	
5.	**Fishery Update**	Paper
6.	**Maritime Update**	Paper
7.	**Illex Licences 2023**	Paper & annexes
8.	**VU options for vessel replacement in the calamari fishery II**	Paper & annex
9.	**Skate survey biomass**	Paper & annex
10.	**Date of next meeting 14th December 2022**	
11.	**Exclusion of the Press and Public**	

The Committee resolved to exclude the press and public on the grounds that the next items of business to be considered were exempt within the terms of paragraph 4 & 9 of Schedule 3 of the Committees (Public Access) Ordinance 2012.

PART 2

12.	**ITQ fees 2023**	Paper

FISHERIES COMMITTEE

OPEN MINUTES

Fisheries Department
Thursday, 9th June 2022
09:00am

These minutes are draft minutes until confirmed by resolution at the next meeting of this committee

Present:	The Honourable Teslyn Barkman– Chairperson	TB
	The Honourable John Birmingham	JB
	Director of Natural Resources – Dr Andrea Clausen	DNR
	Dr Alexander Arkhipkin	AA
	Ms. Sheena Ross	SR
	Mr Tom Blake	TBl
	Mr Michael Poole	MP
	Mrs Janet Robertson	JR
	Mrs Cheryl Roberts	CR
	Capt. Joanna Cox	JC
	Ms Veronica Iriarte	VI
	Dr Daryl Parkyn	DP
	Dr Jorge Ramos-Castillejos	JRC
Minute Taker:	Mrs Beverley Glanville	BG
Public:	**3**	

1	**Apologies for Absence**	ACTION
1.1	Chief Executive- Mr Andy Keeling, Hamish Wylie and Alex Reid	
2	**Declarations of Interest**	
2.1	Industry representatives declared an interest for all items on the agenda.	
3	**Confirmation of the Minutes of the Meeting held on the 10th March 2022.**	
3.2	Item 3.2 MP said mentioned the typo "it says onion where is should say opinion"	**BG**

4	**Matters arising from the Minutes held on the 10th March 2022.**	
4.1	Item 4.6 MP asked if TB had asked about this, TB said that she has but she has nothing in writing and so will ask ExCo for a specific quote from the minutes.	**TB**
4.2	MP asked if the licence fee setting was due to be discussed at the September Fisheries Advisory Committee. DNR hopes to, but does not think that we will have an Economist by September. DNR said that she has advised EXCO that it will be difficult to review the fees, other than in the round, without any detailed expert support. DNR will bring a paper to the next FAC in September and it will be in Part 2.	
4.3	CR asked for it to be written in the minutes that all financial confidential information from the now on, will always be in Part 2 of the agenda, like has been done before.	
4.4	Item 8.5 TB asked if BG had actioned the meeting regarding seabird data. DNR confirmed that she has spoken with AA about this and he is in talks with Al Baylis from SAERI.	**AA**
5	**Fishery Update**	
5.1	DNR gave a brief update on the fishery.	
5.2	DNR thanked MLAs for supporting our requests for an Economist and Cephalopod Scientist in the recent budget session and said that the job descriptions will be completed and recruitment started shortly.	
5.3	DNR noted a typo under Illex Fishery, she stated that the paper will be presented to the FAC in September 2022.	
5.4	TBl asked if they could be provided with a department organogram. JR as they could also have a brief note on all job descriptions. AA to ask out Data Manager to put the organogram on our website and BG to prepare a list of job descriptions for all staff.	**AA/BG**
5.5	MP asked about the MEP report and who has the Economic data and is it publicly available, DNR replied that she has the data and only the Finfish headline data has been supplied to MEP and it won't be made public. A draft of the report will become available, once completed around the end of July, DNR to check this date.	**DNR**
6.	**Compliance Report**	
6.1	SR gave a brief overview of the report.	
6.2	CR said she was told that Compliance issues, when they occurred, would be	

reported to the company concerned at the time they happened. CR would like to know who is collating the data and what is the process and if they are going to be told when an incident arises in real time. SR said that she hopes that the data will be shared and this will become more accessible once we have a new Operation Manager in post. DNR noted that the observers may need a bit of extra training to ensure their practice for reporting compliance is as we planned.

6.3 JR mentioned the Scientific Observers and that she feels they also need training as to what they can and can't say to the captains. JR also feels that the incidents need to be recorded in real time and there have been cases that they didn't know about any issues until they see the observer reports, over 8 weeks later.

6.4 DNR mentioned that our internal database for keeping track of all of the compliance issues. The industry had concerns that they don't know what information is stored on the database. DNR run through the data sources and explained that all of it is seen by industry but not necessarily in the same format. DNR also stated that the compliance records note when mitigating measures are put in place.

6.5 CR asked why the draft MMO reports were not sent to the industry, DNR said there are two reasons for this:

1. The Observer programme is 100% FIG and so the data should naturally come to FIG first.
2. There is nothing about compliance in the MMO reports, this is dealt with separately. DNR added that of course all of the raw data that these reports are built on come to industry twice weekly.

CR asked the DNR is she was aware that MRAG was asking for Companies to sign an agreement between the companies and MRAG, DNR said that she was aware of this and they asked her if she felt this was necessary and she did not feel it was necessary but told them that they could ask the companies, but there was no obligation to sign. CR asked DNR if the MRAG reports could be released sooner, DNR agreed they would try.

7 Maritime Update

7.1 JC gave a brief overview of the paper.

7.2 MP asked JC if Roger Gee will be back, JC said she hoped so, but that he was not on contract to FIMA at this point in time. JC said that with Roger's advice and support they could continue on from what they did last year.

7.3 JC explained how she needed a meeting room for the 29th June meeting. JC to check with BG if Fisheries room is available. **JC**

7.4 MP said other than the couple of minor incidents that happened at the start of the season, industry feedback has been very positive and thanked the Maritime Department and FishOps for all the work they have done on this.

8 February bottom trawl survey biomass of fishery species in Falkland Islands waters, 2010-2022

8.1 JRC gave a presentation on the biomass from the February surveys.

8.2 JR noted that for most on the species there seems to be upward trend and asked why this is. JRC said that more oceanography needs to be done on this.

8.3 JR asked if part of the reason Rockcod has increased is due to it being mistaken by other species. AA said maybe on the vessels by the crew, but not the observers.

8.4 TBl mentioned that if the overall catch has decreased, then it should be in total catch, not by total discard as this effect the biomass. JRC said that you discard the little Rockcod and in doing so, they cannot reach maturity. TBl said it isn't about what has been discarded, it is about what has been caught.

8.5 MP asked how strong is the correlation is between the biomass estimates and the CPUE data. JRC said that he hasn't done correlation analysis between the patterns, but noted that the threads are similar on the graphs. JRC said that as the survey only happens in February, the timings might not be the best for some species.

8.6 MP asked for more information on this and what the implications for each stock and how its translated into management measures and is there anything else the industry can be doing, DNR said the scientific data that is collected to help inform the setting of the allowable catch by species, but different models are used. DNR asked if they wanted more environmental data or more understanding of how we use the data. MP said they would like a mixture of the two, oceanographic information and more high seas/Argentine data. AA said that we do not have any high seas scientific data, only catch data, which is being monitored. TB said they are still asking DEFRA and Fisheries experts for more high seas regulations rules.

9 Finfish Licensing advice-2023

9.1 AA gave a brief overview of the stock assessment scientists paper on finfish licensing advice.

9.2 CR asked if individual vessel units for Finfish vessels are being worked on, DNR said that it will be allocated per company and will come back in the FAC in September as the final agreed vessel unit allocation for 2023.

9.3 TBl asked about the VU rating and vessel categories, DNR said this was done on an average but when divided up it will reflect the actual vessels. TBl asked about the increase in G and decrease in W effort and the only difference is G also targets Illex, why are they being changed. DNR said it is to do with timing of the seasons. DNR said that we have to catch what is in the zone, when it is there. AA added that the biomass is taken from the

	ground fish surveys, but for some categories we are using catch data. TBl added that Hoki is one of the species that is influenced by the catches, DNR confirmed this is the case. AA added that according to this formula if they stay in the north and catch Hake as a bycatch, next year the bycatch will decrease your allocation further. DNR added that it would be great if the G & W licence holders, caught the fish that they are entitled to catch to stop this from happening. TBl said that he hadn't thought about it like this. CR asked we could restrict some of the grid squares to stop this from happening, AA said then they just fish the borders. DNR suggested a separate meeting to go through this with Andreas once he is back, BG to organise.	**BG**
10.	**VU options for vessel replacement in the Calamari fishery**	
10.1	SR gave a brief overview of the paper that was prepared by Andreas.	
10.2	CR explained that that had a 3rd option which was to stay in the Status quo and if a new vessel comes into the fleet whether it be temporary or permanent the vessel units are worked out and it will have the lesser amount of days. CR said that if the biomass was to increase, we wouldn't want to penalise 1 vessel because it can in at X point and can never be changed. AA said if the biomass increases then the proportions increase equally through fleet.	
10.3	TBl said the operators are happy with the system we have now, DNR added that they it might have unforeseen issues further down the line as we get new vessels. CR said a quarter of the fleet has already been replaced and the biomass has increased, DNR said that is about relativity. CR asked why we would change it if the current system works well and it has been agreed, SR said that we wanted to give the industry and option to change it.	
10.4	MP added that the industry as happy to take the risks of the impact and said that it encourages others to invest. DNR asked SR and Andreas to do some examples to show how it is going to work, all agreed.	**SR**
11	**Preliminary results for MMO program in Loligo fleet (2022-C)**	
11.1	VI gave a presentation on the first season 2022 MMO program.	
11.2	No questions were asked, VI was thanked for her presentation.	
12	**Skate Abundance Survey and Mesh Trial ZDLV 2021-10**	
12.1	DP gave a presentation on the results from the Skate Abundance Survey and Mesh Trial on Petrel in October 2021	
12.2	MP appreciated that the data is conclusive that there is not a commercial fishery there at the moment and asked when we would look at this again. DP said that it could because the by-catch of some of the skate is so high, it	

	could be suppressing the recovery of those skate species and it should be monitored on regular basis.
12.3	TBl asked if the by-catch in the Finfish fishery is preventing the recovery of the skate, DP said it could be. TBl asked some main species were endangered, so does that indicate and increase in abundance to the endangered ones, DP said it could be that or it could be when ICUN made the assessments for those species, they may not have not have included all of the information on those species and the maybe regionally abundant and it isn't reflected in their analysis.
13	The date of the next meeting is 7th September 2022 at 09:00
	Post meeting note: Item 4.1 TB has confirmed that "One ExCo member responded to the request of an explanation from the Chair outlining that the financial position and market value of fisheries does relate to the license process, they are commercial fisheries. However, they felt that the information was not complete and more should be requested this year"
	No Part 2.

Minutes confirmed this day of September 2022

Chairman **Secretary**

Fisheries Committee Paper

Part: I

Title: Fishery Update

Agenda Item: 5

Date: 28th September 2022

Report of: Director of Natural Resources

Paper for information only

Brief update on fishery issues:

- Catches:
  - The total catch of *Loligo* attained ~94,000 t (as of 15 Sept 2022), which is the second highest on record (after >95,000 t in 2021) in the last decade. All going well, this year's total catch of *Loligo* could exceed the last year's record catch by the end of the season (30th September).
  - Ca. 11,100 t of hakes were caught in August 2022, making it a record catch for this fish for any month since the beginning of commercial fishery in the Falklands in 1989. Current cumulative catch of hakes (49,500 t as of 15 September) is also one of the highest catches of this fish in the fishing history of the Falkland Islands.

- Cruises/Research:
  - Loligo pre-recruitment survey July 2022.
  - Hake abundance survey July 2022.
  - SBW Survey planned for end of September.
  - Census of Black-browed Albatross on Beauchene Island (subject to FIG permit) planned for end of October. Support from SAERI & FPV using drone.

