

**By-Catch in fishing gear is considered the most serious threat to cetacean populations in Europeans waters ++**

# **Monitoring and Mitigation**

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# Main By-Catch Problem - cetaceans

## Bottom set gill nets & tangle nets

- Harbour porpoise

## Pelagic trawls

- Common and striped dolphins

## Driftnets

- Harbour porpoise

## Creel lines, seines, ghost netting

- Minke & humpback whales

★ Harbour Porpoise

★ Common & Striped Dolphin

★ Minke & Humpback Whale



# **EVALUATE RISK**

## **1a) Overall By-catch estimate**

**By-Catch rates (fisheries monitoring)  
Fishing Efforts**

## **1b) Population size (population monitoring)**

## **2) Evaluate Risk**

**Acceptable or not, according to  
conservation objectives**

## **3) Management measures needed or not**

# Evaluate Risk

**Will depend on both  
Bycatch rates & Fishing efforts**

- High by-catch rate but low fishing effort**
- Low by-catch rate but high fishing effort**



**Essential to know the overall fishing effort**



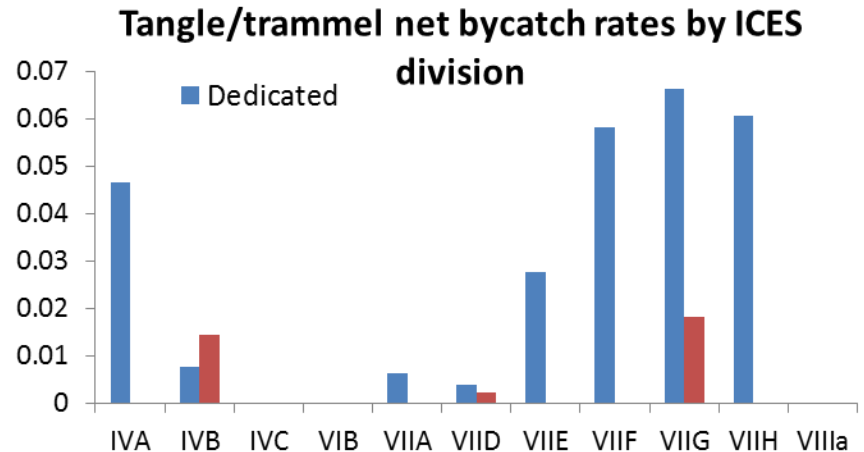
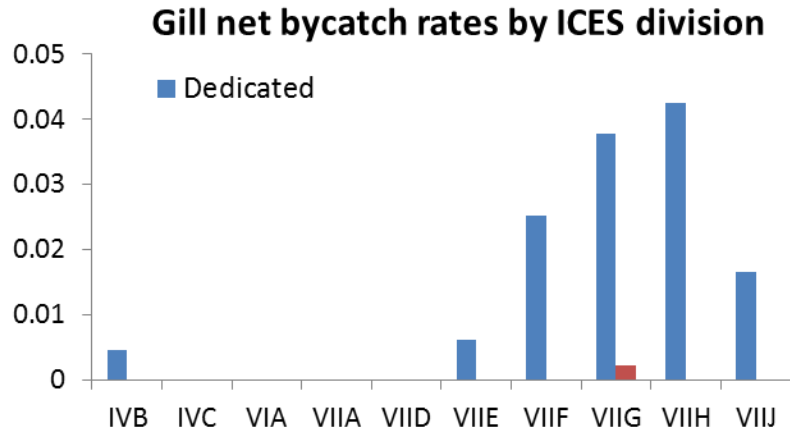
# Coverage presently overestimated as mostly reported for vessels > 10m, but ...

