

# Obstacles and opportunities in European eel fisheries: A conceptual view on local stock management

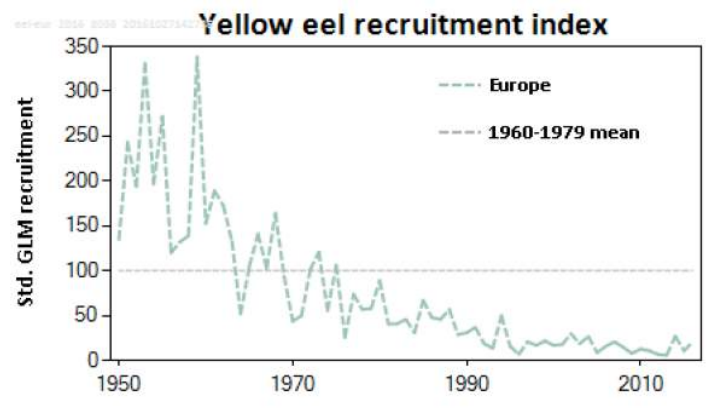
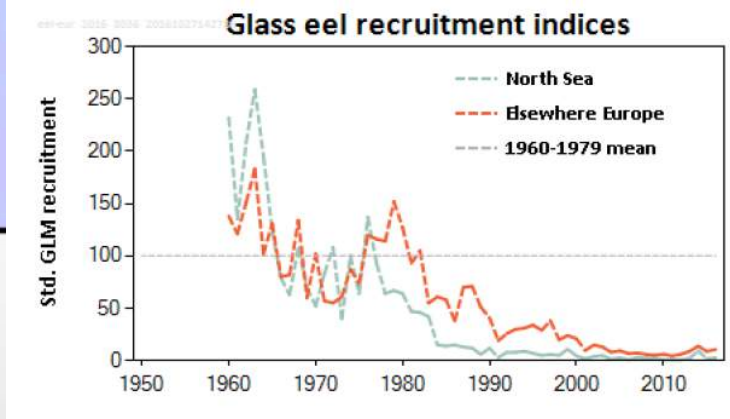
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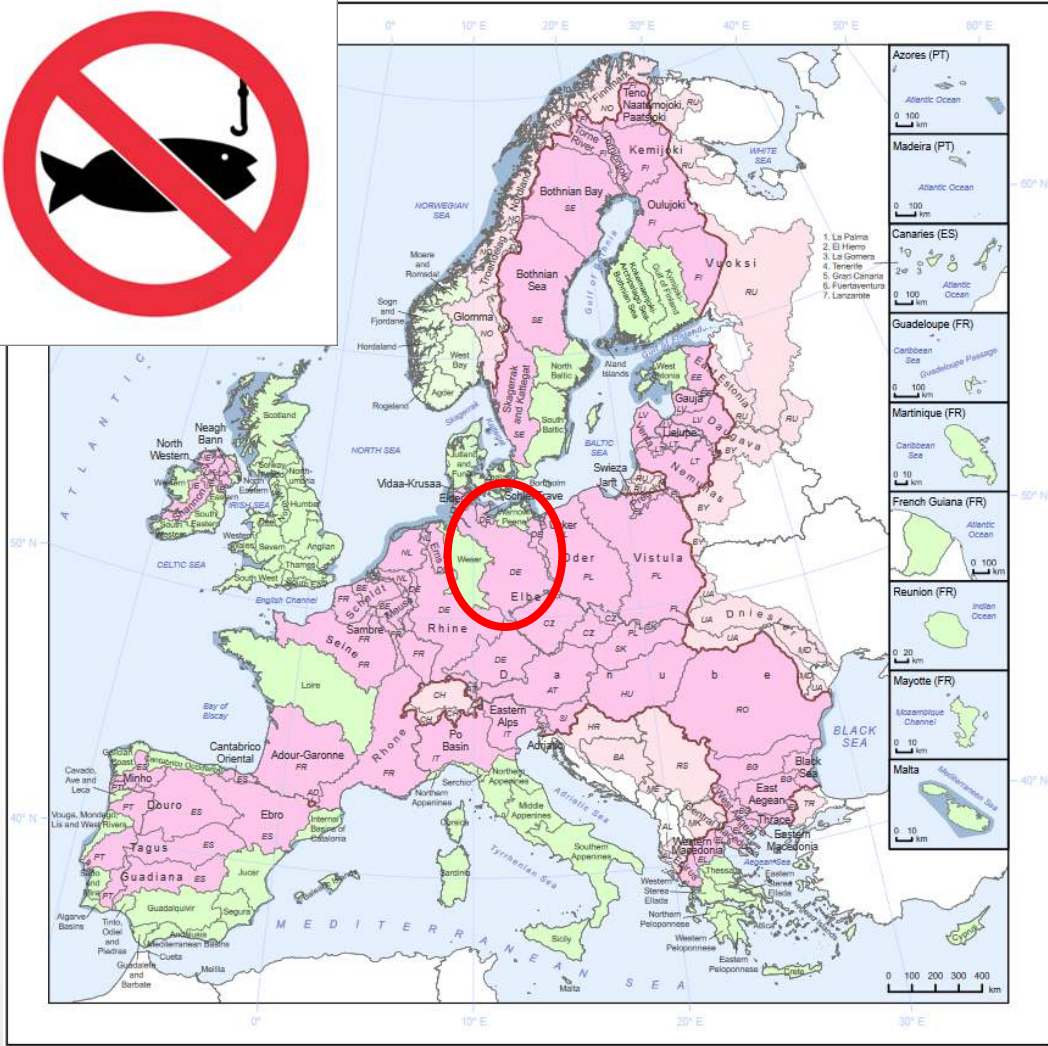
ICES ASC, Fort Lauderdale  
21.09.2017

