

Cost-benefit analysis for mitigation measures in fisheries with high bycatch

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Overview

- Mitigation measures
 - Acoustically detectable nets
 - Acoustic deterrent devices (ADDs)
 - Acrylic echo enhancers
 - Visually detectable nets
 - Other moderations
- Alternative gears
- Conclusions and recommendations

Acoustic deterrent devices (ADDs)

- Small, electronic devices ‘pingers’ that emit relatively low intensity sounds
- No or little change to fishing practices and gear
- Effectiveness and economic viability differs between gear types, species and fisheries
- Successful trials for static nets in the North Sea and Celtic Sea (63-100% reduction in HP bycatch)
- Some evidence for success in trawls for reducing CD bycatch
- Potential for acoustic pollution/ habituation/ displacement
- Cost for 6000 m static net = 1600-4500 Euros
- Cost for a trawl = 900-1200 Euros

Acrylic echo enhancers

- Project by Thünen-Institute for Baltic Sea Fisheries in Germany
- Acrylic glass spheres ('pearls') < 10 mm diameter are hung on gillnet at 30 cm intervals
- Pearls enhance the acoustic visibility of the gillnet
- Initial results in the Black Sea indicate lower bycatch rate of HP
- Early trials show no impact on fishing technique
- No noise pollution or need for energy source
- Cost for 6000 m net = 3600 Euros (3 m high) – 7600 Euros (6 m high)

Visually detectable nets - lights

- Lights placed on float line of gillnets to increase visual detectability
- Cetacean bycatch reduced by 66-70% in gillnets in Peru
- Trials started in the UK in 2019 in bottom-set gillnets off Cornwall
- No noise pollution, potential to reduce seabird bycatch too
- Cost for 6000 m net = 2200-4500 Euros (depending on spacing)

Other moderations

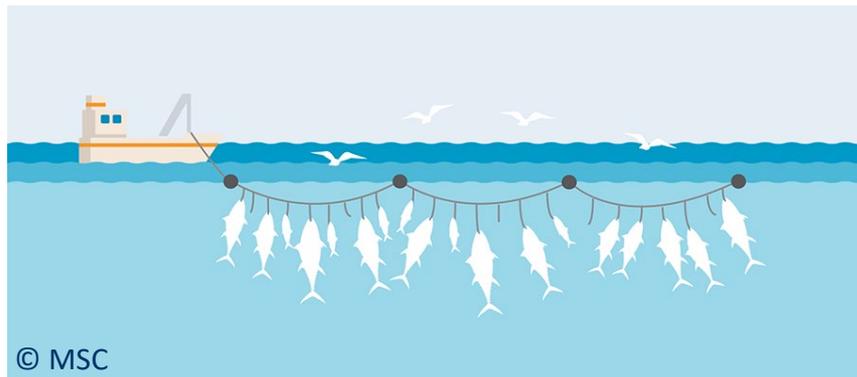
- Tie-downs – reduce vertical profile of the gillnet
 - Shown to reduce HP bycatch in some US fisheries
- Twine diameter – allows animals to break free
 - Trials started in 2019 in UK
- Exclusion devices
 - Limited trials, only 20% reduction in bycatch
- Time-area closures
 - Fishing effort needs to be removed *not* displaced
 - Hard to enforce in international waters
- Fishing time
 - Limiting night fishing may be beneficial (gillnets and trawls)
 - Time/area restrictions for certain mesh sizes (gillnets in US)

Mitigation conclusions

- Presently, ADDs are the only proven mitigation methods for HP bycatch in gillnets
- Some evidence for ADDs reducing common dolphins in trawls
- Any mitigation measures requires fishery scale testing to deliver robust evidence of effectiveness
- Unlikely that a 'one-size fits all' approach can be taken, even for similar gears in different areas
- Mitigation measures and overall effectiveness need to be assessed on a case-by-case basis for each fishery, area and species at risk
- Welfare and ethical considerations need to be accounted for before mitigation trials are conducted
- Stakeholder collaboration and effective mitigation requires an adaptive approach to fisheries management with achievable aims in a fixed time-scale with regular evaluation