- Staff:
  - Recruitment for Fisheries Biologist (Finfish) and Data Analyst was successful with the staff of the Scientific Section promoted for both jobs (Dr Brendon Lee and Rebecca Piontek, respectively).
  - Post for Toothfish Scientist has been advertised locally, with interviews scheduled next months due to candidate's availability (both are at sea at the moment).

- The Operations Manager post has been successfully recruited, Alex Blake took up his new role on 1st August.
- Vasana Tutjavi has been offered a Fisheries role in Scotland and will be leaving the department at the end of October. We recently advertised locally and hope to have positive news on a new FO for the next meeting.
- Matt Jenkins has taken over the role of LO
- Dale Evans has joined the department for a 1-year internship
- Cephalopod scientist and Economist will be recruited Q4 2022/Q1 2023

- ITQ Renewal

  - All applications were received by 30th June and have been reviewed. Applicants were advised of the outcome on the 24th August and where companies had submitted draft commercial agreements, the 21-day period to submit final signed copies was triggered.
  - The deadline for receipt of final signed paperwork was 15th September. All applicants have now submitted their final documentation.
  - A special supplement of the Gazette will be published on the 22nd September providing notices of FIG's intent to Grant ITQB.
  - The Notice to Grant will be open for disputes to be filed for 14 days.
  - The grant of ITQB to successful applicants should take place shortly after this period ends, if there have been no disputes.
  - ITQB is still expected to be operational from 1st January 2023.
  - Any draft charter parties to the harvesting of CE under ITQB will need to be approved by the Director prior to licenses being issued for the 2023 fishing seasons.

- Illex Fishery
  A successful trip to Korea and Taiwan took place August/Sept 2022. Huge thanks to all those involved in the planning. DoNR will arrange a debrief with industry members in the near future. Feedback from industry has been considered in finalising the approach to the Illex licensing policy for 2023 onwards (see paper on agenda). New direct contact with Fisheries and Maritime depts have been established and will be further developed over the coming months/years.

- Control and Enforcement

  - A new contract has been signed with ESS which will expire on 30th June 2023. This allows for 24 catch verifications if required.

- Licence conditions can only be changed by agreement with the Director and a written exemption from the Operations Manager. Ad hoc arrangements with individual staff members of the department should be ratified accordingly.

Fisheries Committee Paper

Part: I

Title: Maritime Update

Agenda Item: 6

Date: 28th September 2022

Report of: Harbour Master

Paper for information only

- Maritime Authority:
  - Staff
    Recruitment for all roles in now complete and all staff are now in post
  - Vessel inspections
    A quieter time of the year for vessel inspections, but flag state and PSC inspections are still been undertaken
  - Flag state engagement.
    I recently joined the DNR for a very successful visit to Korea and Taiwan. My role was to ensure that classification societies, owners and operators were aware of Falklands regulations and requirements for the forthcoming season. It was reassuring that so much work has already been undertaken by vessel owners to ensure compliance, and there is now support from the flag states and classification societies to ensure that vessels are correctly inspected and certified prior to next season. I have also had positive engagement from Vanuatu, who are also taking steps to ensure vessels are compliant.
  - Accident and Incident reporting.
    A presentation was given to FI vessel operators and agents highlighting accident and incident reporting requirements and trends. This highlighted that whilst accident rates had fallen significantly among the jigger fleet, there were higher levels of incidents on the trawlers, with many similar incidents recurring. Further analysis will be completed and fed back to industry on the conclusion of the second trawler season
  - IMO Audit
    The Falklands IMO proxy Audit and CAT 2 monitoring visit is confirmed for the end of March 2023
  - GMDSS DSC provision
    The A1 GMDSS installation is now in progress. There will be no changes needed to operators procedures, but there should be a noticeable improvement of transmission range from Stanley Port Control.

ILLEX APPLICATIONS
FEEDBACK FOR

LOCAL APPLICANT COMPANY

Vessel name	Accidents/Incidents	Welfare	Safety Standards & Systems

- 2023

M

Business arrangements & wider economic contribution	**TOTAL score**	Data Sources	Licence Offer
	0		
	0		
	0		
	0		
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Fisheries Department - Illex Application Assessment Sheet - 2023 ANNEX B

Vessel name:	
Vessel Owner/Operator:	
Applicant Fishing Company:	

Weighting	Definition	Scored
	1 - Incident/Accident	5
20%	0 1 2 3 4 5	20.00%
	2. Welfare	5
25%	0 1 2 3 4 5	25.00%
	3. Safety Standards & Systems	5
30%	0 1 2 3 4 5	30.00%
	4 - Business arrangments and wider economic contribution	5
25%	0 1 2 3 4 5	25.00%
100%		100.00%

1 - Accidents/Incidents	Source: Maritime incident database & other relevant informatior
Assessment of the nature of the accident or incident, the actions that were taken by the vessel owners, master and FI partner; including lessons learnt and changes that were implemented if required).	
5 = no incidents; low risk incident that was dealt with robustly	
0 = fatalities; poory handled incidents; no compensatory action taker	
2 - Welfare	Source: Maritime incident database; FIFD Compliance database, application information, FI partner interview & other relevant information
Assessment of how vessel owners, fishing masters and FI partners respond to any welfare issues, as well as their general approach to crew welfare. Assessment of approach taken to crew illness or death related to illness such as time taken to act, what action wass taken etc. In instances where crew have requested to leave a vessel, the approach taken by the fishing master, vessel owner and FI partner will also be assessed. Assessment of the standard of communications that crew have access to.	
5 = no recorded incidents	
0 = FIG prosecutions or Coroners Court recommendations as a result of poor or limited vessel master intervention	
3 - Safety Standards & Systems	Source: application form, local partner application interview & other relevent information
These should reflect the current status of safety standards on vessels applying to fish in 2023. Trend in improvements to operational and physical safety standards and training (HSE materials and trianing programs, on board equipment) over the past 5 years will be assessed. There is no requirement for a full paper pack for each vessel but any improvements/changes from 2022 should be included in a covering declaration. Where the application is for a 3 year licence the application should include either an 'International Fishing Vessel Certificate' (issued in accordance with the Torremolines Protocol) or a 'Certificate/Statement of Compliance' from either the flag state or a recognised class society with any exemptions noted and evidence that mitigations are approved, and an approved stability book.	
5 = HSE materials and training programs; on-board equipment; evidence of an established safety culture on board vessels (for example deomonstrable use of "Safety Folder" or similar system; HSE policy & operating procedure documents; evidence of safety musters with crew); evidence of external surveyor support and implementation of recommnedations from surveys	
0 = no or limited evidence of safety culture on board vessels; no engagement with safety training or surveyors.	
4 - Business arrangements and wider economic contribution	Source: application form, local partner application interview & other relevent information
Business proposals will be assessed against the return to the local partner; investments made (in business relationships; safety equipment/training etc); the use of local suppliers; innovative approaches; demonstrable plan for long term growth. The scoring for this point will include an assessment of performance in 2022 against commitments made in the application. Where the application is for a 3 year licence a business plan should be provided with clear objectives and outcomes over that period. The communication path between vessel owners/operators and FI partners will also be assessed.	
5 = robust business proposal, improving on previous applications and/or demonstrating an innovative approach; evidence of relevant investment; clear commitment to use local suppliers; clear commitment to long term business growth and development.	
0 = weak proposal, no vision, poor business & economic return to F	

LICENCE APPLICATION
JIGGER – 2023 Season
Fishing Licence type B

Falkland Islands Fishing Company (Applicant) _____
Address _____
E-Mail Address _____

Please tick this box if you are applying for a 3 year licence and to indicate that you are providing either an 'International Fishing Vessel Certificate' (issued in accordance with the Torremolinos Protocol) or a 'Certificate/Statement of Compliance' from either the flag state or a recognised class society. ☐

VESSEL DETAILS:

Name of Vessel		Port of Registry	
Nationality		Year of Registration	
Name of Master		Number of crew	
Radio call sign		Registered Fishing number	
Previous vessel name and date of change		Previous call sign and date of change	
MMSI number		IMO number	
Gross tonnage		Net tonnage	
Is the gross tonnage in accordance with an international Gross Tonnage Certificate?			Y/N
Length overall (m)		Max beam (m)	
Summer draft (m)			
Main engine capacity (kW)		Aux engine (kW)	
Generator capacity (kW)		Bunker capacity (MT)	
Freezer hold capacity (CU m)		Number of holds	
		Hold capacity (CU m)	

A vessels General Arrangement and Fire and Safety plans should be included in your application. Please indicate if the vessel plans are attached Yes ☐ No ☐

<u>If you have ticked NO what are the reasons for this?</u>

FISH PROCESSING DETAILS:

Vertical plate freezers, number		capacity (MT/day)	
Horizontal plate freezers, number		capacity (MT/day)	
Other freezers (please specify)	Type		
	Number		
	Capacity (MT/day)		
Total daily freezing capacity (MT/day)			

INCINERATOR:

Yes ☐ **No** ☐

If your vessel does **not** have an on-board incinerator, please detail below how you intend to undertake your waste management.

JIGGING GEAR:

Number of single jigging machines			
Number of double jigging machines			
Maximum number of jigging lines operated			
Above surface attractor lights – number		total wattage (kW)	
Below surface attractor lights – number		total wattage (kW)	

COMMUNICATIONS AND NAVIGATION EQUIPMENT:

VHF DSC Radio (Manufacturer)		MF/HF Radio (Manufacturer)	
INMARSAT (Y/N)		If Yes, contact number	
Facsimile (Fax – Y/N)		if Yes, contact number	
Number of radars		Contact email address	

Do all crew have regular access to the internet on board? **Yes** ☐ **No** ☐

If NO is ticked what are the reasons for this and what other measures are in place to allow communication?

LIFE-SAVING APPLIANCES (LSA):

Survival Craft (Capacity) *100% Each Side*		Rescue Boat (Capacity)	
Lifejackets (quantity) *100% of crew*		Immersion Suits (quantity) *100% of crew*	
Thermal Protective Aids (quantity)		Lifebuoys (quantity) *>75m = 8 <75m = 6*	
Line-throwing Appliances (quantity) *4 Required*		Pyrotechnics (quantity) *12 Rockets required*	
VHF Radios (LSA) (quantity) *3 Required*		Radar Transponders (SART) *2 Required*	

FISHING VESSEL OWNERS/COMPANY:
Name:
Nationality:
Address:
Email address:

ASSOCIATION (IF APPLICABLE):
Name:
Nationality:
Address:
Email address:

SHIPPING AGENT:
Name:

Fisheries Committee Paper

Part: I

Title: Illex license policy 2023

Agenda Item: 7

Date: 28 September 2022

Report of: Director of Natural Resources

Paper for information only

1. **Background**
   In 2021 DNR introduced a new approach to the administration of Illex fishing licenses, these changes were driven by a statutory requirement to meet national and international safety standards and many of the changes were made to incentivise good practice; build stronger relationships/control in Falklands partners and grow the economic footprint of the local participants. Whilst there is a long-term desire and an approval in principle to move the Illex fishery into the ITQ system, it was considered that improving our approach to general licensing was an appropriate first step.

   A number of changes were made including:

   - The introduction of an objective points-based assessment for applications, that the results of which determined how licenses were allocated. Areas assessed included:
     - Historic incident data
     - Vessel operator track record (safety/incidents)
     - Age of vessel
     - Ability to pay the license fee
     - Local partner track record
     - Safety standards
     - Business proposal and wider economic impacts
   - The application form was amended to include additional safety equipment checks.
   - The season was changed to 1st Feb to 31st May in 2021 and 1st February to 15th June 2022.
   - The discounts policy was amended such that:
     - Part season discounts were discontinued
     - Early payment discounts were amended to:

- 6% discount of license paid in full prior to the opening of the season
- 4% discount of license is paid in full by 31st May (new end of season)
- No discount for any Letter of Credit that is activated post 31st May

- Loyalty should sit with the vessel owner/operator and NOT the vessel from 2021 onwards. This way if a vessel needs replacing the owner will not be penalised, and we will be promoting the replacement of old tonnage with new. *Note: Internal Audit found an inconsistency in our definition and subsequent application that will be amended for 2022.*

2. Overview of 2021 and 2022 application process, license awards and season

In general, the new approach to license application assessment and subsequent allocation has gone well. A number of modifications to the scoring matrix and weighting were made for the 2022 assessments in order to reflect the industry response to FIGs new policy direction. As an example, in 2021 vessels/operators that had experienced a significant maritime incident/accident in the previous 5 years were scored poorly. In 2022 the system focussed on how a vessel operator/master responded to any accident/incident… was the incident reported in a timely manner to the correct authorities? Was there a thorough investigation; were lessons learnt and mitigations implemented?

