NWWAC Focus Group on Skates and Rays

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Centre for Environment Fisheries & Aquaculture Science

World Class Science for the Marine and Freshwater Environment

Cefas

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- Selectivity
  - Potential for gear selectivity to avoid skate and ray bycatch
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  - Further evidence requirements

MFV Halcyon conducted ray survival trials in North Sea inshore gill net fishery 2015

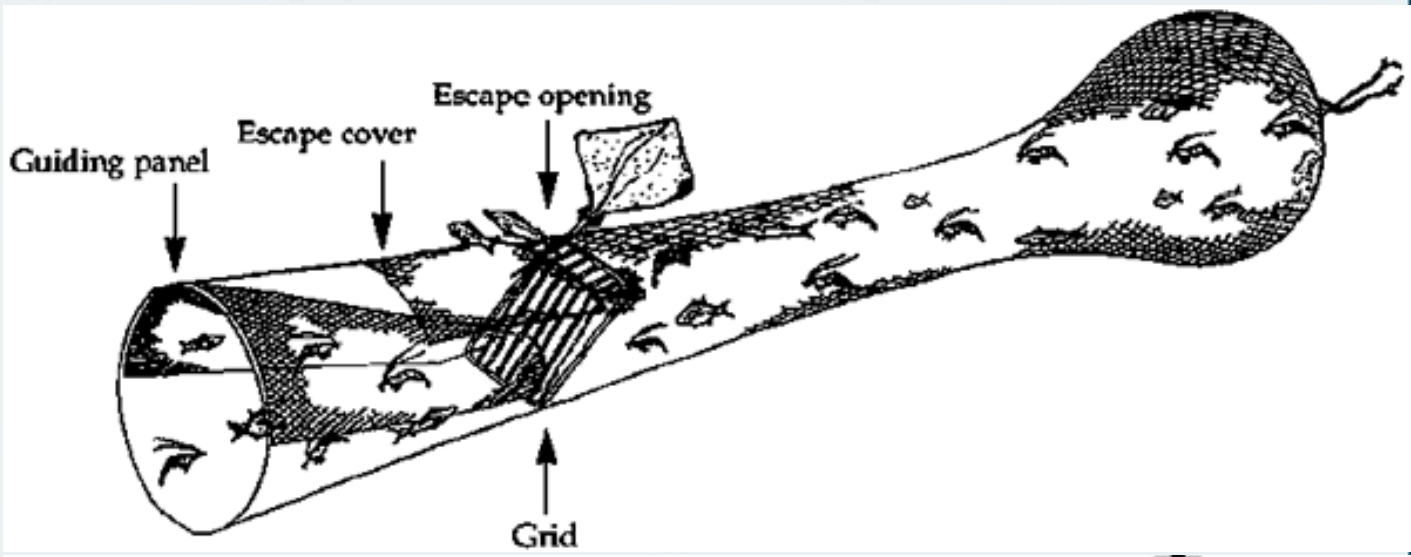
Gear Selectivity

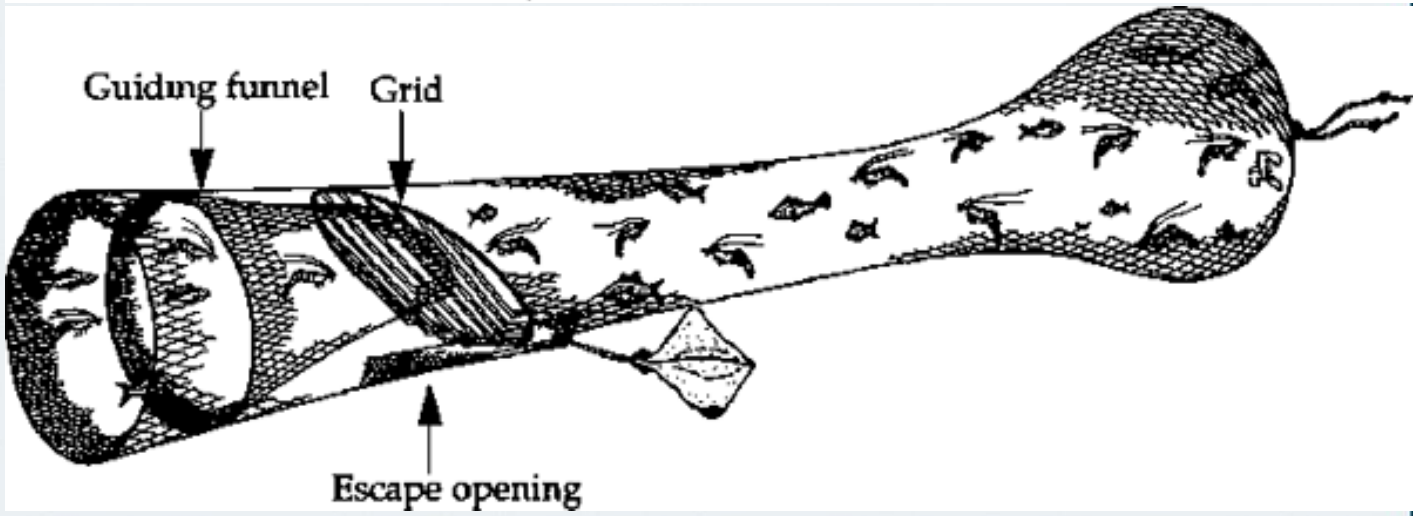
- Few practical studies specifically to avoid skates and rays using gear technology solutions in EU fisheries
- Here some potential gear based solutions for each main gear type:
  - Trawls
  - Long lines
  - Gill nets