Long-lines

- Very selective with right hook size and bait
- Used to some extent by most ASCOBANS Parties
- High quality catch – ‘eco-label’ potential
- Potential for depredation and seabird bycatch
- Only viable seasonally for some species e.g., cod
- Potential for fishing in areas with restrictions for other gears e.g., static nets and trawls



Jigging machine

- Jigging is a low impact, automatic fishing method with hooks fixed on a line and a heavy weight on the end





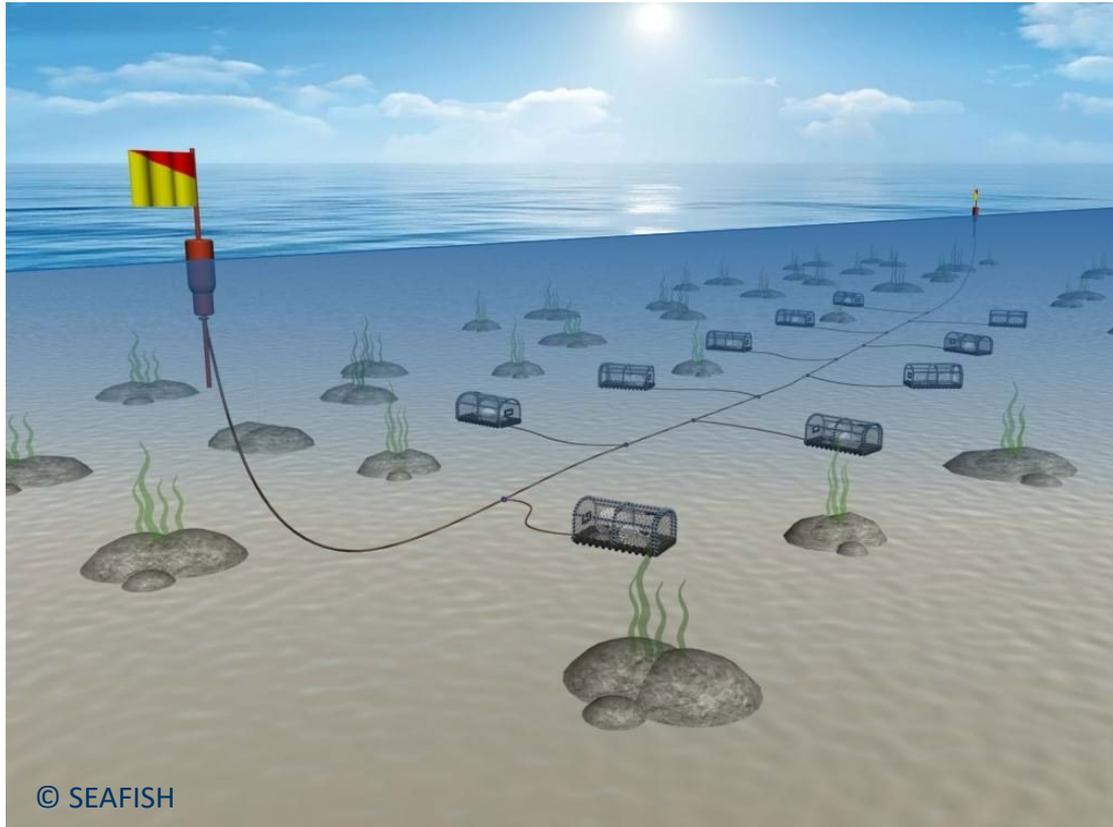
Jigging machine

- Jigging is a low impact, automatic fishing method with hooks fixed on a line and a heavy weight on the end
- Used for demersal and pelagic species, e.g., mackerel, pollack and cod
- High quality catch – ‘eco-label’ potential
- No HP bycatch – potential impacts for seabirds
- Can be used in conjunction with other gears
- Only viable seasonally in some areas, e.g., Shetland
- Cost of implementation - ‘tens of thousands’ of Euros per vessel

Fish pots

Most trials in the Baltic due to the increase in seal interactions with gillnets

Low Impact and Fuel Efficient (LIFE gears)





