Comparisons of landings to scientific advice indicate overshooting within the common TAC for skates and rays in the Northeast Atlantic

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Background

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Original Article

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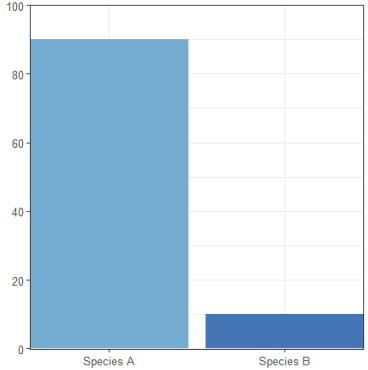
- Build upon work done in STECF 2022 Skates & Rays Management
- Exploitation of fish stocks generally managed on a single-stock or multiple-stock basis
  - Common TAC for stocks with shared characteristics, non-target and/or data-poor species
- Since 1999 common TAC of skates & rays in the North Sea
- Since 2009 in 5 regions: Celtic Seas (SRX/67AKXD), Bay of Biscay and Iberian coast (SRX/89-c), Greater North Sea: ICES division 3.a (SRX/03A-C), ICES division 2.a and Subarea 4 (SRX2AC4-c) and ICES division 7.d (SRX/07D).

Expectation of common TAC

- When using a common TAC there is an explicit expectation that exploitation rates should approximately scale with stock status and fisheries advice

	Species A	Species B
Advice	1000 t	100 t
Catch	~90%	~10%



- We explored if this expectation is met and evidence instances of landings either overshooting or undershooting single-stock advice

Input data

- Primary data sources: 2016-2022
  - ICES estimated landings data
  - ICES scientific advice
  - Annual common TAC values

Species:	Skates and rays *Rajiformes*	Zone:	Union and United Kingdom waters of 4; United Kingdom waters of 2a (SRX/2AC4-C)
Belgium	271	Precautionary TAC	
Denmark	11		
Germany	13		
France	43		
Netherlands	232		
Union	570		
United Kingdom	1 194		
TAC	1 764		

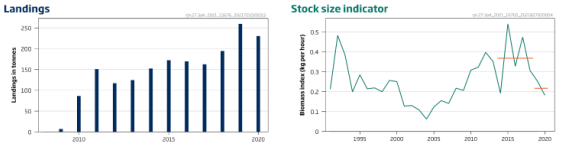
Cuckoo ray (*Leucoraja naevus*) in Subarea 4 and Division 3.a (North Sea, Skagerrak, and Kattegat)

ICES advice on fishing opportunities

ICES advises that when the precautionary approach is applied, catches should be no more than 89 tonnes in each of the years 2022 and 2023.

Stock development over time

ICES cannot assess the stock and exploitation status relative to maximum sustainable yield (MSY) and precautionary approach (PA) reference points because the reference points are undefined.

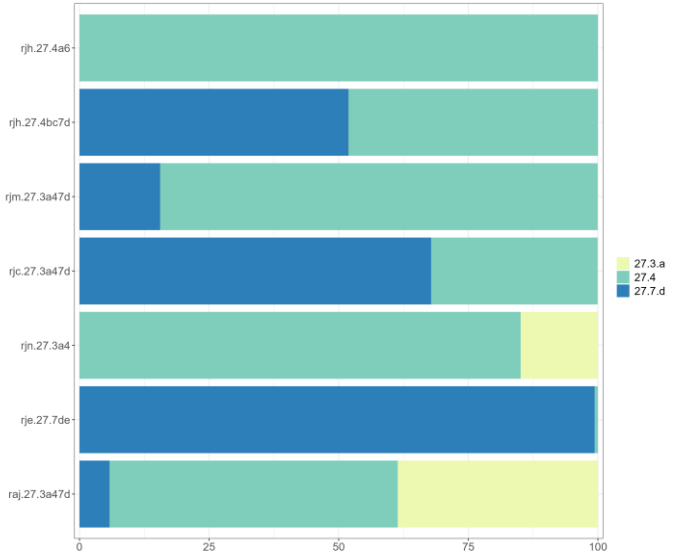


- Only stocks with reported landings, ICES advice, and part of common TACs were included; **26 stocks across 8 species**
- Additional data: species life history traits (L∞, L_{mat}, fecundity)

Analysis

- Advice by ecoregion: many stocks span multiple ecoregions
  - Annual proportion of landings per ecoregion for each stock to split the annual ICES advice

- Comparison of landings to advice
  - Stock-specific exploitation
  - Explore trends of overshooting and/or undershooting with ICES categories and life-history traits



