

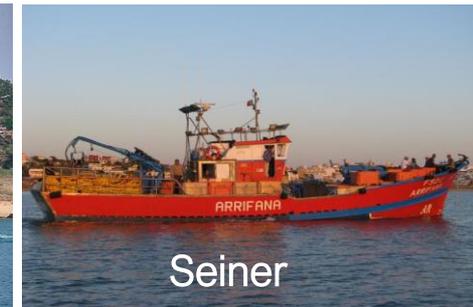
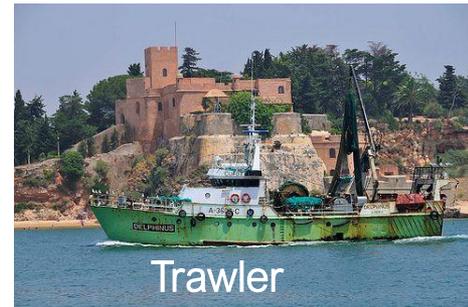
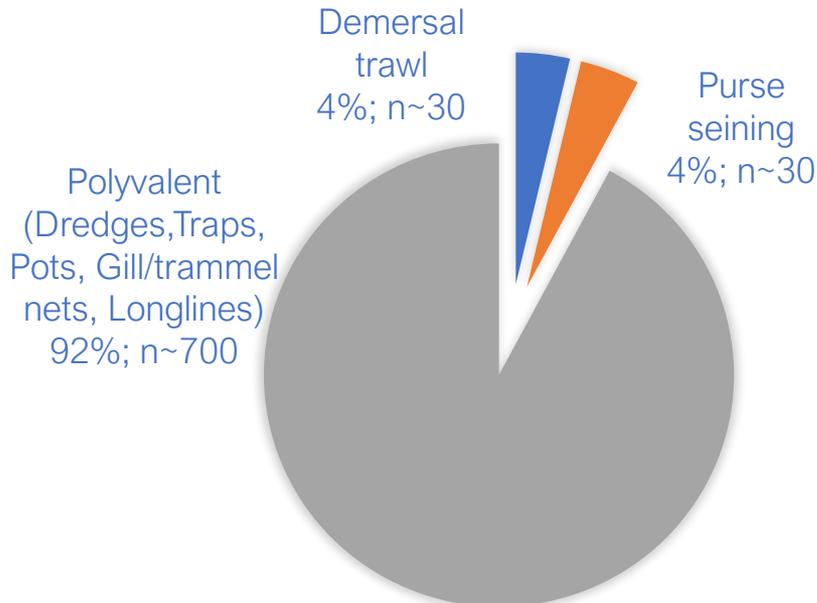
Project iNOVPESCA: Cetacean interactions with Algarve (Southern Portugal) coastal fisheries and mitigation approaches

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Overview: Fisheries in the Algarve

- 700-800 boats
- 34 % national local/coastal fleet
- 3 types of fleets: Demersal trawl; Purse seining; Polyvalent
- ICES area IXa



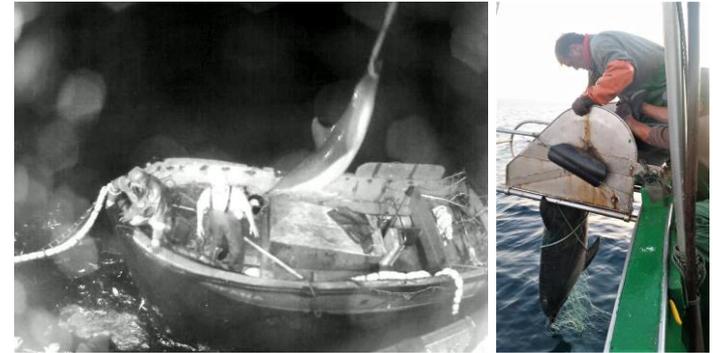
Overview: Interactions of cetaceans and PT fisheries

Previous projects (Safesea_EEAGrants 2008-2010; LIFE MarPro 2011-2016)