| MS | 8.00m<br>and<br>under | 8.01 –<br>10.00m | 10.00m<br>and under | 10.01-<br>15.00m | 15.01m<br>and over | Total | % Fleet<br><10m |
|----|-----------------------|------------------|---------------------|------------------|--------------------|-------|-----------------|
| SE | 631                   | 344              | <b>975</b>          | 294              | 125                | 1,394 | <b>70</b>       |
| DK | 1,713                 | 437              | <b>2150</b>         | 306              | 287                | 2,743 | <b>78</b>       |
| DE | 980                   | 170              | <b>1150</b>         | 137              | 264                | 1,551 | <b>74</b>       |
| NL | 220                   | 88               | <b>308</b>          | 67               | 475                | 850   | <b>36</b>       |
| BE | -                     | -                | <b>-</b>            | 11               | 201                | 212   | <b>0</b>        |
| FR | 3,672                 | 1,524            | <b>5196</b>         | 1,186            | 761                | 7,143 | <b>73</b>       |
| UK | 3,474                 | 1,558            | <b>5032</b>         | 695              | 679                | 6,406 | <b>79</b>       |

# By-Catch Monitoring

- **Dedicated on-board observers**
- **Remote Electronic Monitoring (REM)**
- **Reference Fleets**
- **Specific Projects (combined PETS)**
- **DCF observers**
  - with MM protocol, w.o. MM protocol
- **Logbook reports**
  - mandatory, non-mandatory
- **Questionnaires**
- **Strandings**

# Dedicated vs. non dedicated DCF monitoring ????



## UK 2014, MM, no. animals per haul

| Monitoring Type | No. Observed Hauls (2005-2014) | No. of Marine Mammals observed (2005-2014) | Marine Mammal Bycatch Rates (2005-2014) | Cetacean Bycatch Rates (2011-2013) |
|-----------------|--------------------------------|--|---|------------------------------------|
| Dedicated       | 7433                           | 188  | 0.025                                   | 0.025                              |
| Non-dedicated   | 3142                           | 6  | 0.002                                   | 0.001                              |



## Monitoring - recommended approach:

- Dedicated on-board observers
- REM
- Reference Fleet
- Specific Projects (combined PETS)

### ***Only qualitative data***

- *DCF observers*
  - *with MM protocol, w.o. MM protocol*
- *Logbook reports*
  - *mandatory, non-mandatory*
- *Interviews with fishermen*
- *Strandings*

# Mitigation

- **Acoustic Deterrent Devices (ADDs)**
- **Modifying fishing method**
  - **Depth, mesh size**
- **Alternative fishing gears**
- **Seasonal and area closures**
- **Consequence closures**

## **Mitigation - Recommended approach**

- **Will depend on circumstances  
species at risk, area, gear, etc**
- **Set regionally and fishery specific**
- **Should apply to the risk (e.g. the gear), not  
be dependent of vessel size**
- **Focus should be placed on high-risk areas**
- **Can be a combination of several**

# Mitigation - Recommended approach

## DDD: works for harbour porpoises, many kinds

**Table 1.5.1.1** Overview of commercially available ADDs that have proven effective in deterring harbour porpoises from fishing gear. ADDs listed in italics do not have a published study of their effectiveness, but have the same specification as those with such a study. The maximum distance between any netting and the nearest ADD is half the effective distance between ADDs.

| ADD type               | Source levels<br>dB re 1 $\mu$ Pa<br>rms at 1 m | Signal frequency<br>(kHz) | Pulse<br>duration<br>(nominal) | Interpulse<br>interval (s) | Maximum<br>distance between<br>any netting and<br>the nearest ADD <sup>1</sup> | Reference                       |
|------------------------|---|---------------------------|--------------------------------|----------------------------|--|---------------------------------|
| Dukane Netmark<br>1000 | 132   | 10                        | 300 ms                         | 4                          | 100 m  | Gönener and<br>Bilgin (2009)    |
| <i>Fumunda 10 kHz</i>  | <i>132</i>                                      | <i>10</i>                 | <i>300 ms</i>                  | <i>4</i>                   | <i>50 m</i>  |                                 |
| <i>Aquamark 300</i>    | <i>132</i>                                      | <i>10</i>                 | <i>300 ms</i>                  | <i>4</i>                   | <i>50 m</i>  |                                 |
| Aquamark 100           | 145   | 20–160                    | 200–300 ms                     | 5–30                       | 227 m  | Larsen and<br>Krog (2007)       |
| DDD-03 L               | 174   | 5–500                     | 0.5–9 s                        | Random                     | 2 km   | Northridge <i>et al.</i> (2011) |
| <i>DDD-03 N</i>        | <i>174</i>                                      | <i>5–500</i>              | <i>0.5–9 s</i>                 | <i>Random</i>              | <i>2 km</i>  |                                 |

