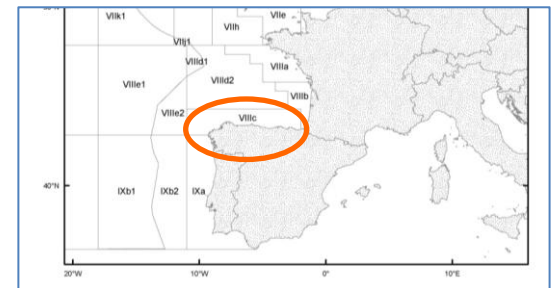
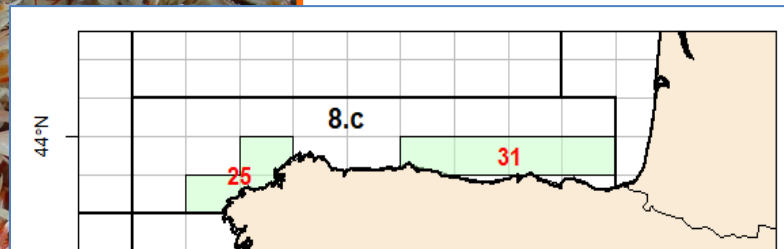
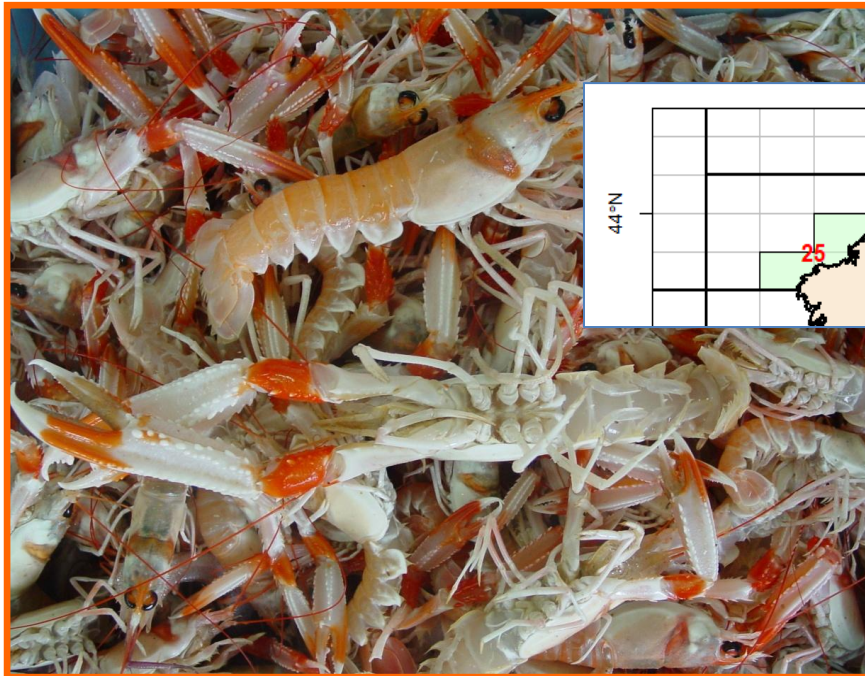


Nephrops in 8c

I. González Herraiz



-FU 25

-FU 31

- Total 8c

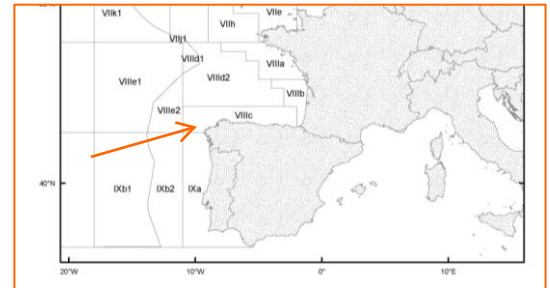


FU 25 Nephrops



8D9	18E0	18E1	18E2	18E3
7D9		17E1	17E2	17E3
6D9	16E0	16E1	16E2	16E3
5D9	15E0	15E1	15E2	15E3
4D9	14E0	14E1	14E2	14E3
3D9	13E0	13E1	13E2	13E3
2D9	12E0	12E1	12E2	12E3

A box labeled "UF 25" is positioned over the 16E1 cell. The cells 15E0 and 15E1 are shaded in light red.



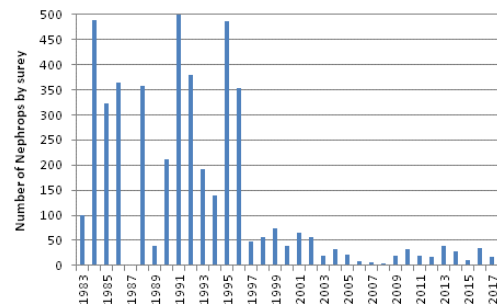
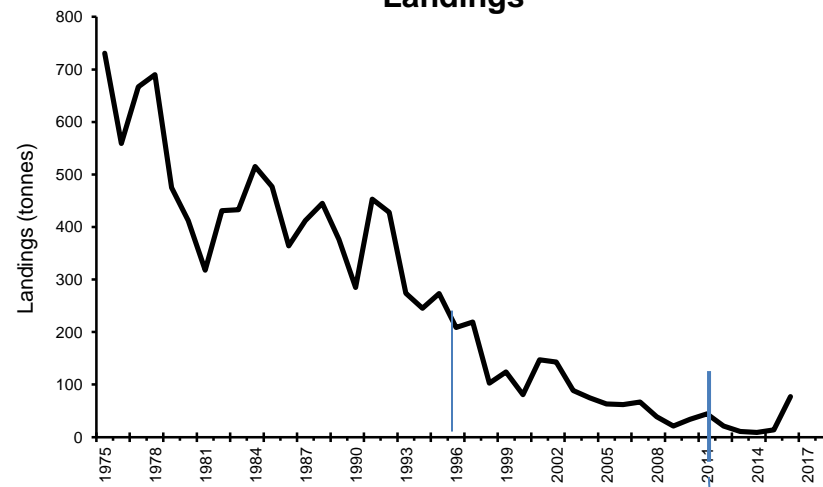
FU 25 – North Galicia

- Catch

In FU 25 the 90% of the Spanish landings of *Nephrops* comes from the métier baca (OTB_DEF \geq 55), 10% from jurelera (OTB_MPD \geq 55) and 1% from pair trawlers (PTB_MPD \geq 55) (2008-2016).

Year	Landings		Discards	Total FU Catch
	Trawl	Non-reported		
1975	731			731
1976	559			559
1977	667			667
1978	690			690
1979	475			475
1980	412			412
1981	318			318
1982	431			431
1983	433			433
1984	515			515
1985	477			477
1986	364			364
1987	412			412
1988	445			445
1989	376			376
1990	285			285
1991	453			453
1992	428			428
1993	274			274
1994	245			245
1995	273			273
1996	209			209
1997	219			219
1998	103			103
1999	124			124
2000	81			81
2001	147			147
2002	143			143
2003	89			89
2004	75			75
2005	63			63
2006	62			62
2007	67			67
2008	39			39
2009	21			21
2010	34			34
2011	44			44
2012	10	11		21
2013	40	11		40
2014	9	0		9
2015	14	0		14
2016	13	65		77
2017	2	0*		2
2018	2	0*	0.2*	0.2*

Landings



Misreporting since ITQs?

* *Nephrops* fishery was closed in 8c (FU 25 & FU 31) in 2017 and 2018, 2 t were caught each year in Sentinel fisheries in FU 25.