• **Bycatch**

- Improved monitoring of bycatches: strandings, observers, interviews, logbooks, video
- All gears; gears of most concern are bottom set-nets (year-round), purse seine (seasonal), beach seine (seasonal)
- Several cetacean species bycaught in Bottom set nets (e.g. +++ common dolphin, + striped dolphin, + harbor porpoise and + bottlenose dolphins); No robust bycatch estimates
- **Common dolphin** interacts with purse seine; (96 %; *Marçalo et al 2015*)
 - > 50 % released alive; bycatch estimates: 200-400 common dolphins encircled/100-200 dead per year; + **sardine**

- **Depredation** with gear and fish catch damage; **bottom set nets**; **bottlenose dolphins**; south of the country (**Algarve**); +++ **gillnets** target hake, ++ gillnets other species, ++ trammel nets

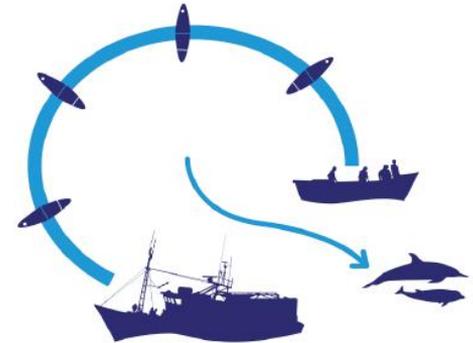


Overview: Past mitigation in Algarve

Fumunda pingers (Purse seine and Gillnets; 2014 – 2015)



10 KHZ and 70 KHZ



FishTeck Banana Pingers (Gillnets; 2017)



40 KHZ



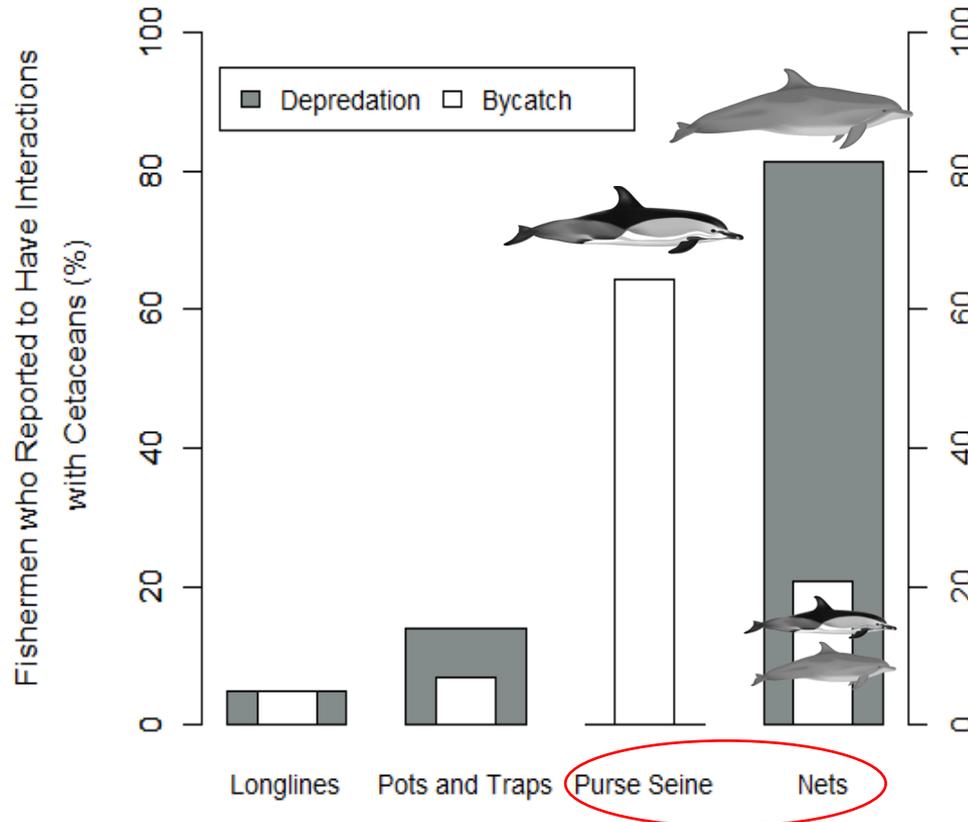
Purse seine - Higher encirclement and mortality rates of common dolphins in sets with pingers
Gillnets - Habituation – dinner bell effect within few months; bycatch/mortality in pingered nets

Project Mar2020 – iNOVPESCA

Reduction of incidental captures of MPS in coastal Algarve fisheries:
Innovation of procedures and mitigation measures (2018-2021)

Results: Harbour questionnaires

Alexandre et al. (in prep.)