Fish pots

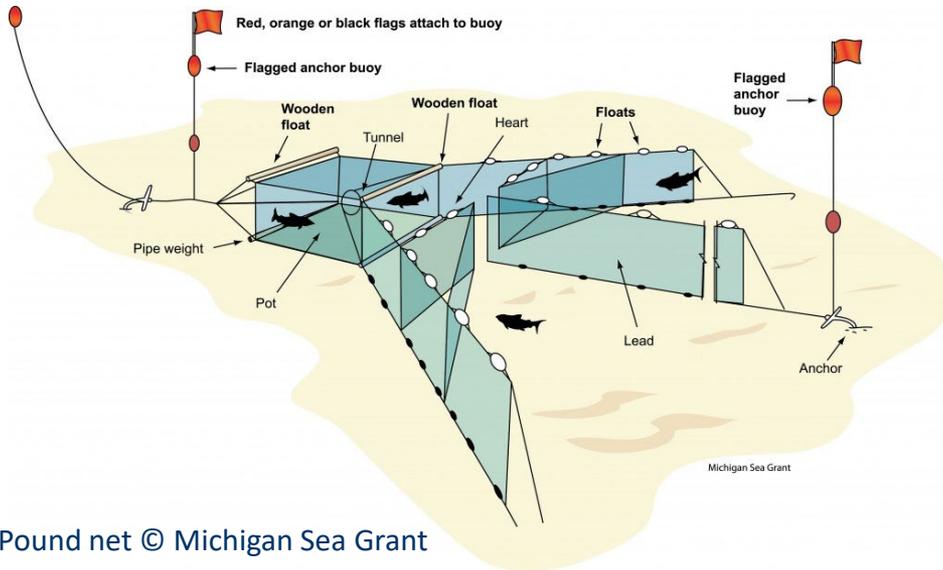
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Low Impact and Fuel Efficient (LIFE gears)

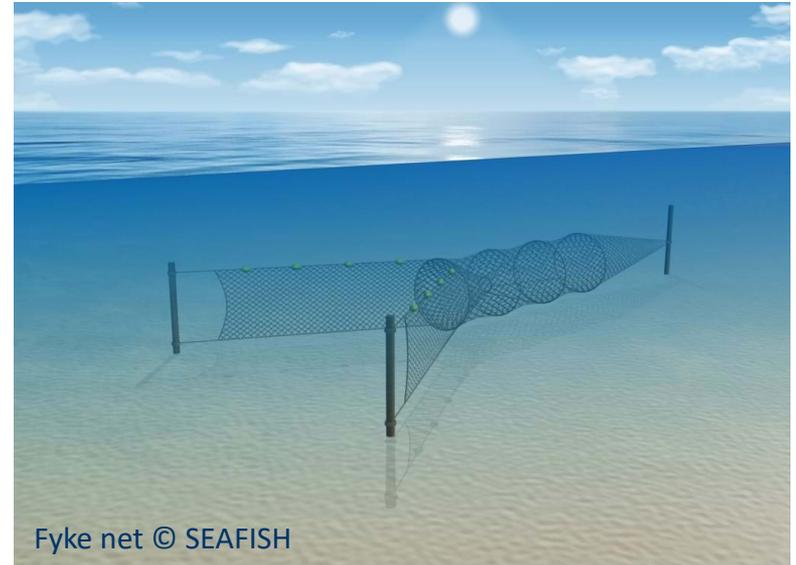
- Fish pots
 - Species and size selective
 - Good alternative to gillnets in coastal fisheries
 - Potential for entanglements
 - Conflicts between mobile and static sectors – limited to areas traditionally used by static gear
 - Cost – changing to 100 pots = 46,000 Euros (if a new hauler is not required)

Fish traps

e.g., pontoon trap, pound net and fyke net



Pound net © Michigan Sea Grant



Fyke net © SEAFISH

Fish traps

e.g., pontoon trap, pound net and fyke net

- All LIFE gears
- Only suitable for coastal waters
- Species and size selective
- Potential for depredation and bycatch of seals and seabirds (can be modified)
- All trials have been conducted in the Baltic
- Cost
 - Pontoon trap - 5000-7500 Euros
 - Fyke net- 500-2000 Euros

Conclusions and recommendations

- Limited work/data in commercial fisheries
- No 'one-size fits all' approach
- Any measures need to reduce bycatch *and* have minimal impact on gear operation and catch of target species
- Strong collaboration between ALL stakeholders is essential
- If countries are not implementing and complying with legal obligations, no mitigation measure will be sufficient