Size-CL/Year Carapace length (mm)

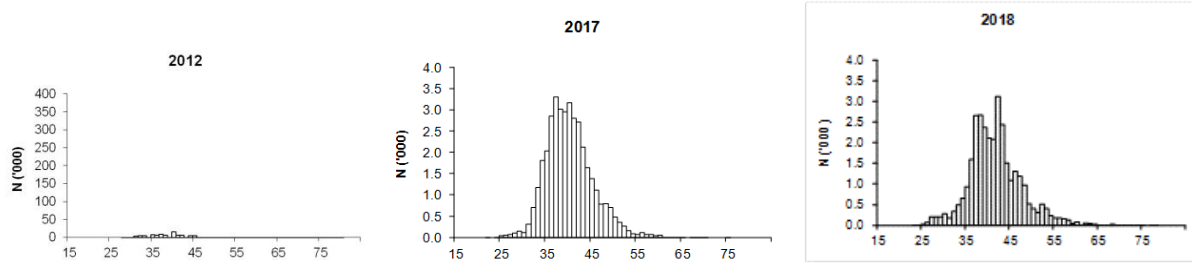
	2012	2013	2014	2015	2016	2017*	2018*
15		7					
16							
17							
18							
19							
20		0					
21		0	0				
22		9	0			0	0
23							
24				1		0	0
25		9	1	2		0	0
26		9	0	1		0	0
27		0	1	1	0	0	0
28	4	10	1	3	0	0	0
29	3	2	1	2	10	0	0
30	4	13	3	18	37	0	0
31	5	2	2	11	31	0	0
32	7	3	2	14	49	1	0
33	6	5	5	25	73	1	0
34	4	6	7	26	97	2	1
35	9	20	12	47	183	2	2
36	7	9	16	26	153	3	2
37	10	10	13	22	137	3	3
38	7	7	13	22	193	3	3
39	3	16	11	12	121	3	2
40	16	12	13	16	180	3	2
41	7	8	9	11	96	3	2
42	7	6	8	12	59	3	3
43	3	16	8	10	58	2	2
44	6	7	7	10	38	2	2
45	6	8	4	6	36	1	1
46	3	8	5	5	18	1	1
47	1	2	4	5	17	1	1
48	1	5	2	3	13	1	1
49	3	3	2	3	11	1	1
50	1	2	2	2	13	0	0
51	3	2	1	2	8	0	0
52	1	2	1	2	6	0	1
53	2	2	2	2	5	0	0
54	1	2	1	1	4	0	0
55	2	1	1	1	3	0	0
56	1	1	1	1	2	0	0
57	1	1	0	0	2	0	0
58	1	1	1	0	1	0	0
59	0	1	0	0	1	0	0
60	0	0	0	0	1	0	0
61	3	0	0	0	0	0	0
62	1	1	0	0	0	0	0
63	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0
67	0	0	0	0	0	0	0
68	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0
71	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0
73	0	0	0	0	0	0	0
74	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0
76	0	0	0	0	0	0	0
77	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0

Total number (thousand)	139	229	163	327	1657	44 38	32
Total weight (tonnes)	21	11	9	14	77	2	2
Mean weight (kg)	0.152	0.048	0.056	0.043	0.046	0.054	0.061
CL-Mean length (mm) Mean length (CL, mm)	40.0	41.0	39.9	37.2	38.2	40.1	41.5

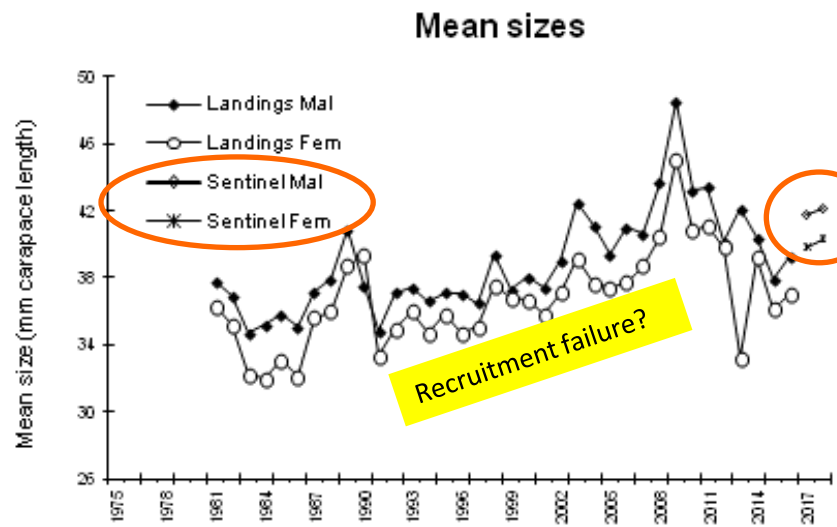


FU 25 – North Galicia

- Length distribution



- Mean sizes



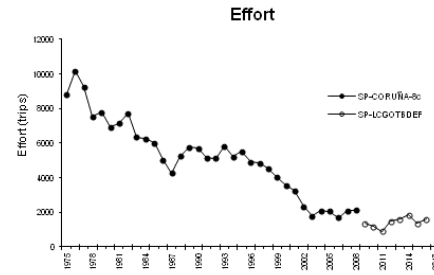
7266 individuals were measured in Sentinel 2017.
8524 in Sentinel 2018 (26% of catch).



Year	Landings (t)	Effort (trips)		LPUE (kg/trip)	
		SP-CORUTR8c	SP-LCOTBDEF	SP-CORUTR8c	SP-LCOTBDEF
1986	302	5017		60.1	
1987	356	4266		83.5	
1988	371	5246		70.7	
1989	297	5753		51.7	
1990	199	5710		34.9	
1991	334	5135		65.1	
1992	351	5127		68.5	
1993	229	5829		39.2	
1994	207	5216		39.6	
1995	233	5538		42.0	
1996	182	4911		37.0	
1997	187	4850		38.5	
1998	67	4560		14.7	
1999	121	4023		30.1	
2000	77	3547		21.7	
2001	145	3239		44.8	
2002	115	2333		49.5	
2003	65	1804		35.9	
2004	40	2091		18.9	
2005	32	2063		15.5	
2006	33	1699		19.4	
2007	37	2075		17.8	
2008	21	2128		9.9	
2009	11		1355		8.3
2010	22		1164		18.6
2011	35		906		38.4
2012	10		1460		6.8
2013	8		1582		5.3
2014	8		1869		4.5
2015	13		1358		9.3
2016	11		1589		6.6
2017	2*		1454*		2.6*
2018	*		*		*

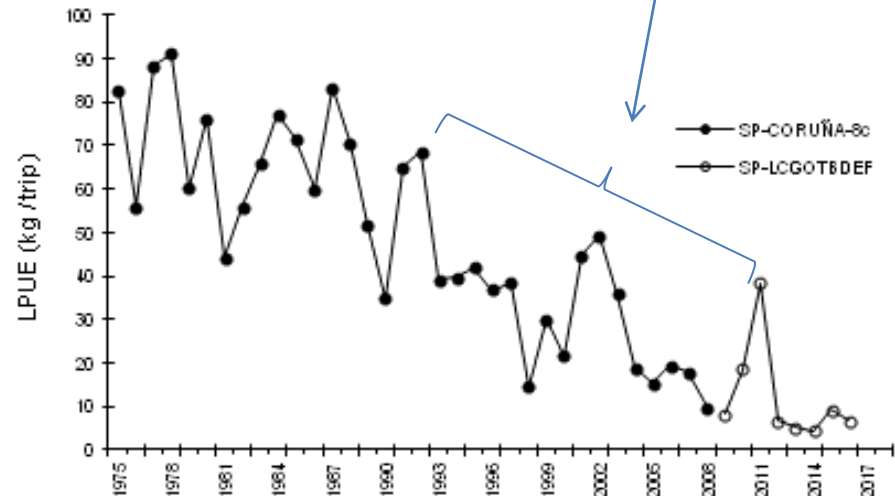
*Nephrops fishery in 8c (FU 25 and FU 31) closed in 2017 and 2018. 2 t were caught each year in 2017 and 2018 by the Sentinel surveys

- CPUE



CPUE in species with affinity with temperate waters decreased from 1992 to 2009 (Teixeira, 2012). More with slower life histories as *Nephrops* (15 years).

