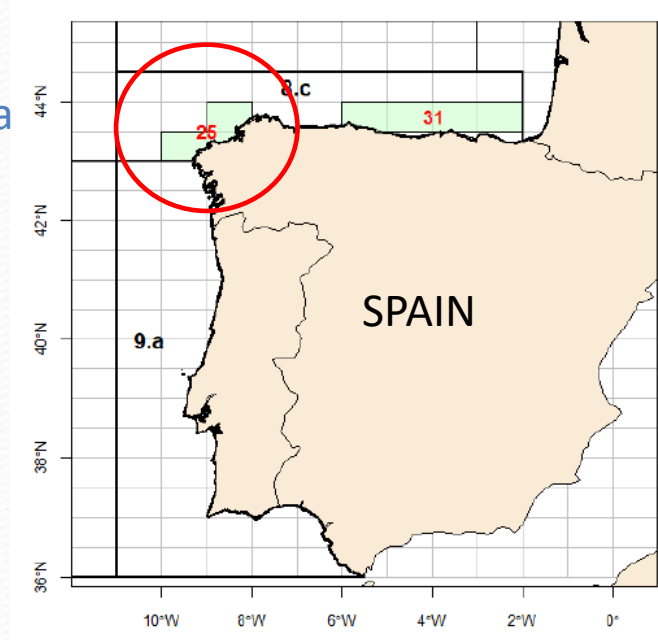
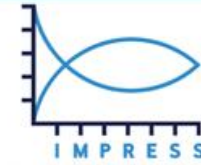