In 2021 128 jigger and 1 trawler applications were received, 7 of which were duplicates (there was no existing policy to prevent duplicate applications and the law is silent on the subject).

In 2022 121 applications were received and 9 of these were duplicates. We charged a fee of £1,000 for each application as a possible deterrent to multiple applications. For 2023 onwards, we have indicated that multiple applications will not be acceptable and the application fee has been dropped.

Applicants were assessed in both years using the application form, any written or electronic supplemental information; historic data on file in Fisheries and Maritime and through local partner interviews.

The allocation of licenses was controlled by FIFD and when any vessel/operator was unable to take up their license, the next vessel/operator on the FIFD assessment list was offered the available license.

105 jigger and 1 trawler license were issued.

There are a number of significant points to note from 2021 and 2022:

- 103 of the 105 jiggers that were licensed, arrived with fast rescue craft installed and during license inspection it was evident that the crew had received appropriate training to deploy the rescue craft when needed (in 2021).

- Most of the vessels had implemented Safety Management Systems (some had been in place for a number of years, but the proportion grew significantly in 2021). These were significantly embedded with associated training programmes for vessel crews and on-shore support teams.
- Whilst the number of compliance issues recorded in 2021 rose from 20 in 2020 to 40 in 2021, the issues found were rectified largely at the time of the inspections, and where they weren't, they were rectified via the agent soon after. It is considered that the more robust approach to safety checks in 2021 may have contributed to the increase in findings compared to previous years. In 2022 there were NO operational accidents or incidents (that involved harm to humans) reported throughout the entire Illex fleet (the first time ever). 55 compliance issues were reported, and as for 2021 these were rectified in short order at the time of identification. In collaboration with Maritime colleagues FIFD have instructed for 2022 that all LSA must remain in their normal in situ locations for Fisheries inspections (the poor practice of collecting them together for inspection has ceased).
- There was a greater up-front commitment to use locally sourced goods and services (transhipment although this was ultimately determined by catches); there was a significant improvement to planning for transhipments in 2022 when compared to 2021.
- There were some new approaches to business relationships and delivery, these were embedded further during 2022.
- There were 2 incidents during 2022 that did not cause harm to human life, these were both investigated, and in one case a vessel master was prosecuted.
- There were 2 welfare issues reported to FIG by third parties during 2022. These took place outside of maritime and RFIP jurisdiction and so were investigated by FIFD under the Fishing License Conditions. The investigations were then passed on to the flag state for further action. Local operators also carried out their own investigations and have implemented remedial actions.
- As a result of the unfortunate deaths in 2021, FIFD with the support of the medical service, implemented an Early Warning Scoring System which monitors crew health and wellbeing. A wellbeing report has also been included as part of the daily catch reporting system to FIFD. This new system has been embedded by local companies on their vessels and during 2022 we saw clear evidence of the system working, with early intervention where crew members were unwell and the EWSS was able to help vessel masters take the correct course of action.

3. 2023 onwards

A number of early discussions on Illex licensing policy for 2023 onwards have taken place with industry over the past few months. In addition, a visit by DoNR and FIMA's Harbour Master to Korea and Taiwan in August/September has enabled FIG to clarify a number of areas both with government officials and with vessel owners and FI partners.

Feedback has been received by individual companies and has been considered as part of this paper.

Below is the proposed approach for 2023:

a. License period
   As indicated when the policy for 2022 was approved, FIG would like to offer the opportunity of 3-year licenses in the Illex fishery. Following a 2-year period of developing/strengthening business arrangements, implementing operational safety systems and carrying out significant training programmes, as a precursor to bringing Illex into ITQ, FIG would like to offer compliant fishing companies and their vessels some security by introducing this new system.
b. Number of Licenses & Applications
   Number of licences – the background regarding the number of licenses issued is that numbers were reduced from 125 to 105 following a series of poor catches. This was largely determined by numbers of applications rather than any clear FIG policy. However, following this drop in applications FIG policy was set at 105 plus 1 trawler.
   Industry have asked for this to be reconsidered both in 2021 and 2022. However, as FIFD do not have access to robust stock assessment data for the Illex stocks and can only rely on real time data as a season unfolds, it is considered irresponsible to increase fishing effort. DNR notes that the figure of 106 is also difficult to defend, however, in the absence of better data a precautionary approach will be followed.

   DNR has recently received some useful economic data from both the Korean and Taiwanese fishing company owners, this could be used to influence the number of licenses awarded, however, the data needs further scrutiny before being considered further.

   Multiple applications -
   Following the policy decision by ExCo for 2022, multiple applications will be disallowed from 2023 onwards.

c. Points based scoring system: assessment & feedback
   i. **Age of Vessel**: Information from FIMA following Port State inspections (along with FIFD license inspection data) reveals that whilst the age of the vessel may have been a significant concern in the absence of robust safety systems, the development and implementation of operational safety systems and as well as modification/rectification of some critical risk areas, that have been addressed over the past 2 years, means that the use of the age of the vessel as measure is no longer relevant.
      Therefore, it is proposed that this assessment point is removed.

   ii. **Accidents/Incidents**: This will assess how vessel owners, fishing masters and FI partners respond to incidents/accidents,

in particular the nature of the incident, the actions that were taken, including lessons learned and changes implemented if required.

iii. **Vessel Operators Track Record**: specifically looking at patterns of incidents or welfare issues that follow a given operator over past 5 years.
Because this will be assessed above in (ii) and below in (iv), it is recommended that this point is removed.

iv. **Vessel Masters Track Record**: this is related to crew welfare specifically, for example in cases of illness or death related to illness – time taken to act, what action is taken etc..; also picking up on issues if they happen with crew requesting to leave a vessel; standard of communications that crew have access to
It is recommended that this point is removed and replaced with the below "Welfare".

Welfare: This will assess how vessel owners, fishing masters and FI partners respond to any specific welfare issues, as well as their general approach to crew welfare.

v. **Local partner record**: Trend in quality of application (over past 5 years) - both from an economic perspective (improving business arrangements over time; growth in use of local suppliers) and safety standards & crew welfare (HSE materials and training programs; on-board equipment). Clear communication path to vessel owners and overseas partners - not just through third parties.
It is recommended that this point is removed and that "Safety Standards & Systems" and "Business arrangements & wider economic contribution" pick up these areas.

vi. **Safety Standards & Systems**: These should reflect the current status of safety standards and training on vessels applying to fish in 2023. There is no requirement for a full paper pack for each vessel, but any improvements/changes should be included in a covering declaration.

Where the application is for a 3-year license the application should include either an "International Fishing Vessel Certificate" (issued in accordance with the Torremolinos Protocol) or a "Certificate/Statement of Compliance" from either the flag state or a class society, with any exemptions noted and evidenced that mitigations are approved and an approved stability book.

vii. **Business arrangements & wider economic contribution**: Business proposals will be assessed against the return to the

local partner; investments made (in business relationships; safety equipment/training etc); the use of local suppliers; innovative approaches; demonstrable plan for long term growth (The scoring for this point will include an assessment of performance in 2022 against commitments made in the application).

Where the application is for a 3-year license a 3-year business plan should be provided with clear objectives and outcomes.

Vessels/owners which are entirely new to the fishery will be considered based on whatever information is available in relation to the vessel and its owner/operator. Lack of information within FIG databases e.g. in relation to incidents, will not automatically lead to "full marks" for new vessels. Where insufficient information is provided, to satisfy the Director, applications may be refused. This is to ensure that vessels with a track history of fishing in Falklands waters are not unduly disadvantaged against "new" entrants.

In assessing applications, the Director will consider all information provided by the applicant, information in relevant FIG databases, information from applicant interviews, and any other relevant information, and will follow the principles and objectives established in the Ordinance.

In terms of feedback to applicants following the assessment process:

- Following the consideration of licence applications, local partners will receive the following:
    - Offers for vessels that are ranked 105 or above
    - The rank of each of the vessels in the overall list of applications received
    - A breakdown by criteria (including the individual score assigned for each) and the total score.
    - Reference to the information considered in reaching the decision

d. Season time & duration
Proposed dates at 1st February to 15th June 2023 (FIFD will be available to carry out licence inspections from 1st January 2023)

e. Fees & Discounts

Application Fees
These are being removed for 2023 applications.

License Fees
The current policy for the setting of license fees is that the fee should be set at circa 10% of the total value of the catch. This policy has been consistent for over 30 years, and the only movement away from this policy is found in the introduction of discounts. It was agreed by ExCo

in paper 137/19 to work towards bringing Illex under the ITQ system. Market and sales price information has been collated from industry and will be provided to MLAs for consideration for the setting of fees for 2023.
A more evidence-based set of recommendations will be developed for 2024 following the analysis of economic data that has been received. It should be noted that the implementation of long-term licenses is expected to grow the overall tax return to FIG.

Discounts
Early payment discount & Letters of Credit.
It is proposed that the early payment discount is discontinued. All licenses are to be paid for in full by 13th January 2023. Letters of Credit will be allowed in extremis, subject to approval by the Director.

Loyalty discount.
It is proposed that discounts for loyalty will apply to vessel operators as they did in 2021 and 2022 but will be varied according to license duration in order to incentivise vessel owners with meeting the criteria for a 3-year license:

1-year license – 0.5% per year to a maximum of 5%

3-year license – 1% per year to a maximum of 10%

Refund policy
It is proposed that the current refund policy will continue to apply to all licenses.

The Fishing License and Transhipment Fee 2023 paper is expected to go to Exco in October. Could any feedback from industry please be submitted to DoNR no later than 7th October 2022.

Fisheries Committee Paper

Title: VU options for vessel replacement in the calamari fishery-Part 2

Agenda Item: X

Date: 28th September 2022

Report of: Sr. Stock Assessment Scientist, Fisheries Manager

1. Introduction:

The attached document describes an example of different options for replacement vessel VUs in the calamari fishery (C- and X- licence).

2. Recommendation:

This document is for discussion.

3. Background:

3.1. Replacement vessels in the calamari fishery are allocated fishing days in proportion to the ratio between the replacement vessel's GT category VU and the retiring vessel's GT category VU. A paper presented at the June 2022 Fisheries Committee meeting presented the options that the VU ratio could either be 1) updated annually, as VUs for the entire fleet are updated, or 2) calculated once in the year the replacement was made, and thereafter left as a fixed value. A request was made for the outcomes of different options to be shown as an example calculation.

3.2. An example is given of a Category 5 vessel that replaced a Category 3 vessel over a period of multiple years and thereby required reduction in its allocated fishing season days. The VU ratio between Categories 3 and 5 varied from year to year.

3.3. Re-evaluating the fishing days reduction annually resulted in average reduction of 12.6 fishing days per season, vs. 13.7 days per season if the reduction was fixed on the first year. Fixing the reduction on the second year resulted in an average reduction of 13.1 days per season.

4. Conclusions:

4.1. The effectiveness of a replacement vessel can depend on a number of factors, but given the stability of the calamari fleet different options for replacement vessel VUs are not likely to have large differences. Fixing the replacement VU ratio from the second year rather than first year may be useful to mitigate effects of a ship being new in the fishery.

VU options for permanent vessel replacement in the Falkland Islands calamari (*Doryteuthis gahi*) fishery. II. Example calculation.