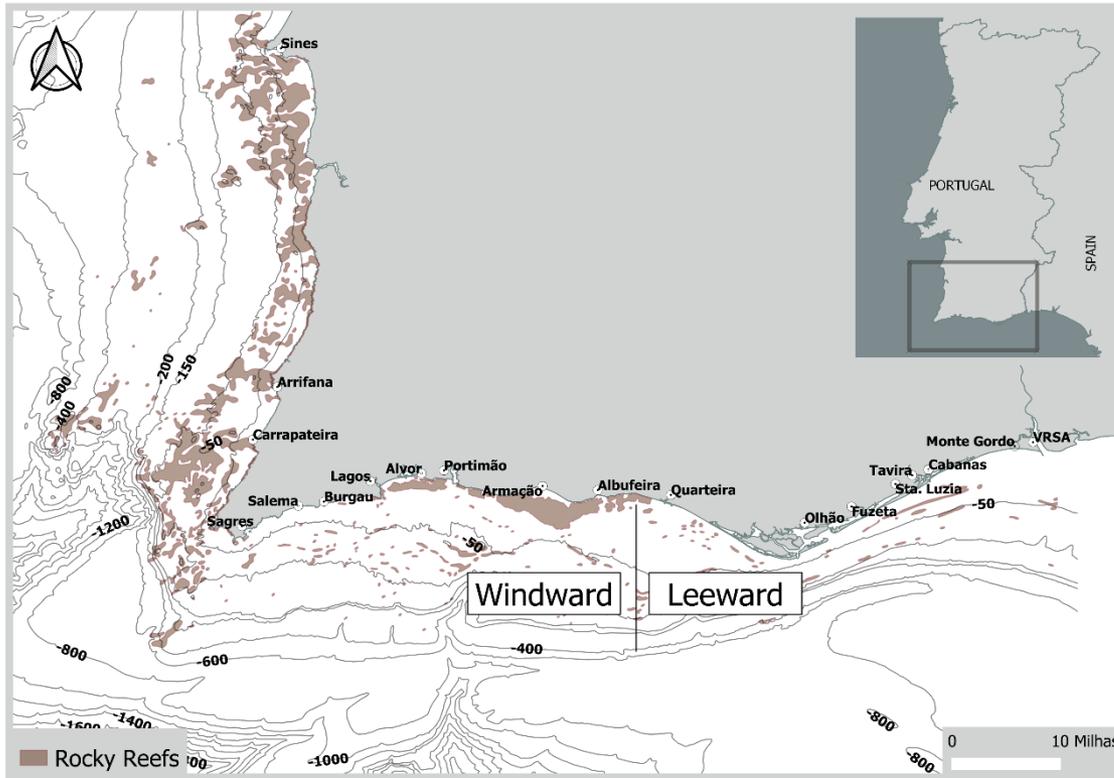


Project Mar2020 – iNOVPESCA

Reduction of incidental captures of MPS in coastal Algarve fisheries:
Innovation of procedures and mitigation measures (2018-2021)

Results: Harbour inquiries

Alexandre et al. (in prep.)



