

Current cetacean bycatch issues in European waters

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Monitoring the effectiveness of pingers in reducing cetaceans' bycatch in Bulgarian bottom set gillnets



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ACCOBAMS-ASCOBANS Joint Bycatch Working Group (JBWG) Workshop

Turbot fishery in Bulgaria

Executive Agency of Fisheries and Aquaculture (EAFA): Number of permits in Bulgaria

2019	2020	2021	2022
116	124	126	126

Involved vessels:

2019	2020	2021	2022
5	4	3	6

Typically 2 main fishing campaigns: spring and summer

Soaking time: 7 to 20 days

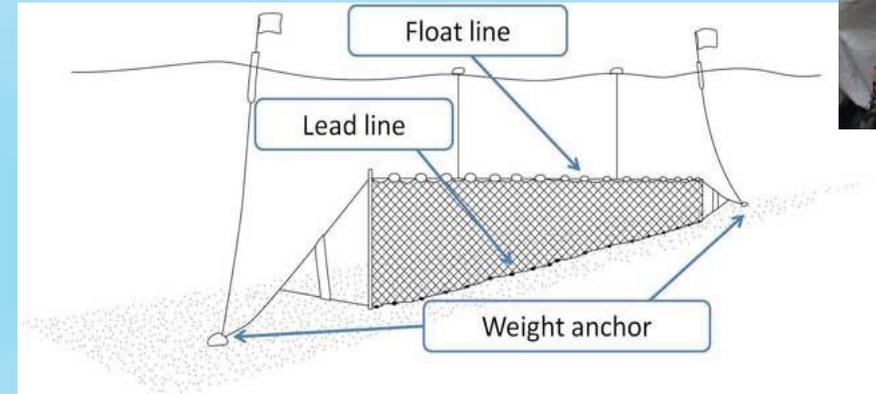
Used types of pingers:

Future Oceans – 10 kHz, 132 dB NETGUARD

Future Oceans – 70kHz, 145 dB NETGUARD

Porpoise Alerting Devices (PAL) – 10 kHz, 132 dB

by F³: Maritime Technology



2019

Material and methods

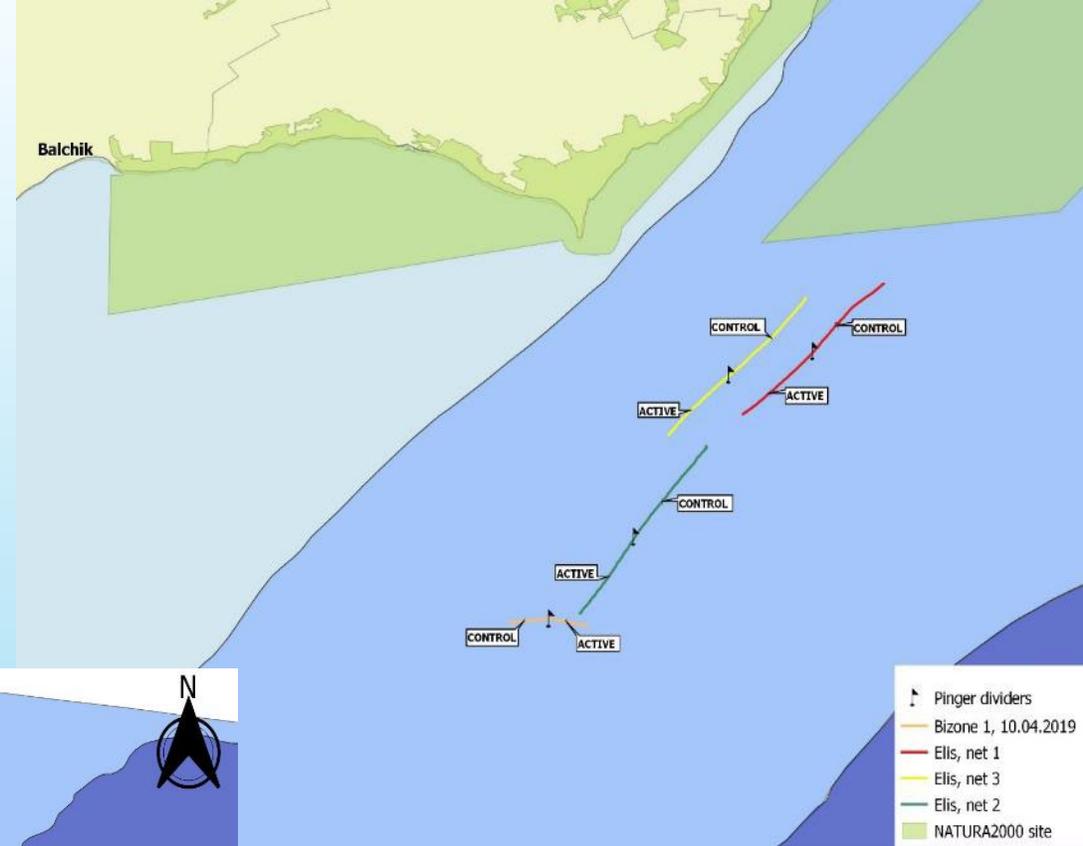
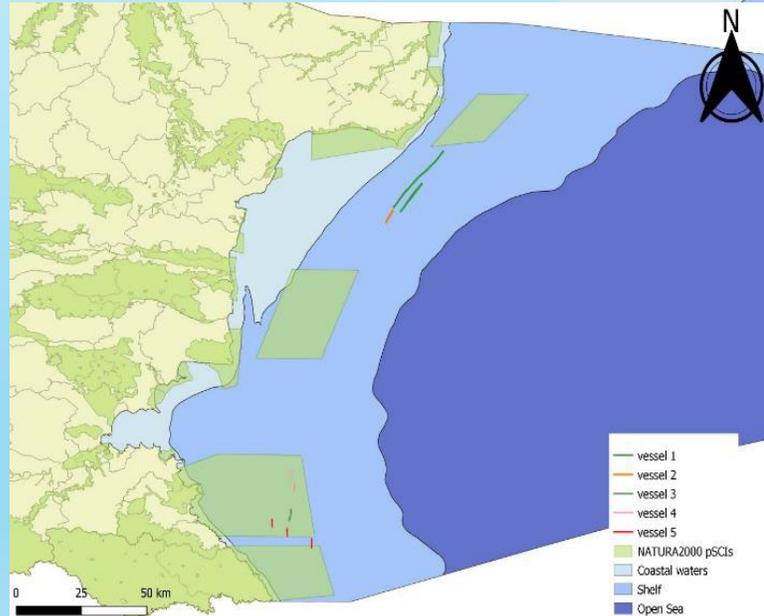
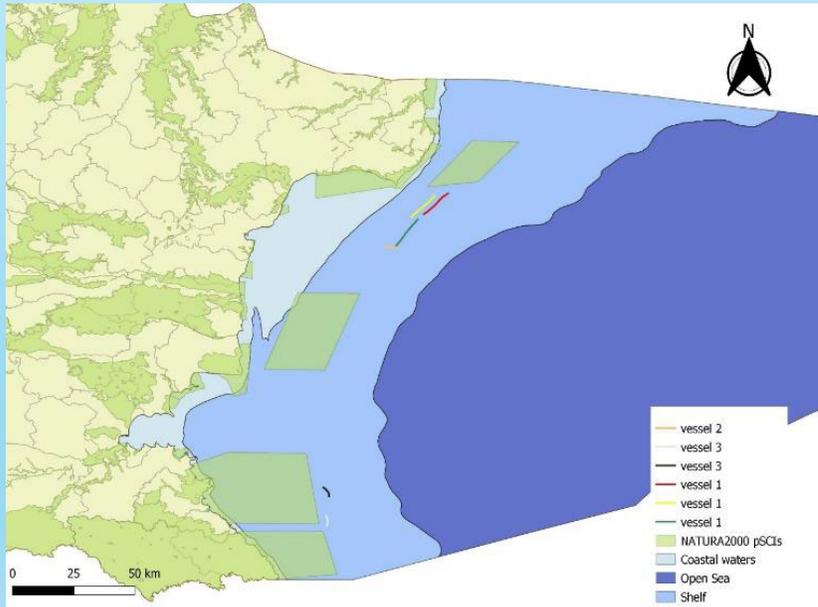
Shelf waters of Bulgarian Black Sea waters

