Balanced harvest *vs* Compenstated harvest :
Using Ecosystemic models to assess effects of fishing scenarios on ecosystems structure and functionning

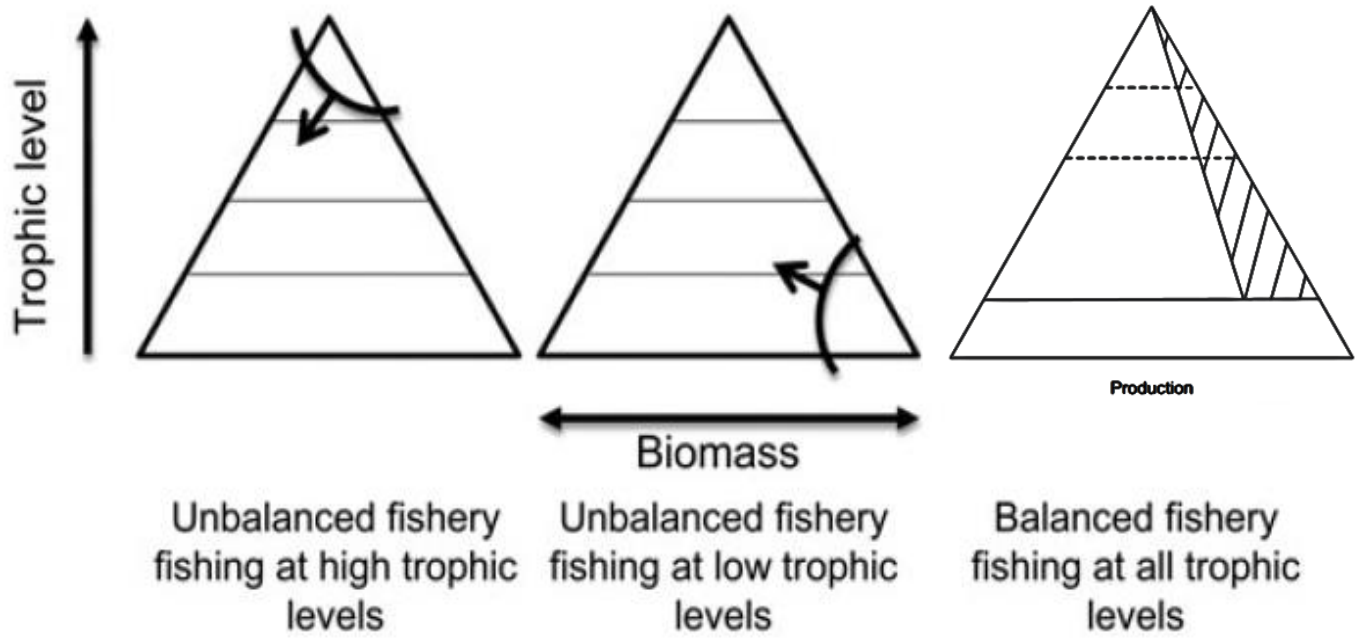
Ilan PEREZ

Supervised by

Didier GASCUEL, Jennifer REHREN et Pierre-Yves Hernvann