LPUE



INDUSTRY & SENTINEL SURVEYS CPUES

SOURCE	YEAR	PERIOD	DIRECTED CPUE (kg/HOUR)	S.D.	NON-DIRECTED* CPUE (KG/HOUR)	S.D.
ICES2017Fernández et al., 2017 - Fishing Industry	2015	Year	6.46		0.18	
ICES2017Fernández et al., 2017 - Fishing Industry	2016	Year	10.81		0.27	
CARACAS Sentinel survey	2017	Aug-Sep	7.22	1.57	0.59	0.56
CARACAS Sentinel survey	2018	Aug-Sep	5.2	2.94	0.9	1.3

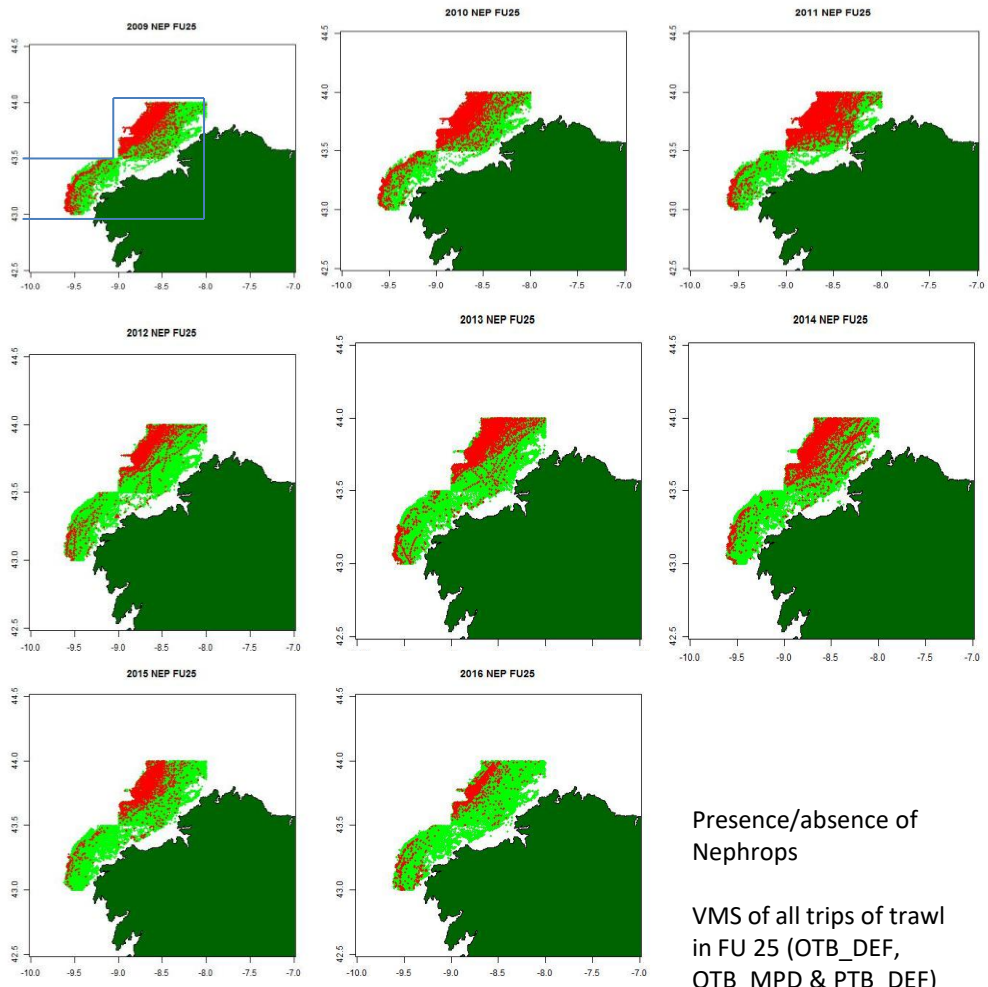
*To avoid the effect of daily variations in the catchability of *Nephrops*, which is a consequence of the changes in their behavior, the hauls that were carried out in more than 50% of time between dusk and dawn were considered non-directed to *Nephrops*.



COMMERCIAL FISHERY

In 2009-2017, 22% of FU 25 VMS pings can not be identified in logbooks.

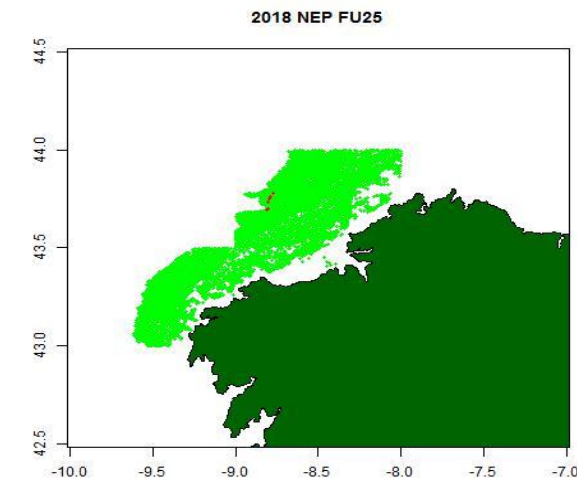
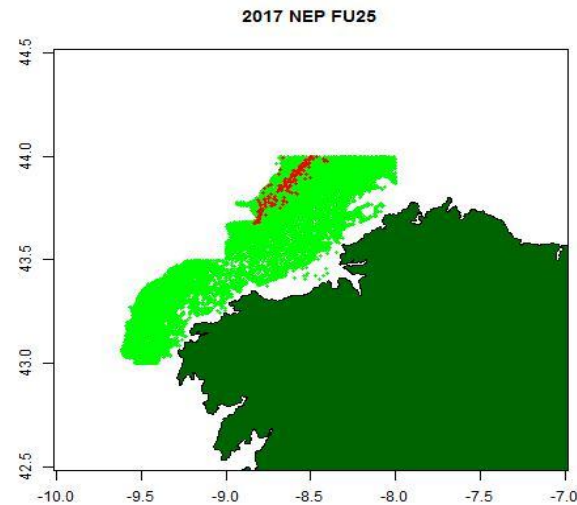
In 2009-2011, 27% of FU 25 VMS identified pings have Nephrops.