MFV Our Olivia Belle conducted ray survival and selectivity trials in Bristol Channel trawl fishery in 2009

Trawls - grids

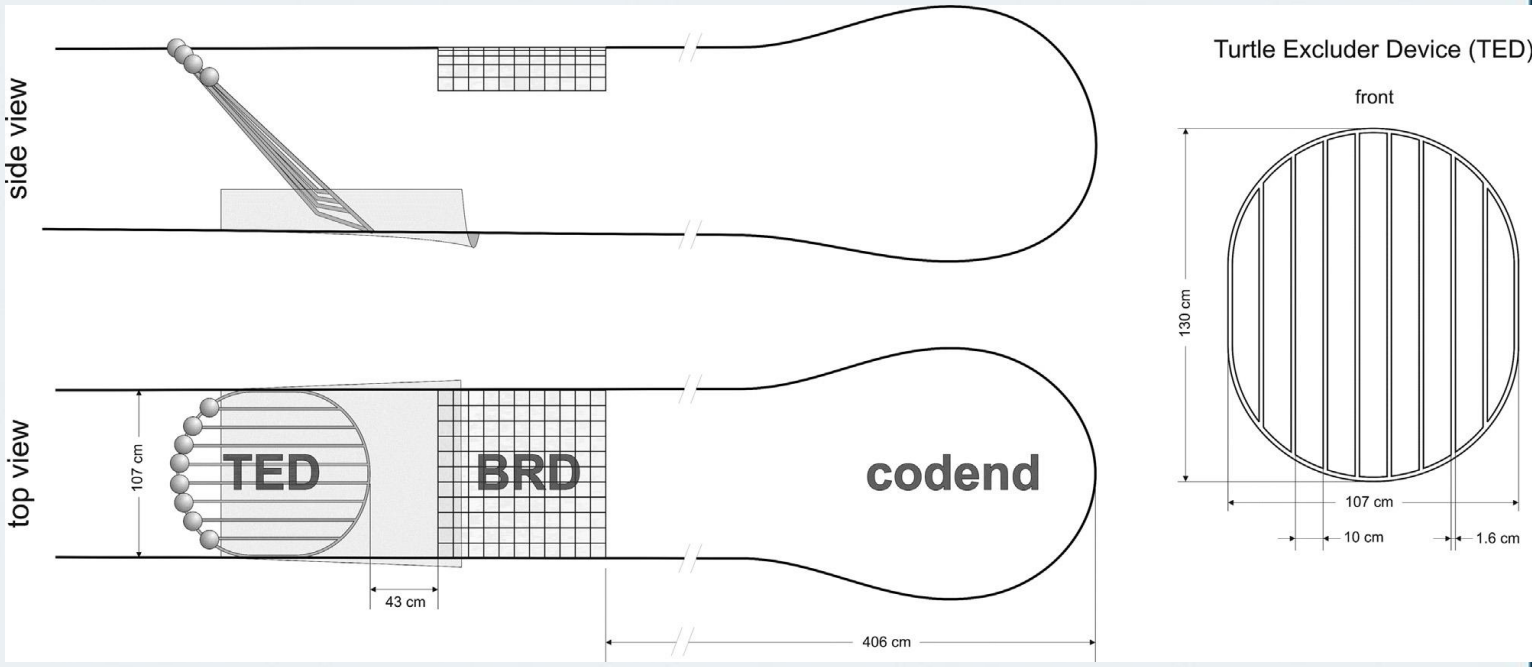
- Where target species is a substantially different shape and size to skates and rays
- Rays and other large organisms that cannot pass between the bars of the grid are guided to their escape