Independent observers

Mixed strings of active and control sections

Spring – 50,28 km; Summer – 51,65 km

$$\text{Bycatch} = \frac{\text{individuals}}{\text{day.km}^2}$$

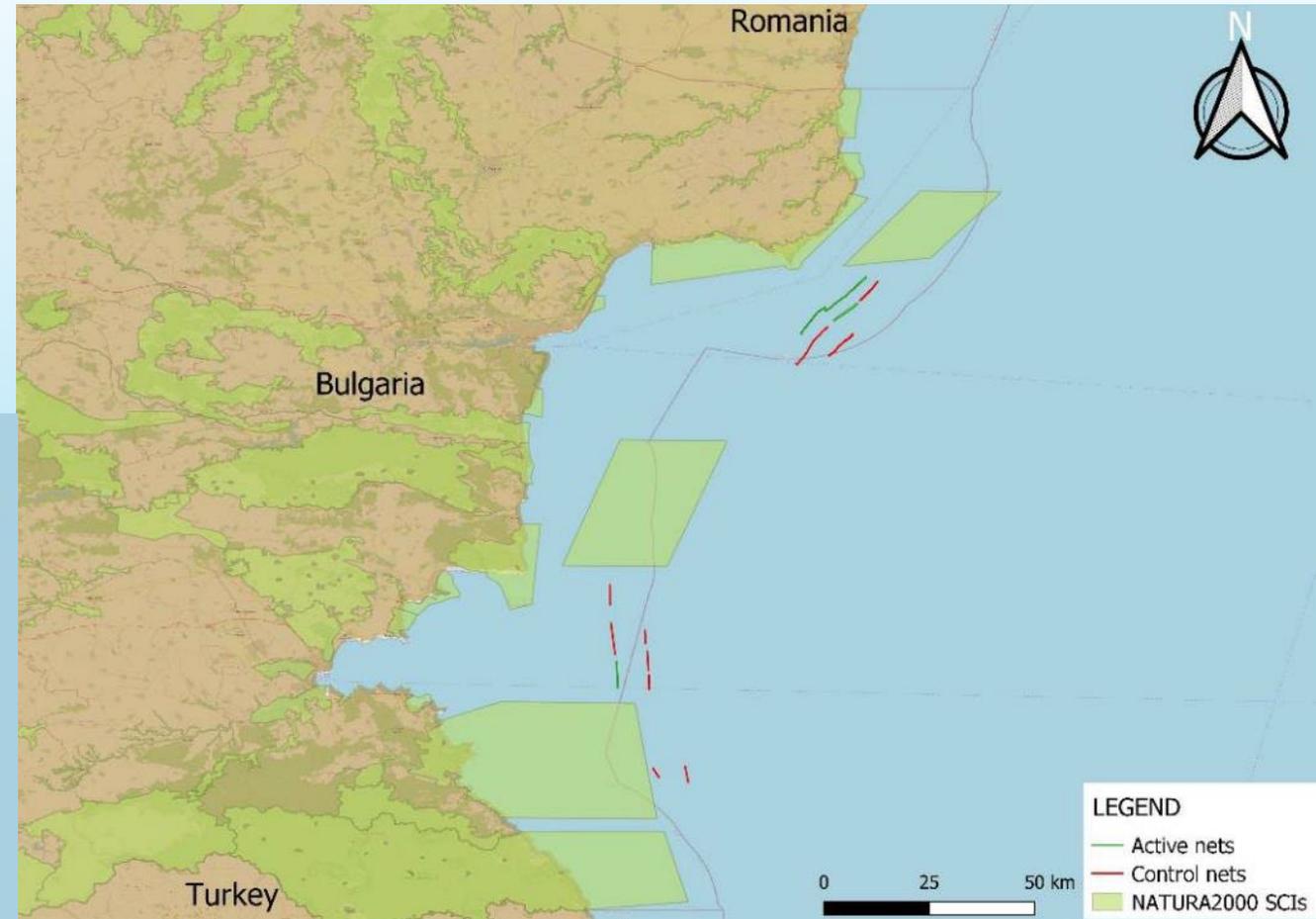
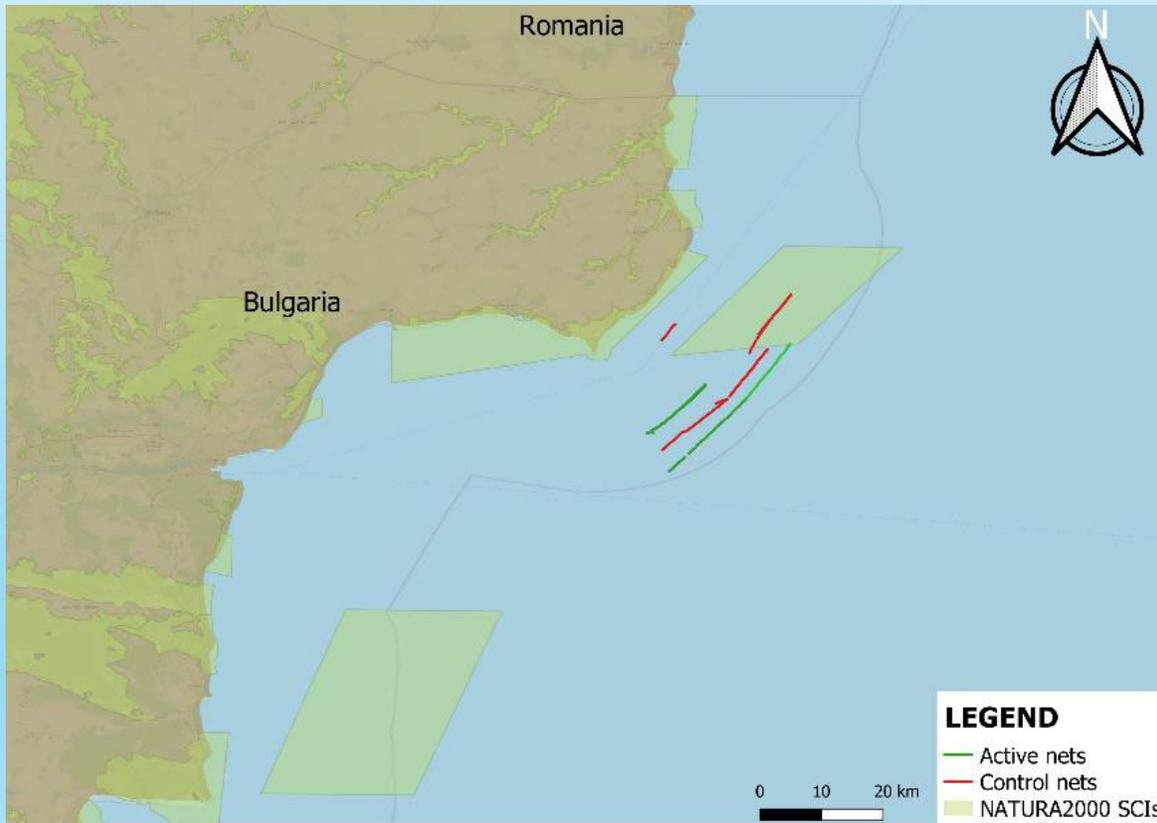