- For **bottom set-nets** significant differences in interaction rate (depredation) is **area** and **species dependent**
 - Bottlenose dolphins
 - Leeward with higher interaction rate
- For **purse seine** significant differences in interaction rate (bycatch) is **species dependent** only
 - Common dolphins

ECONOMIC LOSS – Nets; Bottlenoses; ~3 % Windward and ~15 % Leeward

Project Mar2020 – iNOVPESCA

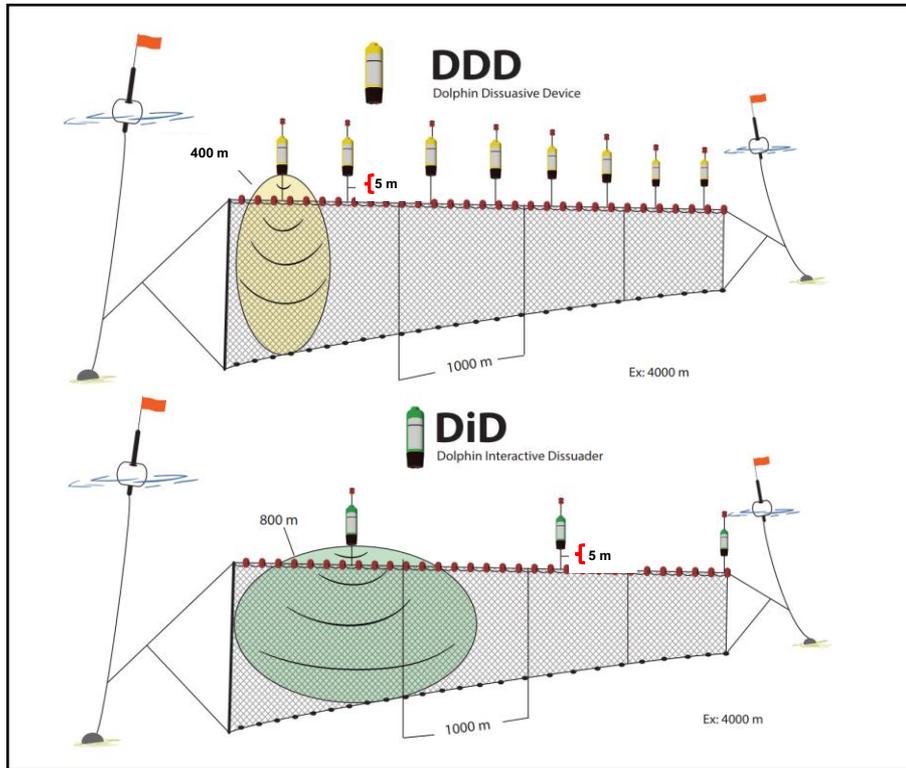
Reduction of incidental captures of MPS in coastal Algarve fisheries:
Innovation of procedures and mitigation measures (2017-2021)

ACTION 3: TEST MITIGATION MEASURES

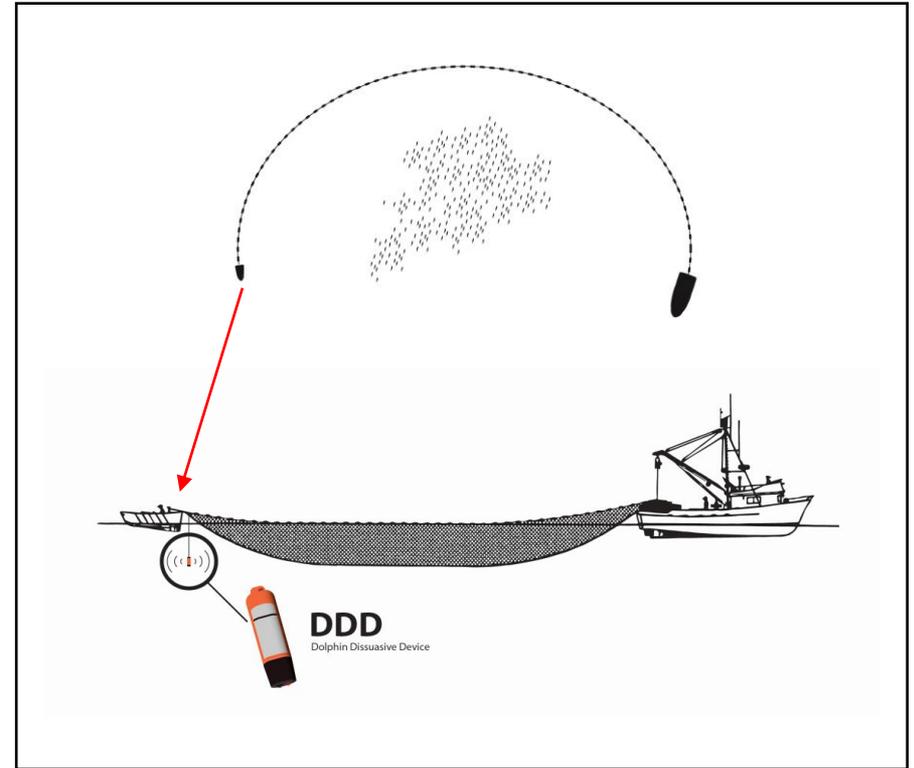
(Collaboration with the fishing sector)