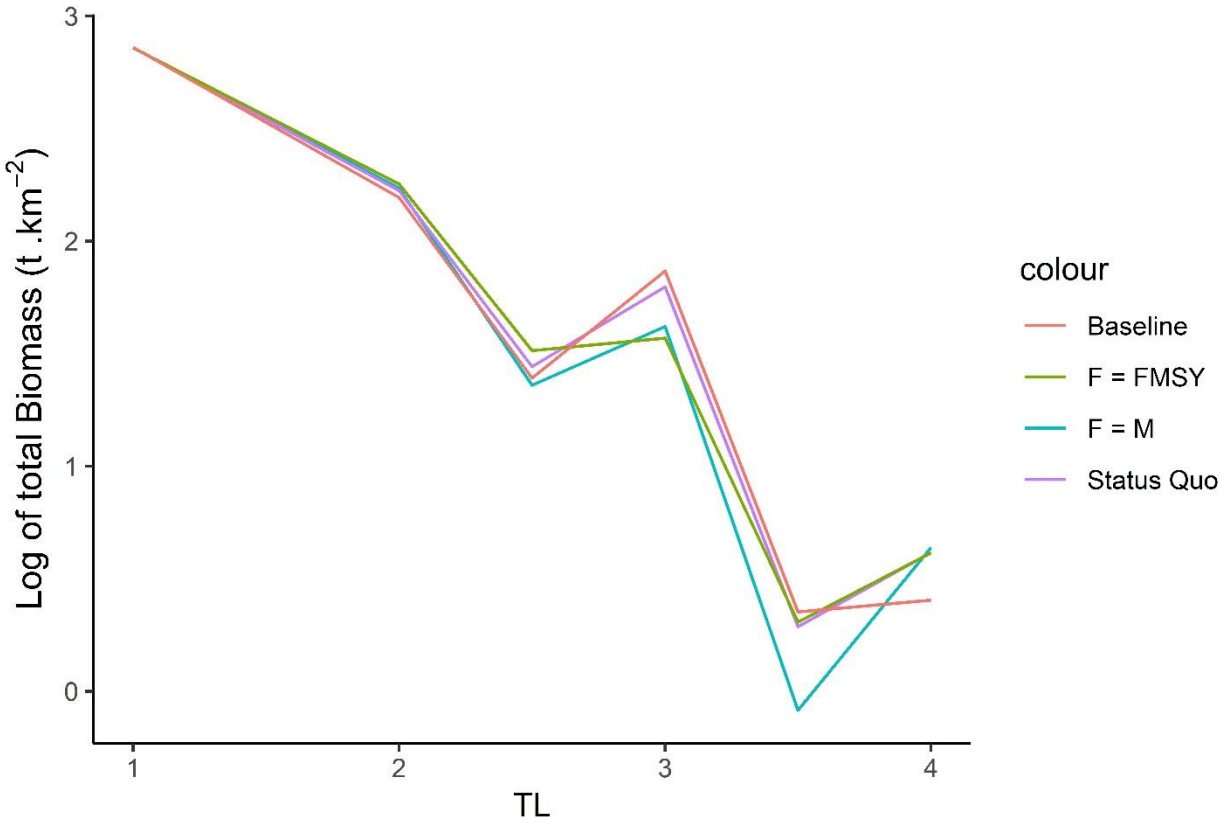
AGRO CAMPUS OUEST

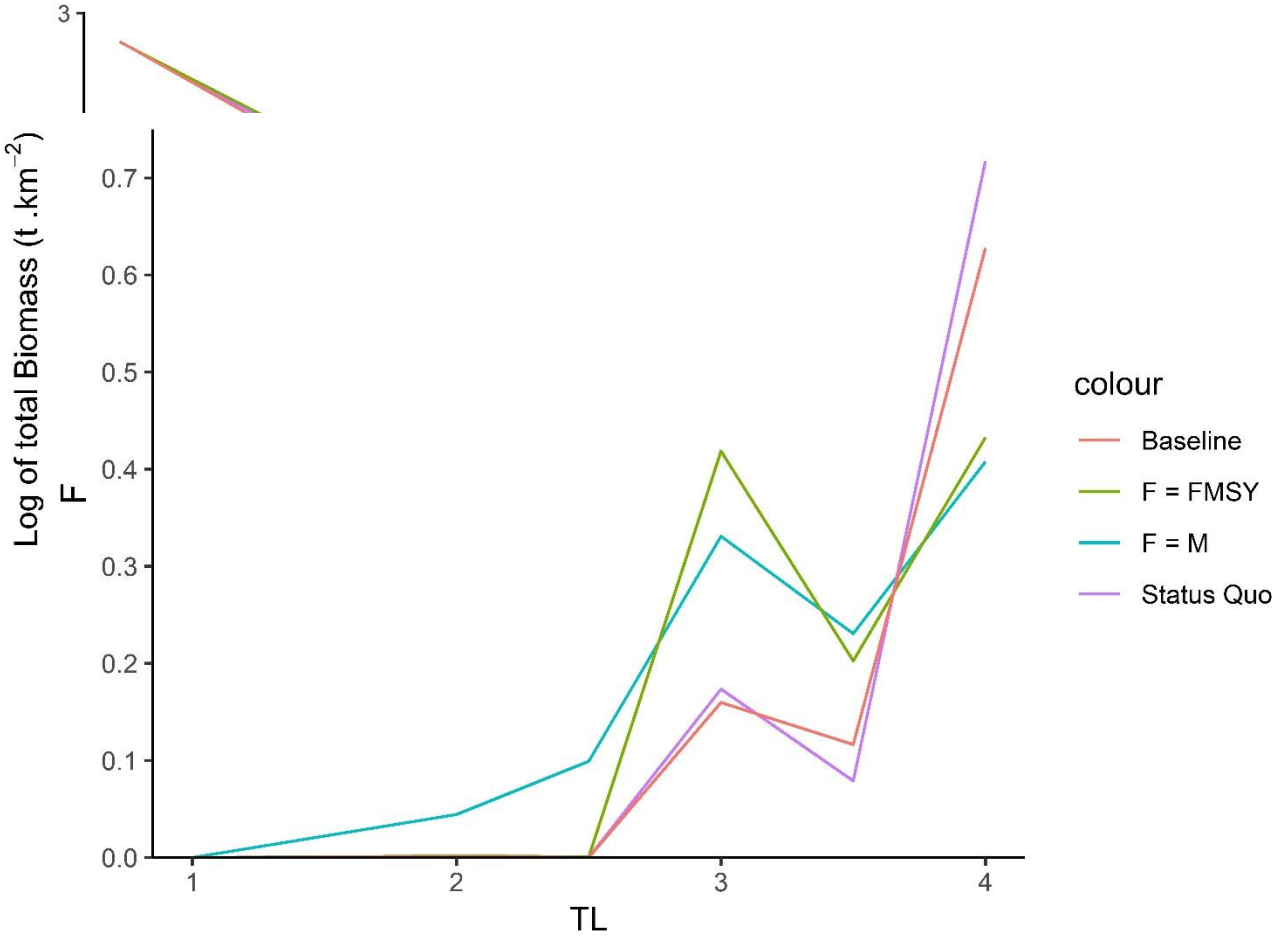
CONTEXT	OBJECTIVES	METHODS	QUESTIONS

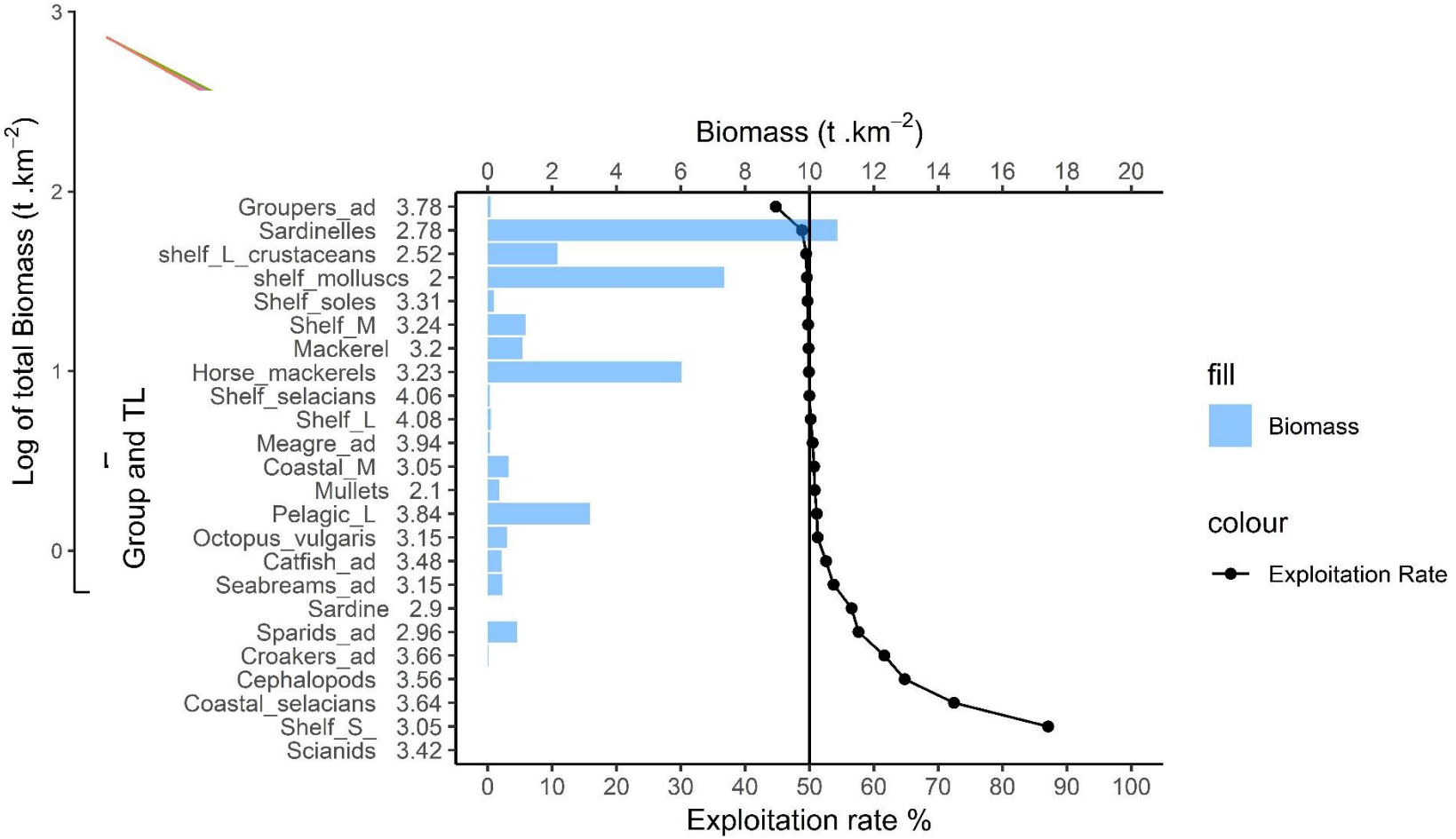


Kolding and van Zwieten (2011) and Bundy et al (2005)