IMPRESS – SPiCT WK

Searching FU 25 Nephrops stock Reference Points with SPiCT

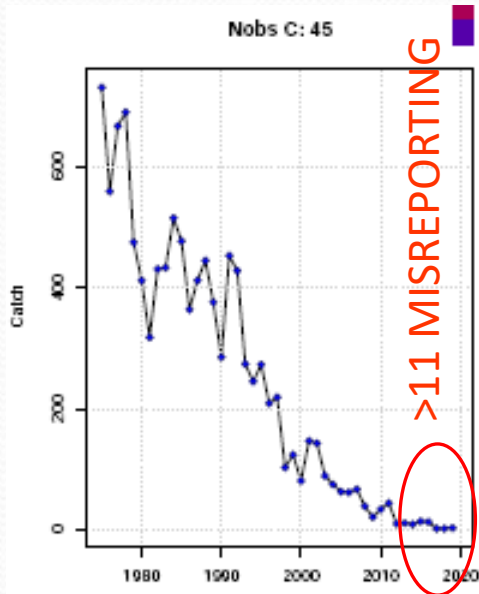
FU 25 North Galicia



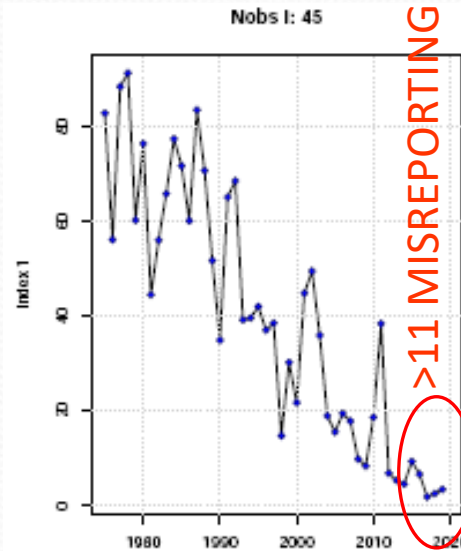


FU 25 North Galicia

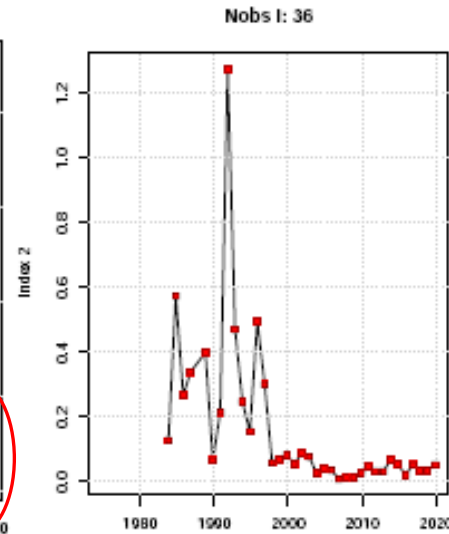
Series



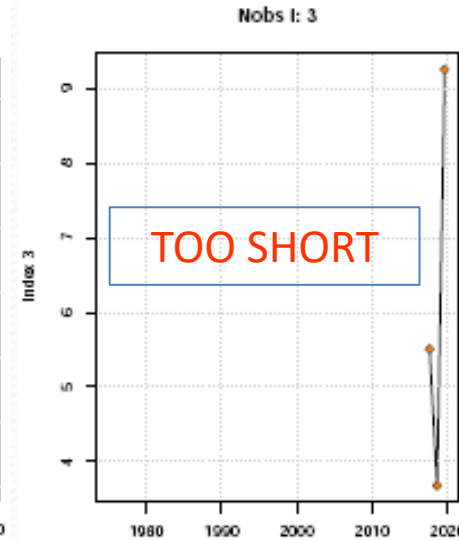
STOCK CATCH
1975-2019



Commercial CPUE
1975-2019



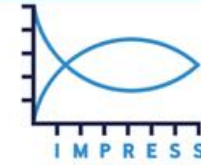
DEMERSALES survey
1983-2019



SENTINEL survey
2017-2019

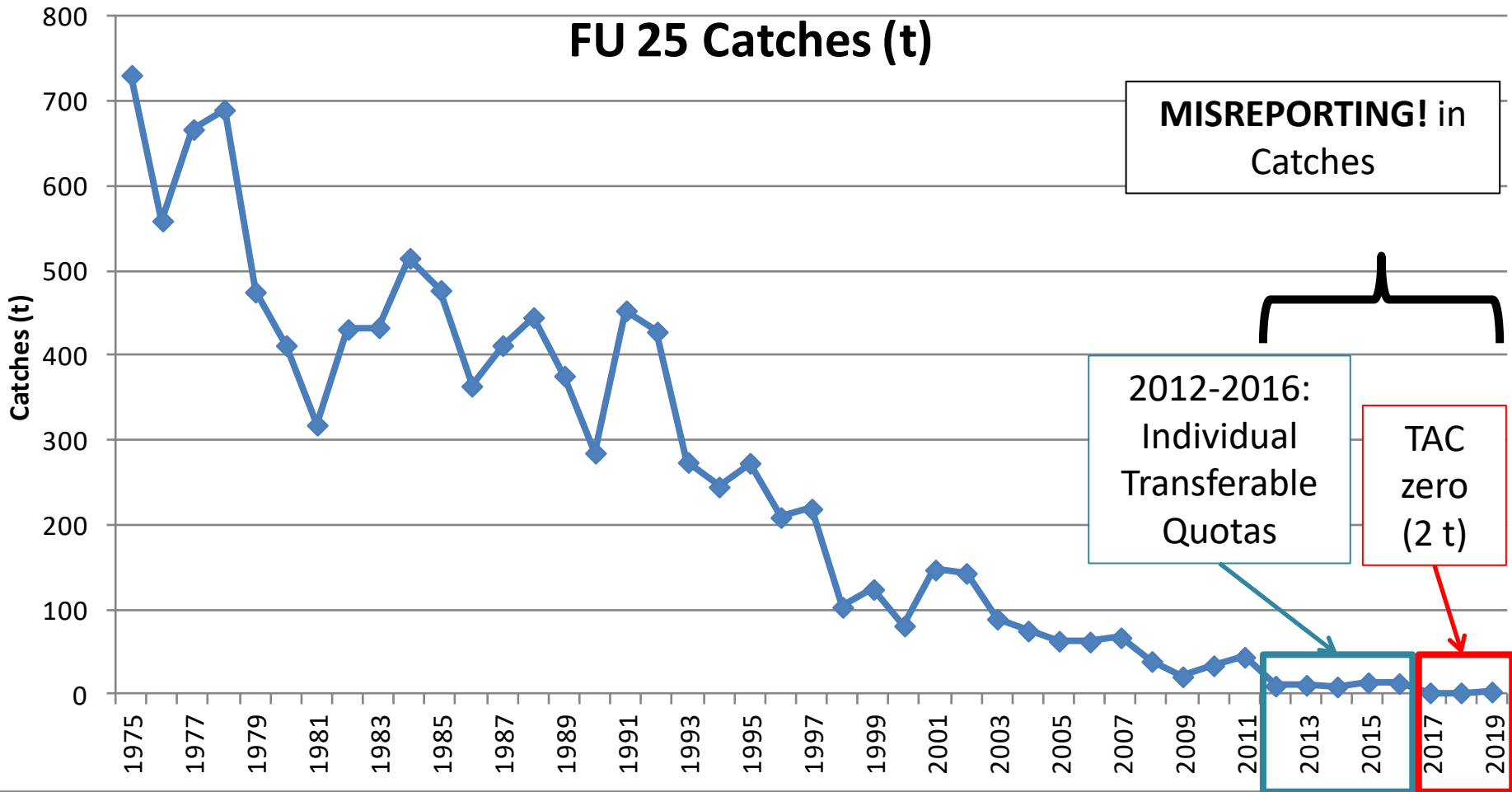
CATCH

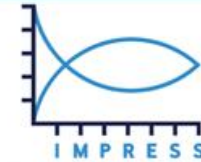
POSSIBLE INDICES



FU 25 North Galicia

Annual Catch Series



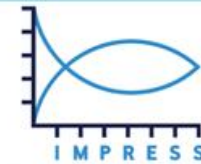


CORUÑA PORT CPUE

Catch	Index	B _{MSY} (t)	F _{MSY}	MSY	B (t)	F	B /B _{MSY}	F/F _{MSY}	Catch (t)	E (B _{inf})
75-19	CPUE	18049	NA	NA	1936 (19)	0.001 (19)	0.11 (19)	NA	3 (20)	NA
75-16	CPUE	21998	NA	NA	8006 (16)	0.0016 (16)	0.36 (16)	NA	13 (17)	NA