A. Winter, S. Ross

Introduction

A previous paper (Winter and Ross 2022) had presented options for adjusting Vessel Units (VU) for vessels entered in the calamari (*Doryteuthis gahi*) fishery as permanent replacements of vessels that had been in a different GT category. The principle of VU adjustment is that the replacing vessel obtains fewer / more fishing days in proportion to the VU ratio between the GT categories of the two vessels, and the two main options are to re-calculate this VU ratio every year, or to fix the VU ratio for future years (Winter and Ross 2022). A request was subsequently presented for an example calculation that would demonstrate the outcome of different options.

A scenario serves as example occurred in 2012, when a Category 3 vessel (maximum 999 GT) was replaced by a Category 5 vessel (maximum 1999 GT). After re-adjusting VUs of the replacing Category 5 vessel annually for several years, its fishing days were fixed at 83% of the season maximum (FIFD 2020), before this vessel itself was replaced (FIFD 2021).

Options

The VU ratio between Category 3 and Category 5 showed a curving trend over the period from 2011 (before this vessel replacement) through 2017 (when Category 3 exited the calamari fishery) (Figure 1, Table 1). The trend was, however, not statistically significant over this range of years.

If the reduction in fishing days for the replacing vessel had been re-calculated each year, based directly on the 3/5 ratio, then over the 6-year period 2012 to 2017 the reduction would have averaged 12.6 days per season. In contrast, if the reduction in fishing days had been fixed on the 3/5 ratio calculated in 2012, the first year of the replacement, then it would have remained at 13.7 days per season:

64 days – 64 days × (1.32 VU/1.68 VU) = 13.7 days

Alternatively, it may be inferred that a new vessel requires a year to habituate itself to the calamari fishery. If, in this case, the reduction in fishing days had been fixed on the 3/5 ratio calculated in 2013, the second year after the replacement, it would after 6 years have averaged 13.1 days per season, thus half-way between the other two options.

Discussion

A particular circumstance of the Category 3/5 vessel replacement examined here is that Category 3 in the calamari fishery had, at that point, been reduced to just a single other vessel, so that annual adjustment may have been disproportionately variable. The effectiveness of a replacement vessel can further depend on whether the vessel is new-built for the fishery; if not whether that vessel had previously ever operated in the calamari fishery, or whether it is only the vessel itself, or the master / crew along with the vessel, who are transferring.

Notwithstanding various possibilities, the calamari fleet has generally been quite stable from year to year, with an average replacement rate of about 11.5% per year. It may therefore be advisable to fix the fishing days allocation for a replacement vessel, but wait until that vessel's second year in the fishery before doing so.

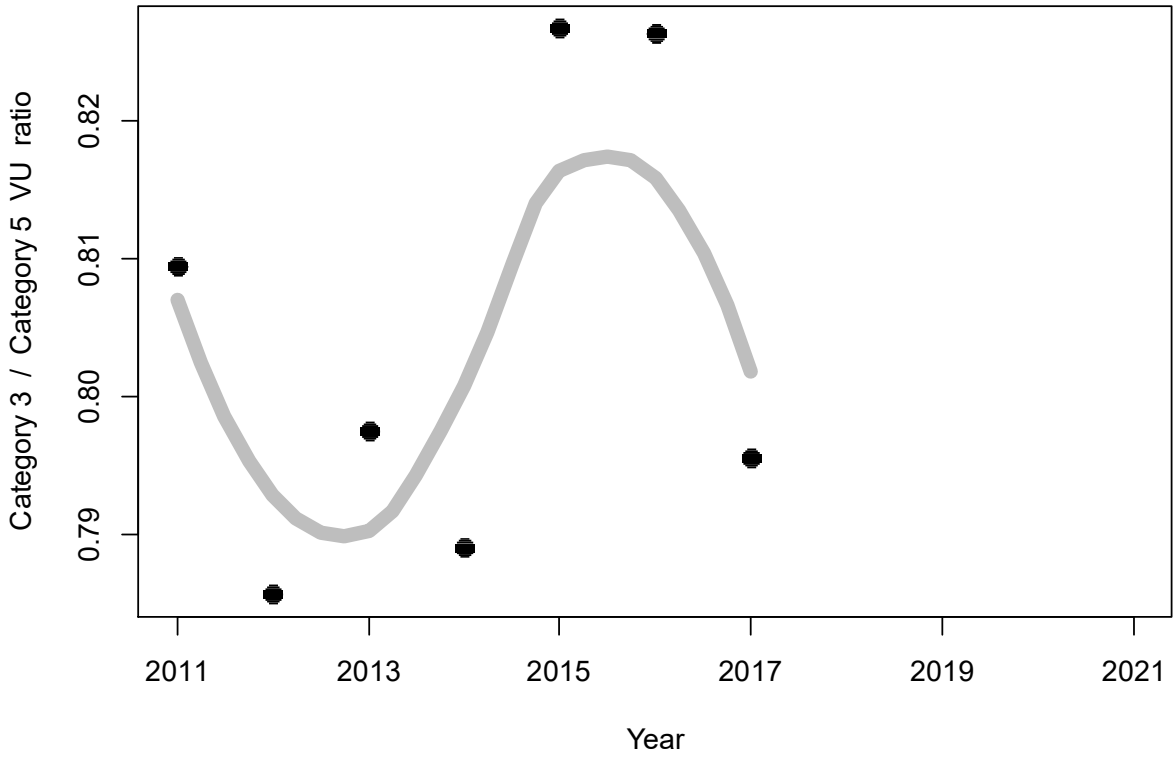


Figure 1. Category 3 / Category 5 VU ratios by year. Grey line: LOESS smooth through the time series.

Table 1. Category 3 and 5 Vessel Units, ratios, and hypothetical adjustment reductions from a maximum of 64 season fishing days* under different adjustment scenarios.

Year	Vessel Units			Reduction in days (from 64)		
	Category 3	Category 5	3/5 ratio	Re-evaluated annually	Fixed from 2012	Fixed from 2013
2011	1.36	1.68	0.810			
2012	1.32	1.68	0.786	13.7	13.7	13.7
2013	1.34	1.68	0.798	13.0	13.7	13.0
2014	1.325	1.679	0.789	13.5	13.7	13.0
2015	1.383	1.673	0.827	11.1	13.7	13.0
2016	1.366	1.653	0.826	11.1	13.7	13.0
2017	1.289	1.62	0.796	13.1	13.7	13.0
2018		1.71				
2019		1.65				
2020		1.67				
2021		1.73				
Average				12.6	13.7	13.1

* Corresponding to the current C-licence fishing season duration in a non-leap year.

References

FIFD. 2020. Vessel Units, Allowable Effort, and Allowable Catch 2021. Summary and recommendations. Fisheries Dept., Directorate of Natural Resources, Falkland Islands Government, 20 p.

FIFD. 2021. Vessel Units, Allowable Effort, and Allowable Catch 2022. Summary and recommendations. Fisheries Dept., Directorate of Natural Resources, Falkland Islands Government, 19 p.

Winter, A., Ross, S. 2022. VU options for permanent vessel replacement in the Falkland Islands calamari (*Doryteuthis gahi*) fishery. Fisheries Advisory Committee paper, June 2022, 3 p.

Fisheries Committee Paper

Title: Survey estimation of skate biomass.

Agenda Item: 9

Date: 28th September 2022

Report of: Sr. Stock Assessment Scientist

1. Introduction:

The attached document describes the changes in estimated biomass of skates from four surveys conducted in 2013, 2018, 2019 and 2021, and advises a restricted resumption of commercial skate target fishing, with an initial quota of 500 tonnes.

2. Recommendation:

This document is for information and discussion.

3. Summary:

3.1. The Falkland Islands licence a commercial fishery targeting skates (Rajiformes). Effort in this fishery has been sparse in the past few years and particularly since a 400 mm trawl mesh regulation was introduced to mitigate bycatch of juvenile or undersized skates, and non-target species.

3.2. A trawl survey was conducted in October 2021 to evaluate the abundance of skates in Falkland Islands waters and the practicality of resuming commercial skate fishing. Data from the 2021 survey are combined with three previous surveys in 2013, 2018, and 2019 to examine changes in skate abundance. The 2013 and 2019 surveys were undertaken with 90 mm mesh and had their catches computationally adjusted to provide biomass estimates equivalent to 400 mm mesh, as used in the 2018 and 2021 surveys.

3.2. Analysis of the survey catches found that the overall abundance of commercial skates decreased between 45% to 70% from 2013 to 2021. Outcomes varied among skate species, but only one species showed an abundance increase from 2013 to 2021. On average, abundance decreases were not lower south of 51° S, where skate target fishing has been prohibited since 1996, than north of 51° S, where skate target fishing has continued to be open.

4. Conclusions:

4.1. The results suggest that the target skate fishing exclusion south of 51° S has not been effective in maintaining skate abundance over the time period when other trawl fisheries continued to be allocated in the same area. Skate catches in Falkland Islands waters are largely taken as bycatch.

4.2. With an estimated decrease of up to 70% in skate abundance, skate fishing is advised to be restricted to 30% of the most recently calculated maximum sustainable yield (MSY), which was 6403 tonnes. Of the 6403 × 30% = 1921 tonnes thus available, an initial precautionary quota of 500 tonnes may be allocated to the skate target (F licence) fishery.

4.3. Skate target fishing should continue to receive close monitoring with regards to the efficacy of the 400 mm mesh regulation at reducing bycatch.

Survey estimation of skate biomass

A. Winter

Summary

Data from four surveys indicate that the abundance of commercial skates in Falkland Islands waters decreased between 45% and 70% from 2013 to 2021. On average, the decrease was not lower south of 51° S, where skate target fishing has been prohibited since 1996, than north of 51° S, where skate target fishing has continued to be open.

Given the low rate of skate target fishing effort taken in recent years, results indicate that a restricted fishery for skates can continue to be allocated in the north, with regulatory 400 mm trawl mesh, at a quota of 500 tonnes.

Introduction

The Falklands Islands fishing zone comprises a high biomass and diversity of skate species (Rajiformes) (Agnew et al. 1999, Agnew et al. 2000, Arkhipkin et al. 2012, Winter et al. 2015), and has provided one of the globally few targeted commercial fisheries for skates (Wakeford et al. 2005, Winter 2015). As a conservation measure, directed fishing on skates in Falkland Islands waters was closed south of 51° S in 1996 (Agnew et al., 1999). Then, a regulatory minimum of 400 mm trawl mesh for skate target fishing was implemented in 2021 to reduce bycatch of undersized individuals and non-target species (Arkhipkin et al. 2022). Directed fishing for skates continues to be open north of 51° S, but has had little operation in the past few years (FIG 2022). With the lack of input, a commercial catch/effort -based stock assessment of skates has not been calculated since 2018 (Winter 2018). Skate bycatches are still taken annually under finfish licence, but these bycatches cannot be reliably indexed to skate abundance given the shifting bases of the finfish licence primary targets.

Monitoring of skate stock biomass has therefore been conducted primarily through periodic trawl surveys of the known skate habitat areas. With recent indications of renewed interest by skate licence quota holders, the purpose of this report is to summarize skate stock survey estimates by species, and examine biomass trends over time. Biomass trends are compared between south of the Falkland Islands fishing zone (where targeted skate fishing has been closed since 1996) and north of the Falkland Islands fishing zone (where targeted skate fishing has remained open).

Methods

Four surveys are included in this report; conducted in October / November of 2013, 2018, 2019, and 2021 (Table 1). The 2013 and 2021 surveys trawled both north and south; the 2018 and 2019 surveys north only. The 2013 and 2019 surveys were Fisheries Department research cruises and used standard 90 mm trawl net mesh for its high capture retention. The 2018 survey was a trawl mesh trial comparing 110, 300, and 400 mm meshes. The 2021 survey was an industry-sponsored exploratory trip to examine the current cost-effectiveness of skate fishing, and used regulatory 400 mm mesh. In each survey, skates were identified to species, weighed, and measured across disk width to the lowest cm.

Table 1 [next page]. Summary of skate trawl surveys, corresponding to Figure 1.