2020

Material and methods

Shelf waters of Bulgarian Black Sea waters
Independent observers

Separate strings of active and control nets
Spring – 82,76 km; Summer – 71,8 km



2021

Material and methods

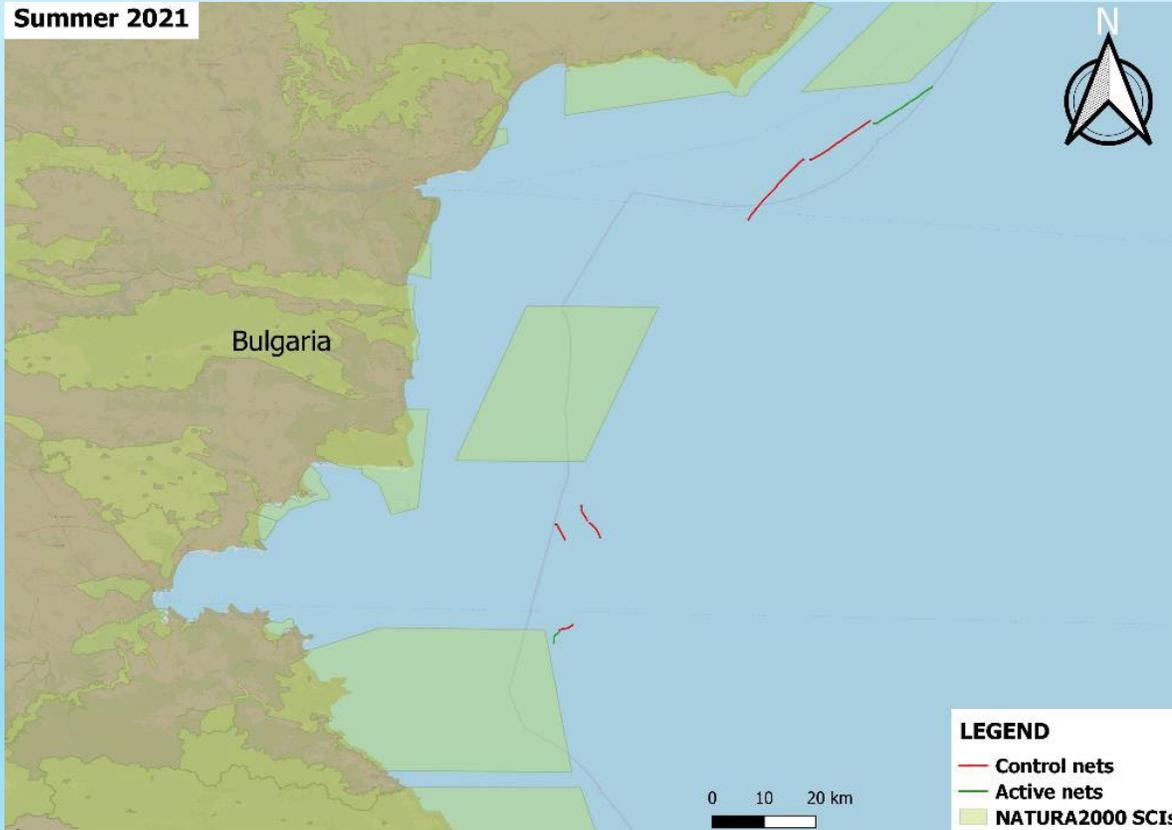
Shelf waters of Bulgarian Black Sea waters

Independent observers

Separate strings of active and control nets

Spring – 39,12 km; Summer – 50,2 km

Summer 2021



Spring 2021



2022

Material and methods

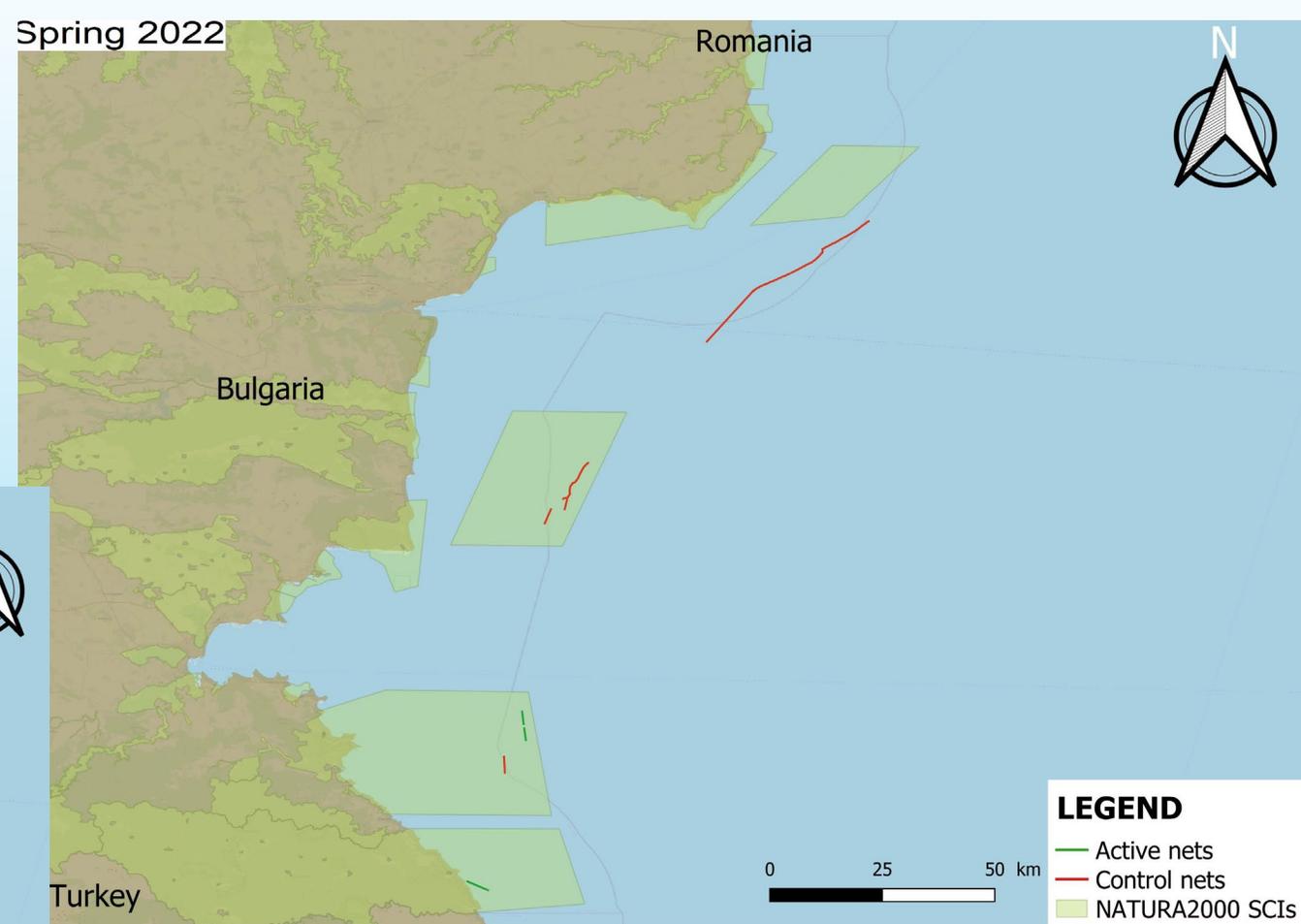
Shelf waters of Bulgarian Black Sea waters