75-11	CPUE	12314	NA	NA	12461 (11)	0.0037 (11)	1.0 (11)	NA	5 (12)	NA

BIOMASS 2011 = 12461 t seems to be very high vs Catch 2011 = 44 t

Let's try DEMERSAL survey index



DEMERSALES SURVEY INDEX

Catch	index	Convergence	B_{MSY} (t)	F_{MSY}	MSY	B (t) 2019.81	F 2019.81	B/B_{MSY}	F/F_{MSY}	Catch (t)	E (B_{inf})
75-19	DEM	no	3462	na	na	562	0.005	0.16	NA	3 (20)	NA (20)



USE DATA SINCE 1983

Catch	index	B_{MSY} (t)	F_{MSY}	MSY	B (t) 2019.81	F 2019.81	B/B_{MSY}	F/F_{MSY}	Catch (t)	E (B_{inf})
83-19	DEM	806	0.07	62	460	0.007	0.57	0.09	3 (20)	2312 (20)
83-16	DEM	2529	0.02	67	411	0.04	0.16	1.6	17	1755
83-11	DEM	10425	0.06	672	141	0.5	0.01	7.6	67	199





Data

- Annual Stock Commercial Catches

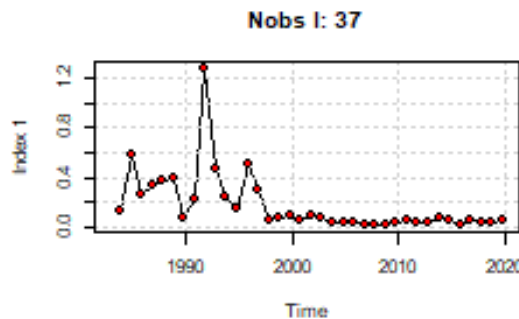
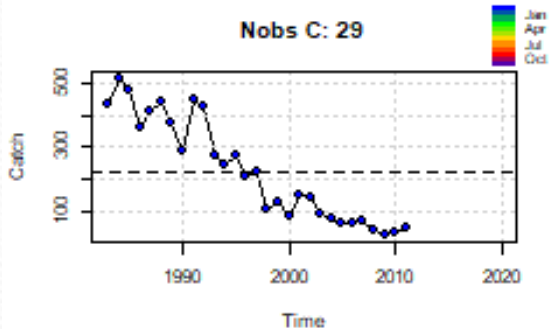
- Abundance Index: Demersales Survey (1983-2019)