according to ICES WKREV812, 2011

# Mitigation - Recommended approach

## Acceptable ADDS:



proven ability to reduce bycatch of the relevant species in the setting of a commercial fishery,

- the device *significantly reduces* (>80%) bycatch
- with a *high level of confidence* (>95%),
- under a rigorously designed experiment
  - parties with a vested interest in the results cannot influence the outcome.
  - it includes at least one control and one treatment group.
  - it is covered 100% by independent on-board observations.
  - By-catch rates should be based on statistically independent by-catch events.

(ICES WKBYC 2013)

# Mitigation - Recommended approach

## Alternative fishing gears:

- Hooks
- Pots for cod and flatfish
- Traps for salmon, whitefish, herring
- Fish aggregating devices



# **IMPLEMENTING EUROPEAN FRAMEWORK**

- **Achieve and maintain a FCS/ GES - marine mammals (all or specific)**
- **Achieving conservation and sustainable use of resources (all or specific)**
  - **Regular evaluation of fisheries for direct & indirect/predictable removals**
    - **Total removals vs. population size**
  - **Taking management measures if needed**
  - **Evaluating long-term efficiency of those measures**

# Implementing European framework

## Regular evaluation of fisheries

### *All*

- Habitats Directive
- ASCOBANS (incl. HP Plans)
- CMS, CBD, HELCOM, OSPAR
- NAMMCO, IWC

### *Some*

- CR (EC) No. 812/2004
  - Only pelagic trawl, driftnet, some set nets // size
  - [Not gillnet: high bycatch --- e.g. NS]



# Implementing European framework

## Habitats Directive

### – Monitoring

- Encompasses all activities where killing of Annex IV (a) species occurs, thus includes recreational fisheries

**UK and Ireland have implemented by-catch monitoring of Protected Species**

**France: programme Obsmer**

**NL: REM project; DK: REM project in the Baltic+ but nothing in NS**

**Management strategies / plans not yet finalised for Natura 2000 marine areas**

# Implementing European framework

## Habitats Directive

- **Implementing conservation measures as required**
  - Monitoring long-term effectiveness of conservation measures

**Needs Management Objectives, but not defined**

**Unknown risk (No reporting of full fishing effort, patchy bycatch estimate)**

**Mitigation measures according to R. 812 (i.e. few fisheries with high risk) and experimental alternative mitigation measures**

# Implementing European framework

## CR (EC) No. 812/2004

- Using pinger in specific net fisheries, vessels =>12m
- Ensuring that ADD are fully operational when setting the gear
- Monitoring and assessing the effects of pinger use overtime
  
- Monitoring specific fisheries, period, vessels => 15m,
- Pilot projects for specific fisheries, period, vessels < 15m
  
- [Facing out driftnets]
  
- Annual reporting to the EU

# Implementing European framework

**CR (EC) No. 812/2004**

**– Annual reporting to the EU**

**Some do, with much information and in time (UK, France, NL)**

**Some are sparing information and data and/or do not use the required format for reporting effort (DE), or do not report fishing effort**

**Some don't: Finland, Spain, Sweden, France (2013). Germany (2014)**

**Uncertainty of the representativeness of total fishing effort reported for all MS**

# - Pingers

- On any bottom-set gillnet or entangling net
- Operational at setting
- Effect over time