BOTTOM GNS and GTR; 2019-Present



PURSE SEINING; 2020

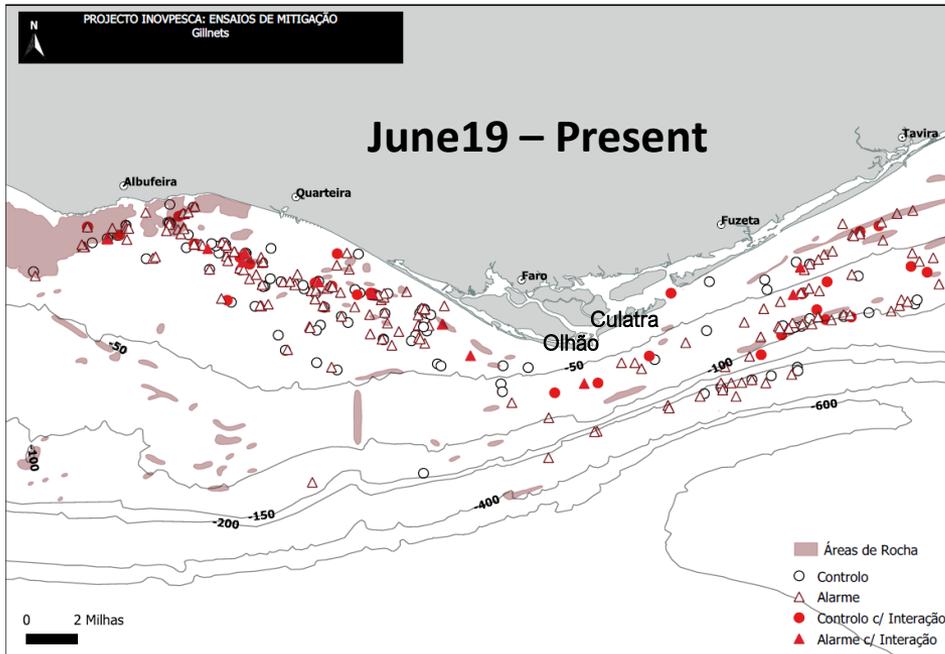


Action 3: Test mitigation measures



Methods: Mitigation Bottom set-nets

Marçalo et al. (in prep.)



- **Fishing harbor; vessel size; observer scheme; target fish/meshsize; acoustic device**
 - **Olhão**; 1 vessel > 12m; observer/logbooks; targets **Hake** (GNS 80 mm); Device: DiD
 - **Quarteira**; 1 vessel < 10 m; logbooks; targets **Red-mullet** and **Hake** (GNS 60 mm); Device: DDD
 - **Culatra**; 1 vessel < 9 m; logbooks; targets **Red-mullet** and **Hake** (GNS 55 mm) and **cuttlefish** and **sole** (GTR 120 mm); Device: DDD
- **Treatments**
 - 1 control/no alarms
 - 1 Alarms

