

Campeche Bank Ecosystem, on the Southern Gulf of Mexico

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ECOSYSTEM DESCRIPTION

The Campeche Bank, situated in the South part of the Gulf of Mexico, is an extensive continental shelf with oil industry and fishing interacting. In this area some fishing-measures were adopted in order to protect the fish resources. Some measures are coastal waters as protected areas and prohibition of trawl fishing within an area of five miles from the coast. In spite of those measures, some important resources had shown declination (v.g. red grouper) or even had collapsed (v.g. pink shrimp). Although, some studies carried out in this region had recognized two typical ecosystems, the Campeche Sound and the Continental Shelf of Yucatan, there are evidences based on the life history of several species (shrimps, spanish and king mackerels, octopus, red grouper among others) that suggest that both systems functions in synchrony or even could be consider like one ecosystem.

PROBLEM

The red grouper (*Epinephelus morio*) was the second most important fishery in the Campeche Bank, located in the South part of the Gulf of Mexico. It is exploited by three fleets, two from Mexico, an artisanal and a medium sized; and one large fleet from Cuba. This resource has shown a decline in biomass and has been declared as overfished by Mexican authorities. The main objective for management is recovery up to the biological reference point representing 50% of the pristine biomass. Actual regulations include minimum legal size, a catch quota for the Cuban fleet and recently closed season during winter in order to protect reproductive process. This is a protogyneous hermaphrodite species that undergoes seasonal reproductive aggregations during the winter. Such aggregations are well known by fishers who used to increase yields since vulnerability increase. In order to protect the reproductive process an MPA was suggested as a measure to ensure stock recovery specifically aimed to protect reproductive process.

FUNCTIONAL GROUPS AND FISHERIES IN THE MODEL

The Campeche Bank Ecopath model consists of 68 functional groups, 44 from Campeche Sound, 21 from Yucatan Continental Shelf, and 3 groups in common. Functional groups were defined based on the ecological role and commercial interest. We defined 11 fishery fleets in the model mainly based on the fishing gear used and objective group. Also, the fleet definition was based on the landing port locality.

Table 1.- Fleets and catches used for the Campeche Bank Model. CAM: fleet operates on the Campeche Sound, YUC: fleet operates on the Yucatan continental shelf.

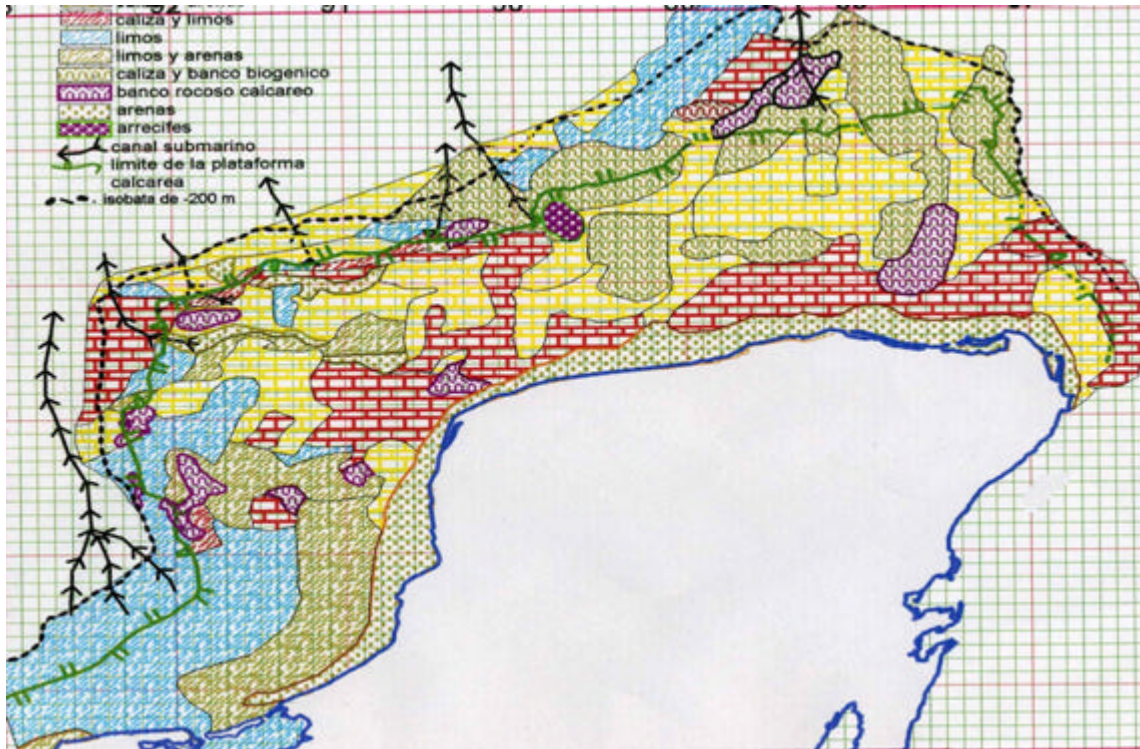
Group Name	Shrimp CAM	Art. Demersal CAM	Art. Pelagic CAM	Beach seine CAM	Octopus CAM	Art. Demersal YUC	Art. Pelagic YUC	Octopus YUC	Shrimp YUC	Lobster YUC	Red Grouper YUC
Herrings CAM				0.052							
Catfishes CAM				0.018							
Squid CAM	0.003										
White shrimp CAM	0.116										
Brown shrimp CAM	0.089										
Croakers CAM				0.021							
Jacks CAM			0.0116								
Groupers CAM		0.00095									
Mojarras CAM				0.0236							
Red Snapper CAM		0.0095									
Octopus CAM					0.0446						
Porgies CAM				0.00428							
Mackerels CAM			0.066								
Sharks CAM			0.025								
Red grouper YUC											0.155
Snappers YUC											0.025
Sharks YUC											0.025
Grunts YUC						0.015					
King mackerel YUC											0.015

