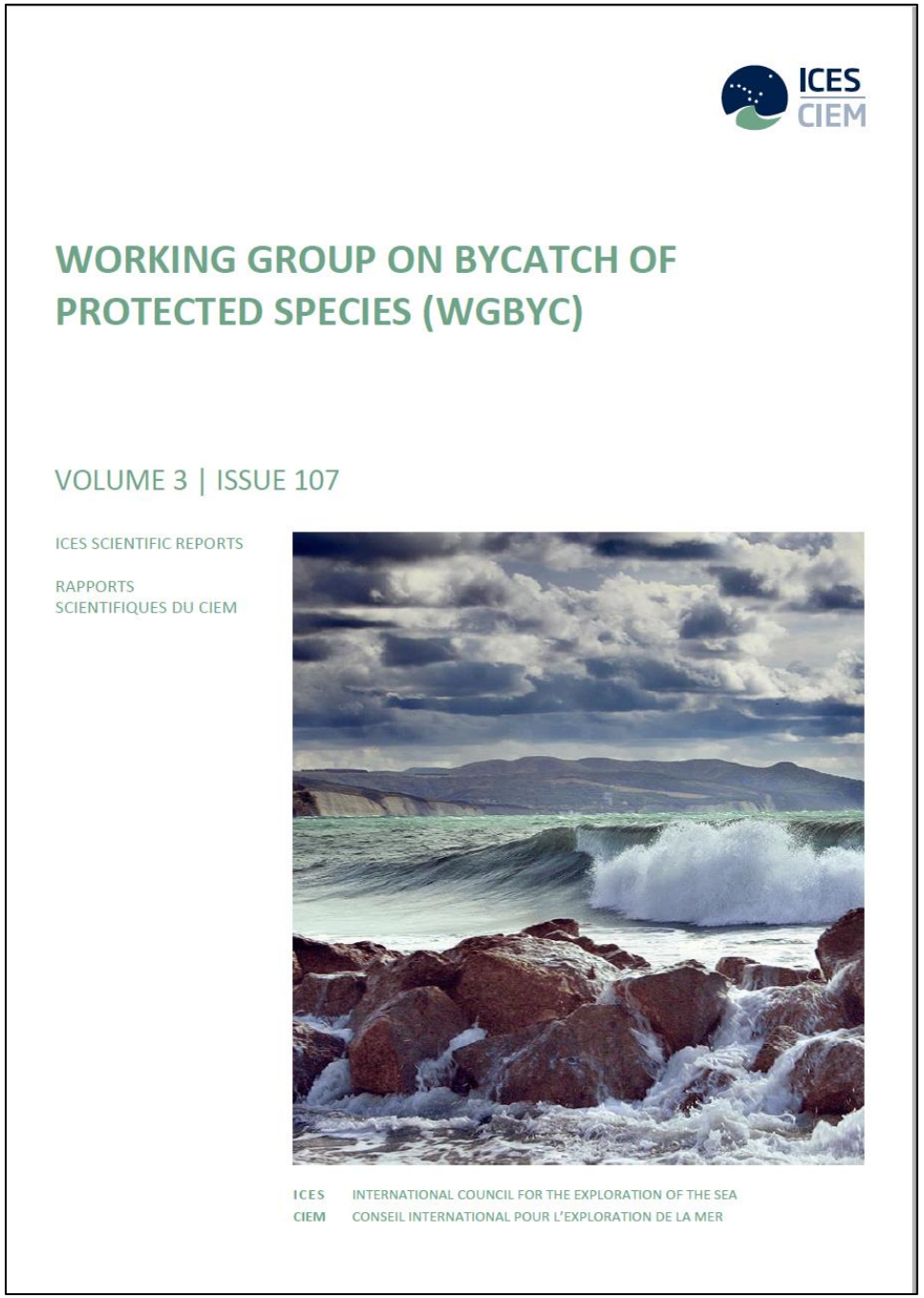


- **ICES WGBYC meeting was held online from 28 Sept - 1 Oct 2021**

- *Eight Terms of Reference were addressed:*

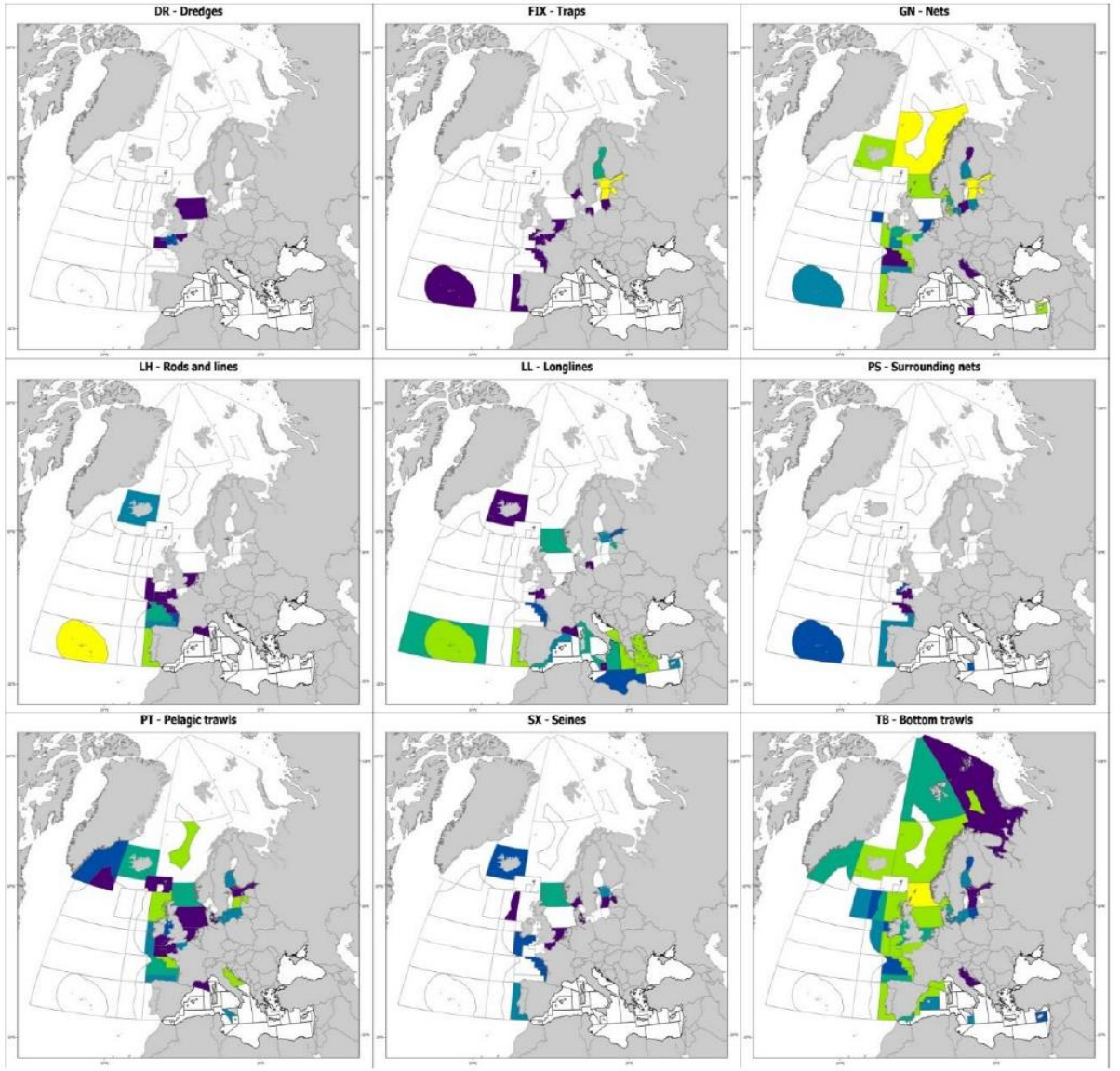
a) Review & summarise data on bycatch rates and mortality estimates through the annual data call and other sources
b) Collate and review recent published information on protected species bycatch mitigation methods and trials
c) Evaluate the range of impacts of bycatch on protected species population to assess likely conservation threats, including feedback on the results from WKMOMA
d) Review ongoing monitoring of different taxonomic groups in relation to spatial bycatch risk and fishing effort to inform coordinated sampling plans
e) Coordinate with other ICES WGs to ensure complete compilation of data on protected species bycatch, and develop and improve on bycatch monitoring methods
f) Identify data requirements on fishing effort, monitoring effort and bycatch incidents by considering spatial, temporal, and gear type aspects on bird bycatch
g) Identify potential research projects and funding opportunities
h) Continue developing, improving, populating & maintaining the database on bycatch monitoring and relevant fishing effort through data calls

REPORTED FISHING AND MONITORING DAYS AND NUMBER OF SPECIMENS AND INCIDENTS IN 2019 PROVIDED BY THE ICES WGBYC 2021 DATA CALL BY ECOREGION