Independent observers

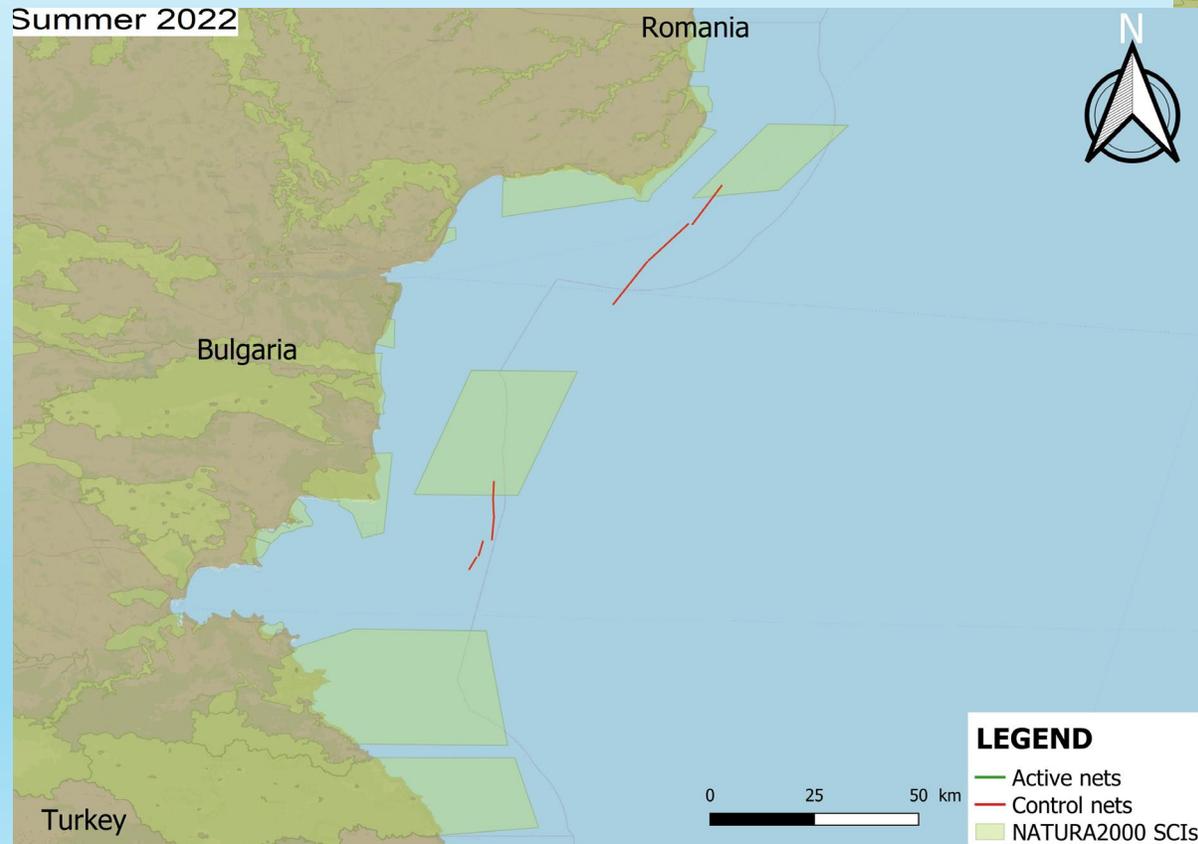
Separate strings of active and control nets

Spring – 77,62 km; Summer – 52,1 km

Spring 2022



Summer 2022



Results 2019

Sample size: 4,3 % of licensed fishing vessels for turbot fishery in 2019

Soaking time: 18-26 days in **spring**; 7-20 (91*) days in **summer/autumn** at **depth:** 68-88 m
Total: 105 bycaught cetaceans – 1 *Tursiops truncatus* and 104 *Phocoena phocoena*

Seasonal distribution: significant increase in bycatch in summer – from 6 to 99!! *Phocoena phocoena* bycatch rate in summer - **2,2 ind./km** was amongst the highest reported rates for the Black Sea.