Trawls - grids

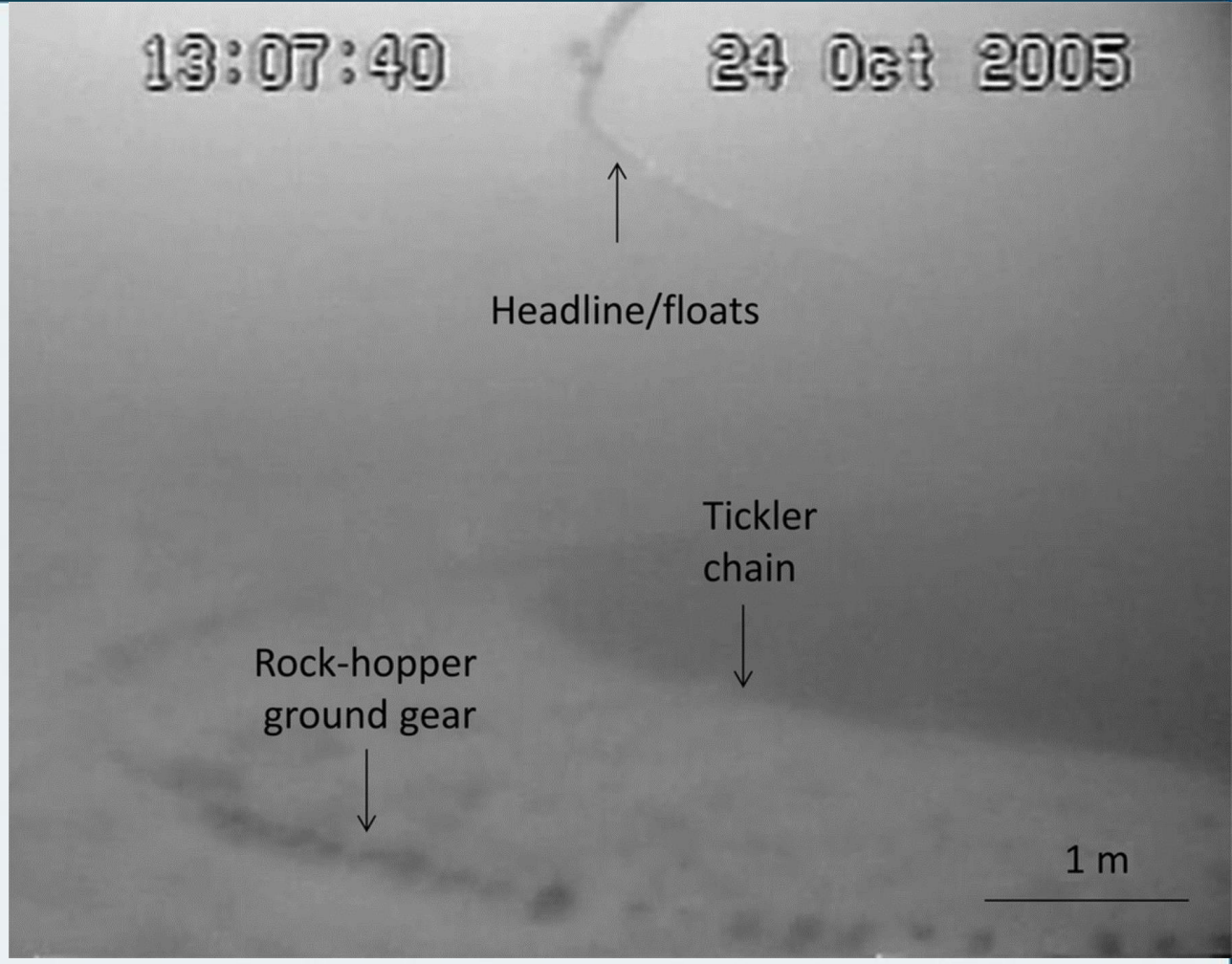
- South American shrimp fishery
- BRD = square mesh panel combined with TED = grid
- Trawls with a BRD and TED combi-nation reduced ray catch rate by 36%
- Not significant for smaller species with bar spacing at 100mm