Year	Ecoregion	ICES Area/ GFCM GSA	Métier 3	Taxa	Species	Total Observed Effort (Days at Sea)	Fishing Days	Monitoring Coverage	Incidents	No. Specimens
2019	Bay of Biscay and the Iberian Coast	27.8.a	Nets	Marine mammal	*Delphinus delphis*	164.83	220741.60	0.07%	4	4
2019	Bay of Biscay and the Iberian Coast	27.8.a	Pelagic trawls	Marine mammal	*Delphinus delphis*	167.75	22886.82	0.73%	8	13
2019	Bay of Biscay and the Iberian Coast	27.8.b	Bottom trawls	Marine mammal	*Delphinus delphis*	164.07	123485.13	0.13%	4	8
2019	Bay of Biscay and the Iberian Coast	27.8.b	Pelagic trawls	Marine mammal	*Delphinus delphis*	50.95	8573.72	0.59%	4	16
2019	Bay of Biscay and the Iberian Coast	27.9.a	Surrounding nets	Marine mammal	*Delphinus delphis*	45.00	15715.00	0.29%	1	2
2019	Celtic Seas	27.7.f	Nets	Marine mammal	*Delphinus delphis*	59.33	2326.58	2.55%	2	2
2019	Celtic Seas	27.7.g	Bottom trawls	Marine mammal	*Delphinus delphis*	172.93	65121.47	0.27%	1	1
2019	Greater North Sea	27.7.e	Nets	Marine mammal	*Delphinus delphis*	170.54	81971.71	0.21%	3	4

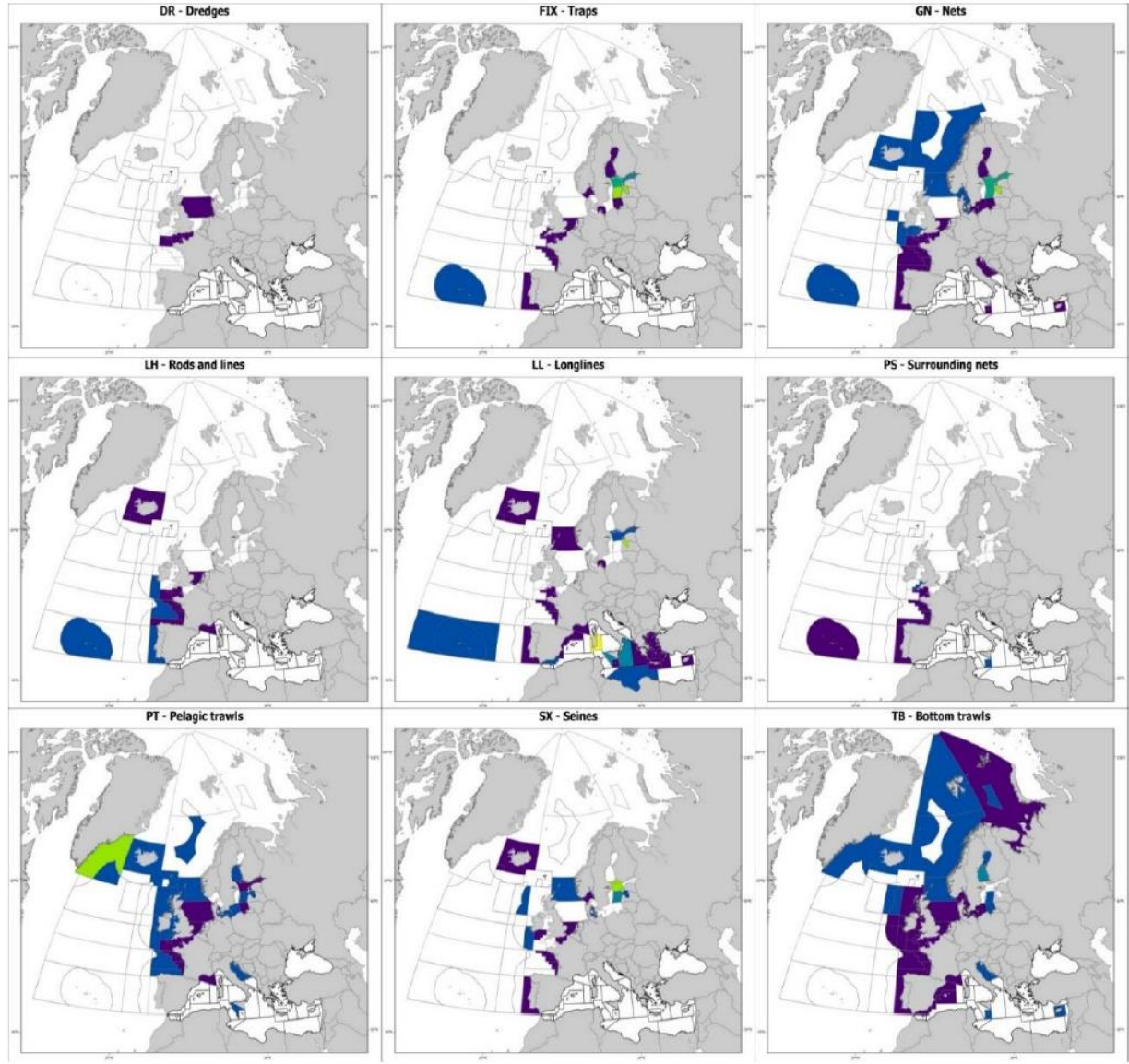
Fishing effort
(days at sea)

- Less than 1,000
- 1,000 to 3,000
- 3,000 to 10,000
- 10,000 to 25,000
- 25,000 to 50,000
- 50,000 or more



Observer effort
(days at sea)

- Less than 10
- 10 to 20
- 20 to 50
- 50 to 100
- 100 to 500
- 500 or more


DR - Dredges
FIX - Traps
GN - Nets
LH - Rods and lines
LL - Longlines
PS - Surrounding nets
PT - Pelagic trawls
SX - Seines
TB - Bottom trawls
Observer coverage %
Less than 1.00
1.00 to 25.00
25.00 to 50.00
50.00 to 75.00
75.00 to 100.00
100.00 or more

Metier (L4)	ICES Subarea	ICES Division	Risk Factor (fishPi)	Fishing Effort (DaS)	Bycatch Monitoring (DaS)	Non-Bycatch Monitoring (DaS)	Total Monitoring Effort (DaS)	Monitoring Coverage %	Combined Score
GTR	8	27.8.c	105	10360	5.5	0.0	5.5	0.05	104.9
GTR	8	27.8.a	84	131882	81.7	0.0	81.7	0.06	83.9
GNS	8	27.8.a	84	84242	80.1	0.0	80.1	0.10	83.9
GTR	8	27.8.b	84	95095	90.8	0.0	90.8	0.10	83.9
GNS	8	27.8.c	84	23218	42.5	0.0	42.5	0.18	83.8
GNS	9	27.9.a	84	138764	302.0	0.0	302.0	0.22	83.8
GNS	8	27.8.b	84	24422	71.5	0.0	71.5	0.29	83.8
GNS	7	27.7.e	84	34636	100.6	50.0	150.6	0.43	83.6
GND	8	27.8.b	75	8650	0.3	0.0	0.3	0.00	75.0
GND	8	27.8.a	75	3379	3.0	0.0	3.0	0.09	74.9
LLS	8	27.8.a	64	47985	9.5	0.0	9.5	0.02	64.0
LLS	8	27.8.b	64	19781	12.9	0.0	12.9	0.07	64.0
LLS	9	27.9.a	64	28646	185.0	0.0	185.0	0.65	63.6
GTR	7	27.7.e	63	45821	26.9	0.0	26.9	0.06	63.0
GTR	7	27.7.h	63	10532	13.0	0.0	13.0	0.12	62.9
GNS	7	27.7.h	63	3008	3.6	14.0	17.6	0.58	62.6
GNS	7	27.7.g	63	2782	17.0	20.0	37.0	1.33	62.2
GNS	7	27.7.f	63	2261	34.9	19.0	53.9	2.38	61.5
FPO	9	27.9.a	60	108467	2.0	0.0	2.0	0.00	60.0
OTB	7	27.7.f	56	32180	4.7	0.0	4.7	0.01	56.0
OTB	8	27.8.a	56	209445	37.7	0.0	37.7	0.02	56.0
OTB	7	27.7.e	56	261212	91.8	40.0	131.8	0.05	56.0
OTB	7	27.7.h	56	95663	45.4	3.0	48.4	0.05	56.0
OTB	8	27.8.b	56	112330	115.8	0.0	115.8	0.10	55.9
OTB	7	27.7.b	56	8051	8.0	7.0	15.0	0.19	55.9
OTB	9	27.9.a	56	40221	107.0	0.0	107.0	0.27	55.9
OTB	7	27.7.a	56	11671	14.0	18.0	32.0	0.27	55.8
OTB	7	27.7.g	56	26702	75.6	25.0	100.6	0.38	55.8
OTB	8	27.8.c	56	8941	48.0	0.0	48.0	0.54	55.7
OTB	6	27.6.a	56	32960	220.2	10.0	230.2	0.70	55.6
GTR	7	27.7.f	63	17	2.5	0.0	2.5	14.19	54.1
OTT	8	27.8.a	52	353795	77.3	0.0	77.3	0.02	52.0
PTB	9	27.9.a	52	2035	1.0	0.0	1.0	0.05	52.0
PTB	8	27.8.c	52	6783	13.0	0.0	13.0	0.19	51.9
GND	7	27.7.e	50	330	0.0	1.0	1.0	0.30	49.8
FPO	7	27.7.e	48	66313	4.3	0.0	4.3	0.01	48.0
FPO	7	27.7.f	48	6915	0.0	1.0	1.0	0.01	48.0
LLS	7	27.7.e	48	7634	1.3	0.0	1.3	0.02	48.0
FPO	8	27.8.a	48	30395	7.0	0.0	7.0	0.02	48.0
FPO	8	27.8.b	48	2396	2.3	0.0	2.3	0.10	48.0
OTM	8	27.8.a	48	2600	2.8	0.0	2.8	0.11	47.9
PTM	8	27.8.b	48	6670	50.9	0.0	50.9	0.76	47.6
PTM	8	27.8.a	48	20287	165.0	0.0	165.0	0.81	47.6
OTM	7	27.7.e	48	843	6.0	1.0	7.0	0.83	47.6
PS	9	27.9.a	44	38406	75.0	0.0	75.0	0.20	43.9
PS	8	27.8.c	44	20144	43.0	0.0	43.0	0.21	43.9
LHM	8	27.8.c	40	6579	5.0	0.0	5.0	0.08	40.0
LHM	7	27.7.e	40	5512	0.0	5.0	5.0	0.09	40.0
OTT	7	27.7.f	39	1001	0.3	0.0	0.3	0.03	39.0
OTT	7	27.7.g	39	34746	26.7	0.0	26.7	0.08	39.0
OTT	7	27.7.h	39	79977	77.7	1.0	78.7	0.10	39.0
OTT	7	27.7.e	39	5088	9.2	9.0	18.2	0.36	38.9
OTT	7	27.7.b	39	769	7.1	0.0	7.1	0.93	38.6
OTT	6	27.6.a	39	8749	136.0	0.0	136.0	1.55	38.4
LHM	9	27.9.a	40	2230	180.0	0.0	180.0	8.07	36.8
DRB	7	27.7.e	36	30777	0.0	12.0	12.0	0.04	36.0
TBB	7	27.7.e	36	8384	12.1	147.0	159.1	1.90	35.3
TBB	7	27.7.g	36	3674	22.7	48.0	70.7	1.92	35.3
TBB	7	27.7.f	36	1694	20.7	47.0	67.7	4.00	34.6
TBB	7	27.7.h	36	963	0.0	49.0	49.0	5.09	34.2
PS	7	27.7.e	33	2623	3.0	0.0	3.0	0.11	33.0
PS	8	27.8.a	33	2952	4.0	0.0	4.0	0.14	33.0
PS	8	27.8.b	33	4900	28.0	0.0	28.0	0.57	32.8
PTM	7	27.7.h	32	483	0.6	0.0	0.6	0.12	32.0
PTM	6	27.6.a	32	1633	23.0	0.0	23.0	1.41	31.5
PTM	8	27.8.c	32	1848	22.2	33.0	55.2	2.99	31.0
PTM	7	27.7.b	32	415	13.0	0.0	13.0	3.13	31.0
OTM	7	27.7.f	32	26	1.0	0.0	1.0	3.80	30.8
PTM	7	27.7.a	32	282	13.0	0.0	13.0	4.60	30.5
OTM	6	27.6.a	32	1517	86.0	0.0	86.0	5.67	30.2
OTM	7	27.7.b	32	166	13.0	0.0	13.0	7.82	29.5
PTM	7	27.7.g	32	78	7.0	0.0	7.0	8.97	29.1
PTB	8	27.8.a	26	1391	6.8	0.0	6.8	0.49	25.9
PTB	8	27.8.b	26	1152	28.3	0.0	28.3	2.46	25.4
TBB	7	27.7.a	24	1568	39.6	0.0	39.6	2.53	23.4
TBB	8	27.8.a	24	149	4.1	0.0	4.1	2.72	23.3
TBB	8	27.8.b	24	448	20.0	0.0	20.0	4.45	22.9
SDN	8	27.8.a	22	23537	16.0	0.0	16.0	0.07	22.0
SDN	8	27.8.b	22	10995	10.5	0.0	10.5	0.10	22.0
SSC	7	27.7.g	22	1395	10.0	13.0	23.0	1.65	21.6
GND	7	27.7.f	25	48	0.0	7.0	7.0	14.58	21.4
DRB	7	27.7.h	18	179	0.0	1.0	1.0	0.56	17.9
PTB	6	27.6.a	13	492	15.9	0.0	15.9	3.24	12.6
PS	7	27.7.f	11	210	11.0	0.0	11.0	5.25	10.4