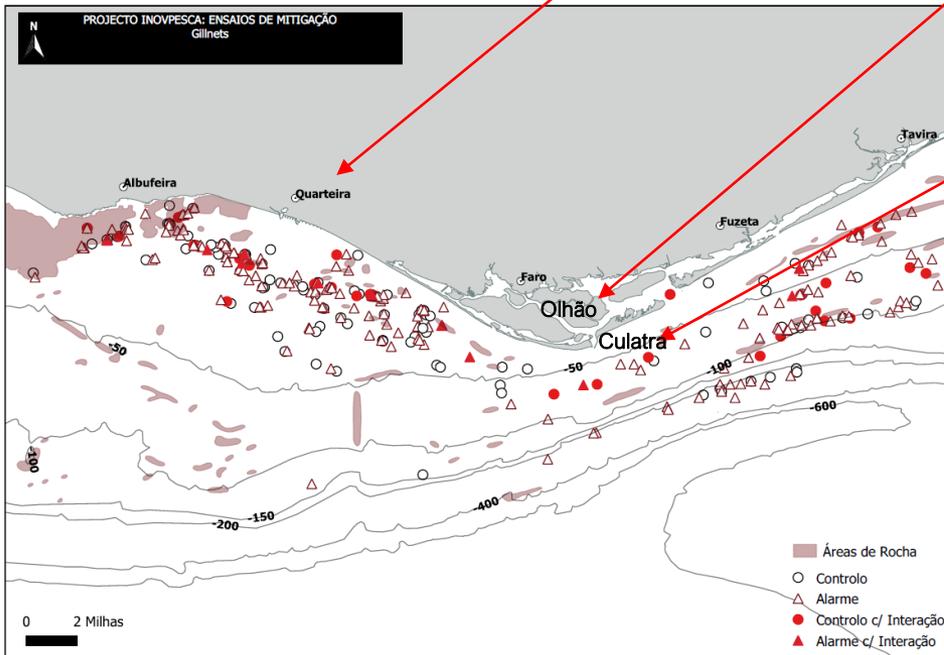
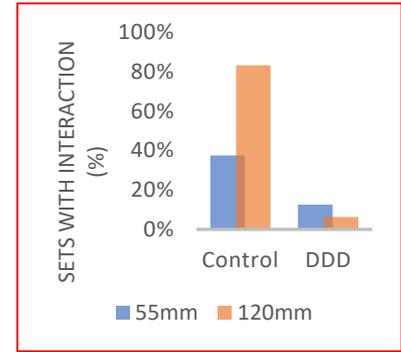
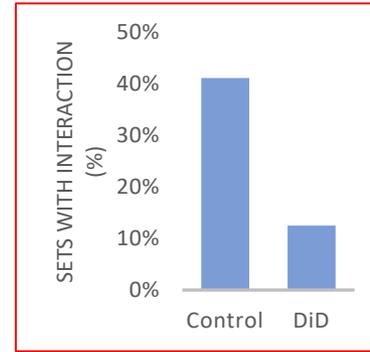
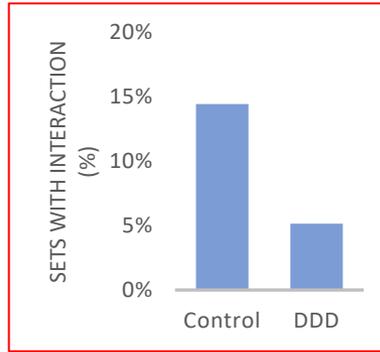
Action 3: Test mitigation measures



Results: Mitigation Gillnets

Marçalo et al. (in prep.)

- 17 months testing
- Increased CPUE (double in alarm sets)
- Depredation reduction 60-70 % (Hake, Red mullet); ~100 % (Cuttlefish, sole)
- **Higher profit = Happy fishers**



BYCATCH GNS 220

- ✓ Targets Monkfish
- ✓ Soaking times are 3x other meshes
- ✓ 65 sets/65 trips
- ✓ 2 bycatch events (1 DD/ 1 TT)