Ray bycatch in a tropical shrimp fishery: Do Bycatch Reduction Devices and Turtle Excluder Devices effectively exclude rays? Tomas Willems, Jochen Depestele, Annelies De Backer, Kris Hostens. Fisheries Research 175 (2016) 35–42

Trawls – tickler chains

- Whitefish trawling Minch and Stanton Bank
- Removing the 'tickler' chain decreased catches of sharks and skates
- Catch rates for flatfish, haddock and whiting did not differ.
- Larger anglerfish were caught without the 'tickler' in place



Tickler chain as it runs along the seabed ~4 m ahead of the rock-hopper ground gear
R. J. Kynoch et al. ICES J. Mar. Sci. 2015; icesjms. fsv037

Longlines

- Changing baits, hook size and shape
- Using decoys/ attractants (lights)
- Rare earth metals/magnets (mixed results)

Category	small J hooks	small J hooks	large J hooks	circle hooks
Nominal size	5	4	2	16/0
Offset (°)	20	20	20	10
Gape width (cm)	1.9	2.1	2.6	2.7
Min. tot. width (cm)	2.2	2.4	3.3	4.4

Bait size and light attractants did not have a significant effect on stingray catch rate. Larger J-hooks reduced the stingray capture rate. Mediterranean. Biological Conservation. Piovanoa, S. et al, Volume 143, Issue 1, January 2010, Pages 261–264

http://www.sharkbywatch.org

- Stakeholder workshop to discuss the ‘by-catch and dead discards of threatened sharks, skates and rays’ the
- Trawls: Selectivity grids and the removal of tickler chains
- Longline: attraction devices such as electric decoys
- Gill net: Fine monofilament mesh and individual panels joined by weak links to allow by-catch to break free

Discard survival – state of evidence

- Discard survival in context of Landing Obligation
- What is ‘high’ survival? Exemptions to date
- Review of published scientific evidence
- Further evidence requirements

Discard survival and the Landing Obligation

The principle of the new CFP is to incentivise fishers to avoid catching unwanted fish.

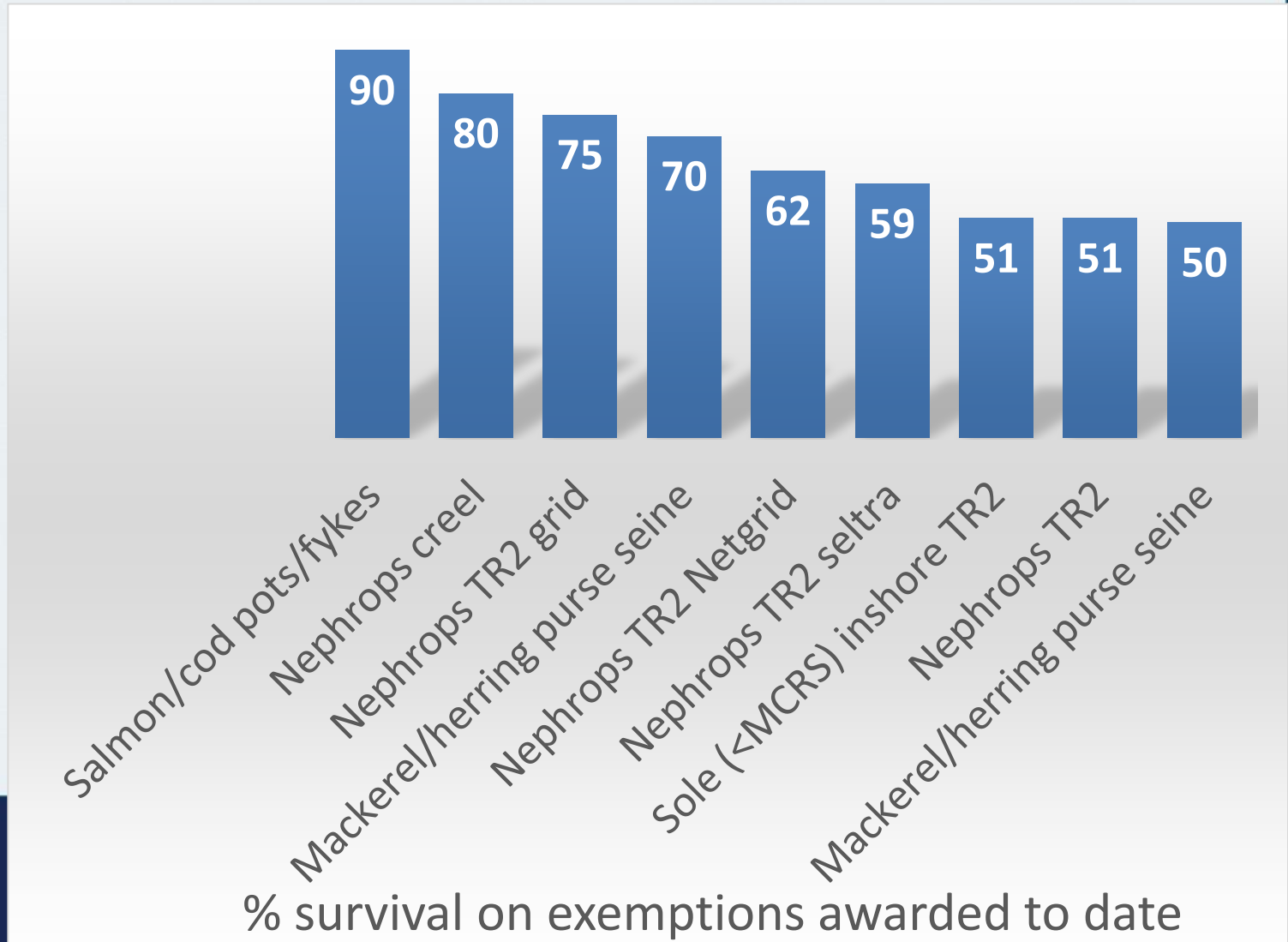
The policy includes a number of exemptions including for:

"***species for which scientific evidence demonstrates high survival rates, taking into account the characteristics of the gear, of the fishing practices and of the ecosystem***".

To support any proposed exemption, scientific evidence for discard survival rates are required that are representative of the species and fishery.

What is ‘high’ survival? Exemptions to date

- STECF concluded that the selection of a value is subjective
- It will likely to be species- and fishery-specific
- The value will be based on “trade-offs” between the benefits to the stock of continued discarding and the potential removal of incentives to change exploitation pattern (STECF 2014).
- Some exemptions conditional



Review of published scientific evidence

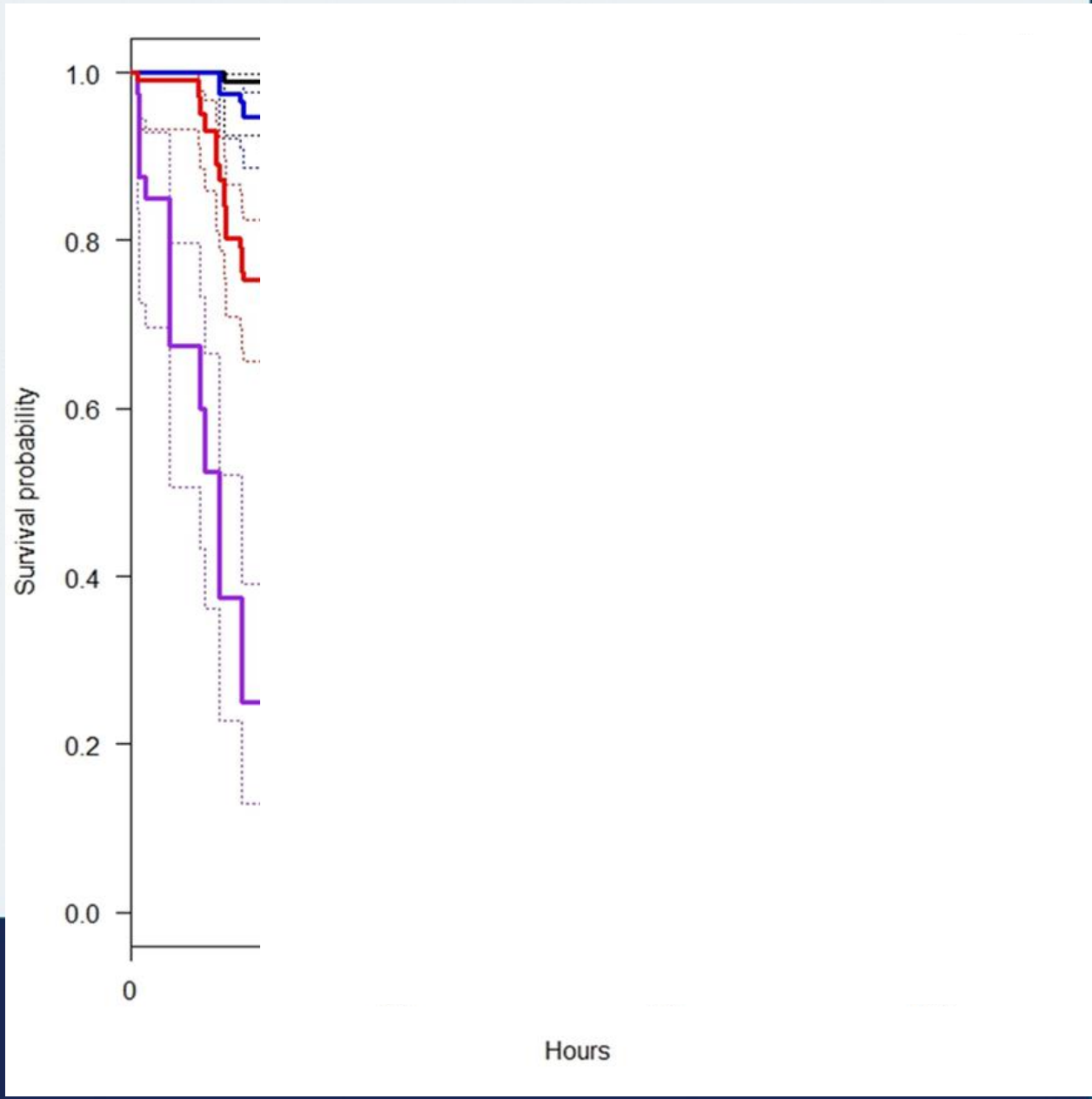
- Guidelines to undertake robust scientific assessments of discard survival produced by ICES WKMEDS
- Critical review process developed based on guidelines applied to published material on skates and rays
- Based on the requirement for evidence that is relevant to the fishery; evidence was selected only from EU fisheries and commercial species
- Globally there is other evidence

Thornback ray
Blonde ray
Cuckoo ray
Spotted ray
Skates and Rays
Small-eyed Ray
Shagreen ray
Long-nosed Skate
White skate
Sandy ray
Starry ray
Common skate
Arctic skate
Norwegian skate
Round skate
Undulate ray

Critical review

- six studies published original relevant estimates of discard survival
- All captive observation (vs tagging, at-vessel)
- Essential questions:
  - Are criteria given to define when death occurred?
  - Was a control used to inform experimental induced mortality?
  - Was mortality observed to asymptote?
  - Was the sample representative of the catch?
  - Was the sample representative of the population in the fishery?