Stock	Year	C_t	DEM_kg/lanc
FU25	1983	433	0.127
FU25	1984	515	0.574
FU25	1985	477	0.266
FU25	1986	364	0.339
FU25	1987	412	0.369
FU25	1988	445	0.399
FU25	1989	376	0.066
FU25	1990	285	0.215
FU25	1991	453	1.275
FU25	1992	428	0.471
FU25	1993	274	0.247
FU25	1994	245	0.154
FU25	1995	273	0.496
FU25	1996	209	0.3
FU25	1997	219	0.058
FU25	1998	103	0.069
FU25	1999	124	0.082
FU25	2000	81	0.055
FU25	2001	147	0.087
FU25	2002	143	0.078
FU25	2003	89	0.025
FU25	2004	75	0.041
FU25	2005	63	0.036
FU25	2006	62	0.009
FU25	2007	67	0.011
FU25	2008	39	0.012
FU25	2009	21	0.025
FU25	2010	34	0.047
FU25	2011	44	0.03
FU25	2012	10	0.03
FU25	2013	11	0.067
FU25	2014	9	0.055
FU25	2015	14	0.02
FU25	2016	13	0.052
FU25	2017	2	0.032
FU25	2018	2	0.035
FU25	2019	3	0.051

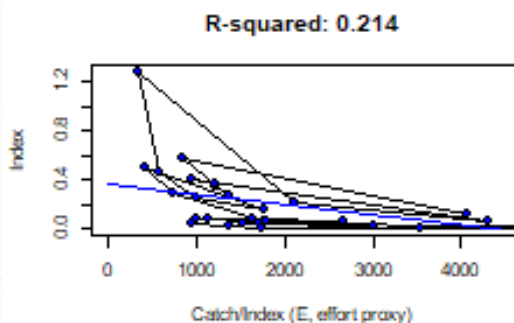


INDEX : DEMERSALES 1983-2019

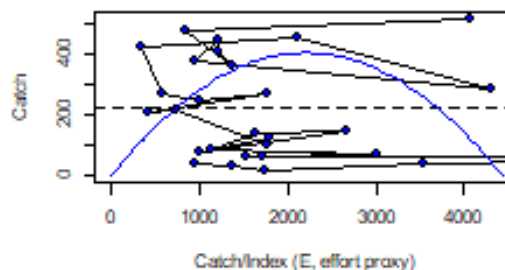
E(B_inf)



Negative slope

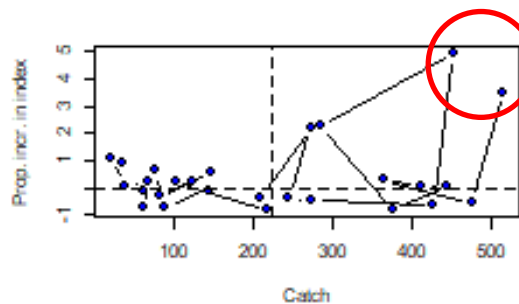
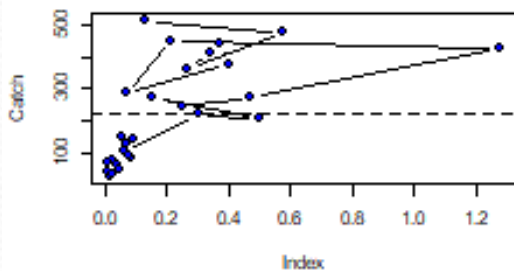


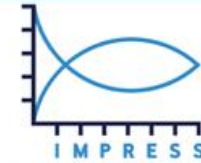
Emsy guess: 2216.786 Optimal effort



E(B_inf)

E(B_inf)