 TL < 400 m, 08-10

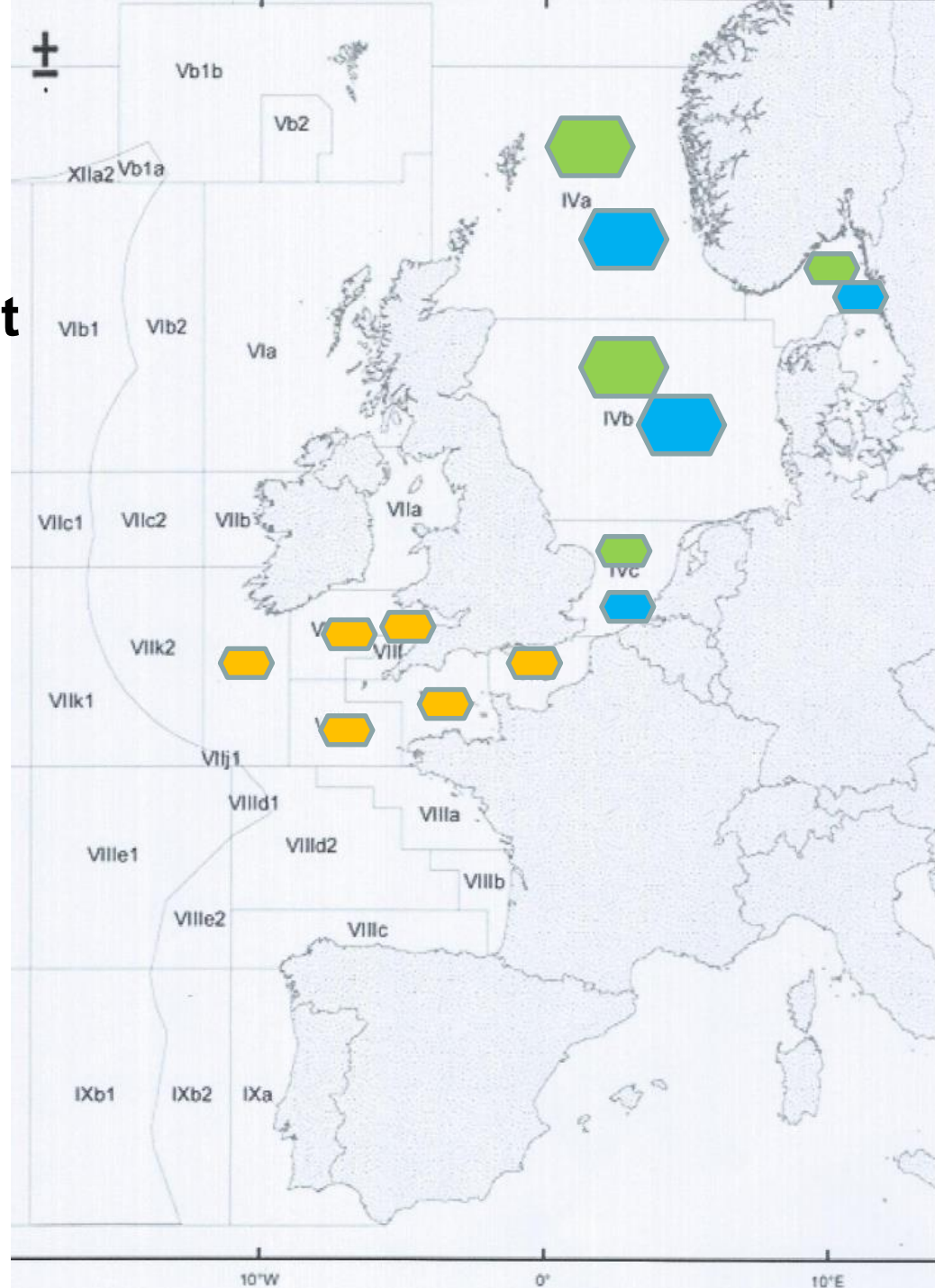
 Mesh => 220 mm, 01-12

 All year, VIIdefghj

➤ Do: UK

➤ ?: DK, PL