Monitoring captive fish to asymptote



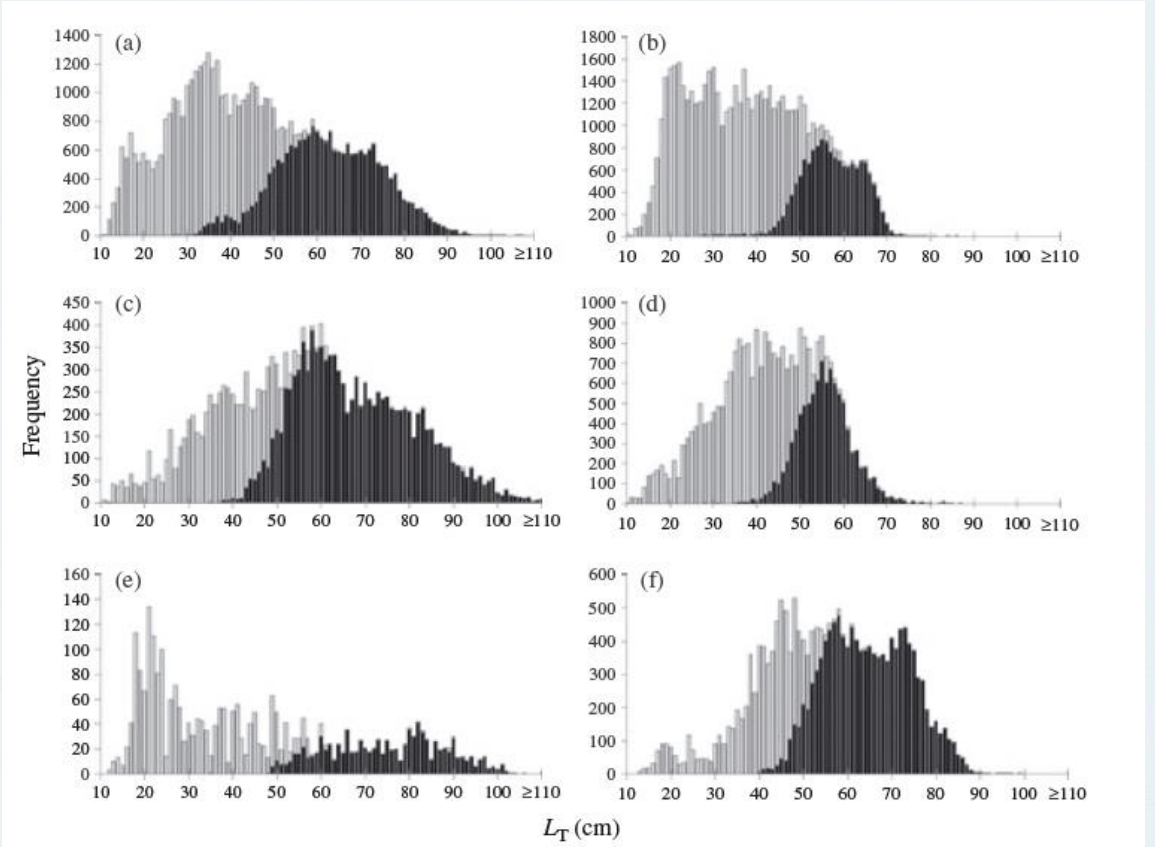
Survival Estimate	Species	Fishery	Quality and comment
72% (n=141)	Mixed ray species	North Sea Beam trawl	*Modelled* to asymptote; mixed ray species; survival rate likely overestimated
55-87% (n=162)	Thornback ray	Bristol Channel otter trawl	Not monitored to asymptote; survival rate overestimated
59% (n=32)	Cuckoo ray	Irish Sea beam trawl	Not monitored to asymptote; no control; survival rate likely overestimated
25-74% (n=25)	Blonde ray	Western Channel beam trawl	Not monitored to asymptote; no control; survival rate likely overestimated
40-67% (n=13)	Spotted ray		
25-83% (n=26)	Cuckoo ray		
81% (n=120)	Thornback ray	GFCM subarea 24 otter trawl	Not monitored to asymptote; survival rate likely overestimated
21% (n=68)	Brown skate		
55-67% (n=278)	Small-eyed skate	Bristol Channel otter trawl	Not monitored to asymptote; no control; survival rate likely overestimated

Enhancing existing evidence

- Based on evidence demands of exemptions awarded, the studies were not sufficiently robust to provide estimate of discard survival
- Opportunity to re-analyse existing captive observation data to improve quality (e.g. Western Channel and Bristol Channel otter trawl)
- Apply to estimates of at-vessel or immediate mortality (health at point release) available from several studies to provide proxy for survival
- Analysis of recent tag returns: Data Storage Tags allow assessment of discard survival, VIId gill net (but not conventional tags)

Prioritising new evidence

- Where will quota be most restrictive?
- Which species are of most interest? (results show inter-species differences; potentially more evidence required)
- Which gear type(s) are highest priority? (more selective gear indicates higher survival)
- Priorities will be determined by quantities of catch and discard data (e.g. STECF, national data), quota top-ups, bycatch avoidance potential, and national, local and vessel quota allocations



3. 4. Total length (L_T) frequency of discarded (□) and retained (■) (a) *Raja clavata*, (b) *Leucoraja naevus*, (c) *Raja brachyura*, (d) *Raja montagui*, (e) *Leucoraja fullonica* and (f) *Raja microocellata* (all gear types, 2002–2010), as recorded in the CEFAS observer programme.

J. F. Silva J. R. Ellis and T. L. Catchpole, *Journal of Fish Biology* (2012) 80, 1678–1703

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