Results 2020

Sample size: 3,2 % of licensed fishing vessels for turbot fishery in 2020

Soaking time: 14-31 days in **spring**; 7-14 days in **summer/autumn** at **depth:** 45-83 m

Total: 47 (*9 in spring and 38 in summer*) bycaught cetaceans – 1 *Tursiops truncatus*; 3 *Delphinus delphis* and 43 *Phocoena phocoena*

Seasonal distribution: higher bycatch in summer!!!



Results 2021

Sample size: 2,4 % of licensed fishing vessels for turbot fishery in 2021

Soaking time: 13-16 days in **spring**; 12-26 days in **summer** at **depth:** 70-86 m

Total: 31 bycaught cetaceans – 2 *Tursiops truncatus* and 29 *Phocoena phocoena*

Seasonal distribution: higher bycatch in summer (21) compared to spring (10)!!!



Results 2022

Sample size: 4,8 % of licensed fishing vessels for turbot fishery in 2022

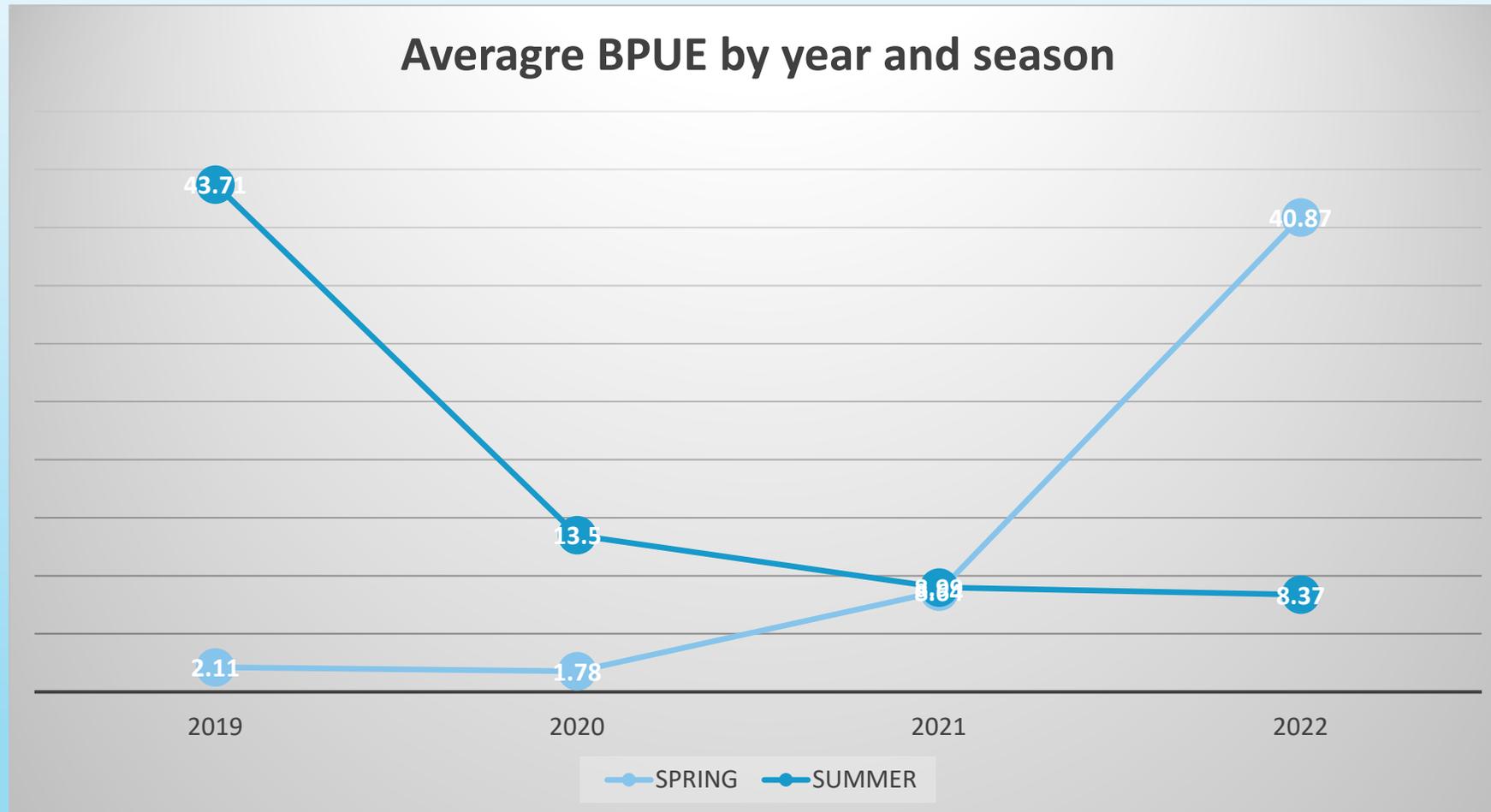
Soaking time: 10-19 days in **spring**; 13-15 days in **summer** at **depth:** 50-94 m

Total: 67 bycaught cetaceans – 8 *Tursiops truncatus* and 59 *Phocoena phocoena*

Seasonal distribution: higher bycatch in spring (21) compared to summer (10)!!!