# Eel Biology & State of the Stock



Source: ICES 2016

# Management approach



**EU 1100/2007:** „...reduce anthropogenic mortalities to permit the escapement of 40% of the silver eel biomass, relative to the escapement that would have existed without anthropogenic influences...“

**ICES 2016:** „...when precautionary approach is applied...all anthropogenic mortalities should be reduced to – or kept as close to – zero as possible...“

Source: EU

# Model system: EMU Elbe



## Study area:

- German part: ~ 97.000 km<sup>2</sup>
- Water surface: 2235 km<sup>2</sup>

## Output:

- Escapement
- Yield

## Effects:

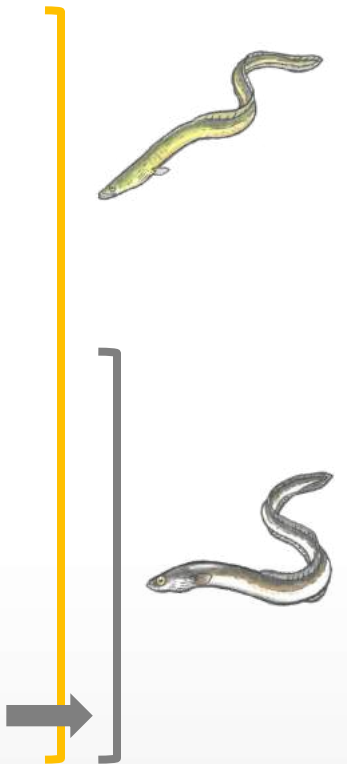
- Stocking
- Minimum landing size
- Fishing regime

# Conceptual model

Year/Age	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0	6.526	6.526	6.526	6.526	6.526	6.526	6.526	6.526	6.526	6.526	6.526
1	3.791	3.735	8.295	6.116	6.677	7.238	7.242	7.241	7.249	7.313	7.233
2	2.491	1.732	2.694	2.709	5.708	4.351	4.771	5.182	5.213	5.244	5.100
3	1.127	1.168	1.787	1.264	1.993	2.028	4.313	3.312	3.648	3.973	3.900
4	565	429	459	448	672	487	848	1.018	2.550	2.118	1.897
5	343	250	190	136	141	141	232	197	400	518	555
6	91	75	49	34	25	18	21	24	46	42	32
7	14	12	8	6	4	3	2	2	2	3	1
8	5	3	1	1	1	0	0	0	0	0	0
9	1	1	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0