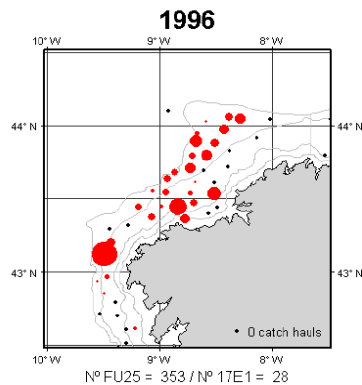
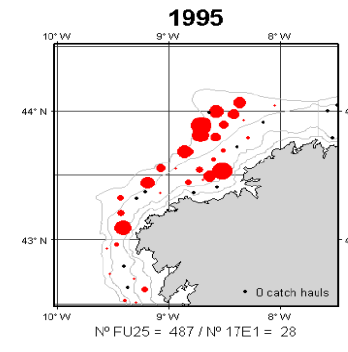
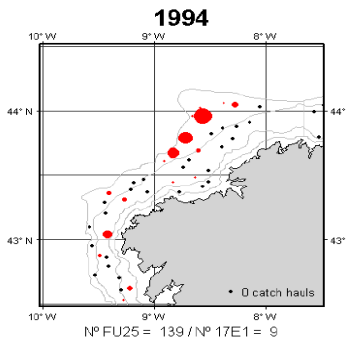
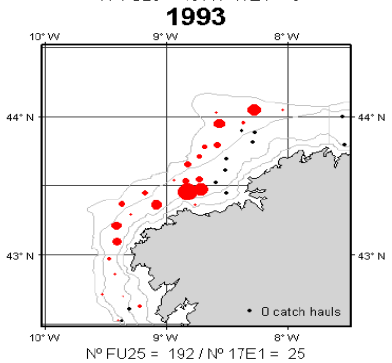
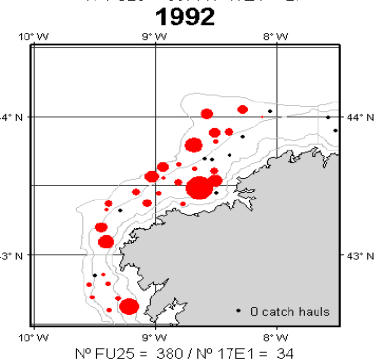
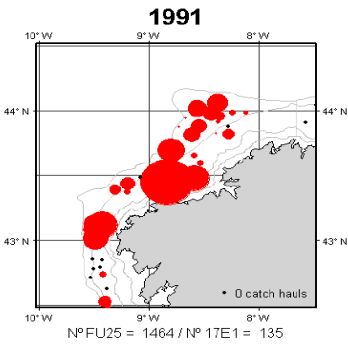
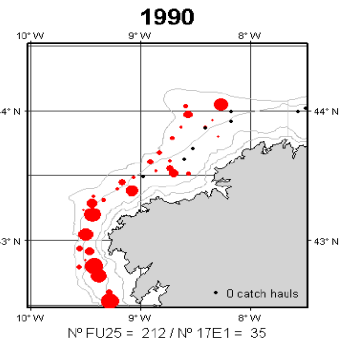
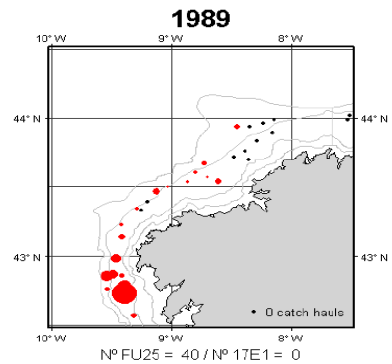
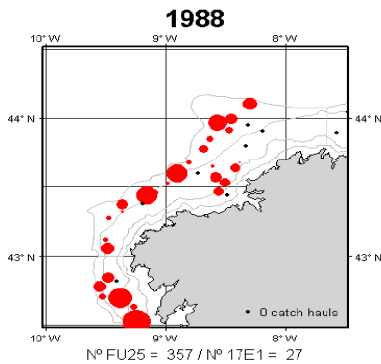
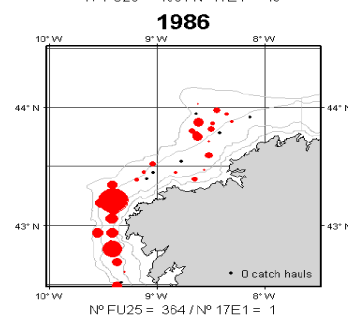
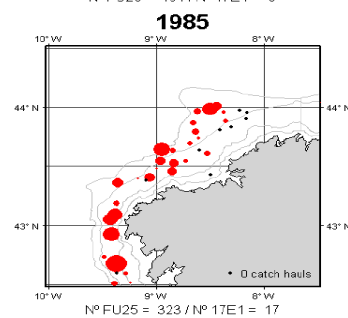
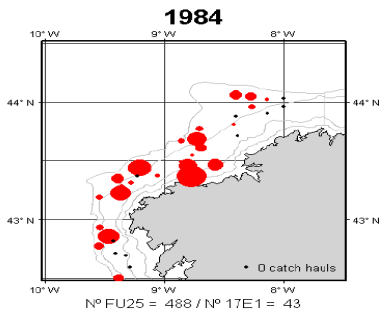
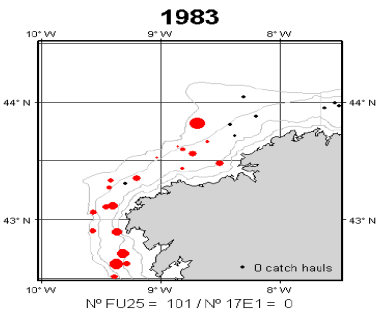


Presence/absence of Nephrops

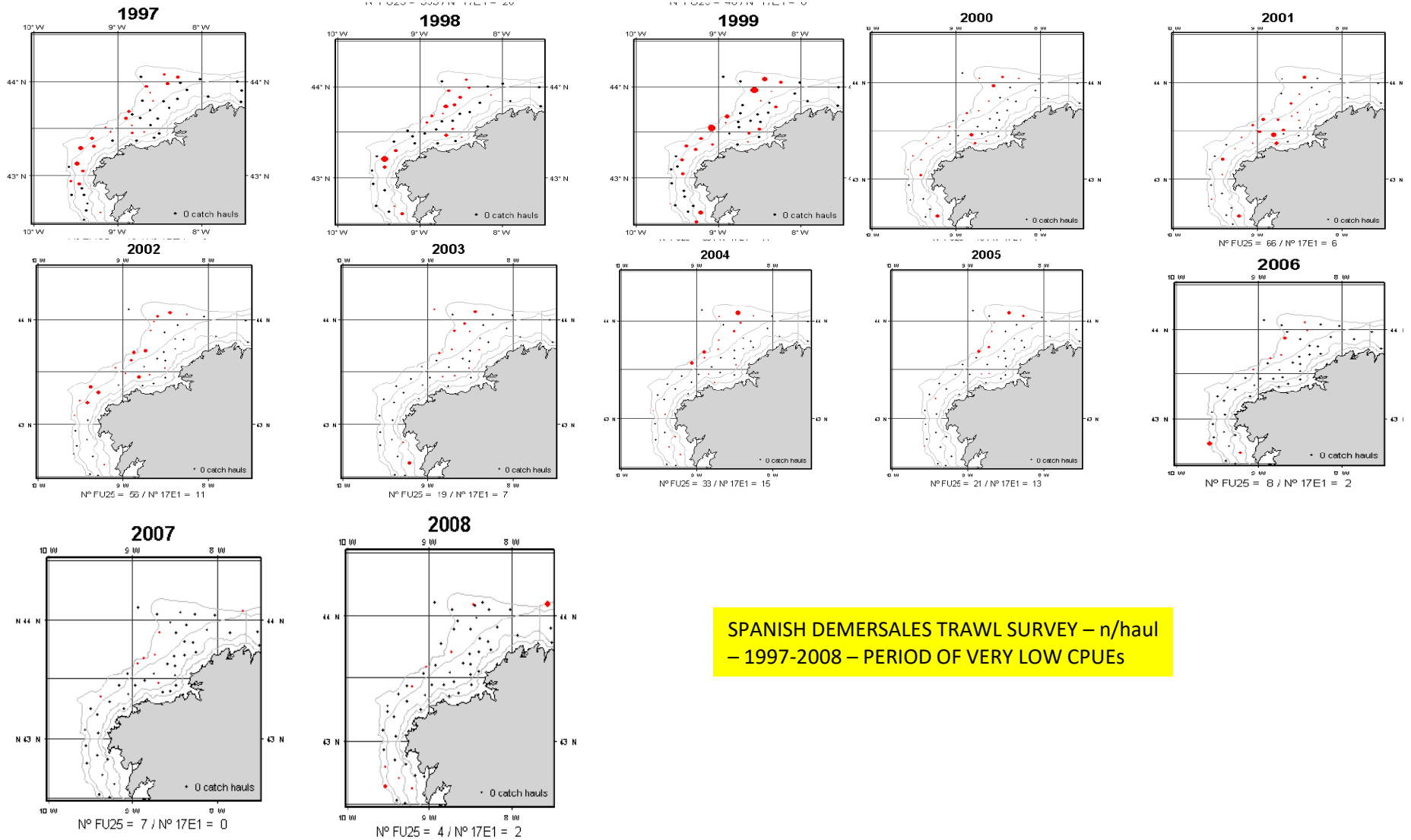
VMS of all trips of trawl in FU 25 (OTB_DEF, OTB_MPD & PTB_DEF)