Results 2019-2022



Seasonal distribution: change in 2022, impact of war in Ukraine?

Results from the study were used for estimation of Black Sea harbour porpoise bycatch level in Bulgarian Black sea waters:

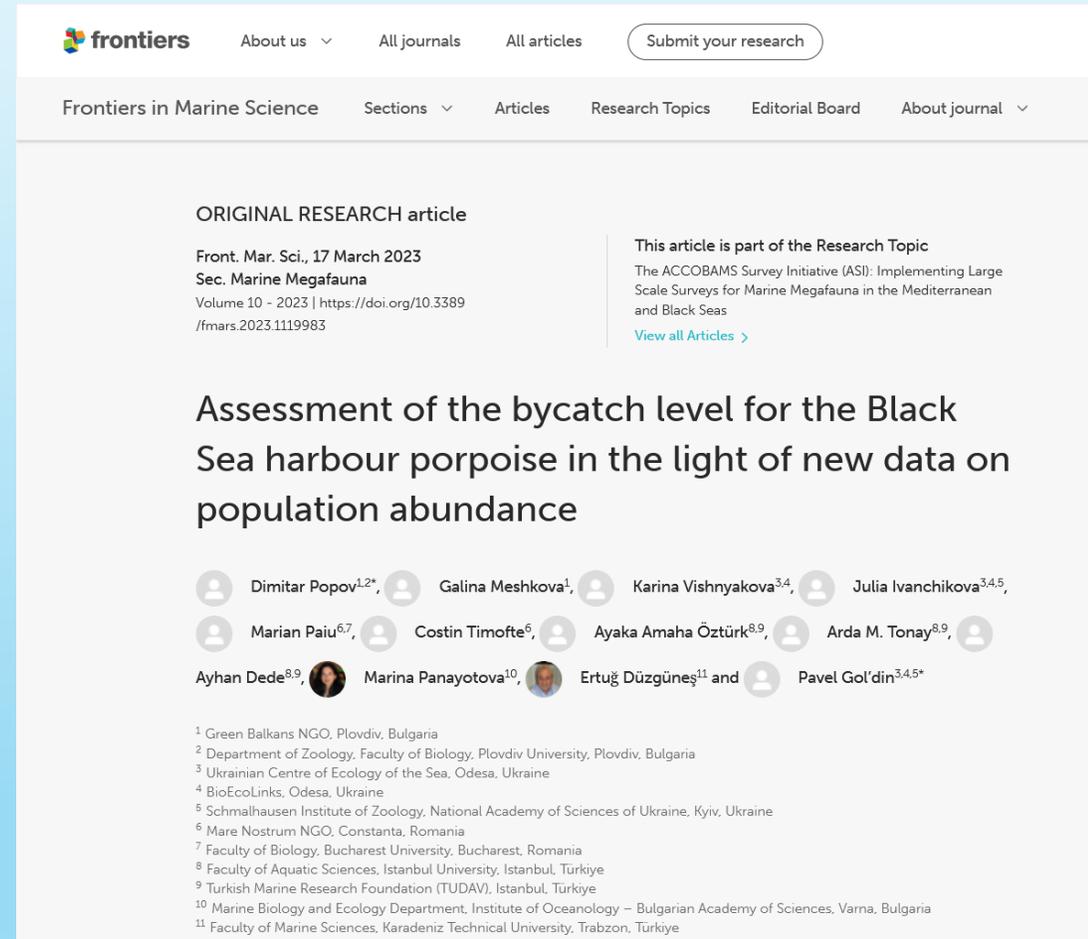
	2019	2020	2021	2022
Fishing vessels	116	124	126	126
Fishing operations, median	2	5.5	6	3
Bycatch per operation, median	1	1	0.5	2
Total bycatch, median	232	682	378	756
Share of population	2.08%	10.82%	11.65%	5.02%
Total bycatch based on ind./km	1815	529	552	784
Share of population	16.29%	10.82%	16.99%	5.21%
Total bycatch (Northridge&Fortuna, 2008)	2515±1176	1376±525	1246±476	1295±230
CV	46.75%	38.14%	38.18%	17.77%
Share of population	22.58%	28.14%	38.39%	8.61%

Results from the study were used for estimation of Black Sea harbour porpoise bycatch level in the Black Sea:

Popov D, Meshkova G, Vishnyakova K, Ivanchikova J, Paiu M, Timofte C, Amaha Öztürk A, Tonay AM, Dede A, Panayotova M, Düzgünes, E and Gol'din P (2023) Assessment of the bycatch level for the Black Sea harbour porpoise in the light of new data on population abundance. *Front. Mar. Sci.* 10:1119983. doi: 10.3389/fmars.2023.1119983