# Conceptual model

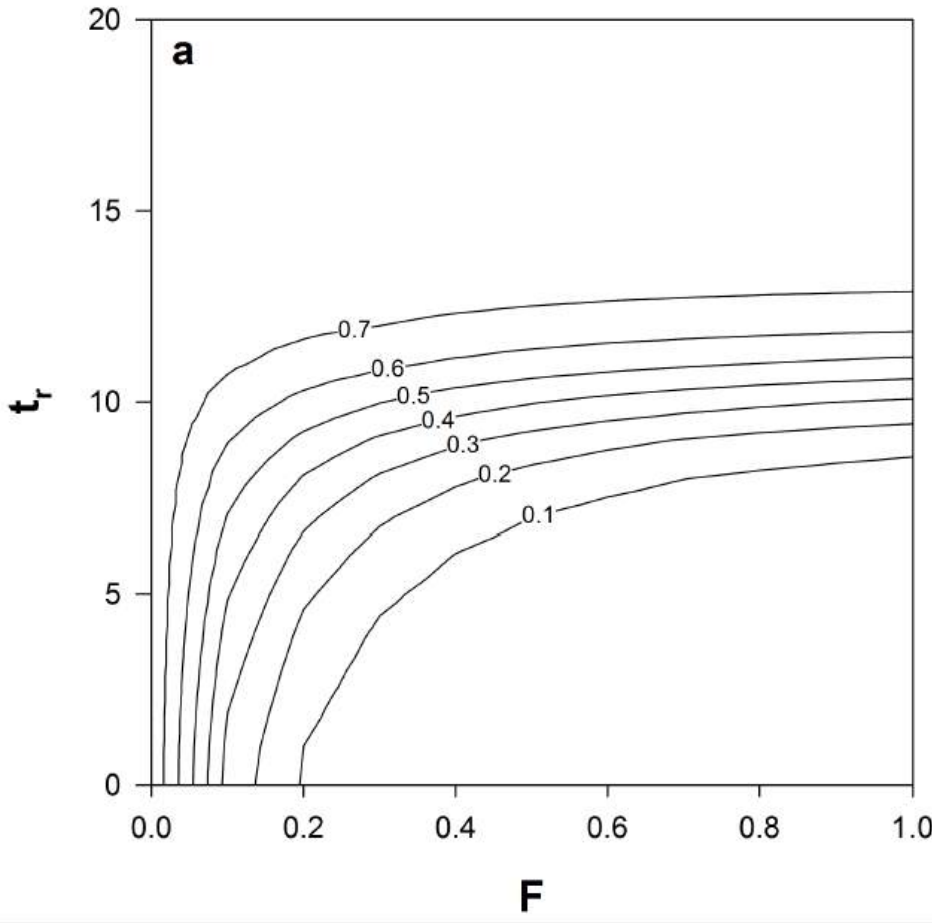
Year/Age	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0	<b>6.526</b>	6.526	6.526	6.526	6.526	6.526	6.526	6.526	6.526	6.526	6.526
1	←	<b>3.735</b>	8.295	6.116	6.677	7.238	7.242	7.241	7.249	7.313	7.233
2	2.491	←	<b>2.694</b>	2.709	5.708	4.351	4.771	5.182	5.213	5.244	5.100
3	1.127	1.168	←	<b>1.264</b>	1.993	2.028	4.313	3.312	3.648	3.973	3.900
4	565	429	459	←	<b>672</b>	487	848	1.018	2.550	2.118	1.897
5	343	250	190	136	←	<b>141</b>	→	197	400	518	555
6	91	75	49	34	25	←	<b>21</b>	→	46	42	32
7	14	12	8	6	4	3	←	<b>4</b>	→	3	4
8	5	3	1	1	1	0	0	←	<b>3</b>	→	2
9	1	1	0	0	0	0	0	0	←	<b>1</b>	→
10	0	0	0	0	0	0	0	0	0	←	<b>0</b>