SENTINEL SURVEYS

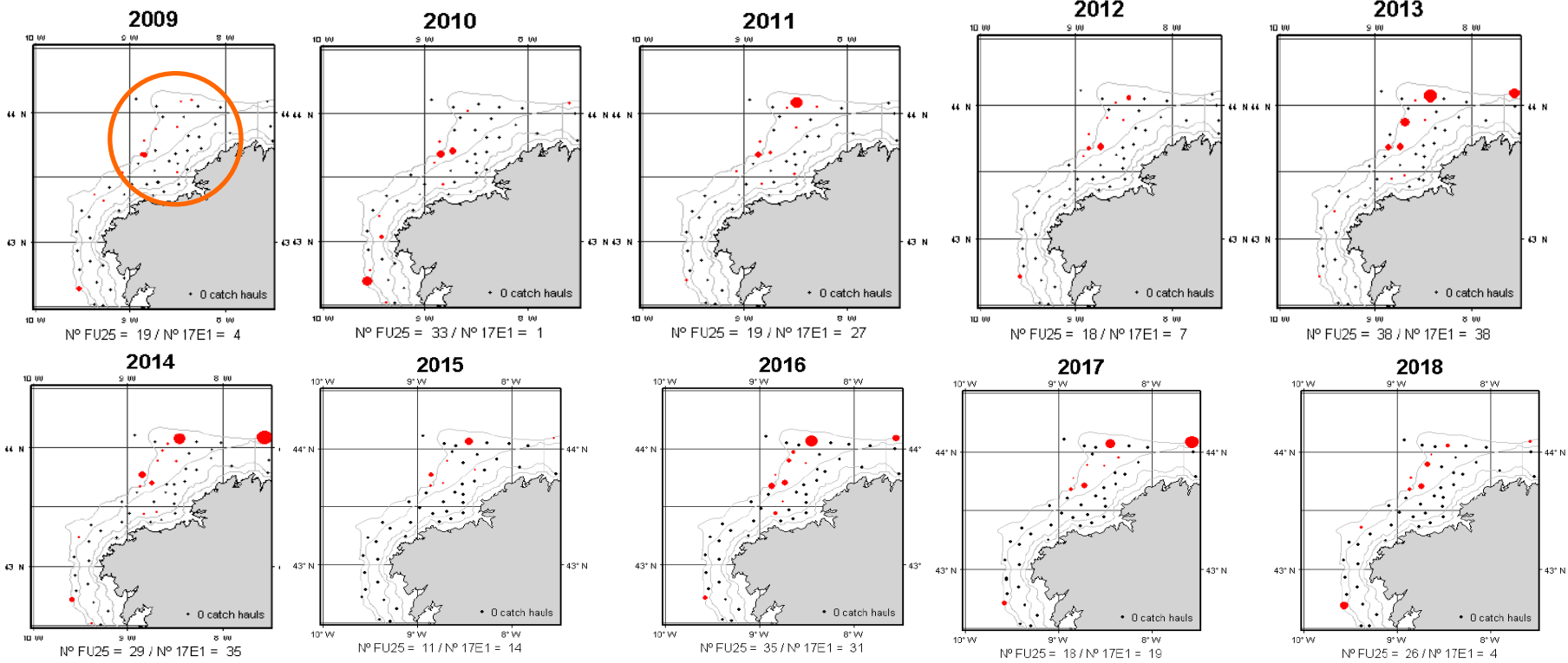




**SPANISH DEMERSALS TRAWL SURVEY – n/haul
– 1983-1996 – PERIOD OF HIGH CPUES**



SPANISH DEMERSALS TRAWL SURVEY – n/haul
 – 1997-2008 – PERIOD OF VERY LOW CPUEs

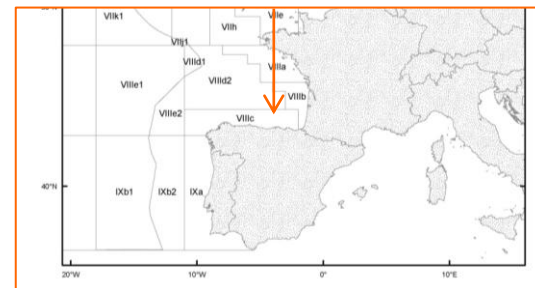


SPANISH DEMERSALS TRAWL SURVEY – n/haul
 – 2009-2018 – BETTER CPUES IN STATISTICAL
 RECTANGLE 16E1

FU 31 Nephrops



18E3	18E4	18E5	18E6	18E7	18E8
17E3	17E4	17E5	17E6	UF 31	17E8
16E3	16E4	16E5	16E6	16E7	16E8
15E3	15E4	15E5	15E6	15E7	15E8



Year	Landings			Discards	Total Catch
	Trawl	Creel	Other gears		
1983	63				63
1984	100				100
1985	128				128
1986	127				127
1987	118				118
1988	151				151
1989	177				177
1990	174				174
1991	105		4		109
1992	92		2		94
1993	95		6		101
1994	146		2		148
1995	90		4		94
1996	120		9		129
1997	97		1		98
1998	69		3		72
1999	46		2		48
2000	33		1		34
2001	26		1		27
2002	25		1		26
2003	24 34		1		22 35
2004	47 29		0		47 29
2005	44 48		0		44 48
2006	45 37		0		45 37
2007	49 32		0		49 32
2008	19		0 1		49 20
2009	6 9		0 1		6 10
2010	8		0		9
2011	7		0		7
2012	10		0		10
2013	10		0		10
2014	4		0		4
2015	3		0		3
2016	4		0		4 3
2017	0*		0*		0*
2018	0*		0*	3*	3*

* Nephrops fishery was closed in 8c (FU 25 & FU 31) in 2017 and 2018.

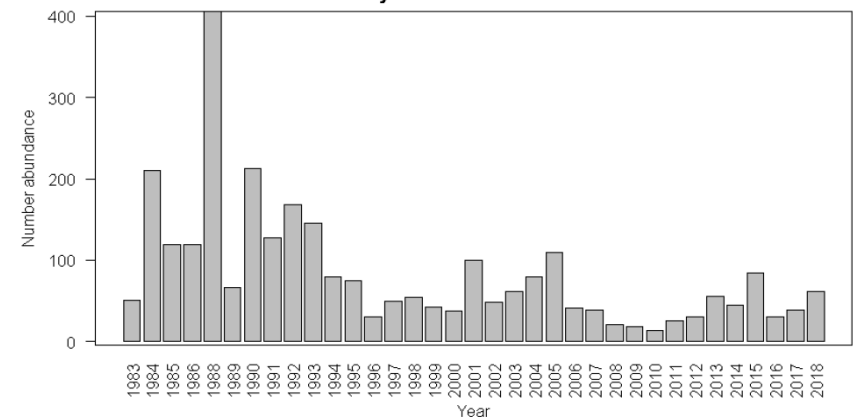
- Catch

In FU 31 the 85% of the Spanish landings of *Nephrops* comes from the métier baca (OTB_DEF \geq 55), 7% from crustacean pots (FPO_CRU), 3% from jurelera (OTB_MPD \geq 55), 3% from pair trawlers (PTB_MPD \geq 55) and 1% from other pots or traps (FPO_FIF) (logbooks 2008-2016).