Areas with High Fishing Effort (using VMS days at sea):

Western Channel (7e): OTB

French Biscay Shelf (8a): GNS, GTR, OTB, OTT

French Biscay Shelf (8b): GTR, OTB

Portuguese W Coast (9a): GNS, FPO

Monitoring Coverage (%):

W Scotland (6a): PTM

Celtic Seas (7f): GTR, TBB

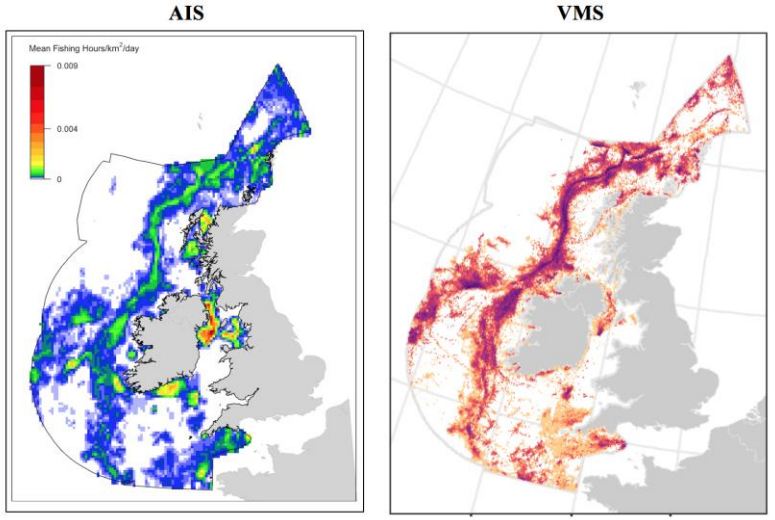
Celtic Seas (7g): PTM, SSC

Celtic Seas (7h): TBB

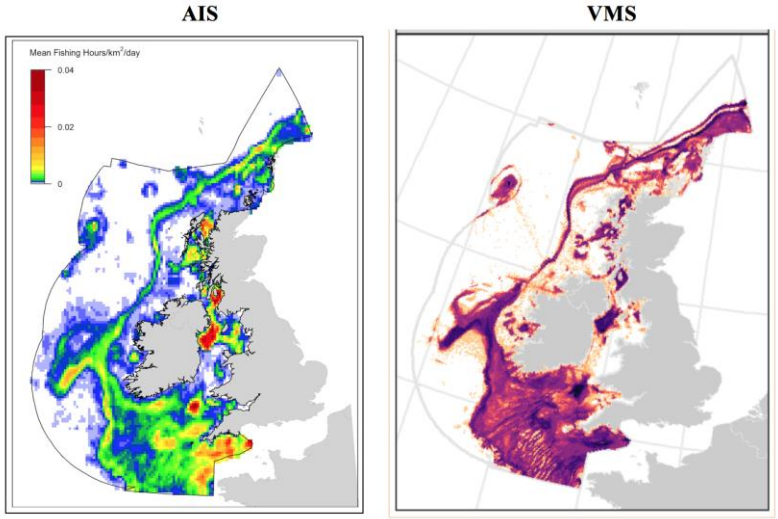
Portuguese W Coast (9a): LHM

Comparison of Fishing Effort determined by AIS vs VMS

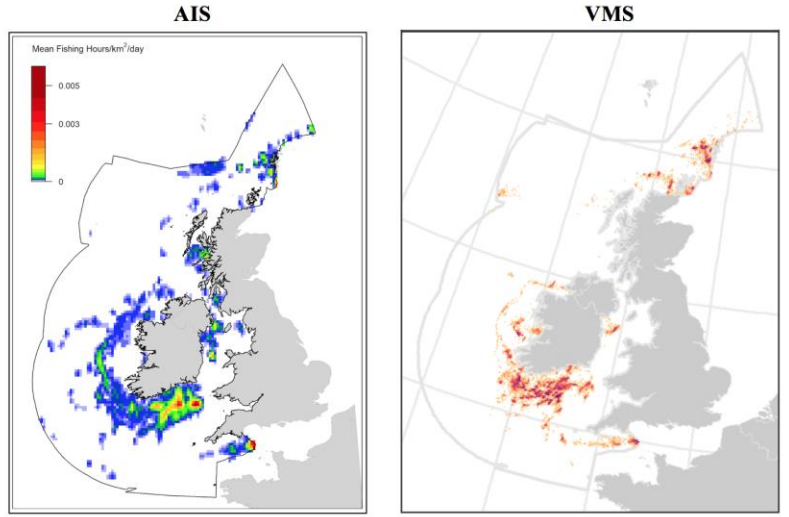
a) Pelagic Trawls & Seines



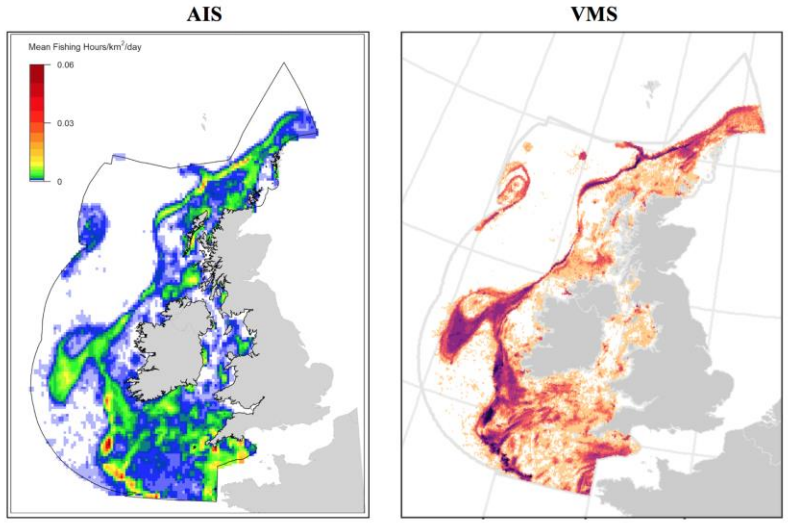
b) Bottom Otter Trawls



c) Demersal Seines



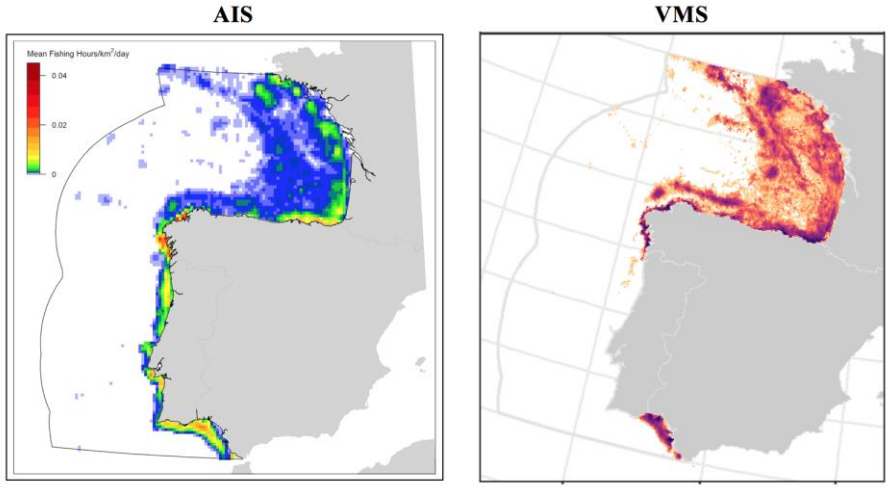
d) Static Gear



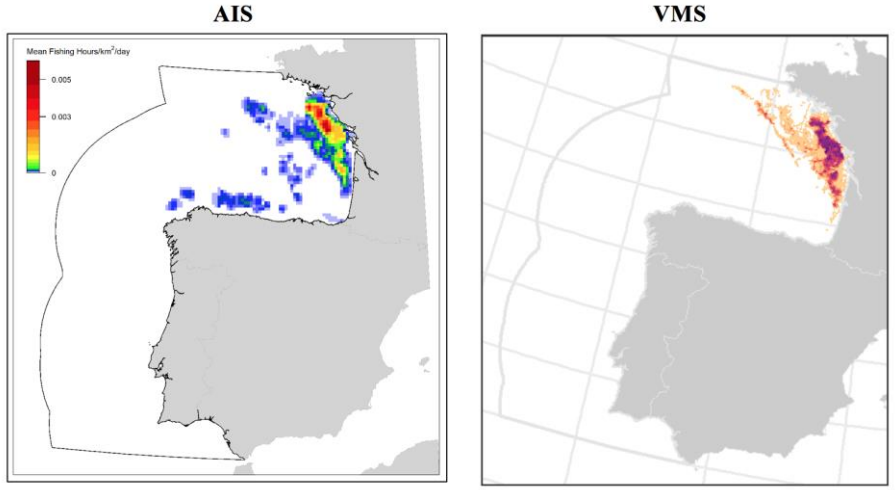
Source: Evans et al. (2021)