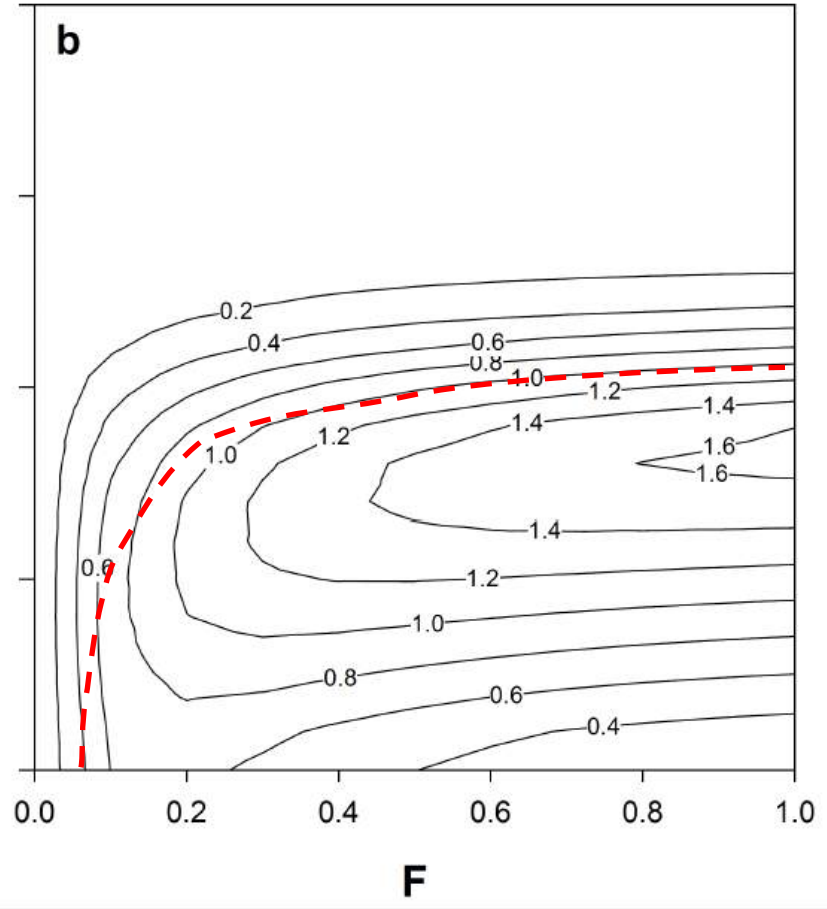
$$N_{i+1} = N_i * e^{-(F_i + M_i \dots)}$$