Landings

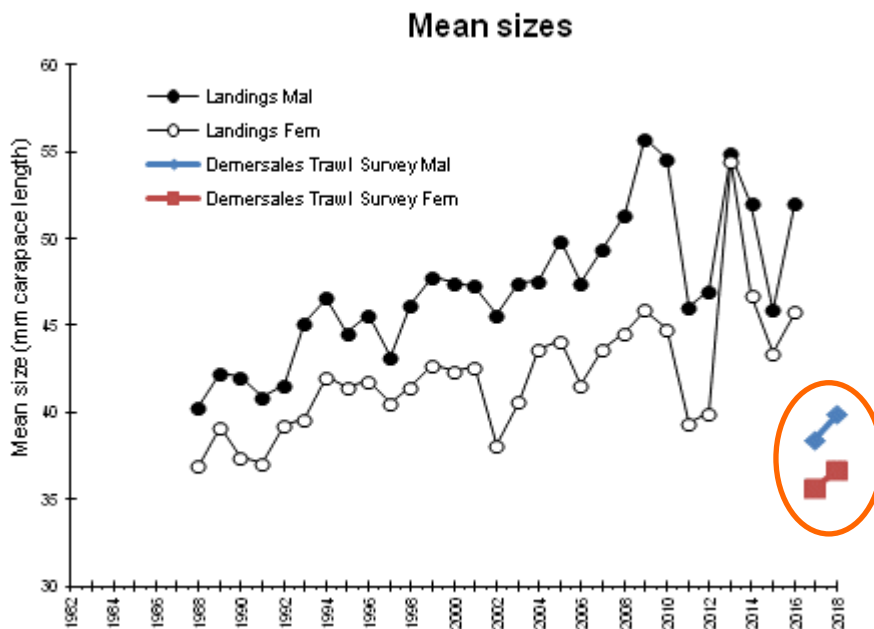


Norway lobster FU 31 time series



FU 31 – Cantabrian Sea

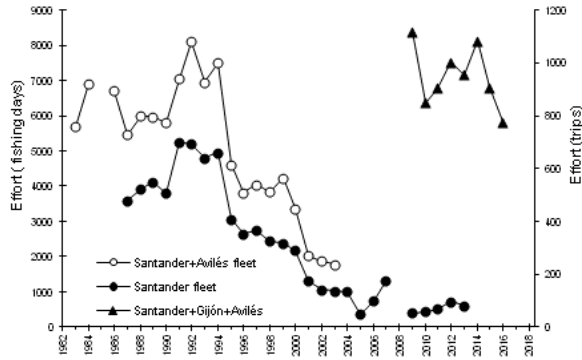
- Mean sizes



From trawl survey:
 2017 – 30 males, 11 females
 2018 – 47 males, 17 females

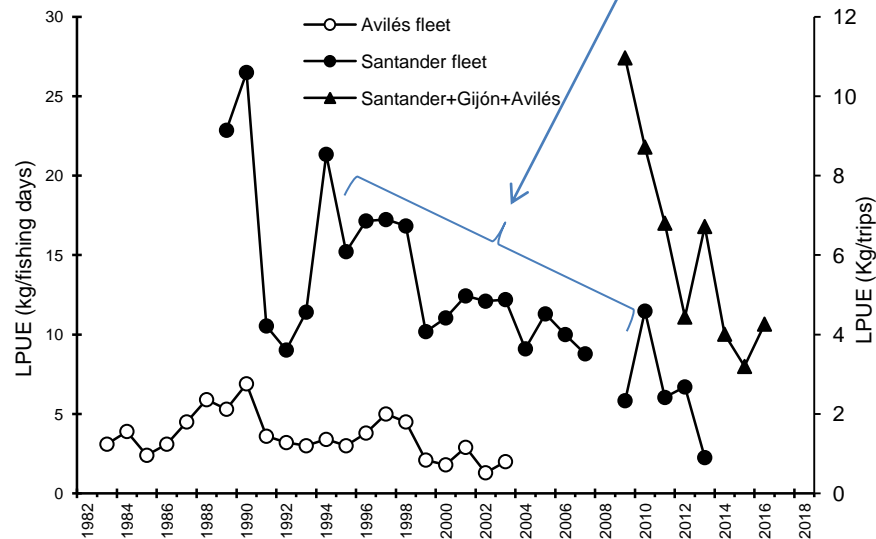
- CPUE

Effort



CPUE in **species** with affinity with **temperate waters** decreased from **1992 to 2009** (Teixeira, 2012). More with slower life histories as *Nephrops* (15 years). ?

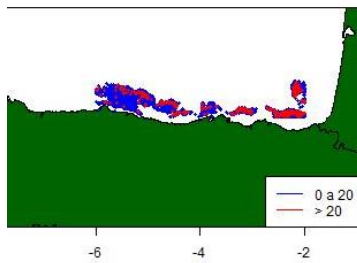
LPUE



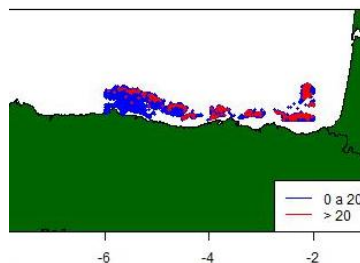
In 2009-2017, 28% of FU 31 VMS pings can not be identified in logbooks.

In 2009-2017, 9% of FU 25 VMS identified pings have Nephrops.