Comparison of Fishing Effort determined by AIS vs VMS

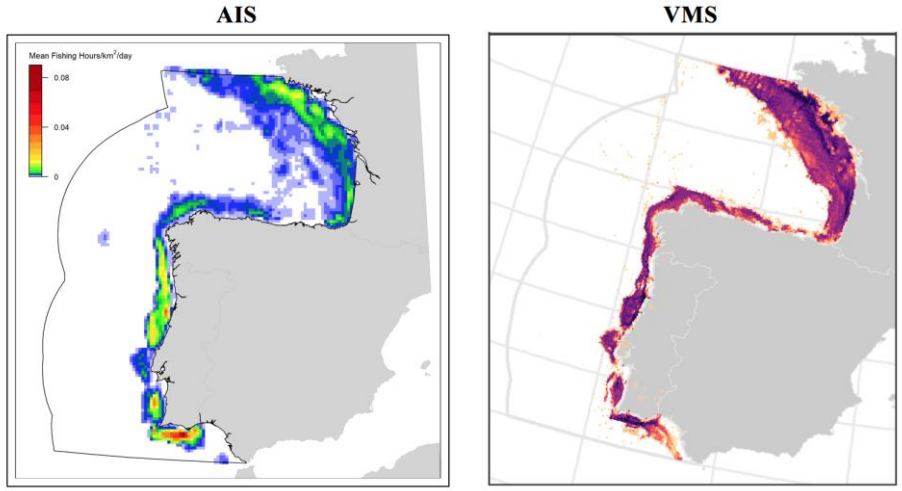
a) Pelagic Trawls & Seines



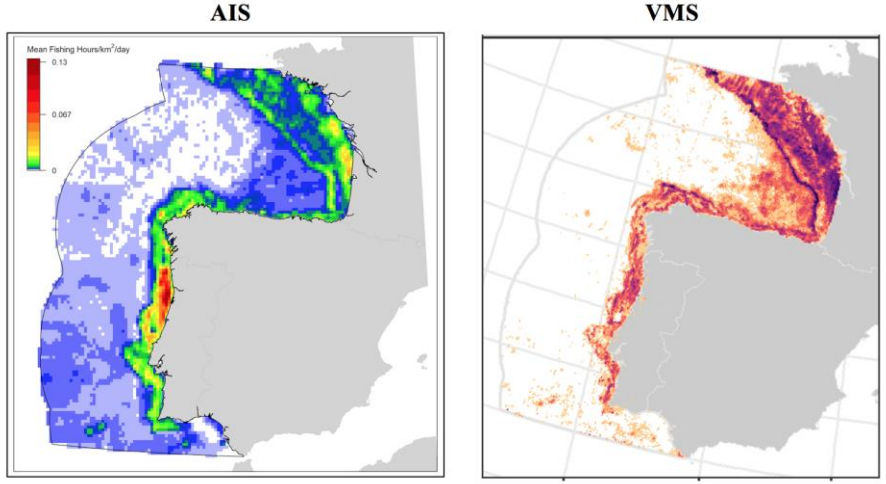
c) Demersal Seines



b) Bottom Otter Trawls

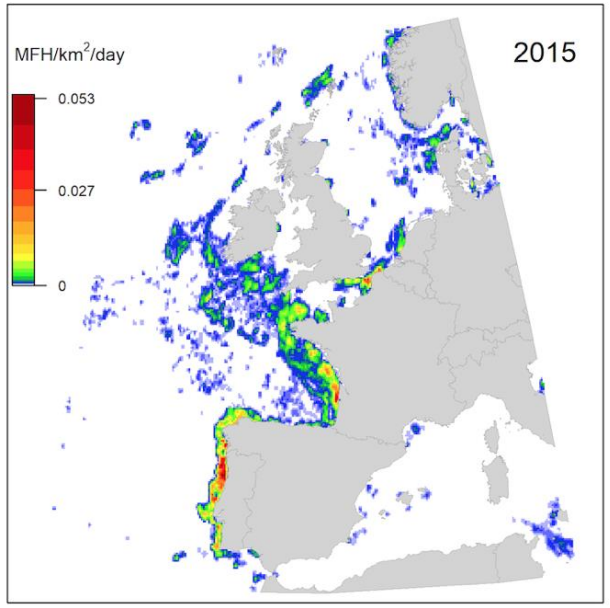


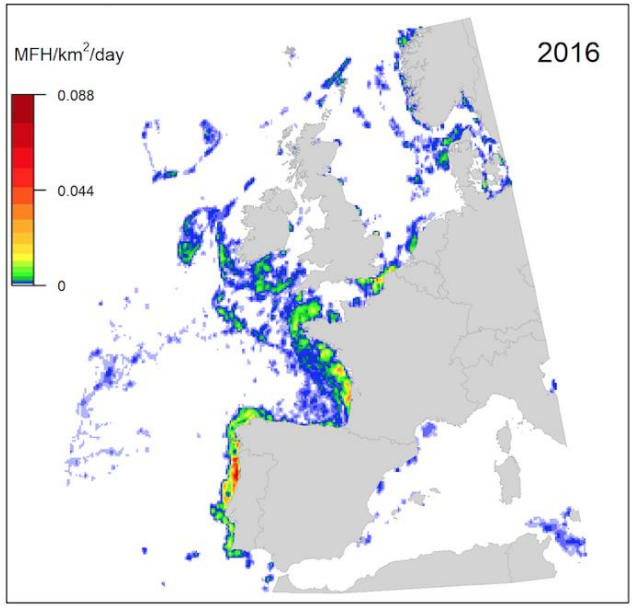
d) Static Gear

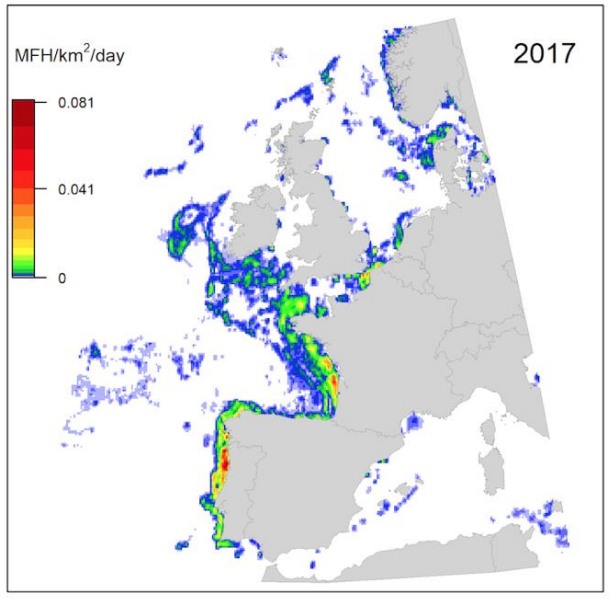


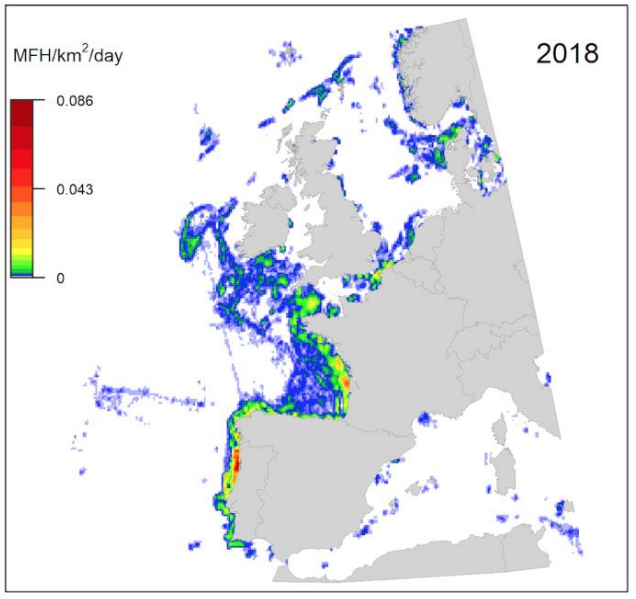
Source: Evans et al. (2021)

Annual Variation in Fishing Effort using Static Gillnets, 2015-2018 (MFH = mean fishing hours/km²/day)

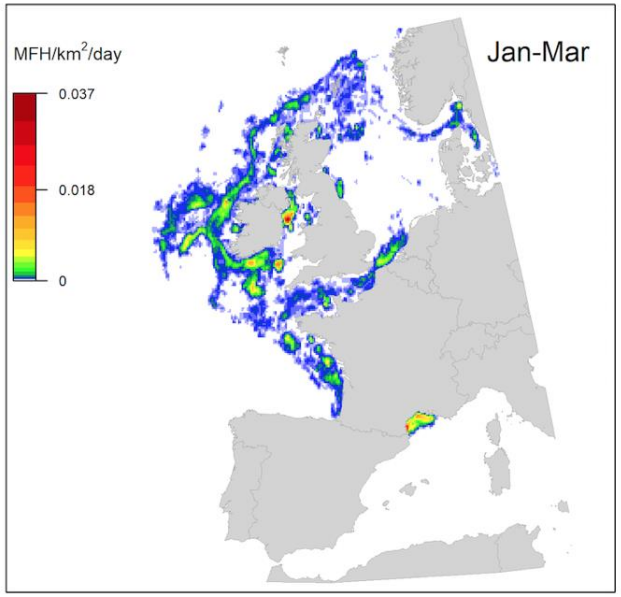


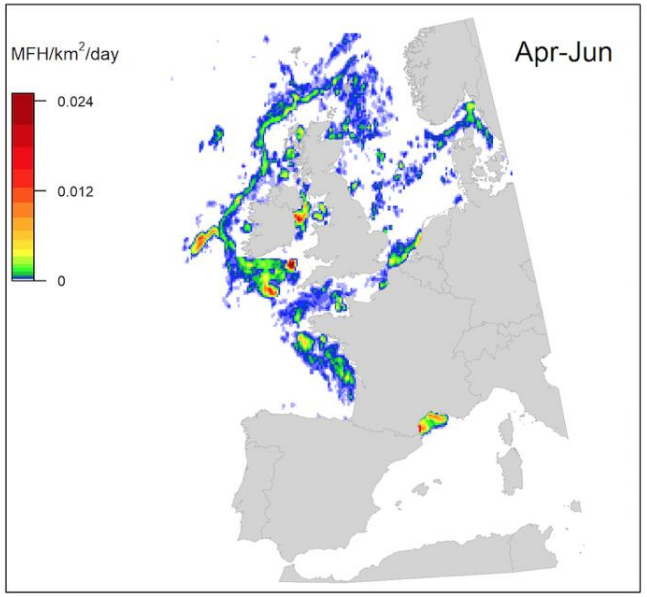


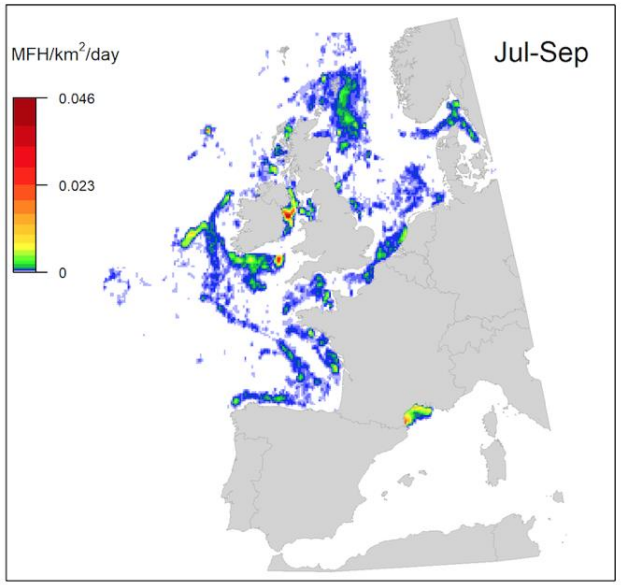


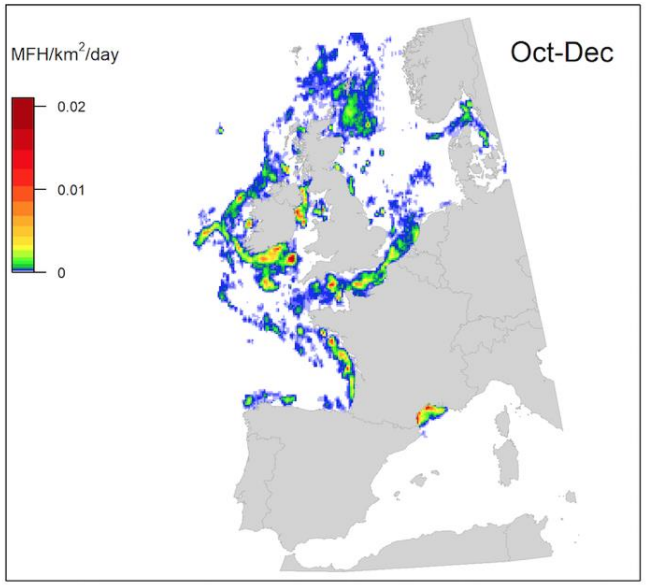


Seasonal Variation in Fishing Effort using Pelagic Trawls, 2015-2018 (MFH = mean fishing hours/km²/day)