# Minimum Landing size

### Escapement

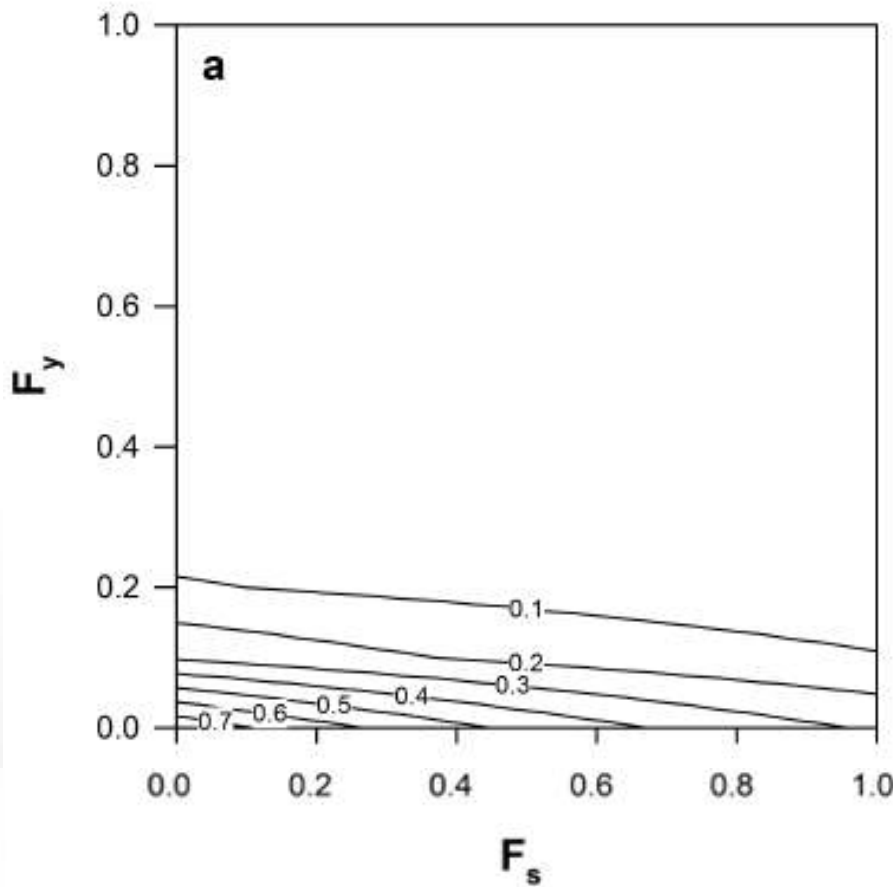


### Yield

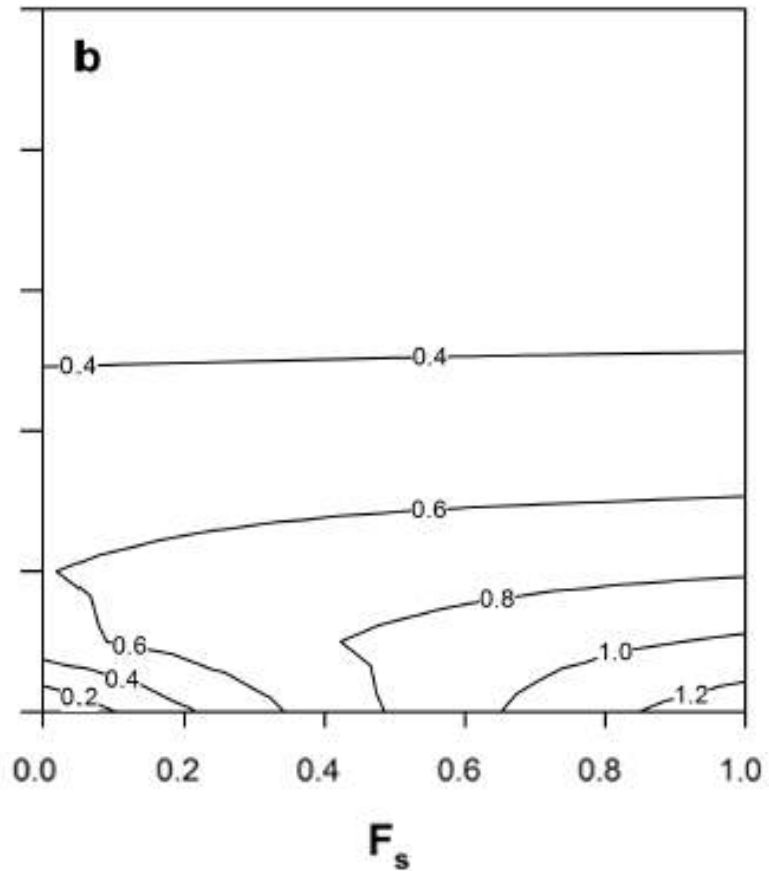


# Fishing regime (no MLS)

Escapement



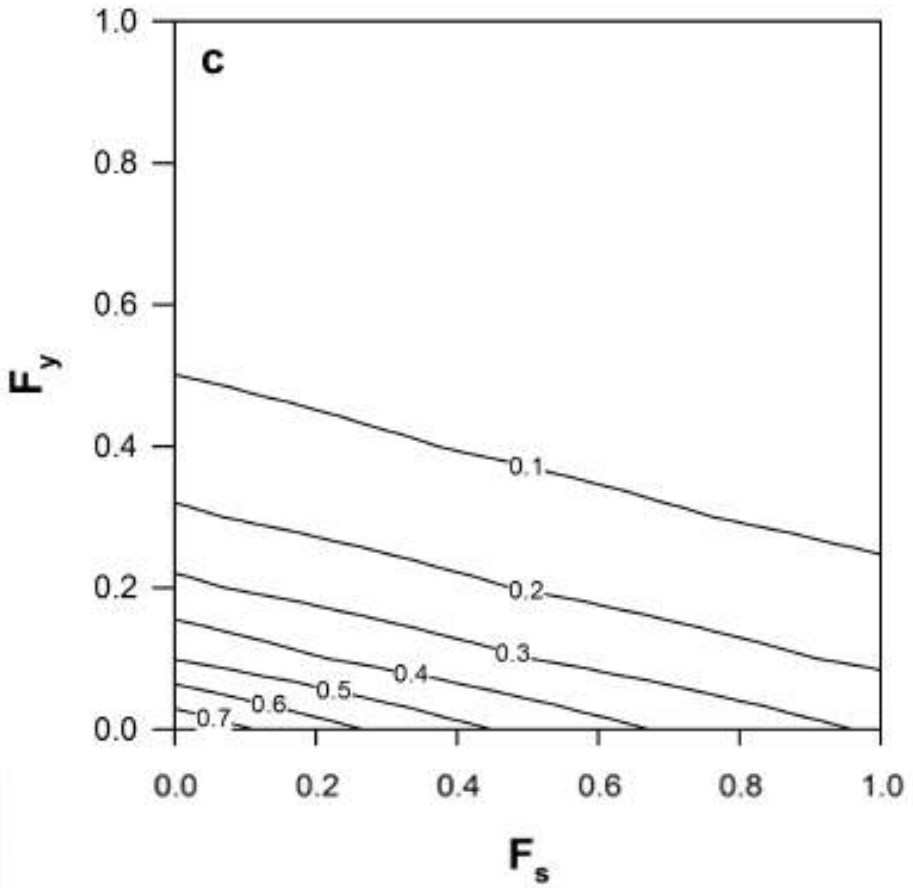
Yield