Year	Mesh (mm)	Trawls (N)		Reference
		North	South	
2013	90	30	32	Pompert et al. 2014
2018	400	6	0	Arkhipkin et al. 2018
2019	90	56	0	Goyot et al. 2020
2021	400	7	12	Parkyn et al. 2022

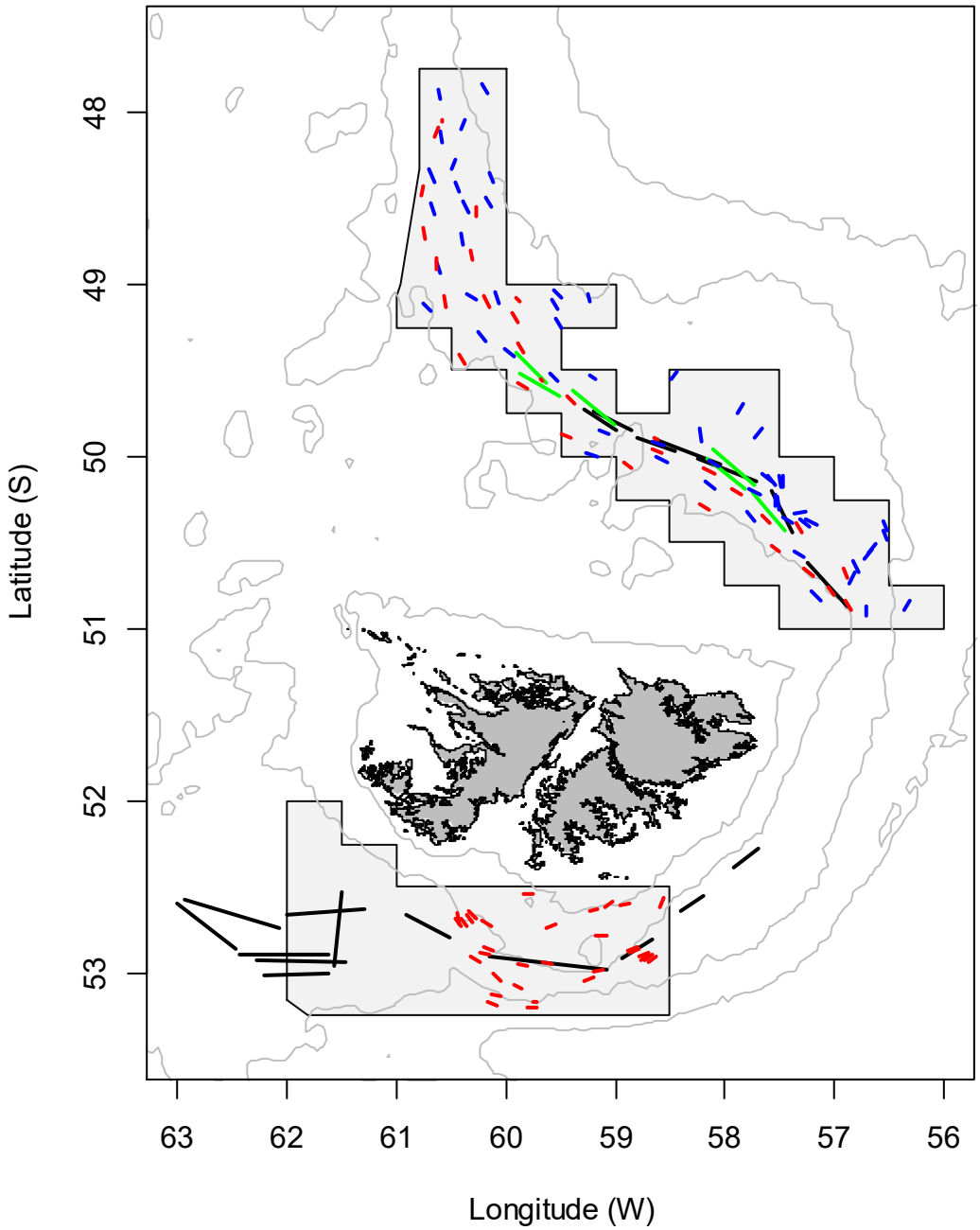


Figure 1. Distribution of survey trawl tracks in 2013 (red), 2018 (green – 400 mm mesh only), 2019 (blue), and 2021 (black). Grey shaded areas are the North and South Skate Boxes.

To establish an equal baseline for comparing skate biomasses between surveys, in 2018 only the 400 mm mesh catches were analysed. In 2013 and 2019, 90 mm mesh catches were thinned by deselecting smaller skates in proportion to their likelihood of not being caught in 400 mm mesh. These proportions of likelihood were calculated using the SELECT method for unpaired trawl data (Sistiaga et al. 2016), which fits a logistic model to the numbers per size interval retained in the larger of two meshes being compared, vs. the numbers per size interval of both meshes. For example, if the SELECT logistic model predicted that 30% of skates of a given disk-width occurred in the 400 mm mesh, then 70% of skates of that disk width were deselected from 90 mm mesh trawls. Other than trawl meshes, all four surveys used the same bottom trawl gear configuration of ground rope and tickler chain. For that reason, an earlier skate survey (Arkhipkin et al. 2010) was not included in the analysis as it had used rockhopper gear.

Skate density per species per trawl was calculated as the catch weight (or deselected 400 mm – equivalent catch weight) divided by swept area (trawl width × trawl distance). Skate density was then extrapolated to estimated total biomass in the North Skate Box and South Skate Box (Figure 1). The North Skate Box comprises 36514.8 km^2 of the northern slope that has been the primary area for commercial skate fishing (Goyot et al. 2020). The South Skate Box comprises 22559.4 km^2 that is representative skate habitat across the southern slope and south-eastern outer shelf (Pompert et al. 2014, Winter et al. 2015). Both Skate Boxes were partitioned into 5 × 5 km^2 grids, and extrapolation calculated using inverse distance weighting (Ramos and Winter 2022). For calculation catch in each trawl was assigned to the midpoint of the trawl.

With just four years of data in the north and two years of data in the south, significance of changes in biomass could be computed only as linear slope differences among years. Variability of biomass estimates in each year, per species, in either North or South Skate Box, was calculated by randomly re-sampling the proportion that skate represented in the total catch of each trawl, randomly re-sampling the skates that would make up that proportion per trawl (and if 90 mm mesh; the outcome that any skate would be deselected from equivalence to 400 mm mesh by double bootstrapping, Sistiaga et al. 2016), and randomly re-assigning the trawl location between start point and endpoint of each track, for inverse distance weighting. Randomizations were iterated 10000× in either Skate Box in each year. From each randomization the linear regression from 2013 to 2021 was calculated, weighted by inverse variance (Marín-Martínez and Sánchez-Meca 2010) of the yearly data, and the fraction of negative slopes interpreted as the significance of biomass decrease across the time series. The randomizations were also used to evaluate whether proportional decrease from 2013 to 2021 was significantly different between north and south, and whether estimated biomass densities in 2021 were significantly different between north and south.

Results

Ten skate species were identified in the 2021 survey, and proportionally deselected in the 90 mm mesh trawls (2013 and 2019) as summarized in Table 2. Additionally, species *Bathyraja magellanica*, *Dipturus trachydermus*, and *Psammobatis* spp. were recorded in small quantities (<2.3% of total skate catches) in the 2013 and 2019 surveys, but not examined as the data were not available to adjust their catch equivalences from 90 to 400 mm mesh.

Estimated biomasses of most skate species, and the aggregates of all skate species, decreased significantly from 2013 to 2021, both north and south (Table 3, Figures 2 and 3). One species (*Dipturus argentinensis*) was not recorded in the south in the 2013 survey, but recorded in the south in the 2021 survey, representing the only case of a statistically significant increase over time. While *D. argentinensis* was consistently one of the least abundant skates in

all surveys (Table A1), the increase over time in the south appears substantiated from observer data in the commercial fisheries (Figure A2).

Table 2. Average proportions of skate species by number (N) and weight (Wt) caught in 90 mm trawls that are considered equivalent to what would have been caught in 400 mm trawls. Number proportions are equivalent to Figure A1.

Species		2013 North		2013 South		2019 North	
		N	Wt	N	Wt	N	Wt
RAL	*Bathyraja albomaculata*	0.122	0.183	0.156	0.181	0.120	0.168
RBR	*Bathyraja brachyurops*	0.163	0.344	0.179	0.505	0.152	0.383
RBZ	*Bathyraja cousseauae*	0.233	0.714	0.516	0.904	0.392	0.840
RDA	*Dipturus argentinensis*	0.519	0.584			0.457	0.602
RDO	*Amblyraja doellojuradoi*	0.568	0.670	0.333	0.426	0.274	0.499
RFL	*Dipturus lamillai*	0.911	0.967	0.975	0.994	0.827	0.915
RGR	*Bathyraja griseocauda*	0.461	0.887	0.778	0.958	0.463	0.893
RMC	*Bathyraja macloviana*	0.309	0.364	0.416	0.462	0.367	0.445
RMU	*Bathyraja multispinis*	0.571	0.760	0.667	0.866	0.667	0.784
RSC	*Bathyraja scaphiops*	0.359	0.752	0.543	0.848	0.495	0.811

Table 3. Proportional biomass decreases from 2013 to 2021 in the North and South Skate Boxes. Asterisks indicate species for which the 2013 to 2021 decrease within either North or South was statistically significant ($p < 0.05$). The last column indicates whether the rate of decrease was significantly different between North and South.

Species	Biomass decrease 2013 to 2021		Significance of
	North	South	North / South difference
RAL	0.616*	0.603*	NS
RBR	0.765*	0.986*	$p < 0.005$
RBZ	0.424*	0.654	NS
RDA	0.771	–Inf*	$p < 0.001$
RDO	0.787*	0.650*	NS
RFL	0.441*	0.109	NS
RGR	0.614*	0.011	$p < 0.050$
RMC	0.624	0.972*	$p < 0.050$
RMU	0.140	0.222	NS
RSC	0.886*	0.794*	NS
Total	0.667*	0.691*	NS

Among the nine skate species other than *D. argentinensis*, five species had a higher proportional biomass decrease, from 2013 to 2021, in the north, and four species had a higher proportional biomass decrease in the south. However, the north – south difference was statistically significant ($p < 0.05$) for only three species, *Bathyraja brachyurops*, *Bathyraja griseocauda* and *Bathyraja macloviana*. The north – south difference in decrease was also not statistically significant for the aggregate among all skate species (Table 3).

In the most recent survey in 2021, one species *Bathyraja scaphiops* had significantly higher average biomass density south than north, while three species *B. brachyurops*, *B. macloviana*, and *Amblyraja doellojuradoi*, had significantly higher average biomass density

north than south. The north – south difference in average biomass density was not statistically significant for the aggregate among all skate species (Table 4).