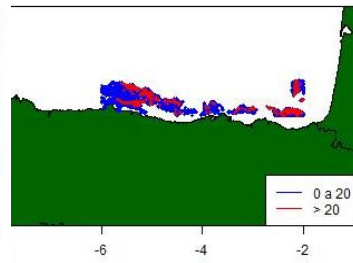
2009 NEP FU31 por Rango



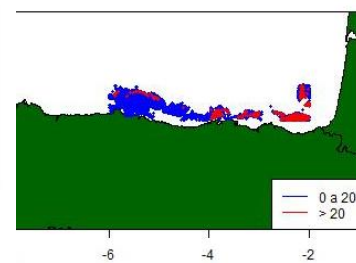
2010 NEP FU31 por Rango



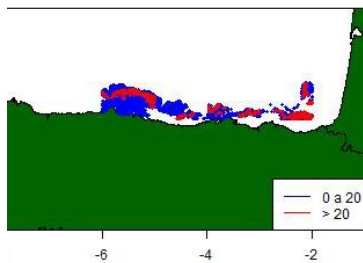
2011 NEP FU31 por Rango



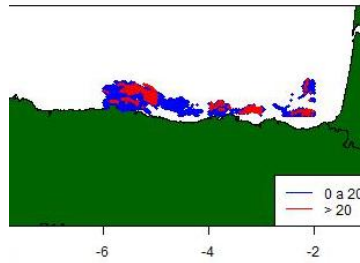
2012 NEP FU31 por Rango



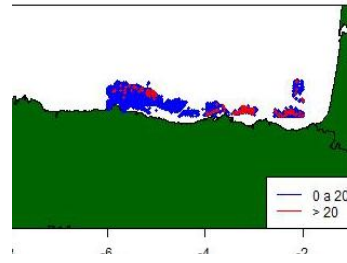
2013 NEP FU31 por Rango



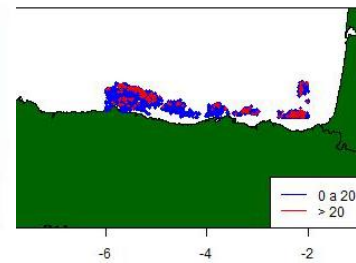
2014 NEP FU31 por Rango



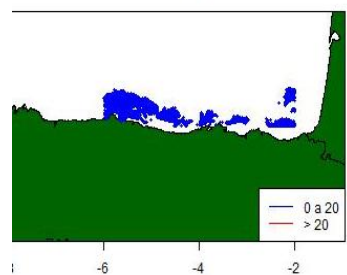
2015 NEP FU31 por Rango



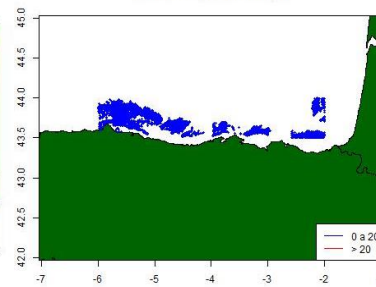
2016 NEP FU31 por Rango



2017 NEP FU31 por Rango



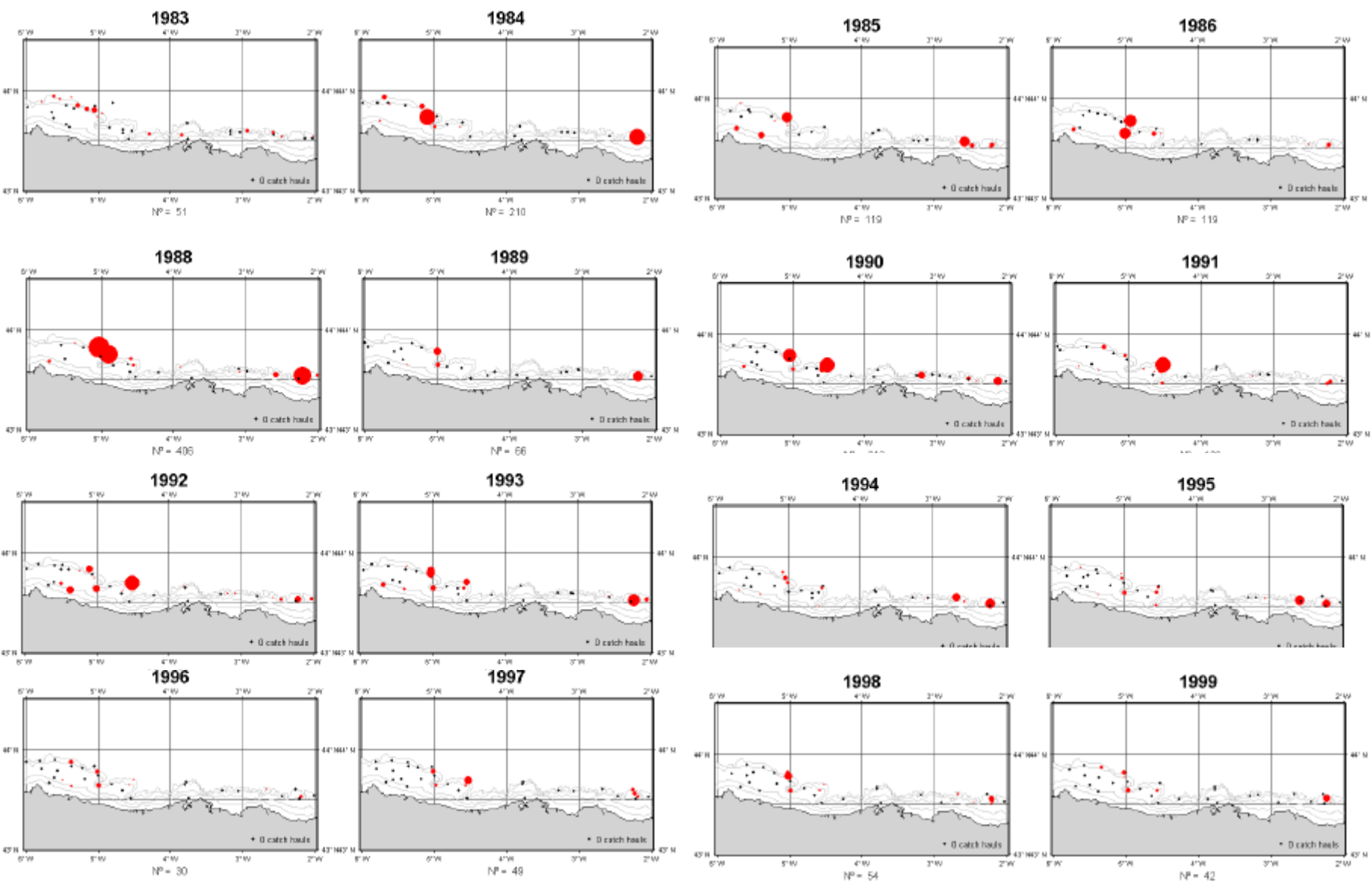
2018 NEP FU31 por Rango



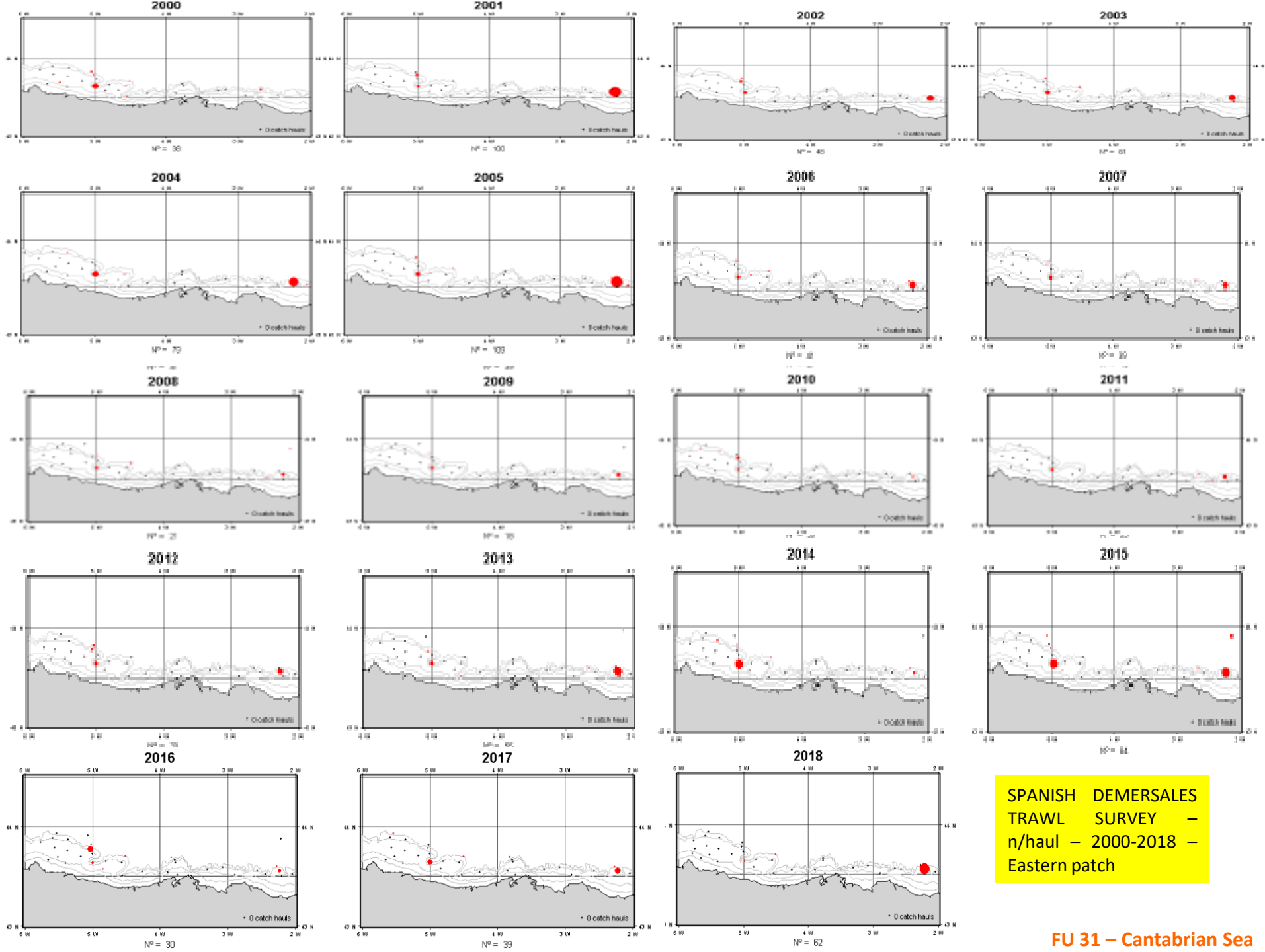
CPUE

Kg/fishing day

VMS of all trips of trawl in FU 31 (OTB_DEF, OTB_MPD & PTB_DEF)