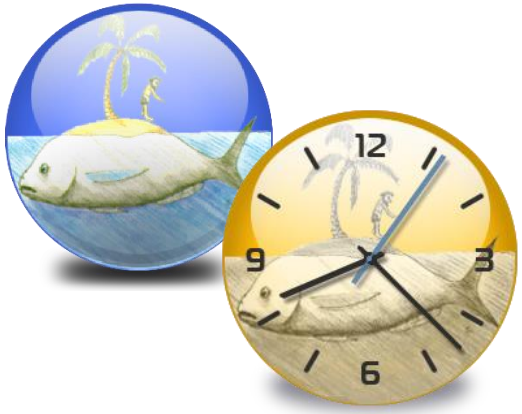
- Assess the effects of BH on Real Ecosystems
- Estimation of the feasibility of implementing BH in fisheries policy
- Does a BH scenario lead to a balanced ecosystem ?
- Compare multiple BH scenarios with other scenarios


Log of total Biomass (t .km^{-2})
3
2
1
0
1
2
3
4
TL
colour
Baseline
F = FMSY
F = M
Status Quo

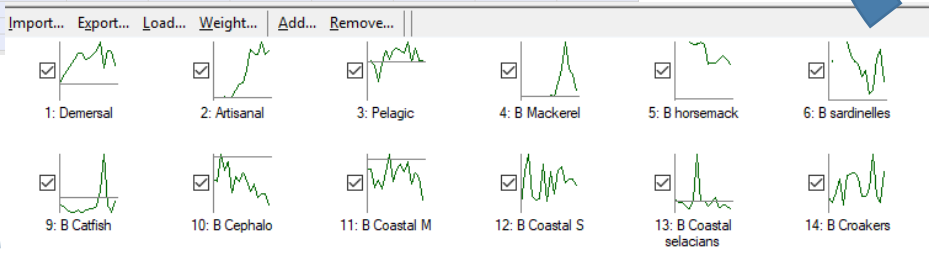

3
Log of total Biomass (t .km^{-2})
F
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
3
4
TL
colour
Baseline
F = FMSY
F = M
Status Quo