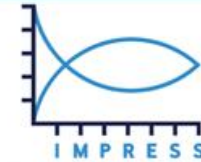




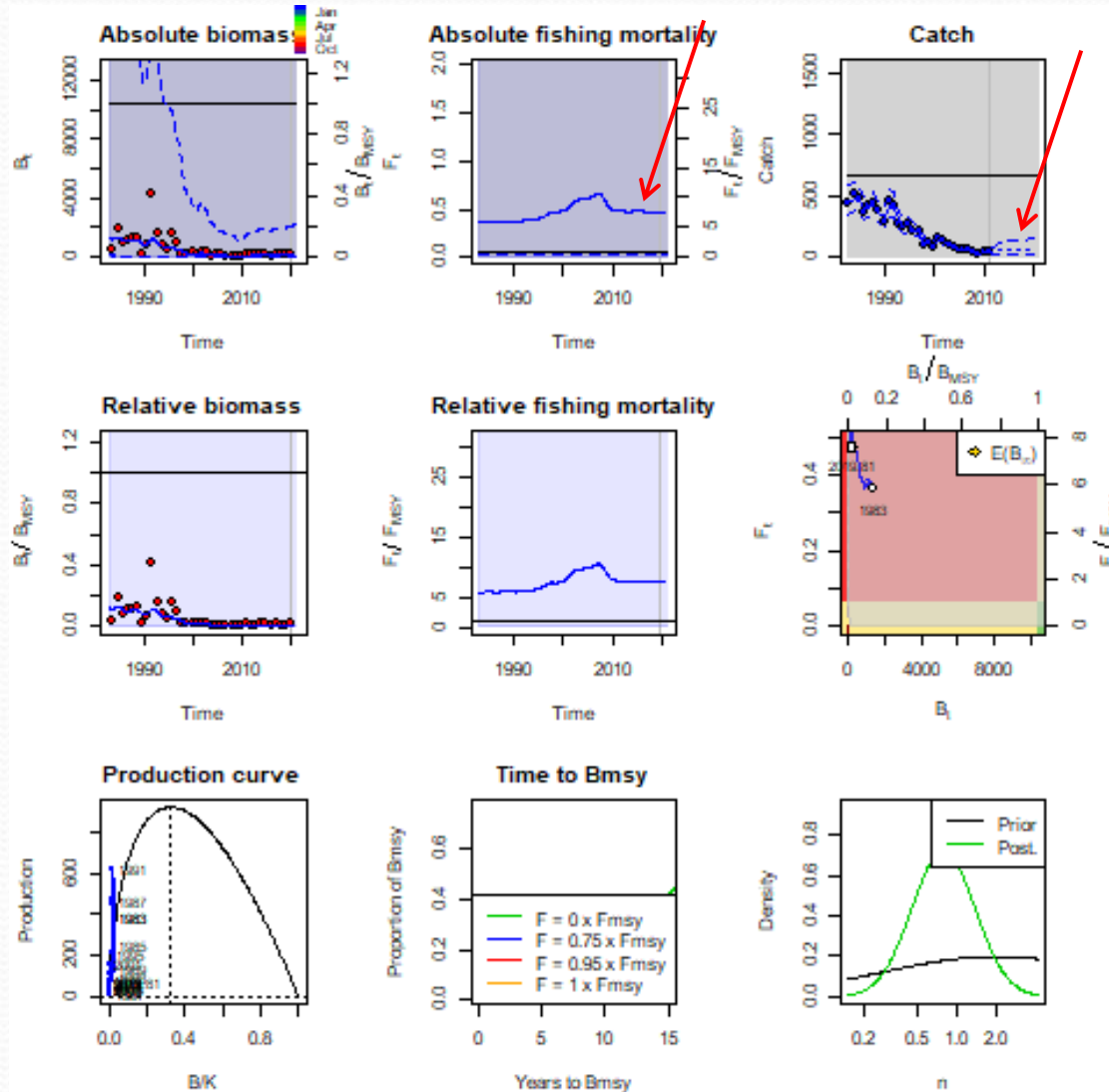
INDEX : DEMERSALES 1983-2019

Catch	B_{MSY}	F_{MSY}	MSY	B 2019.81	F 2019	B/B_{MSY} 2019	F/F_{MSY} 2019	Catch 2019.83	E (B_inf)
83-11	10425 t	0.06	672 t	141 t	0.47	0.013	7.6	67 t	199

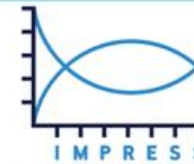
K= 48600 t



INDEX : DEMERSALES 1983-2019



spici_v1.2.8@bdece0a01623f1a0b9c3cb4328469f16138826b14



INDEX : DEMERSALES 1983-2019

BIOMASS

Checklist:

1.- Convergence

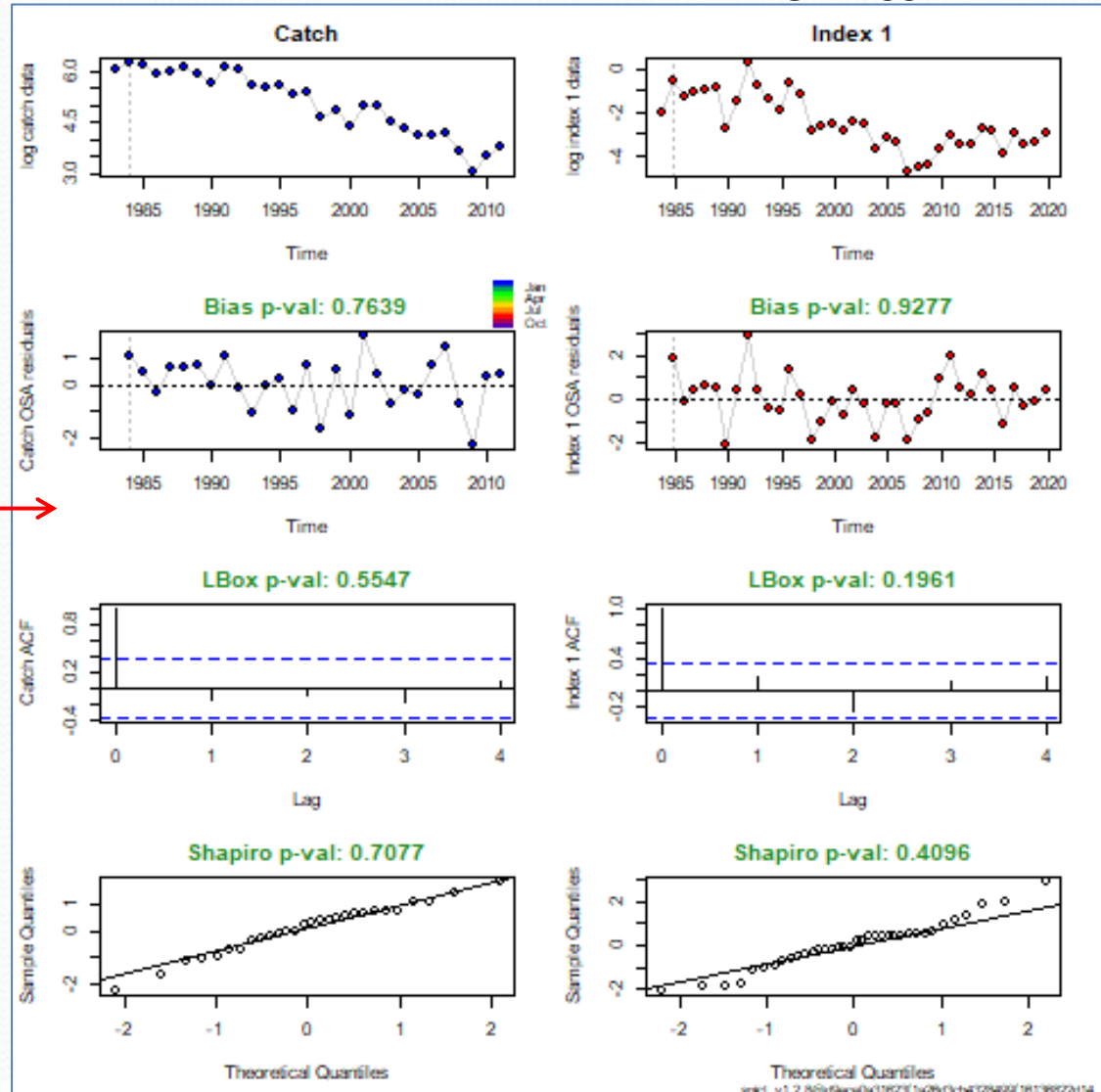
yes

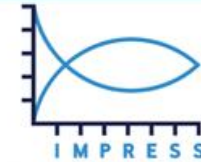
2.- Variance parameters finite

yes

3.- No assumptions violation

ok

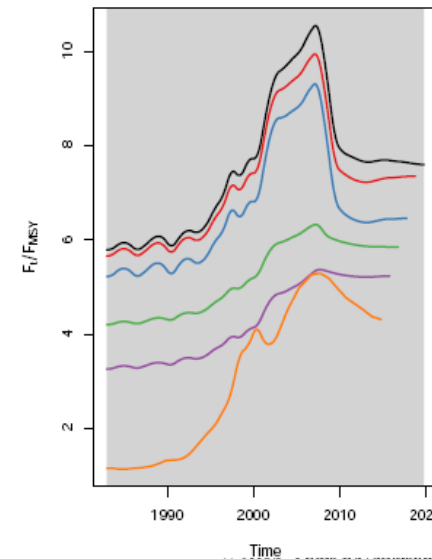
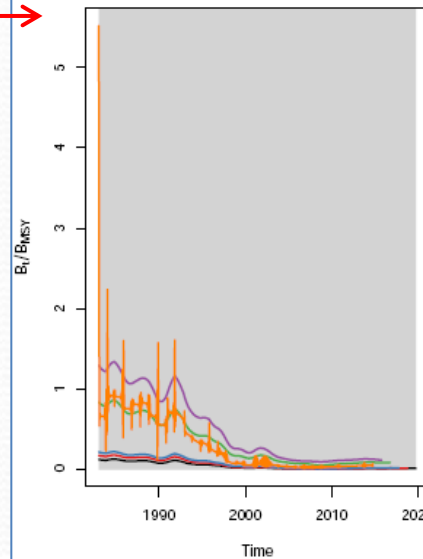
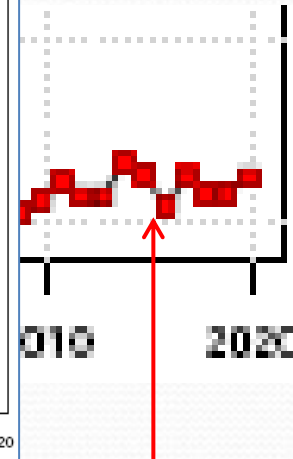
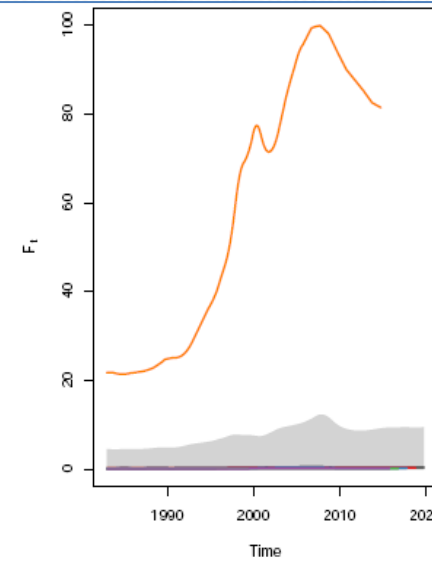
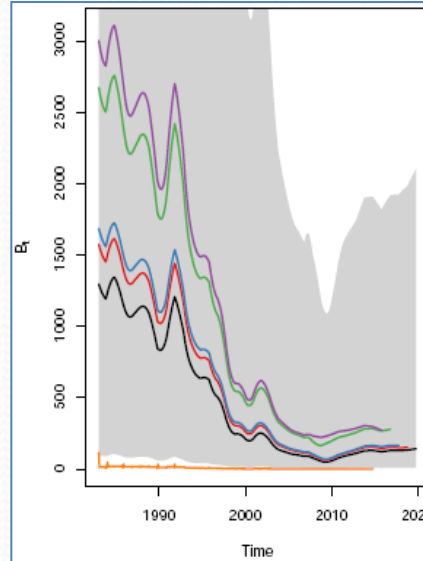




INDEX : DEMERSALES 1983-2019

Checklist:

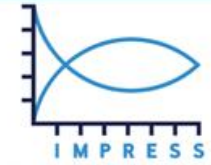
- 1.- Convergence yes
- 2.- Variance parameters finite yes
- 3.- No assumptions violation ok
- 4.- Retro convergence no →
- 5.- Realistic production curve yes
- 6.- Sensitivity to \neq initial values +/-