<https://www.frontiersin.org/articles/10.3389/fmars.2023.1119983/full>

CONCLUSION: EVEN THE MOST CONSERVATIVE ESTIMATE EXCEEDS THE MOST LIBERAL REMOVAL RATE FOR BLACK SEA HARBOUR PORPOISE



The screenshot shows the article page on the Frontiers website. At the top, there is a navigation bar with the Frontiers logo, 'About us', 'All journals', 'All articles', and a 'Submit your research' button. Below this is a secondary navigation bar with 'Frontiers in Marine Science', 'Sections', 'Articles', 'Research Topics', 'Editorial Board', and 'About journal'. The main content area features the article title 'Assessment of the bycatch level for the Black Sea harbour porpoise in the light of new data on population abundance' and the authors' names: Dimitar Popov, Galina Meshkova, Karina Vishnyakova, Julia Ivanchikova, Marian Paiu, Costin Timofte, Ayaka Amaha Öztürk, Arda M. Tonay, Ayhan Dede, Marina Panayotova, Ertuğ Düzgünes, and Pavel Gol'din. A sidebar on the right indicates that the article is part of a research topic: 'The ACCOBAMS Survey Initiative (ASI): Implementing Large Scale Surveys for Marine Megafauna in the Mediterranean and Black Seas'. At the bottom, there are 11 numbered footnotes providing affiliations for each author.

ORIGINAL RESEARCH article
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Sec. Marine Megafauna
Volume 10 - 2023 | <https://doi.org/10.3389/fmars.2023.1119983>

This article is part of the Research Topic
The ACCOBAMS Survey Initiative (ASI): Implementing Large Scale Surveys for Marine Megafauna in the Mediterranean and Black Seas
[View all Articles >](#)

Assessment of the bycatch level for the Black Sea harbour porpoise in the light of new data on population abundance

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Results of pingers' trials: FutureOceans 10 kHz

Used on different vessels and tested in:

- different configuration - mixed sets of active/control in 2019 and separate sets afterwards
- spacing (70, 100 and 140 m)

**Not significant
(t-test, $p > 0.05$)**

FO 10 kHz	Control net	Active
Year	Bycatch (ind./km ² *days)	Bycatch (ind./km ² *days)
2019	7,12	0,00
	2,16	2,38
	0,00	2,29
	0,00	8,16
	35,84	55,56
	103,90	86,58
	16,03	0,00
		16,03
2020	2,42	2,64
	0,00	0,00
	14,88	0,00
2021	26,46	0,00
	20,25	0,00
	0,00	0,00
2022	100,00	150,00
	150,00	
	0,00	0,00
	42,10	0,00
Total	521,15	323,64
Bycatch reduction		37,90%

Results of pingers' trials: FutureOceans 70 kHz

Used on different vessels and tested in:

- different configuration - mixed sets of active/control in 2019 and separate sets afterwards
- spacing (140, 200 and 280 m)

FO 70 kHz	Control net	Active
Year	Bycatch (ind./km ² *days)	Bycatch (ind./km ² *days)
2019	0,00	0,00
	0,00	6,67
	78,13	74,40
	56,69	0,00
2020	0,00	0,00
2022	0,00	42,10
Total	134,81	123,17
Bycatch reduction		8,64%

Not significant (t-test, p>0.05)

Results of pingers' trials: PAL 10 kHz

Year	Season	Vessel	Stand. net bycatch	PAL net bycatch	Outcome of t-test: paired samples, one-sided
2020	Spring	1	5,67	0	Hypothesis: PAL reduces bycatch in nets set at the same time and in the same area p = 0.003115 Conclusion: Significant at 0.05 level
2020	Summer	1	32,18	14,88	
2020	Summer	1	27,55	9,92	
2020	Summer	1	6,87	3,13	
2021	Spring	1	9,45	0	
2021	Spring	1	6,54		
2022	Spring	1	26,46		
2021	Summer	1	17,8	0	
2021	Summer	1	45,79		
2021	Summer	1	20,25		
		Sum	198,56	27,93	
		Bycatch reduction		85,93%	

CONCLUSIONS:

Significant difference between spring and summer (Mann-Whitney, U=266.5, p<0.05) for period 2019-2021 but not significant when 2022 added.

No significant difference in bycatch rates between active and control nets when FO pingers are used (t-test, p>0.05).

Significant reduction (86%) of bycatch with PALs (t-test, p<0.05)

Results of pingers' trials: PAL 10 kHz

RECOMMENDATIONS:

Report to Bulgarian MOEW, MAF and EAFA for further trials of PAL pingers;

No action by authorities even after infringement procedure by EC against Bulgaria has been started in June 2022;

CONCETA project in Turkey included trials of PAL pingers in Turkey around Sinop;

Presentation of results during GFCM WGFiT and BSWG in 2021 resulted in inclusion of trials in BlackSea4Fish project that are currently under way in Romania, Bulgaria and Turkey.



ACKNOWLEDGMENTS



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Bycatch monitoring was conducted within Support MSFD implementation in the Black Sea through establishing a regional monitoring system of cetaceans (D1) and noise monitoring (D11) for achieving GES CeNoBS **project co-funded by European Commission www.cenobs.eu**

Pinger trials in 2019 were made in Black Sea Harbour porpoise (*Phocoena phocoena relicta*) bycatch mitigation in the Bulgarian waters of the Black Sea project funded by **New England Aquarium, Boston, USA**

Pinger trials in 2020 and 2021 were made in Monitoring and mitigation of cetacean bycatch in Bulgarian waters project funded by **ACCOBAMS Supplementary Conservation Fund, MoU 14/2019**

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**THANKS FOR
YOUR
ATTENTION!**

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