SPANISH DEMERSALES TRAWL SURVEY – n/haul
 – 1983-2000 – DISMINUYE CPUE



SPANISH DEMERSALES TRAWL SURVEY – n/haul – 2000-2018 – Eastern patch



Year	FU25		Discards	FU 31		8c Outside FUs		Total 8c
	Official	Non-reported		Landings	Discards	Landings	Discards	
1975	731							731
1976	559							559
1977	667							667
1978	690							690
1979	475							475
1980	412							412
1981	318							318
1982	431							431
1983	433			63				496
1984	515			100				615
1985	477			128				605
1986	364			127				491
1987	412			118				530
1988	445			151				596
1989	376			177				553
1990	285			174				459
1991	453			109				562
1992	428			94				522
1993	274			101				375
1994	245			148				393
1995	273			94				367
1996	209			129				338
1997	219			98				317
1998	103			72				175
1999	124			48				172
2000	81			34				115
2001	147			27				174
2002	143			26				169
2003	89			35		30		154
2004	75			29		10		114
2005	63			48		12		123
2006	62			37		11		110
2007	67			32		13		112
2008	39			20		10		69
2009	21			10		5		36
2010	34			9		5		47
2011	44			7		3		54
2012	10	11		10		5		36
2013	11	0		10		4		25
2014	9	0		4		2		15
2015	14	0		3		2		19
2016	13	65		3		4		85
2017*	0	0		0		0		0
2018*	0	0	0.2	0	3	0	4	8

8cNephrops

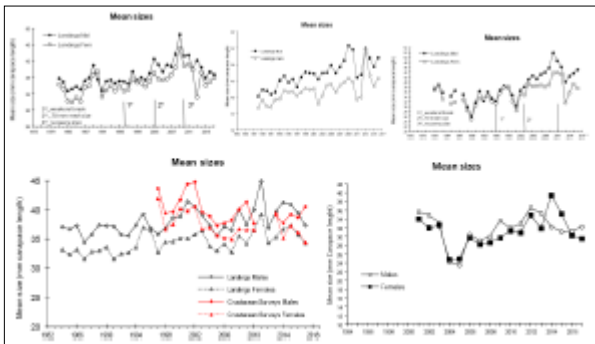
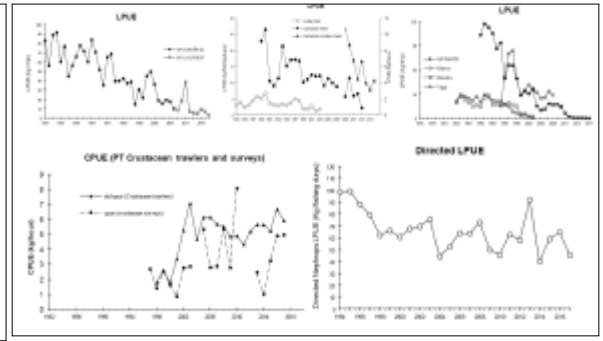
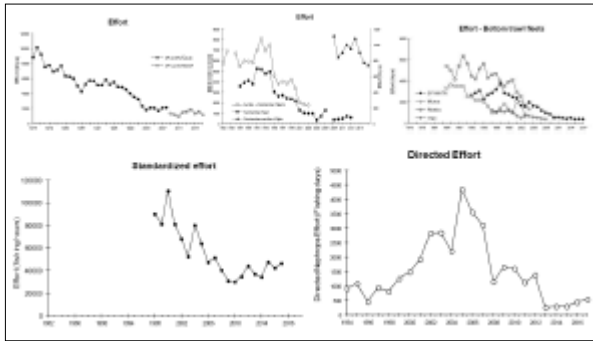
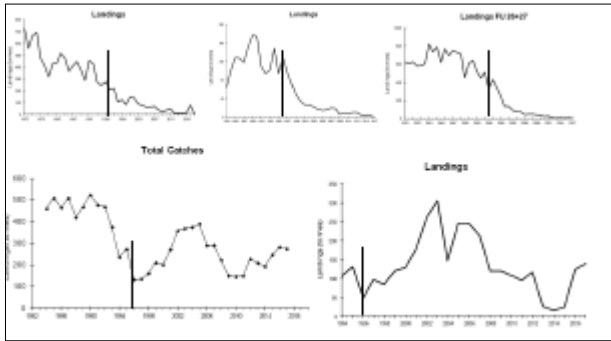
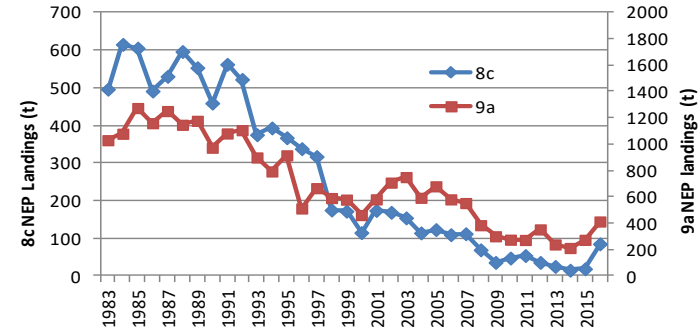
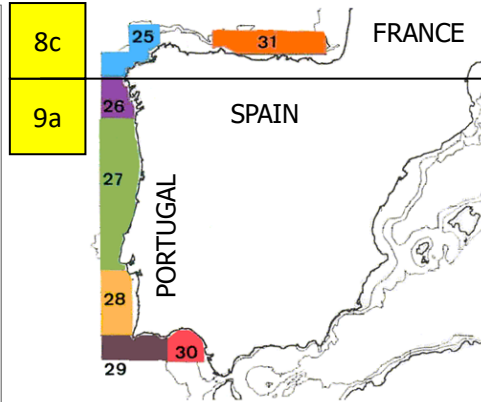
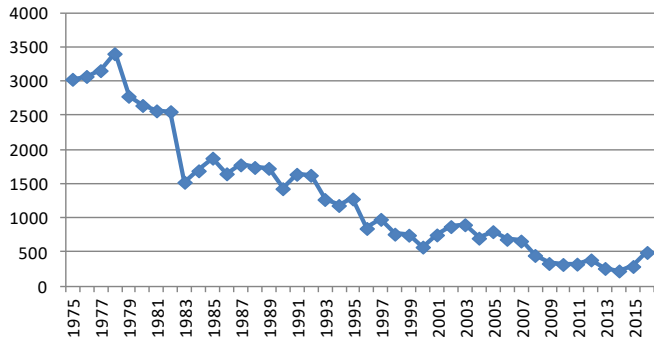
FU 25 provides the 63% of the Spanish *Nephrops* landings from the 8c, FU 31 the 25% and other rectangles of 8c the 12% (logbooks 2003-2016).

In division 8c, the 87% of *Nephrops* landings comes from the metier baca (OTB_DEF \geq 55), 7% from jurelera (OTB_MPD \geq 55), 2% from pair trawlers (PTB_MPD \geq 55) and 2% from pots (FPO_CRU) (logbooks 2008-2016).

* *Nephrops* fishery was closed in 8c (FU 25 & FU 31) in 2017 and 2018, 2 t were fished each year in Sentinel fishery in FU 25.

8cNephrops

8c & 9a NEP landings



FU	RECRUITMENT											
	YEARS											
	1983-87	1990	1991	1996	2001	2002	2004-05	2006-07	2011-12	2013	2015	2017
25	X		X		~					X		
31		X	X			X			X		X	
26-27		X		X	X					X		
28-29							X	X				X
30							X					X