- 7.- B & F IC < 1 no





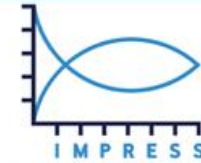
GOBIERNO
DE ESPAÑA

MINISTERIO
DE CIENCIA
E INNOVACIÓN



IMPROVING SCIENTIFIC ADVICE
TO FISHERY MANAGEMENT
FOR RESOURCES OF INTEREST
FOR SPAIN IN ATLANTIC WATERS

Thank you



SURVEY INDEX vs COMMERCIAL FLEET INDEX

Catch	index	B_{MSY} (t)	F_{MSY}	MSY	B (t) 2019.81	F 2019.81	B/B_{MSY}	F/F_{MSY}	Catch (t)	E (B_{inf})
83-19	DEM	806	0.07	62	460	0.007	0.57	0.09	3 (20)	2312 (20)
	CPUE	5953	NA	NA	1923	0.0015	0.3	NA	3 (20)	NA (20)
83-16	DEM	2529	0.02	67	411	0.04	0.16	1.6	17	1755
	CPUE	2680	NA	NA	2059	0.003	0.76	NA	7	NA
83-11	DEM	10425	0.06	672	141	0.5	0.01	7.6	67	199
	CPUE	NA	NA	NA	1483	0.005	NA	NA	8	NA