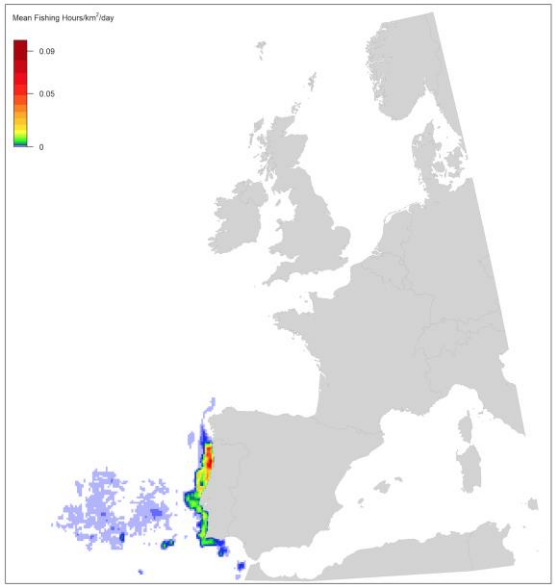




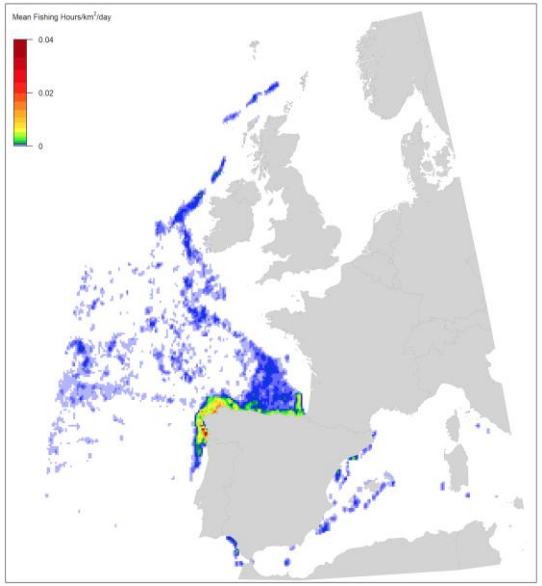


STATIC NET FISHING EFFORT BY COUNTRY – 2015-18

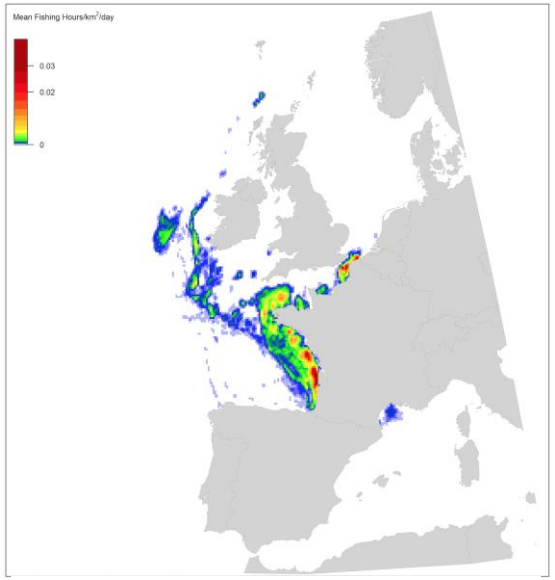
Portugal



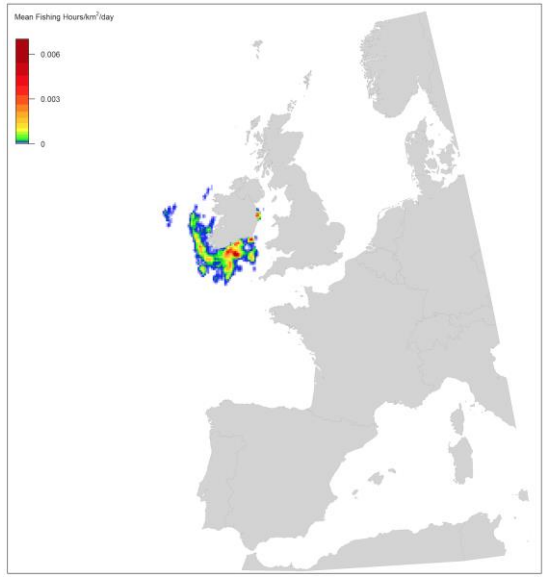
Spain



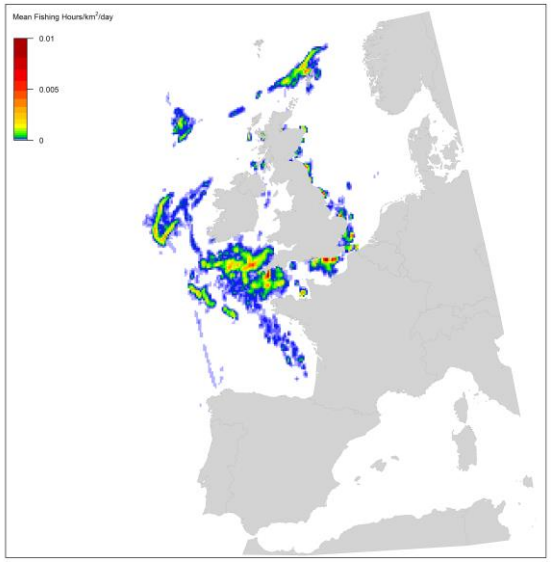
France



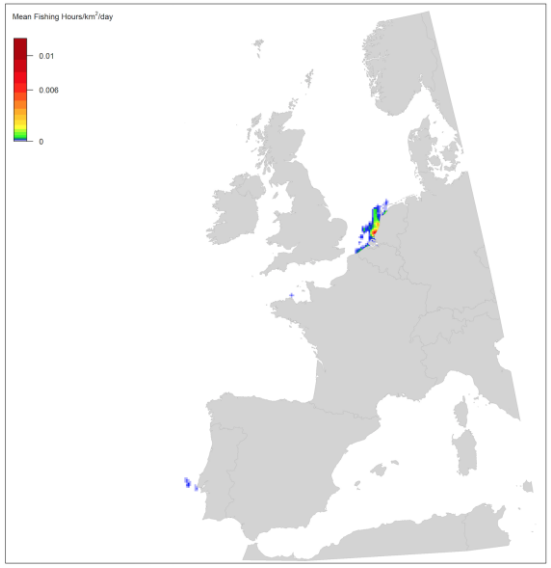
Ireland



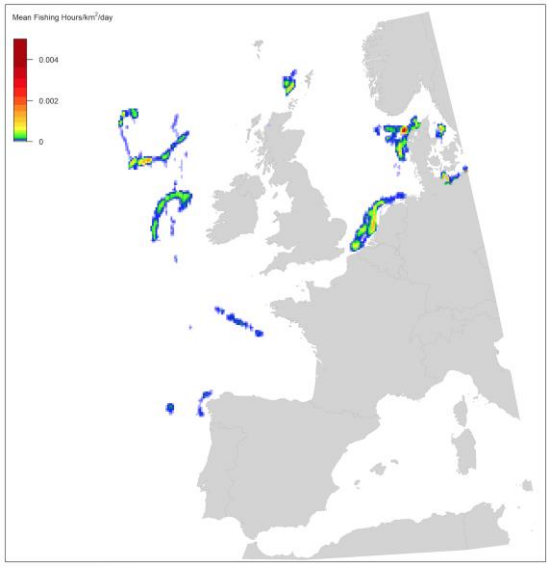
United Kingdom