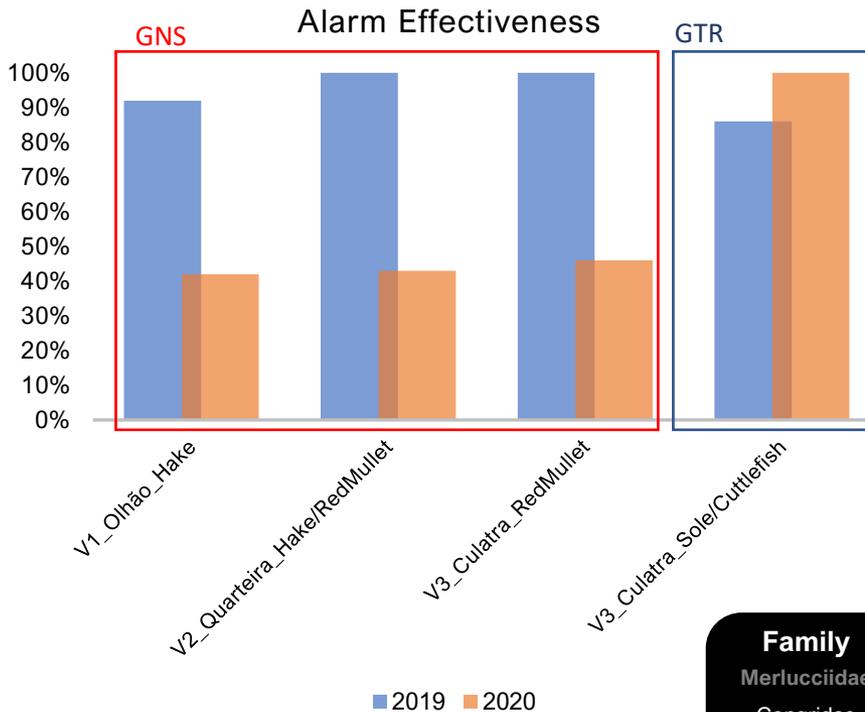
Action 3: Test mitigation measures



Results: Mitigation Gillnets

Marçalo et al. (in prep.)

HABITUATION?



- Habituation when favorite prey is targeted
- Diet - Hake (*Merluccius merluccius*) most important prey of bottlenose dolphins in PT mainland waters (Marçalo et al in prep)

Family	Species	%N	%O	%W	IRI*
Merlucciidae	<i>Merluccius merluccius</i>	15,86	60,47	22,01	2289,96
Congridae	<i>Conger conger</i>	12,55643	58,13953	14,14267	1552,273
Gadidae	<i>Micromesistius poutassou</i>	20,03386	32,55814	9,155599	950,3545
Mugilidae	<i>Liza sp.</i>	3,075621	20,93023	29,0796	673,0162

* IRI = (%N + %W) * %O

Action 3: Test mitigation measures

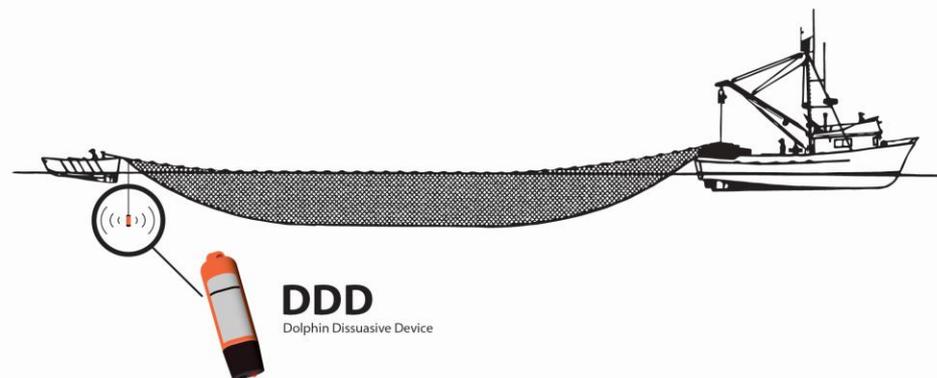
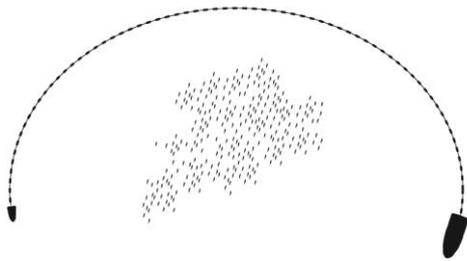