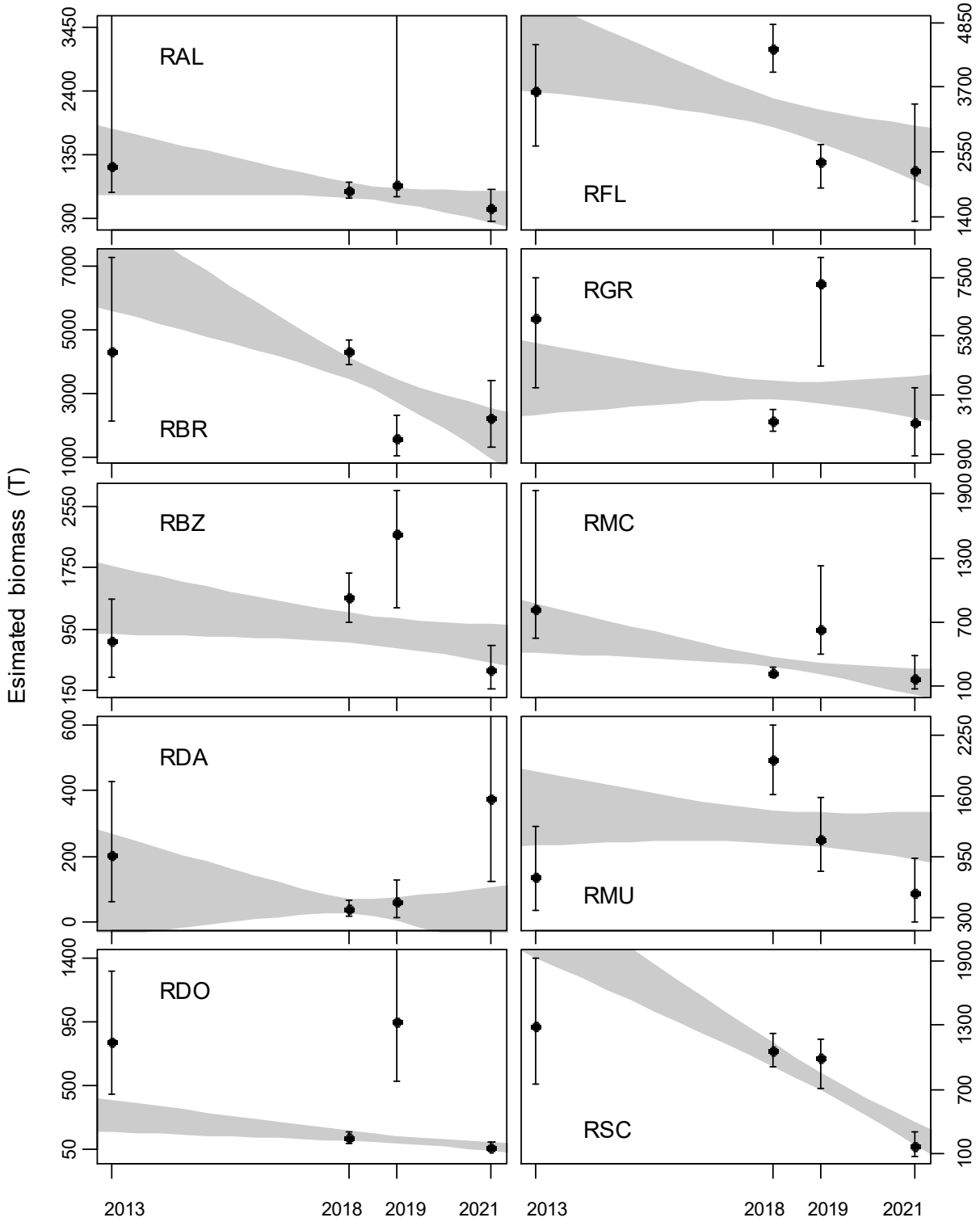


Figure 2. Linear changes in estimated biomass of skate species in the northern Skate Box, from the four surveys in 2013 to 2021. Black symbols per year: point estimate and 95% confidence intervals. Grey under-shading: 95% confidence intervals of linear regression random re-sampling.

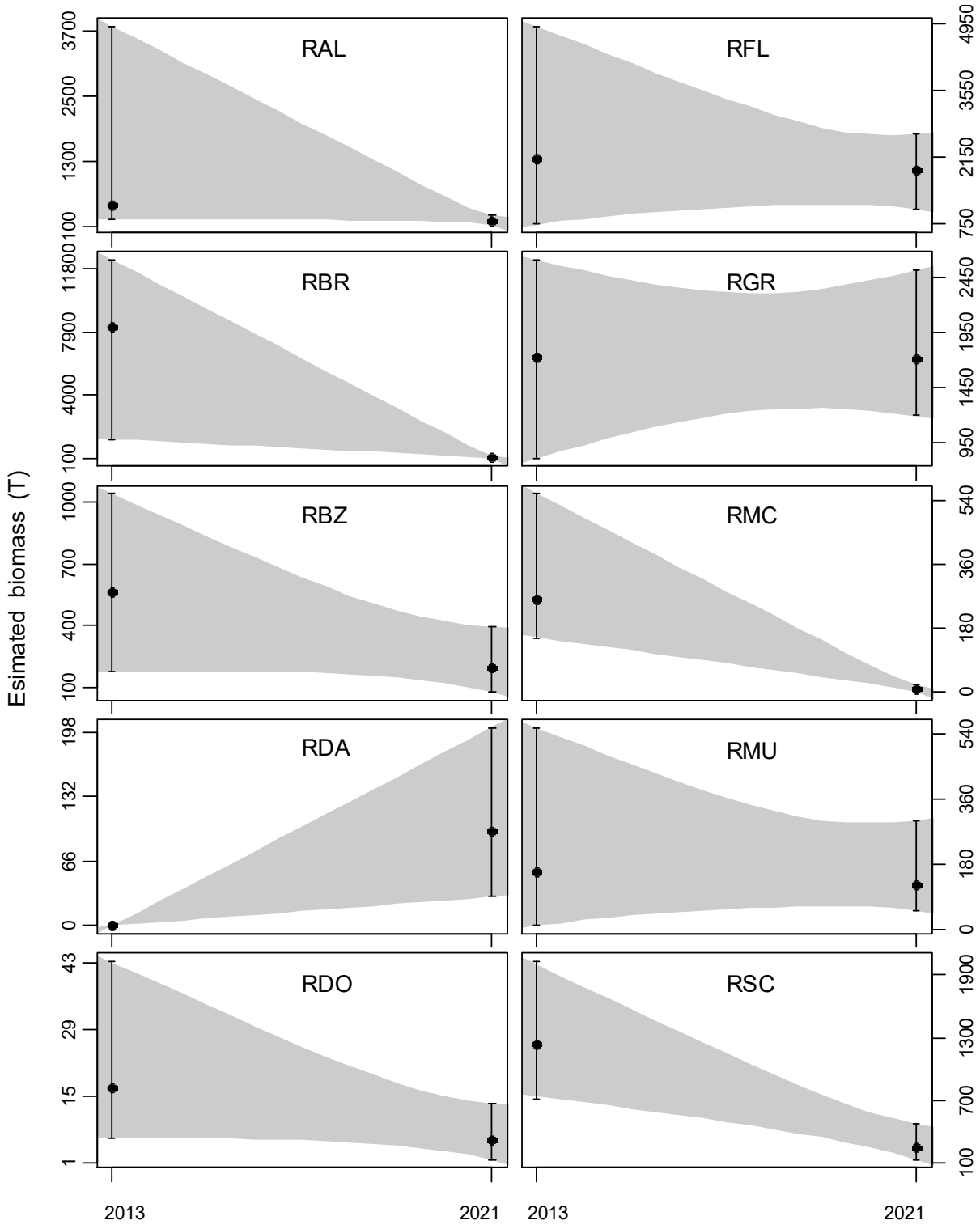


Figure 3. Linear changes in estimated biomass of skate species in the southern Skate Box, from the surveys in 2013 and 2021. Black symbols per year: point estimate and 95% confidence intervals. Grey under-shading: 95% confidence intervals of linear random re-sampling.

Table 4 [next page]. Estimated biomass densities by species the North and South Skate Boxes during the 2021 survey. Significance of the difference between North and South at $p < 0.05$.

Species	2021 Biomass density (T / km^2)		Significance of
	North	South	North / South difference
RAL	0.0131	0.0091	NS
RBR	0.0614	0.0053	$p < 0.001$
RBZ	0.0114	0.0087	NS
RDA	0.0103	0.0043	NS
RDO	0.0017	0.0003	$p < 0.001$
RFL	0.0605	0.0833	NS
RGR	0.0572	0.0757	NS
RMC	0.0045	0.0003	$p < 0.001$
RMU	0.0152	0.0055	NS
RSC	0.0047	0.0113	$p < 0.050$
All	0.2400	0.2039	NS

Discussion

The results of this analysis present a considerable contrast to Winter et al. (2015), which found that abundance trends of major skate species did not decrease between 1994 and 2013. Based on the updated survey results, abundance trends since 2013 have decreased both north and south in the Falkland Islands fishing zone for two skate species listed as near-threatened – *B. brachyurops* (Pollom et al. 2020c) and *Bathyraja macloviana* (Pollom et al. 2020d), and one species listed as vulnerable – *Bathyraja albomaculata* (Pollom et al. 2020a). *Bathyraja griseocauda* – listed as endangered (Pollom et al. 2020b) – decreased significantly north but not south, possibly justifying Wakeford et al.'s (2005) anticipation of a refuge in Falkland Islands waters. *B. brachyurops*, *B. albomaculata*, and *B. griseocauda* are three of the four large species that have dominated Falkland Islands skate fishing (Agnew et al. 2000). The fourth large species, *Dipturus lamillai*, had the highest average biomass density in the 2021 survey. *Dipturus lamillai* was recently described as a new species (Concha et al. 2019) resident around the Falkland Islands and listed as least concern (Pompert et al. 2020), which has separated this new species from the endangered status of its previous conspecific *Dipturus chilensis* (Dulvy et al. 2021).

Notably, skate abundances overall have not decreased less in the south part of the Falkland Islands fishing zone, which has been closed to commercial skate fishing since 1996, than in the north part of the Falkland Islands fishing zone, which has remained open. These results suggest that the target skate fishing exclusion has been ineffective while other trawl fisheries continued to be allocated over the same area. As in fishing regions elsewhere (Stevenson and Lewis 2010, Silva et al. 2012, Núñez et al. 2016), skate catches in Falkland Islands waters are largely taken as bycatch (Winter 2018, FIG 2022), and the South Skate Box has recorded a higher density of total trawl catch reports than the North Skate Box in 23 of the 26 years between 1996 and 2021.

The biomass comparisons between surveys should be interpreted with some caution, as two of the four surveys, in 2018 and 2021, were not designed as biomass surveys and were restricted in their areas covered. The SELECT method for comparing trawl meshes, while suitable for unpaired trawls, implicitly assumes that all data come from the same overall size distributions, which is not independently verifiable among surveys in different years. The 90 mm surveys in 2013 and 2019 also towed much shorter tracks than the 400 mm surveys in 2018 and 2021 (Figure 1), to reduce saturation of the net. Trawl durations are known to have a potential influence on catch, with shorter trawls often producing relatively higher CPUE (Godø

et al. 1990, Somerton et al. 2002, Can and Demirci 2004), although an interactive effect of trawl duration with mesh size has not been explicitly studied.

Notwithstanding such limitations, the opportunistic use of four surveys over a span of nine years demonstrated changes of the skate population in Falkland Islands waters, with an estimated biomass reduction on the order of 45% to 70%. The most recent production model stock assessment (Winter 2018) estimated total skate biomass north of 51° S at 43,343 tonnes, with a maximum sustainable yield of 6,403 tonnes. By comparison, the 2013 stock assessment estimated total skate biomass north of 51° S at 35,110 tonnes, but with a maximum sustainable yield of 6,933 tonnes (FIFD 2014). A precautionary current quota for skate catch would therefore be 30% of the lower MSY of 6,403 tonnes = 1,921 tonnes, which is higher than the total Falkland Islands skate catch in 2021: 1,574 tonnes (FIG 2022). The total Falkland Islands skate catch in 2021 was non-target bycatch, and the total Falkland Islands skate catch in 2022 is in route to be at least 200 tonnes lower (unpublished data). Resumption of a restricted target fishery, with regulatory 400 mm mesh, may therefore be advised, with a suggested quota of 1921 – 1574 + 200 ≈ 500 tonnes.

References

Agnew, D.J., Nolan, C.P., Pompert, J. 1999. Management of the Falkland Islands skate and ray fishery. In: Case studies of the Management of Elasmobranch Fisheries (R. Shotton, ed.), FAO, Rome, pp. 268-284.

Agnew, D.J., Nolan, C.P., Beddington, J.R., Baranowski, R. 2000. Approaches to the assessment and management of multispecies skate and ray fisheries using the Falkland Islands fishery as an example. Canadian Journal of Fisheries and Aquatic Sciences 57: 429-440.

Arkhipkin, A., Winter, A., Pompert, J. 2010. Skate biomass cruise ZDLT1-10-2010. Falkland Islands Fisheries Department. Stanley, Falkland Islands, 43 p.

Arkhipkin, A., Brickle, P., Laptikhovsky, V., Pompert, J., Winter, A. 2012. Skate assemblage on the eastern Patagonian Shelf and Slope: structure, diversity and abundance. Journal of Fish Biology 80:1704-1726.