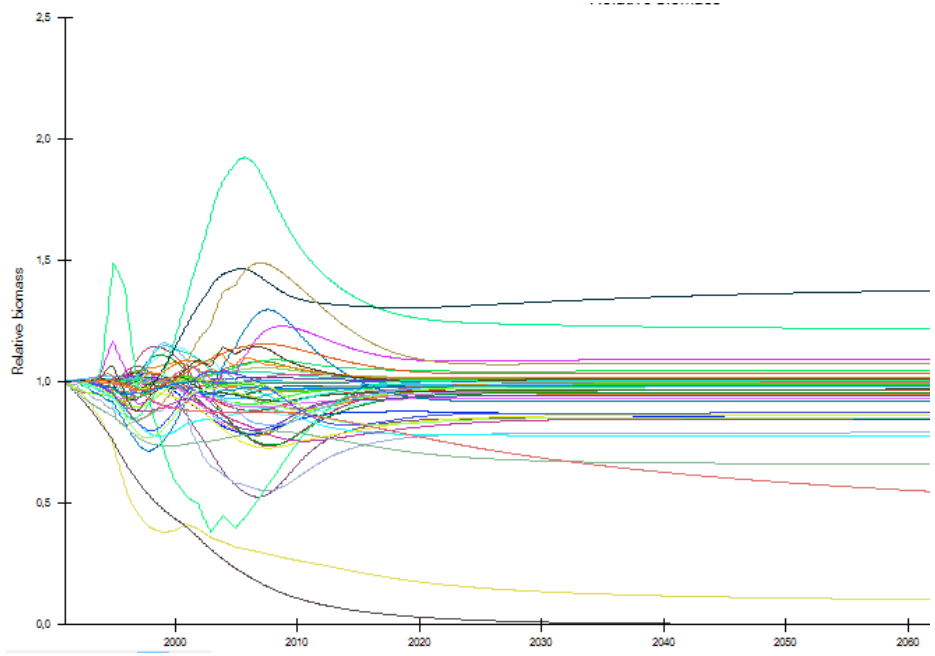

Biomass (t .km^{-2})
0 2 4 6 8 10 12 14 16 18 20
Log of total Biomass (t .km^{-2})
3
2
1
0
Group and TL
Groupers_ad 3.78
Sardinelles 2.78
shelf_L_crustaceans 2.52
shelf_molluscs 2
Shelf_soles 3.31
Shelf_M 3.24
Mackerel 3.2
Horse_mackerels 3.23
Shelf_selacians 4.06
Shelf_L 4.08
Meagre_ad 3.94
Coastal_M 3.05
Mullets 2.1
Pelagic_L 3.84
Octopus_vulgaris 3.15
Catfish_ad 3.48
Seabreams_ad 3.15
Sardine 2.9
Sparids_ad 2.96
Croakers_ad 3.66
Cephalopods 3.56
Coastal_selacians 3.64
Shelf_S_ 3.05
Scianids 3.42
0 10 20 30 40 50 60 70 80 90 100
Exploitation rate %
fill
Biomass
colour
Exploitation Rate

- Tools : Ecopath with Ecosim (and EcoTroph)



	Group name	Trophic level	Habitat area (fraction)	Biomass in habitat area (t/km²)	Biomass (t/km²)	Total mortality (/year)	Production / biomass (computed) (/year)	Consumption / biomass (/year)	Ecotrophic Efficiency	Production / consumption	Biom. accumul. (t/km²/year)	Biom. acc. rate (/year)
1	Marine mammals	4,156	1,000	0,01000	0,01000		0,0400	12,46	0,000	0,003		
2	Coastal birds	3,443	1,000	0,01000	0,01000		0,280	67,00	0,000	0,004		
	Meagre											
3	Meagre ad	3,944	1,000	0,120	0,120	0,210		2,100	0,657	0,100		
4	Meagre juv	3,802	1,000	0,000053	0,000053	0,300		17,88	0,974	0,017		
5	Mullets	2,095	1,000	0,417	0,417		0,800	8,220	0,800	0,097		
6	Pelagic L	3,840	1,000	3,422	3,422		0,960	5,400	0,900	0,178		
7	Mackerel	3,198	1,000	1,450	1,450		0,450	3,000	0,735	0,150		
8	Sardine	2,900	1,000	11,79	11,79		0,650	4,333	0,771	0,150		
9	Sardinelles	2,778	1,000	18,00	18,00		0,990	7,650	0,785	0,129		
10	Horse mackerels	3,232	1,000	10,000	10,000		0,720	3,600	0,844	0,200		
11	Coastal selacians	3,642	1,000	1,240	1,240		0,300	2,000	0,015	0,150	-0,0620	-0,0500
12	Coastal M	3,047	1,000	0,830	0,830		0,580	2,900	0,858	0,200		
13	Coastal S	3,123	1,000	4,214	4,214		0,620	3,100	0,950	0,200		
	Croakers											
14	Croakers ad	3,659	1,000	0,0770	0,0770	0,600		3,850	0,754	0,156		
15	Croakers juv	3,230	1,000	0,00352	0,00352	1,170		9,940	0,706	0,118		
	Seabreams											
16	Seabreams ad	3,151	1,000	1,690	1,690	0,480		4,700	0,884	0,102		
17	Seabreams juv.	3,141	1,000	0,0125	0,0125	0,760		21,07	0,884	0,036		
	Catfish											
18	Catfish ad	3,477	1,000	0,600	0,600	0,340		4,100	0,226	0,083		
19	Catfish juv	3,045	1,000	0,00166	0,00166	0,580		22,33	0,780	0,026		
20	Shelf selacians	4,062	1,000	0,200								
21	Shelf L	4,077	1,000	0,360								
22	Shelf M	3,239	1,000	1,550								





CONTEXT	OBJECTIVES	METHODS	QUESTIONS

Plusieurs cas d'étude :

-Mauritanie

-Guinée ??

-Mer Celtique

(waiting for you PY)

Plusieurs Scenarios F:

- Status quo

-BH : F = c * Pi/Bi

-FMSY pour tous

-Compensated Harvest….

Plusieurs Range d'espèces :

- « Actuellement » exploitées

-Potentiellement exploitable

-Tout le monde sauf < 1g

-Tout le monde, du zoo aux top pred

- Fleets implementation for BH scenario

- F implementation : what P/B is the one to choose ?