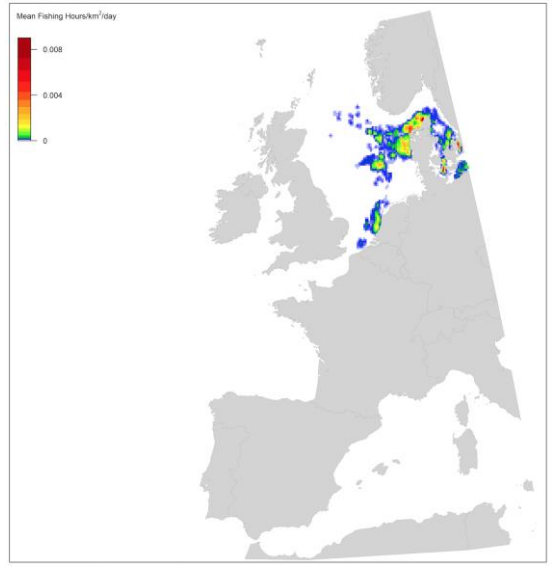
Netherlands



Germany

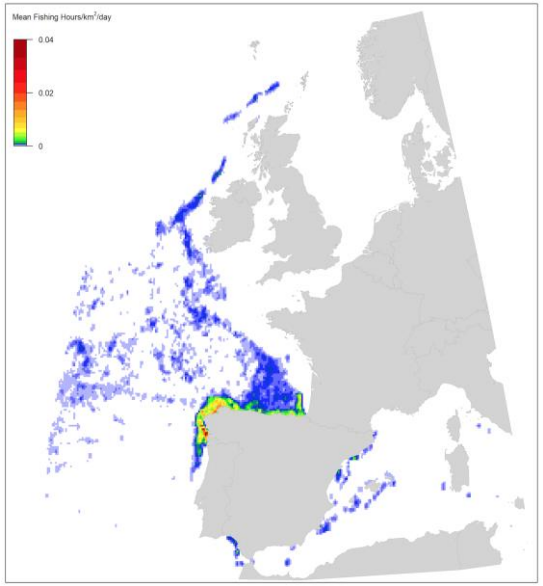


Denmark

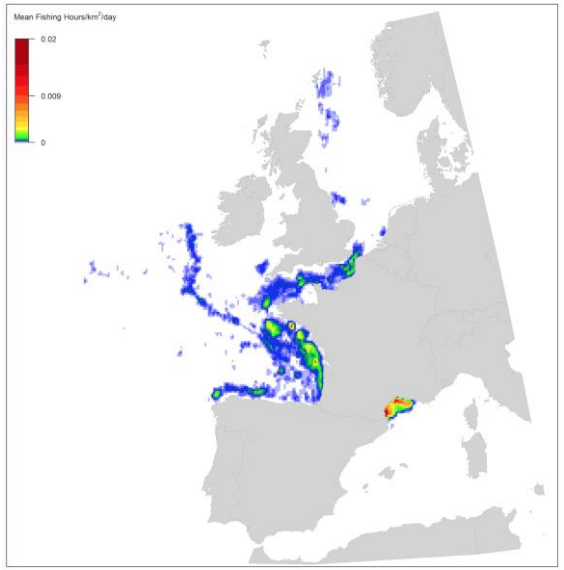


PELAGIC TRAWL FISHING EFFORT BY COUNTRY – 2015-18

Spain



France



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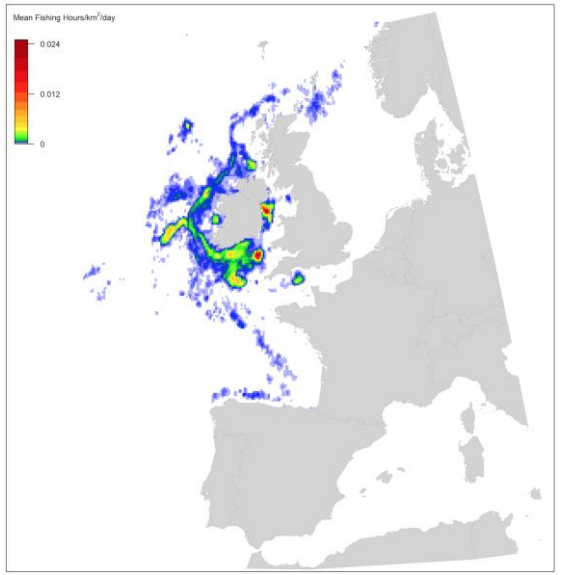
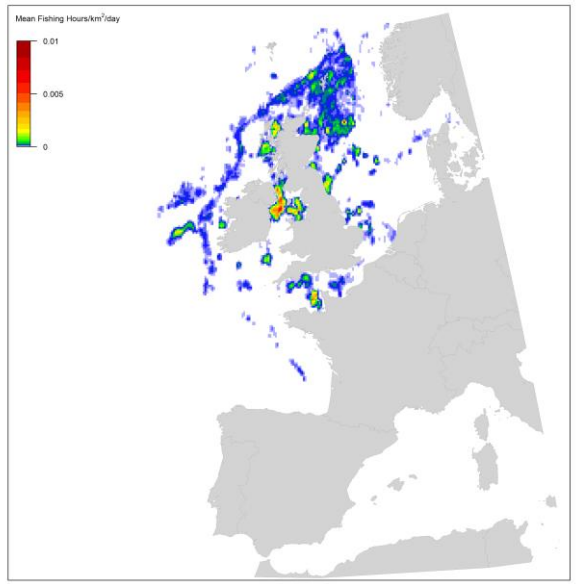
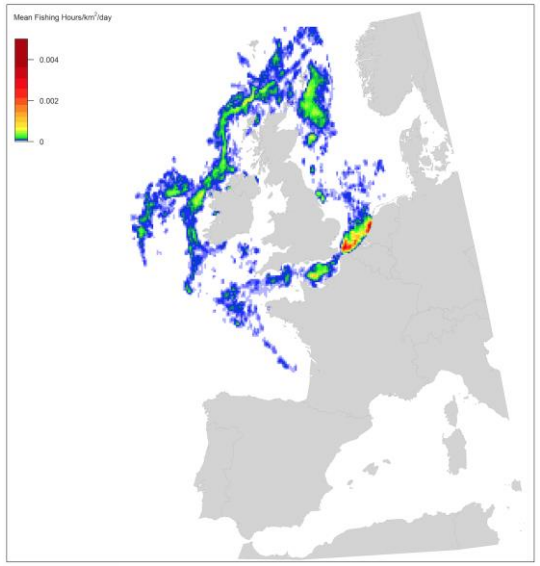