Arkhipkin, A., Goyot, L., Trevizan, T., Derbyshire, C., Hall, J. 2018. Skate mesh trial survey, Fisheries Cruise ZDLV-10-2018. Falkland Islands Fisheries Department. Stanley, Falkland Islands, 31 p.

Arkhipkin, A., Skeljo, F., Wallace, J., Derbyshire, C., Goyot, L., Trevizan, T., Winter, A. 2022. Industry-collaborative mesh trials to reduce bycatch in the Falkland Islands skate trawl fishery (Southwest Atlantic). ICES Journal of Marine Science 10.1093/icesjms/fsab259.

Can, M.F., Demirci, A. 2004. Effect of towing duration on the Catch per Unit of Swept Area (CPUE) for lizardfish, *Saurida undosquamis* (Richardson, 1848), from the bottom trawl surveys in the İkenderun Bay. Turkish Journal of Fisheries and Aquatic Sciences 4: 99–103.

Concha, F.J., Caira, J.N., Ebert, D.A., Pompert, J.H.W. 2019. Redescription and taxonomic status of *Dipturus chilensis* (Guichenot, 1848), and description of *Dipturus lamillai* sp. nov. (Rajiformes: Rajidae), a new species of long-snout skate from the Falkland Islands. Zootaxa 4590: 501-524.

Dulvy, N.K., Acuña, E., Bustamante, C., Concha, F., Herman, K., Pacoureau, N., Velez-Zuazo, X. 2021. *Dipturus chilensis* (amended version of 2020 assessment). The IUCN Red List of Threatened Species 2021: e.T144159779A199743048. https://www.iucnredlist.org/species/144159779/199743048

Falkland Islands Fisheries Department (FIFD). 2014. Vessel Units, Allowable Effort, and Allowable Catch 2015. Fisheries Department, Directorate of Natural Resources, Falkland Islands Government, 54 p.

Falkland Islands Government (FIG). 2022. Fisheries Department Fisheries Statistics. 25. Stanley, Falkland Islands, 68 p.

Godø, R. Pennington, M., Vølstad, J.H. 1990. Effect of tow duration on length composition of trawl catches. Fisheries Research 9: 165–179.

Goyot, L., Blake, A., Roberts, G., Winter, A. 2020. Skate biomass and biological survey. Scientific Report ZDLM3-10-2019. Falkland Islands Fisheries Department. Stanley, Falkland Islands, 63 p.

Marín-Martínez, F., Sánchez-Meca, J. 2010. Weighting by inverse variance or by sample size in random-effects meta-analysis. Educational and Psychological Measurement 70: 56–73.

Núñez, J.R., Bovcon, N.D., Cochia, P.D., Góngora, M.E. 2016. Bycatch of chondrichthyans in a coastal trawl fishery on Chubut province coast and adjacent waters, Argentina. Journal of the Marine Biological Association UK 98: 605–616.

Parkyn, D. C., Arkhipkin, A.I., Trevizan, T., Büring, T. 2022. Skate Survey and Mesh Trial. Fisheries Cruise ZDLV-10-2021. Falkland Islands Fisheries Department. Stanley, Falkland Islands, 35 p.

Pollom, R., Dulvy, N.K., Acuña, E., Bustamante, C., Cevallos, A., Chiaramonte, G.E., Cuevas, J.M., Herman, K., Navia, A.F., Paesch, L., Pompert, J., Velez-Zuazo, X. 2020a. *Bathyraja albomaculata*. The IUCN Red List of Threatened Species 2020: e.T63102A124458655. https://www.iucnredlist.org/species/63102/124458655

Pollom, R., Dulvy, N.K., Acuña, E., Bustamante, C., Chiaramonte, G.E., Cuevas, J.M., Herman, K., Paesch, L., Pompert, J., Velez-Zuazo, X. 2020b. *Bathyraja griseocauda*. The IUCN Red List of Threatened Species 2020: e.T63113A124459226. https://www.iucnredlist.org/species/63113/124459226

Pollom, R., Dulvy, N.K., Acuña, E., Bustamante, C., Charvet, P., Chiaramonte, G.E., Cuevas, J.M., Herman, K., Paesch, L., Pompert, J., Velez-Zuazo, X. 2020c. *Bathyraja brachyurops* (errata version published in 2021). The IUCN Red List of Threatened Species 2020: e.T63111A200320565. https://www.iucnredlist.org/species/63111/200320565

Pollom, R., Dulvy, N.K., Acuña, E., Bustamante, C., Chiaramonte, G.E., Cuevas, J.M., Herman, K., Paesch, L., Pompert, J., Velez-Zuazo, X. 2020d. *Bathyraja macloviana* (errata version published in 2021). The IUCN Red List of Threatened Species 2020: e.T63117A200321617. https://www.iucnredlist.org/species/63117/200321617

Pompert, J., Brewin, P., Winter, A., Blake, A. 2014. Scientific Cruise ZDLT1-11-2013. Falkland Islands Fisheries Department. Stanley, Falkland Islands, 72 p.

Pompert, J., Concha, F., Derrick, D., Pacoureau, N., Dulvy, N.K. 2020. *Dipturus lamillai*. The IUCN Red List of Threatened Species 2020: e.T177301951A177302177. https://www.iucnredlist.org/species/177301951/177302177

Ramos, J.E., Winter, A. 2022. February bottom trawl survey biomasses of fishery species in Falkland Islands waters, 2010–2022. SA–2022–05. Falkland Islands Fisheries Department. Stanley, Falkland Islands, 86 p.

Silva, J.F., Ellis, J.R., Catchpole, T.L. 2012. Species composition of skates (Rajidae) in commercial fisheries around the British Isles and their discarding patterns. Journal of Fish Biology 80: 1678–1703.

Sistiaga, M., Herrmann, B., Grimaldo, E., O'Neill, F.G. 2016. Estimating the selectivity of unpaired trawl data: a case study with a pelagic gear. Scientia Marina 80: 321–327.

Somerton, D.A., Otto, R.S., Syrjala, S.E. 2002. Can changes in tow duration on bottom trawl surveys lead to changes in CPUE and mean size? Fisheries Research 55: 63–70.

Stevenson, D.E., Lewis, K.A. 2010. Observer-reported skate bycatch in the commercial groundfish fisheries of Alaska. Fishery Bulletin 108: 208-217.

Wakeford, R.C., Agnew, D.J., Middleton, D.A.J., Pompert, J.H.W., Laptikhovsky, V.V. 2005. Management of the Falkland Islands multispecies ray fishery: Is species-specific management required? Journal of Northwest Atlantic Fishery Science 35: 309-324.

Winter, A. 2015. Fishing for skates in the Falkland Islands. Shark Focus 54: 14–15.

Winter, A. 2018. Skates (Rajidae) stock assessment, Falkland Islands Fisheries Department. Stanley, Falkland Islands, 14 p.

Winter, A., Pompert, J., Arkhipkin, A., Brewin, P. 2015. Interannual variability in the skate assemblage on the South Patagonian shelf and slope. Journal of Fish Biology 87: 1449-1468.

Appendix

Table A1. Estimated biomass densities per species per survey, with 95% confidence intervals.

Species	Biomass density (T / km^2) ± 95% confidence interval			
	2013 North		2013 South	
RAL	0.0317	0.0204 – 0.1399	0.0230	0.0112 – 0.1681
RBR	0.1187	0.0587 – 0.1992	0.3662	0.0551 – 0.5490
RBZ	0.0218	0.0092 – 0.0367	0.0251	0.0077 – 0.0462
RDA	0.0056	0.0017 – 0.0117	0.0000	
RDO	0.0222	0.0121 – 0.0357	0.0007	0.0003 – 0.0019
RFL	0.0998	0.0730 – 0.1224	0.0936	0.0325 – 0.2176
RGR	0.1635	0.0924 – 0.2060	0.0765	0.0357 – 0.1154
RMC	0.0226	0.0151 – 0.0530	0.0117	0.0068 – 0.0248
RMU	0.0201	0.0103 – 0.0350	0.0071	0.0005 – 0.0247
RSC	0.0352	0.0204 – 0.0528	0.0551	0.0318 – 0.0901
	2018 North		2019 North	
RAL	0.0210	0.0176 – 0.0245	0.0236	0.0183 – 0.1170
RBR	0.1180	0.1071 – 0.1288	0.0442	0.0292 – 0.0643
RBZ	0.0372	0.0285 – 0.0463	0.0602	0.0335 – 0.0753
RDA	0.0011	0.0005 – 0.0019	0.0017	0.0004 – 0.0036
RDO	0.0035	0.0025 – 0.0046	0.0261	0.0144 – 0.0427
RFL	0.1203	0.1088 – 0.1324	0.0650	0.0521 – 0.0733
RGR	0.0588	0.0480 – 0.0704	0.1990	0.1156 – 0.2263
RMC	0.0061	0.0048 – 0.0074	0.0173	0.0110 – 0.0338
RMU	0.0545	0.0445 – 0.0649	0.0312	0.0217 – 0.0434
RSC	0.0292	0.0249 – 0.0336	0.0272	0.0194 – 0.0318
	2021 North		2021 South	
RAL	0.0131	0.0069 – 0.0216	0.0091	0.0065 – 0.0136
RBR	0.0614	0.0369 – 0.0932	0.0053	0.0033 – 0.0091
RBZ	0.0114	0.0048 – 0.0203	0.0087	0.0034 – 0.0174
RDA	0.0103	0.0034 – 0.0215	0.0043	0.0013 – 0.0090
RDO	0.0017	0.0010 – 0.0028	0.0003	0.0001 – 0.0006
RFL	0.0605	0.0357 – 0.0935	0.0833	0.0461 – 0.1168
RGR	0.0572	0.0234 – 0.0924	0.0757	0.0528 – 0.1113
RMC	0.0045	0.0019 – 0.0105	0.0003	0.0000 – 0.0009
RMU	0.0152	0.0067 – 0.0258	0.0055	0.0023 – 0.0133
RSC	0.0047	0.0022 – 0.0084	0.0113	0.0058 – 0.0211