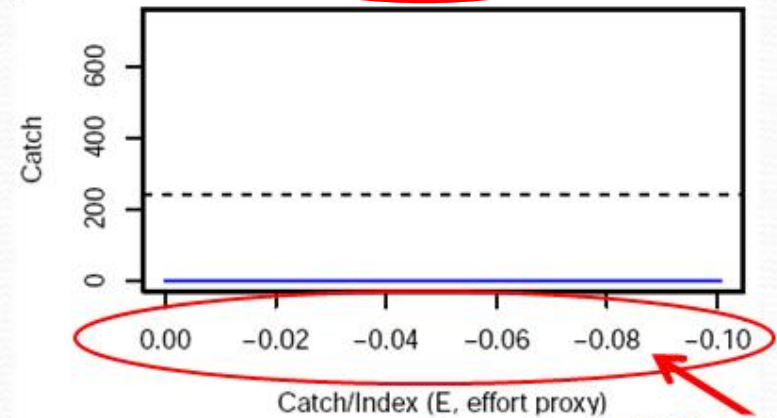
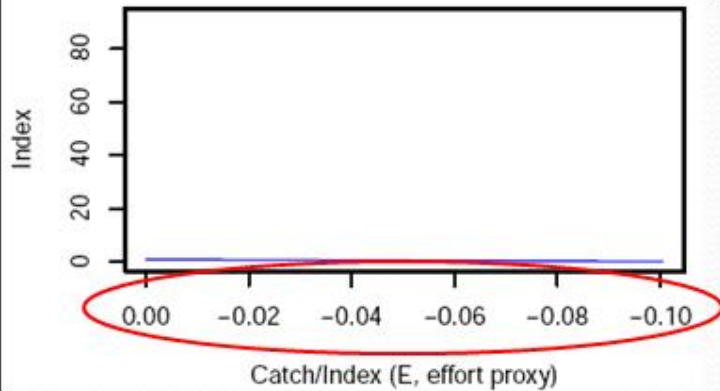


No F_{MSY} and MSY

R-squared: 0.537

(Converge all but...:)

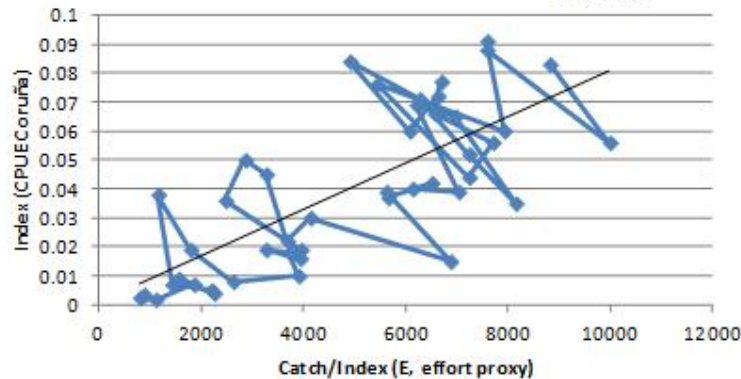
Emsy guess: -0.05



75-2019

$$y = 8E-06x + 0.0007$$

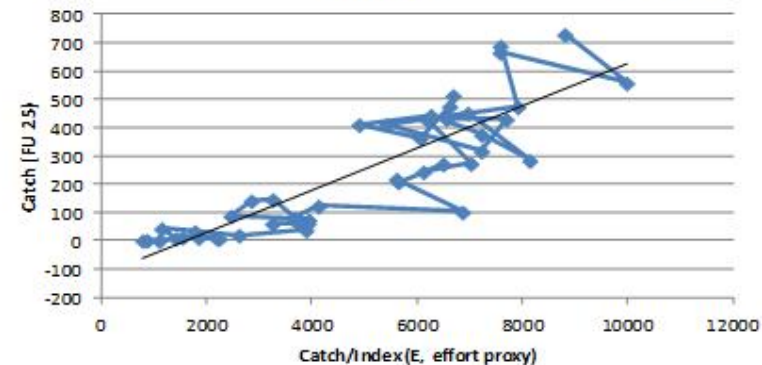
$$R^2 = 0.5394$$



75-2019

$$y = 0.0748x - 122.34$$

$$R^2 = 0.7441$$



- The effort in the projections is higher the present effort
- In the last years catch, effort and CPUE have decreased
- Nephrops has disappeared from some areas of the stock