Methods: Mitigation Purse Seine



- Fishing harbor; observer scheme; target fish

- 4 vessels (Control vs Alarm)
- observer/logbooks; target **Sardine**; Device: DDD

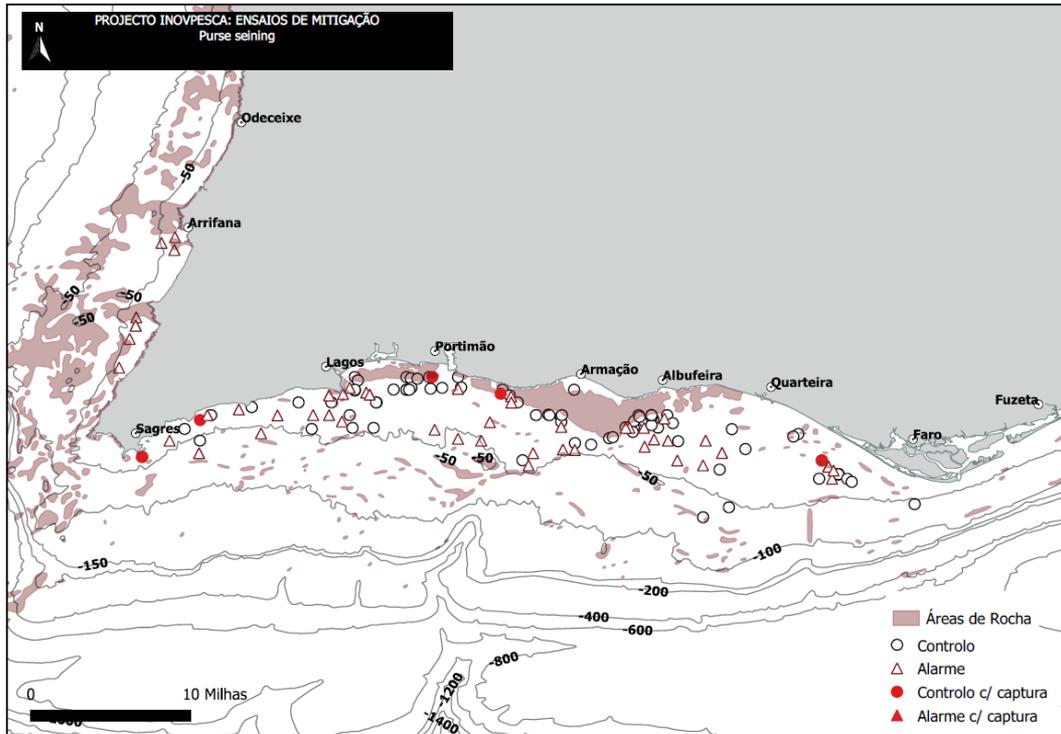


Action 3: Test mitigation measures



Results: Mitigation Purse Seine

Marçalo et al. (in prep.)



- Incidental captures observed in control (no use of alarms) sets only
- Species bycaught 100% *Delphinus delphis*
- Bycatch rate of 0.36 animals/set
- Mortality rate of 0.05 animals/set

FORESEEN WORK 2021...

- **MITIGATION:**

1. Monitor habituation in GNS & GTR; 2. Repeat trials in purse seine; 3. Analyse for seasonal, area, depth effects; 4. Development of a manual of good practices and deliver it to the fishers and associations

- **MSFD EUROPEAN PROJECT – CetAMBICion** (Coordinated Cetacean Assessment, Monitoring and Management Strategy in the Bay of Biscay and Iberian Coast sub-region; March 2021-March 2023)

Partners: Spain, Portugal, France

Goal: Urgent need to reduce of cetacean bycatch in EU fisheries along the Bay of Biscay and Iberia

WP 4: Proposal of coordinated measures to address cetacean bycatch; Task 4.3. Pilot mitigation trials: Fixed and seine nets (pingers)





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iNOVPESCA
MITIGAÇÃO DE INTERAÇÕES PESCA-CETÁCEOS



**THANK YOU
OBRIGADA**

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