Results

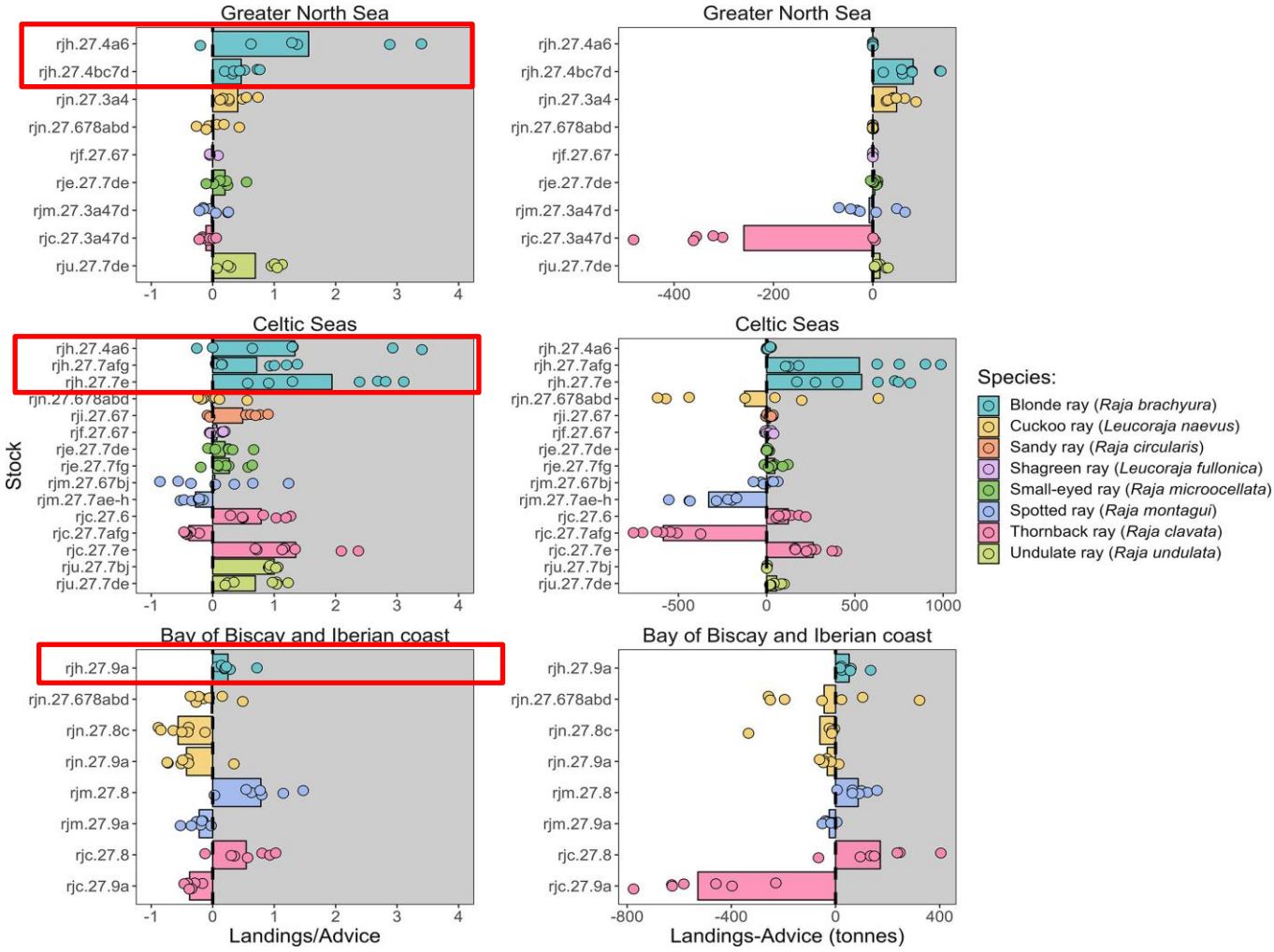
> 1 = overshoot

< 0 = undershoot

Blonde ray consistently overshot in all ecoregions

Thornback ray often undershot

Cuckoo ray mostly undershot in Bay of Biscay and Iberian coast



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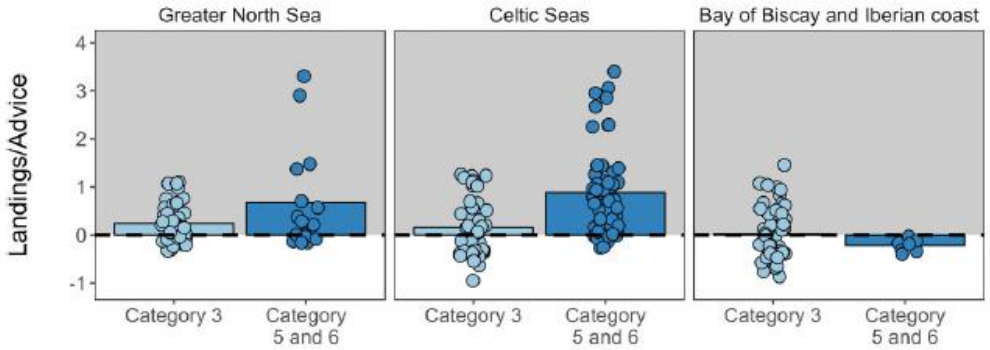
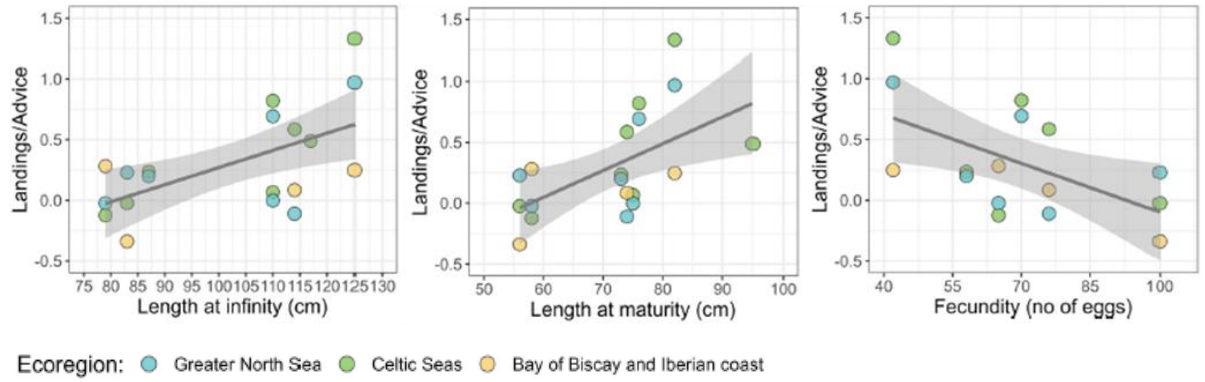
ICES categories and life-history

Relative



Category 5 & 6 -> data-limited, no quantitative assessment:
more prone to be overshot (GNS, CS)

Relative



Most vulnerable species consistently overshot (high $L\infty$ and L_{mat}, low fecundity)

Less vulnerable species (low $L\infty$ and L_{mat}, high fecundity) had mixed overshooting/undershooting

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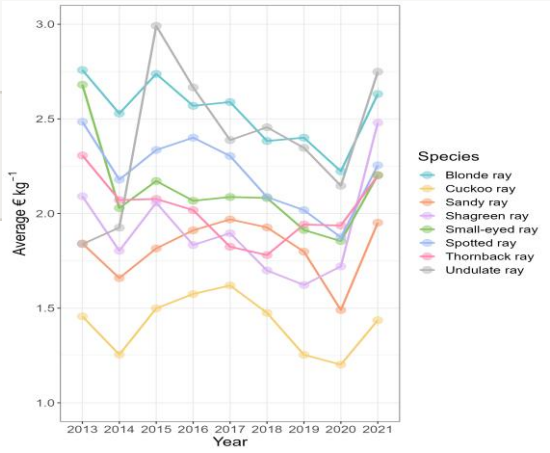
Key points

- Exploitation of ICES advice:
  - Blonde ray, cuckoo ray and spotted ray frequently overshot
  - Thornback ray often undershot

- Drivers of overshooting:
  - Economic incentives
  - Catchability
  - ICES advice framework
  - Common TAC flexibility

Drivers of overshooting

Economic incentives	Blonde ray highest market value (€2.50kg^{-1}), compared to €2.00kg^{-1} for thornback ray.
Catchability > economics	Cuckoo ray and spotted ray have lower average prices (<€1.50kg^{-1} and ~€2.00 kg^{-1} resp.); In some areas it may be linked to aggregations in shallow coastal waters -> increasing catchability



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Drivers of overshooting

Economic incentives	Blonde ray highest market value (€2.50kg^{-1}), compared to €2.00kg^{-1} for thornback ray.
Catchability > economics	Cuckoo ray and spotted ray have lower average prices (<€1.50kg^{-1} and ~€2.00 kg^{-1} resp.); In some areas it may be linked to aggregations in shallow coastal waters -> increasing catchability
ICES advice framework	Historically advice was based on species-specific landings, following by precautionary approach in 2012. -> advised catches may not necessarily track changes in stock status (e.g. advice cap of 20%)
Common TAC flexibility	Fishers can land those species they catch and may not be bound by restrictions on certain species or stocks. Expectation that catch is scaled with single-stock advice is not met -> Thornback ray is most abundant species but mostly undershot

Management challenges

- Single-stock TACs to better link advice, stock status and exploitation, but…
  - Bycatch of non-targeted skates/rays (potential choke-species)
  - Highly uncertain discard data, and survival varies
  - Quantitative assessments for small stocks difficult due to data limitations
- Existing (local) measures may limit exploitation; seasonal closures, gear limits, different minimum landing sizes (MLS)
- Improved stock assessments; MSY approach in category 2 or 3
  - TACs might increase -> unknown how this will affect management, fisher behaviour or levels of exploitation

Thank you

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ICES International Council for the Exploration of the Sea
CIEM Conseil International pour l'Exploration de la Mer

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