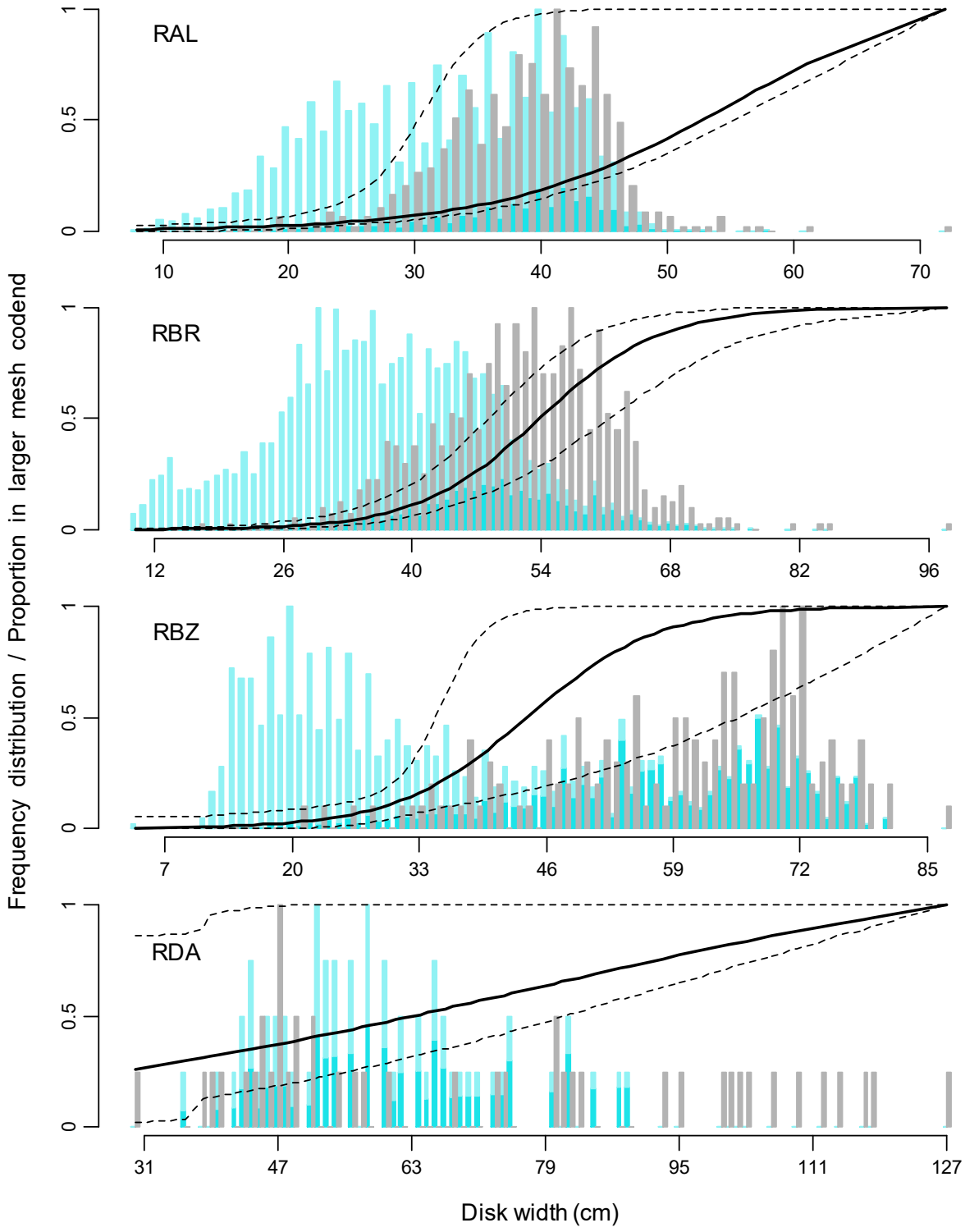


Figure A1. Combined disk width frequency distributions in 90 mm mesh (blue) and 400 mm mesh (grey). Lighter sections of the blue bars: fractions per disk width interval deselected to equalize 90 mm mesh catches to 400 mm mesh catches. Black lines: SELECT logistic models of proportions retained in the larger mesh ± 95% confidence intervals.

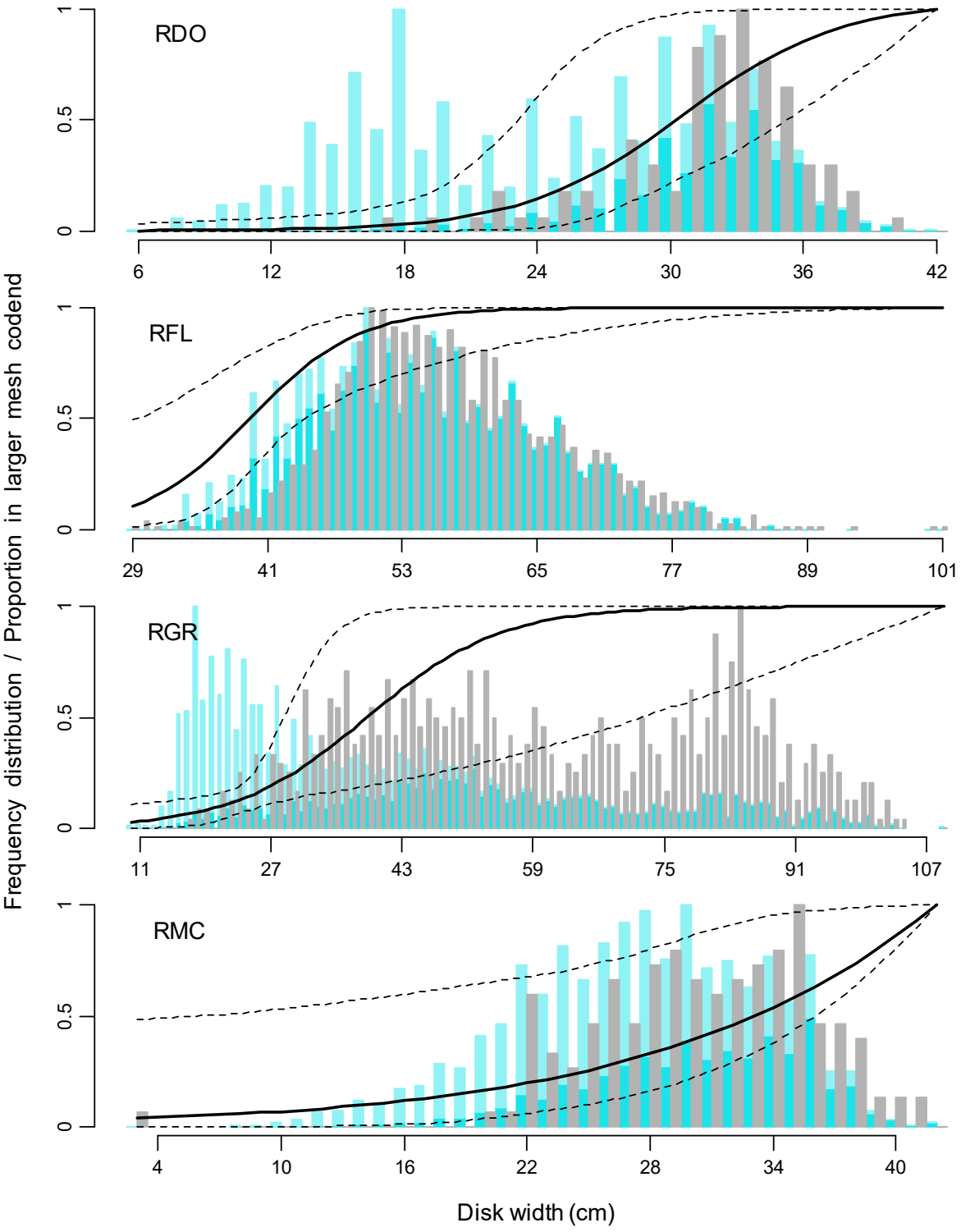
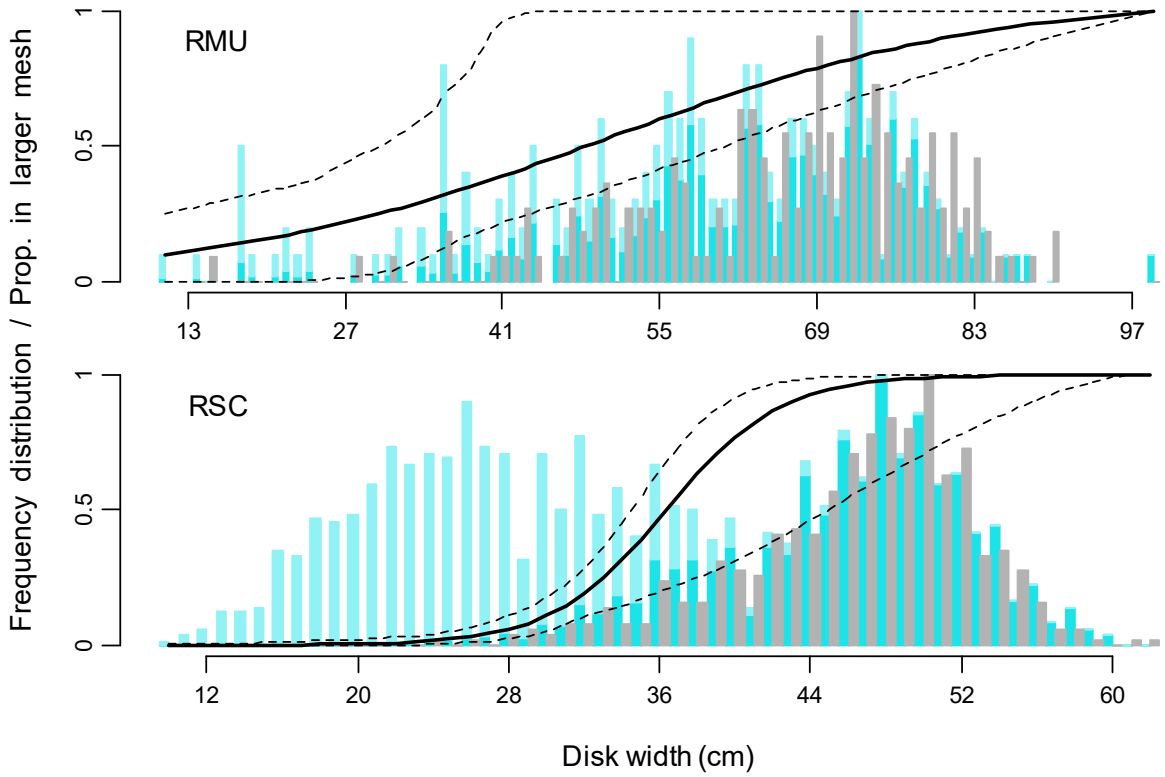


Figure A1. Continued.



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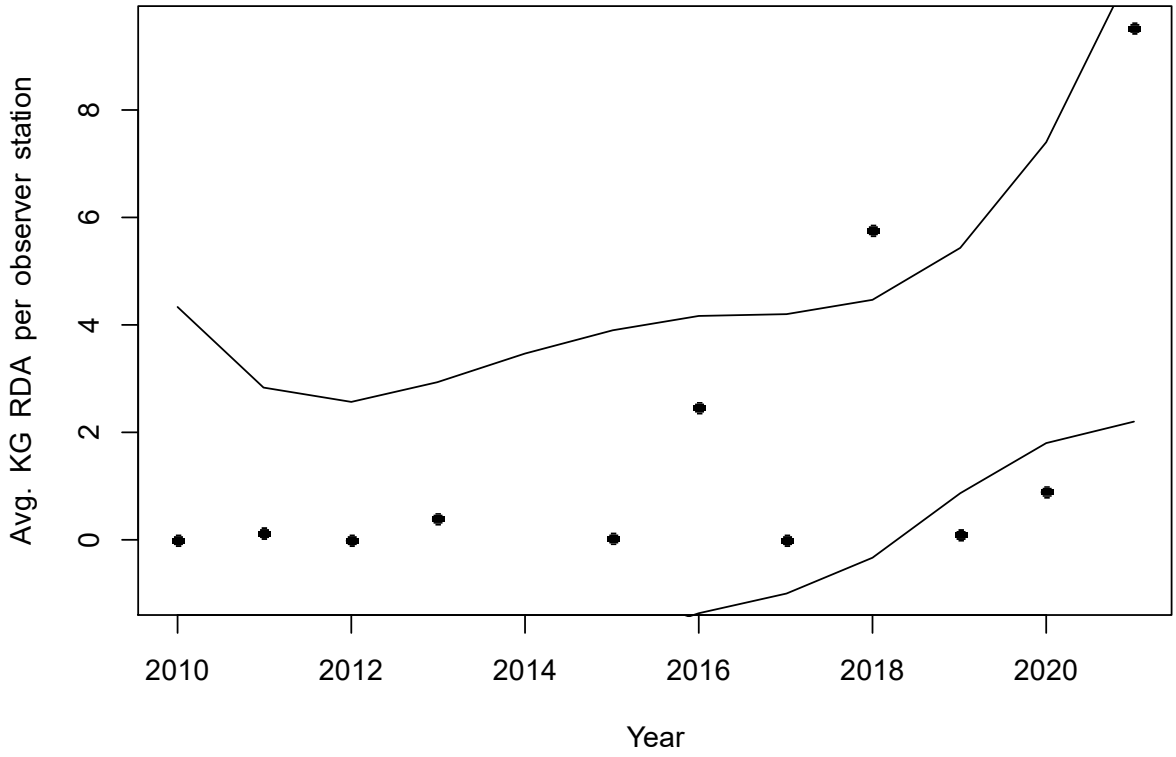

Figure A2. Average kg RDA catch per observer sample (from observer trips on which any RDA was recorded). Lines: 95% confidence interval of LOESS smooth. 2010 was the first year in which RDA was observer-reported in the Falkland Islands.