HABITAT DEFINITION

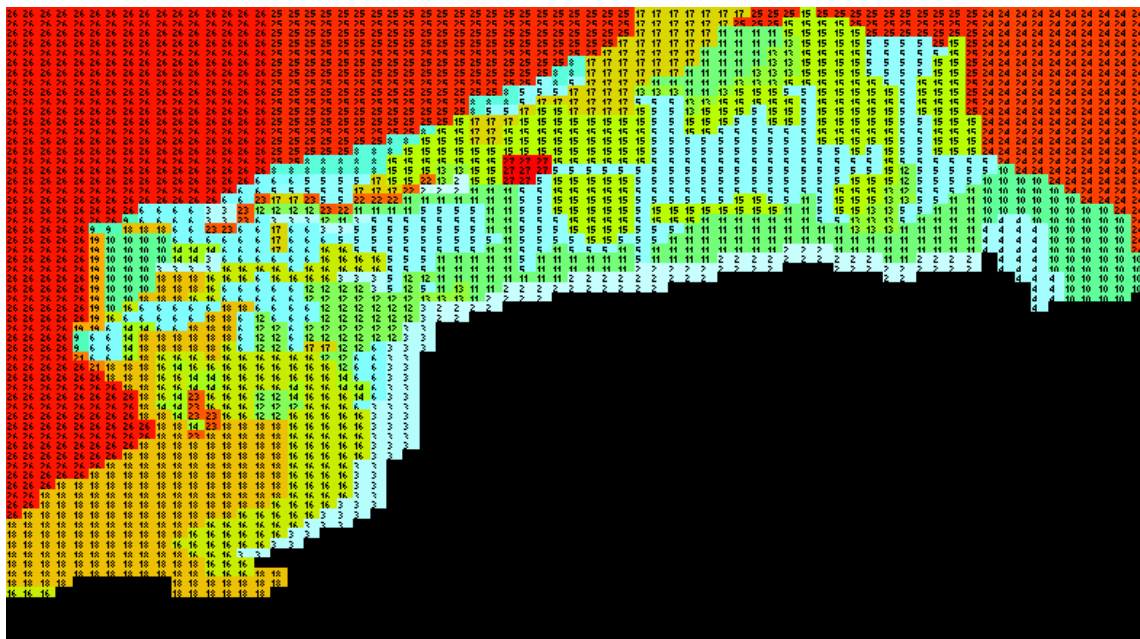
The habitat definition was defined used bottom type since most functional groups in the model are demersal. We use the available information on the sediments distribution on the Campeche Bank. We also consider the depth for the separation among coastal zones, oceanic and distribution of deep sediments. Additionally, the distribution of Catchability of the red grouper as an indicator of reproduction areas; since this species aggregates for reproduction, fishermen allocates the fishing effort to these areas.

Habitat	Enter name of habitats	Fraction of total area
0	All habitats (e.g., pelagic)	1.000
1	Arena CAM	0.000
2	Arena YUC	0.026
3	Arena CAM	0.029
4	CalizayArena CAM	0.010
5	CalizayArena YUC	0.101
6	CalizayArena CAM	0.036
7	CalizayArena PROF CAR	0.000
8	CalizayArena PROF YUC	0.010
9	CalizayArena PROF CAM	0.002
10	Caliza CAR	0.036
11	Caliza YUC	0.061
12	Caliza CAM	0.024
13	Banco Rocosó Calc YUC	0.013
14	Banco Rocosó Calc CAM	0.010
15	CalizayBancoBiog YUC	0.091
16	LimosyArenas CAM	0.060
17	Limos YUC	0.030
18	Limos CAM	0.091
19	Caliza Prof CAM	0.004
20	Limos Prof YUC	0.000
21	Limos Prof CAM	0.001
22	CalizayLimos YUC	0.002
23	CalizayLimos CAM	0.005
24	Prof CAR	0.070
25	Prof YUC	0.101
26	Prof CAM	0.183
27	Arrecife	0.003

Distribution of sediments in Campeche Bank



Basemap based upon sediment type.



Distribution of Catchability for Red grouper in the Campeche Bank