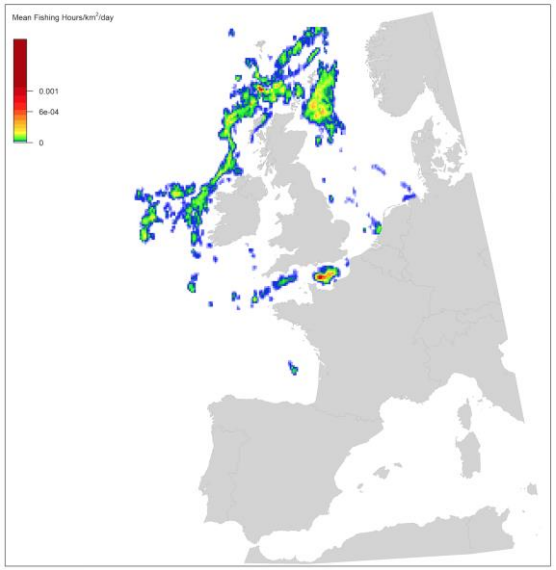
United Kingdom



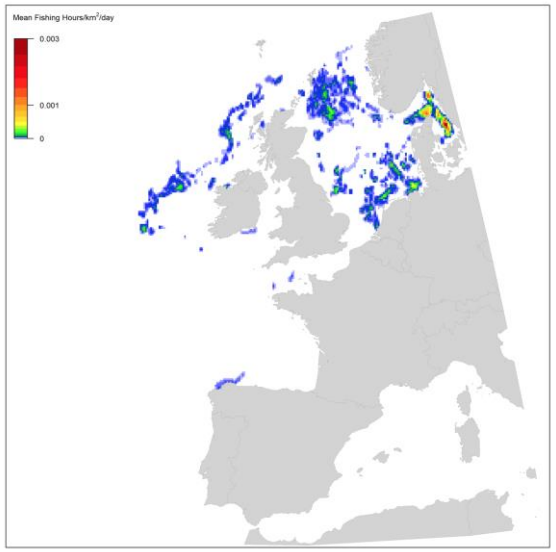
Netherlands



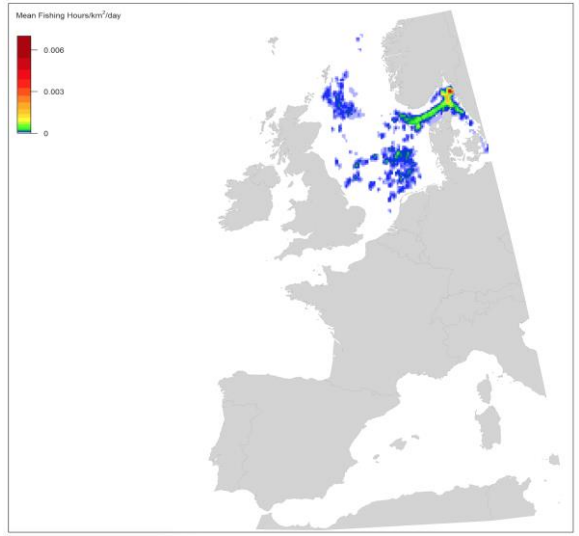
Germany



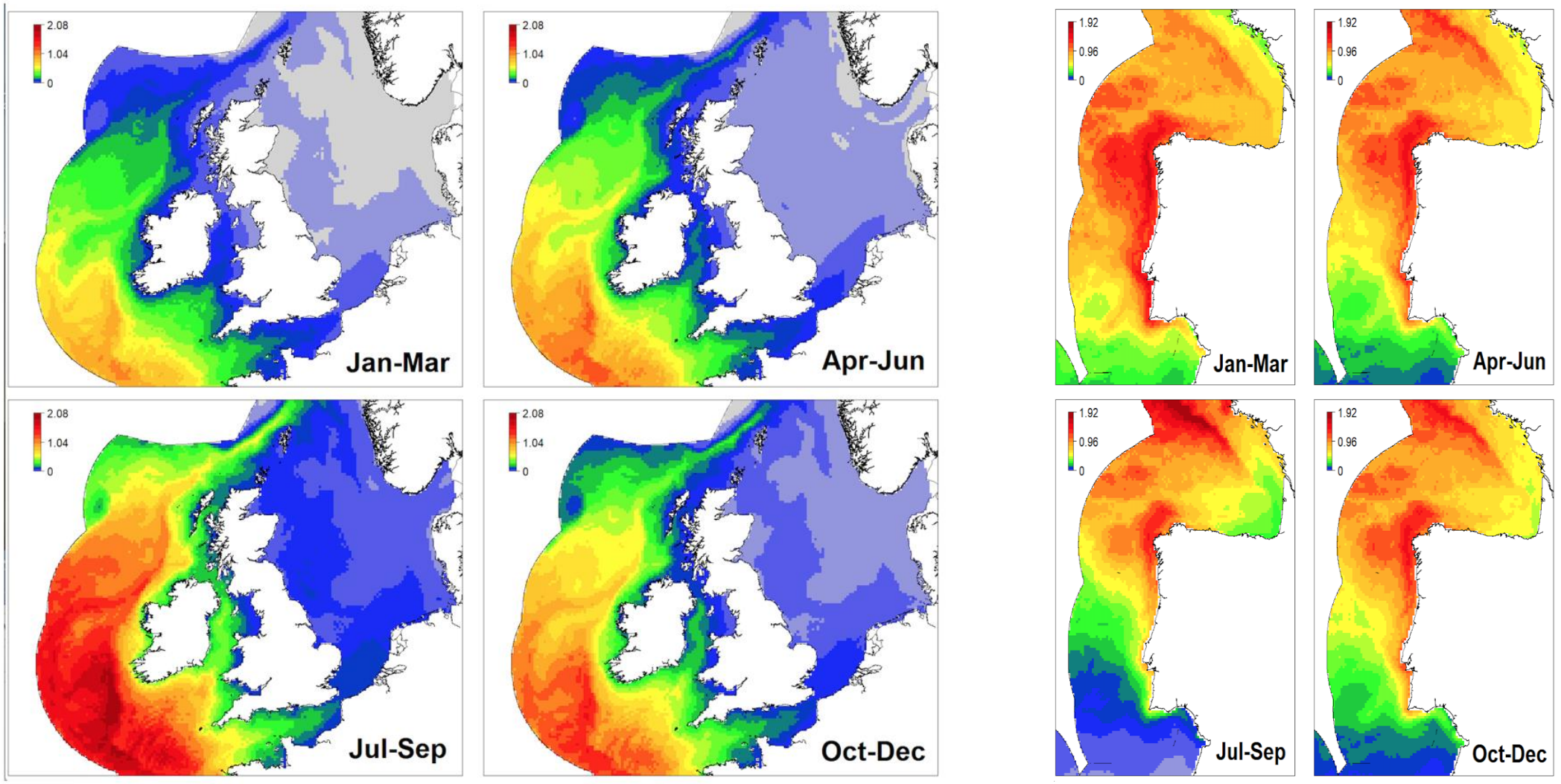
Denmark



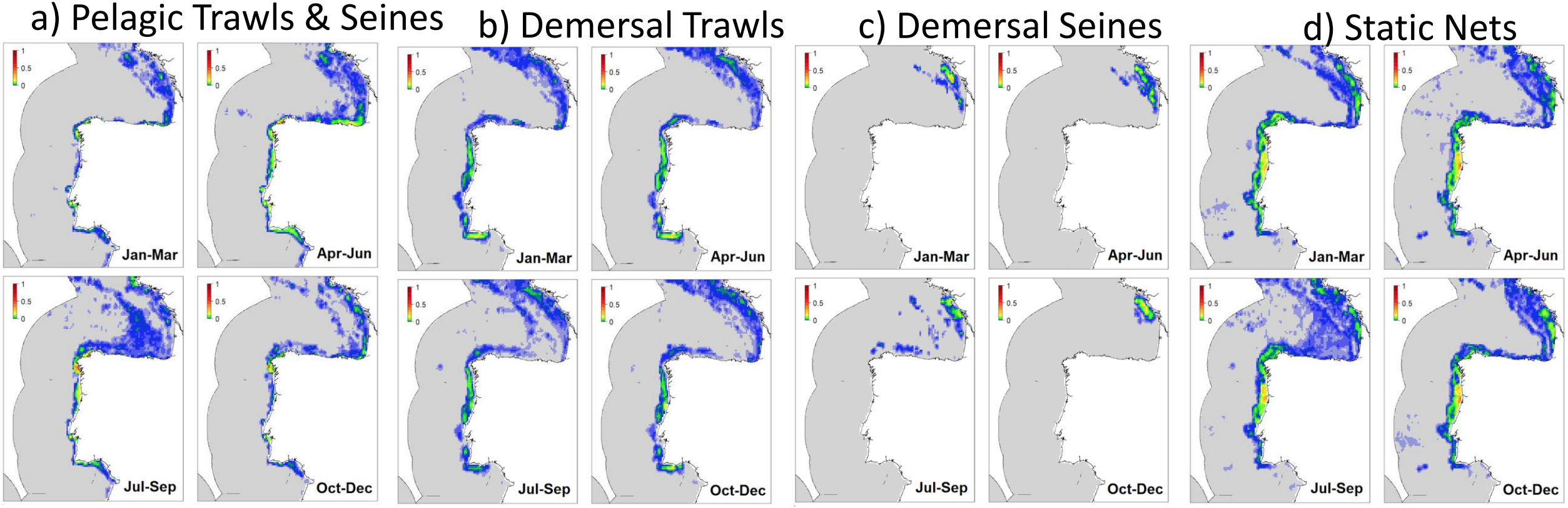
Sweden



Seasonal Variation in Common Dolphin Densities



Common Dolphin Bycatch Risk Maps by Gear Type



- All of these gear types are known to cause common dolphin bycatch
- Greatest overlap between high common dolphin densities and fishing effort occur in the eastern Bay of Biscay but also along the west Iberian coast, particularly regions such as Galicia and parts of Portugal

Metier (L4)	ICES Subarea	ICES Division	Risk Factor (fishPi)	Fishing Effort (DaS)	AIS Fishing Effort	No. bird species with mod/high overlap	No. mammal species with mod/high overlap	Total No. Birds/Mammals with mod/high overlap	No. species at risk x DaS
GTR	8	27.8.c	105	10360	M	5	8	13	134680
GTR	8	27.8.a	84	131882	M	5	8	13	1714466
GNS	8	27.8.a	84	84242	M	5	8	13	1095146
GTR	8	27.8.b	84	95095	M	1	4	5	475475
GNS	8	27.8.c	84	23218	M	4	8	12	278616
GNS	9	27.9.a	84	138764	H	6	6	12	1665168
GNS	8	27.8.b	84	24422	M	1	4	5	122110
GNS	7	27.7.e	84	34636	M	3	3	6	207816
GND	8	27.8.b	75	8650	L	1	4	5	43250
GND	8	27.8.a	75	3379	L	6	5	11	37169
LLS	8	27.8.a	64	47985	M	2	8	10	479850
LLS	8	27.8.b	64	19781	M	1	4	5	98905
LLS	9	27.9.a	64	28646	M	6	6	12	343752
GTR	7	27.7.e	63	45821	L	3	3	6	274926
GTR	7	27.7.h	63	10532	L	1	3	4	42128
GNS	7	27.7.h	63	3008	L	1	3	4	12032
GNS	7	27.7.g	63	2782	L	3	3	6	16692
GNS	7	27.7.f	63	2261	L	3	2	5	11305
FPO	9	27.9.a	60	108467	L	2	1	3	325401
OTB	7	27.7.f	56	32180	M	0	2	2	64360
OTB	8	27.8.a	56	209445	H	1	7	8	1675560
OTB	7	27.7.e	56	261212	H	1	3	4	1567272
OTB	7	27.7.h	56	95663	M	1	3	4	382652
OTB	8	27.8.b	56	112330	L	1	4	5	561650
OTB	7	27.7.b	56	8051	M	1	8	9	45459
OTB	9	27.9.a	56	40221	H	1	6	7	281547
OTB	7	27.7.a	56	11671	M	1	3	4	46684
OTB	7	27.7.g	56	26702	M	1	2	3	80106
OTB	8	27.8.c	56	8941	L	1	7	8	71528
OTB	6	27.6.a	56	32960	M	1	7	8	263680
GTR	7	27.7.f	63	17	L	1	2	3	51
OTT	8	27.8.a	52	353795	H	1	7	8	2830360
PTB	9	27.9.a	52	2035	L	1	6	7	14245
PTB	8	27.8.c	52	6783	L	1	7	8	54264
GND	7	27.7.e	50	330	L	5	2	7	2310
FPO	7	27.7.e	48	66313	H	1	2	3	265252
FPO	7	27.7.f	48	6915	H	2	0	2	13830
LLS	7	27.7.e	48	7634	L	0	3	3	22902
FPO	8	27.8.a	48	30395	M	0	4	4	121580
FPO	8	27.8.b	48	2396	L	0	1	1	2396