➤ Don't: FR, IE, NL, SE



# - Monitoring

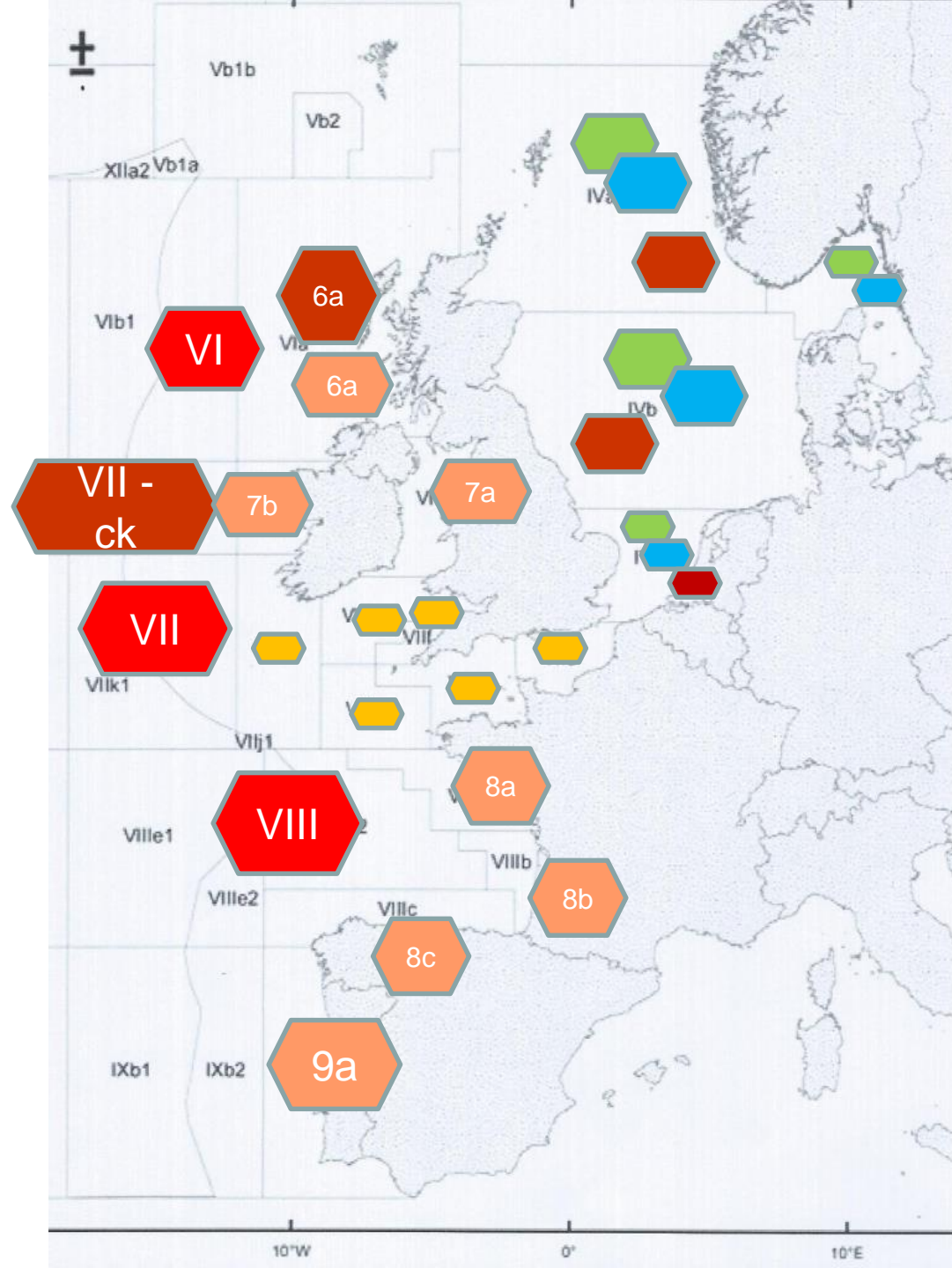
- Monitoring level /fleet size > 15 m
- Projects < 15 m