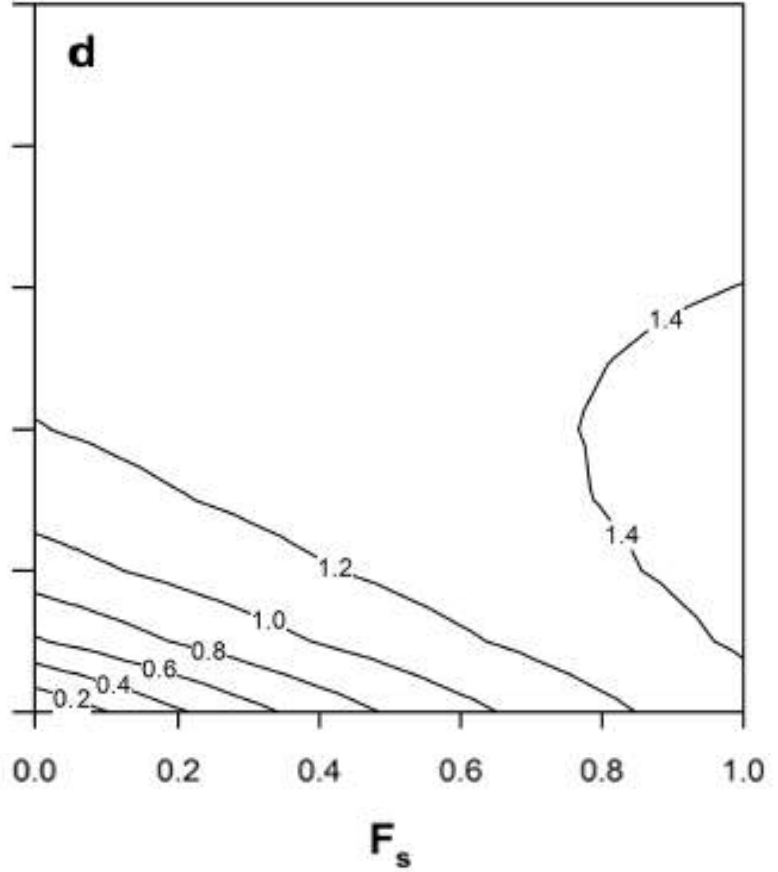


# Fishing regime (45cm)

Escapement

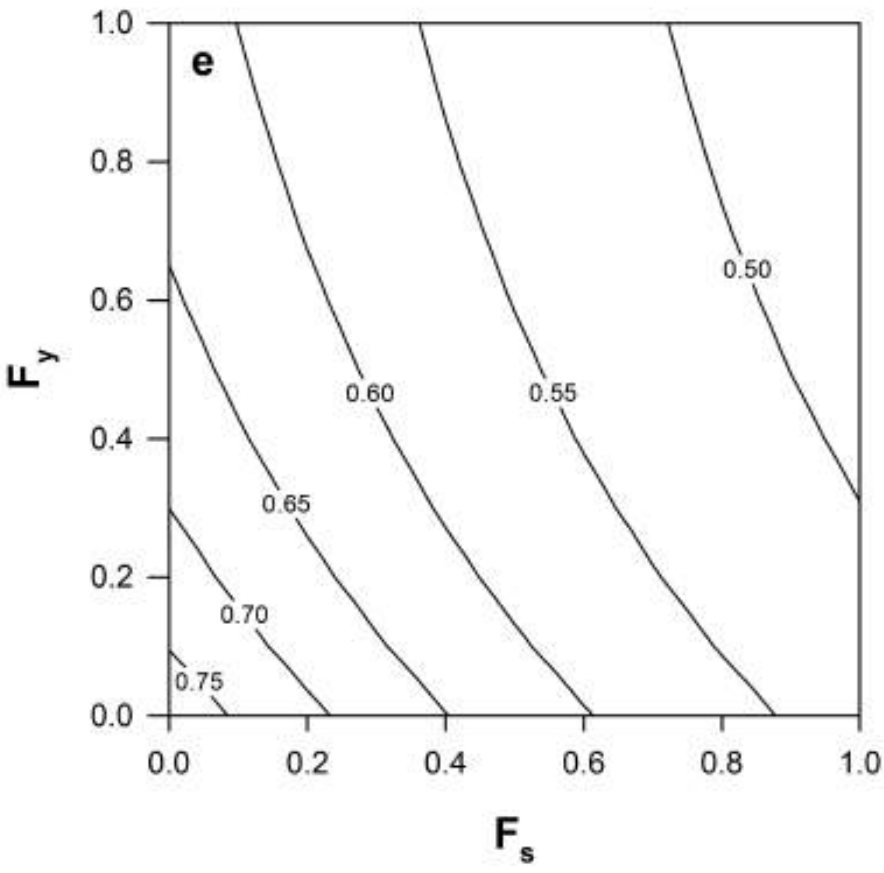


Yield

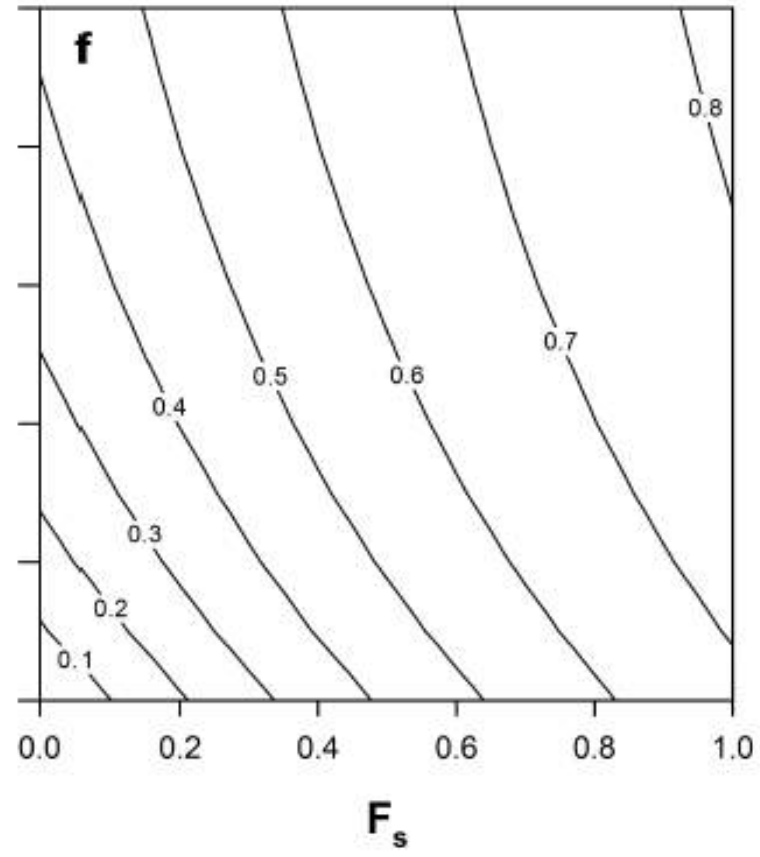


# Fishing regime (65cm)

### Escapement



### Yield



# Conclusions

- Minimum landing size is effective; yet, needs to be flanked by additional measures
- Yellow eel fisheries do matter!



# Thank you for your attention!

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