OTM	8	27.8.a	48	2600	L	6	5	11	28600
PTM	8	27.8.b	48	6670	L	1	4	5	33350
PTM	8	27.8.a	48	20287	H	1	5	6	121722
OTM	7	27.7.e	48	843	L	5	2	7	5901
PS	9	27.9.a	44	38406	H	3	6	9	345654
PS	8	27.8.c	44	20144	H	2	7	9	181296
LHM	8	27.8.c	40	6579					
LHM	7	27.7.e	40	5512					
OTT	7	27.7.f	39	1001	L	1	2	3	3003
OTT	7	27.7.g	39	34746	M	1	2	3	104238
OTT	7	27.7.h	39	79977	H	1	3	4	319908
OTT	7	27.7.e	39	5088	M	1	3	4	20352
OTT	7	27.7.b	39	769	L	1	8	9	6921
OTT	6	27.6.a	39	8749	M	1	6	7	61243
LHM	9	27.9.a	40	2230					
DRB	7	27.7.e	36	30777					
TBB	7	27.7.e	36	8384					
TBB	7	27.7.g	36	3674					
TBB	7	27.7.f	36	1694					
TBB	7	27.7.h	36	963					
PS	7	27.7.e	33	2623	L	1	3	4	10492
PS	8	27.8.a	33	2952	L	2	6	8	23616
PS	8	27.8.b	33	4900	M	2	4	6	29400
PTM	7	27.7.h	32	483	L	1	2	3	1449
PTM	6	27.6.a	32	1633	L	5	6	11	17963
PTM	8	27.8.c	32	1848	L	3	6	9	16632
PTM	7	27.7.b	32	415	L	4	7	11	4565
OTM	7	27.7.f	32	26	L	3	2	5	130
PTM	7	27.7.a	32	282	L	3	2	5	1410
OTM	6	27.6.a	32	1517	L	5	6	11	16687
OTM	7	27.7.b	32	166	L	4	7	11	1826
PTM	7	27.7.g	32	78	M	3	2	5	390
PTB	8	27.8.a	26	1391	M	1	6	7	9737
PTB	8	27.8.b	26	1152	M	1	4	5	5760
TBB	7	27.7.a	24	1568					
TBB	8	27.8.a	24	149					
TBB	8	27.8.b	24	448					
SDN	8	27.8.a	22	23537	H	1	2	3	70611
SDN	8	27.8.b	22	10995	L	1	2	3	32985
SSC	7	27.7.g	22	1395	L	1	2	3	4185
GND	7	27.7.f	25	48	L	7	2	4	192
DRB	7	27.7.h	18	179					
PTB	6	27.6.a	13	492	L	1	8	9	4428
PS	7	27.7.f	11	210	L	1	2	3	630

Areas with High Fishing Effort (using VMS days at sea):

Western Channel (7e): OTB

French Biscay Shelf (8a): GNS, GTR, OTB, OTT

French Biscay Shelf (8b): GTR, OTB

Portuguese W Coast (9a): GNS, FPO

Areas with High Fishing Effort (using AIS hours/km^2):

Western Channel (7e): OTB, FPO

Celtic Seas (7f): FPO

Celtic Seas (7h): OTT

French Biscay Shelf (8a): OTB, OTT, PTM

French Biscay Shelf (8b):

North Spain (8c): PS

Portuguese W Coast (9a): GNS, OTB, PS

DISCREPANCIES BETWEEN MONITORING EFFORT AND PERCEIVED RISK OF BYCATCH

a) FishPi method

Western Channel (7e): GNS
French Biscay shelf (8a, 8b): GNS, GTR, GND
North Spain (8c): GNS, GTR
Portuguese W Coast (9a): GNS

b) Risk Mapping

Western Channel (7e): OTB, GNS, GTR
French Biscay shelf N (8a): GNS, GTR, OTB, OTT
French Biscay shelf S (8b): GNS, GTR, OTB
North Spain (8c): GNS, GTR, PS
Portuguese W Coast (9a): GNS, LLS, PS, OTB
Celtic Sea (7g): OTT
Celtic Sea (7h): OTT, OTB