 Pelagic trawls (s + p)

 Bottom-set GEN, MS=>80mm

 Driftnets

- Pelagic trawl: ok
- GEN: some, low effort
- Driftnet > 15, none



# Implementing European framework e.g. NS

## Regular evaluation of fisheries – risk assessment

- Except in a few sectors, the level of bycatch monitoring is very low and below 1%,
- Overall, the dedicated monitoring of bycatch is conducted at a level of 0.5% or less in the Channel, North Sea proper and ICES area IIIa, except NL



**over 99% of net fishing in the NS is conducted without any marine mammal bycatch monitoring**



**DCF framework & coverage overestimated**

# **EFFECTIVE BY-CATCH** **MONITORING AND MITIGATION**

**Flexibility for accommodating dynamic process**

**Pragmatic approach: principle of sufficient sampling -  
low enough impact of fisheries**

**Synergy in monitoring between EU instruments, with all  
PETs species listed under HD and other instruments**

**Addressing recreational fisheries**

**Measures directed at high impact fisheries (high fishing  
effort / high bycatch)**

**Monitoring effectiveness of mitigation measures**

**Homogeneity across requirements (vessel length)**

**Incentives, but robust penalties for non-compliance**



# By-catch effective monitoring and mitigation

## Reporting

**Accessibility, transparency and harmonisation**

**Required standard format of reporting BC information and fishing effort data / penalties if not**

- **D.A.S and net metre/fishing hr (nets), fishing hr (trawl)**
- **ICES area not over-aggregated (e.g. VII ed)**
- **Non aggregated gear type, clear definition of gears**
- **All vessel size**

**Infringement reporting for all vessels**

**Polyvalent fisheries – BC unit: landing of target species**

# By-catch effective monitoring and mitigation

## Monitoring

**Target:** prioritise high impact fisheries

**All set net fisheries, hake set net, bass & tuna fisheries, VHVO vessels  $\leq$  15m, w/wo pingers**

**keeping some monitoring on Fish. having had a high BC**

**Level:** target coverage / risk assessment minimum sampling

**Combined monitoring: increase data pool & cost effectivity**

**inclusion of all PETS in all EU monitoring schemes**

**DCF does not fulfill requirement for PETs - necessity for defining protocol and target**

**Incentives for accepting observers / REM onboard**

# By-catch effective monitoring and mitigation




## Mitigation

Measures: no measure but target to bycatch reduction

necessity of defining 'hard' target for bycatch reduction -  
so efficiency can be assessed

financial resources available for improvement and  
alternative mitigation methods

Target: based on likely bycatch rate (BRA) associated to  
specific bycatch rate limits

-  needs total overall fishing effort in the areas of risk
-  needs specific bycatch rate limits
-  all size vessels targeted, not only > 12m

Enforcement: clearly defined and efficient, penalties

# By-cath effective monitoring and mitigation

## *Mitigation methods*

**ADDs: no specification, but a proven ability in reducing bycatch in commercial fisheries**

**significant reduction (> 80%)**

**high level of confidence (> 95%)**

**rigorous experimental design**

**randomization of signal emission (reduce habituation)**

**handling-friendly (longevity, easy to use, safe...)**

**Alternative MM: incentives for continuing effort**

**socio-economic benefits**

**eco-labelling**

**[good work in Sweden and Denmark]**

# THANKS ...



**Fish wireless, solve the bycatch problem!**