ARISTOTLE UNIVERSITY OF THESSALONIKI

MARINE FISHERIES and FISH BIOLOGY

ODYSSEA

WP4 – Ecosystem modelling workshop
Ecopath with Ecosim

EwE 1_AUTH_Morocco

Donna Dimarchopoulou

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727277

ODYSSEA OBSERVATORIES

MARINE PROTECTED AREA of the NATIONAL PARK Al-Hoceima

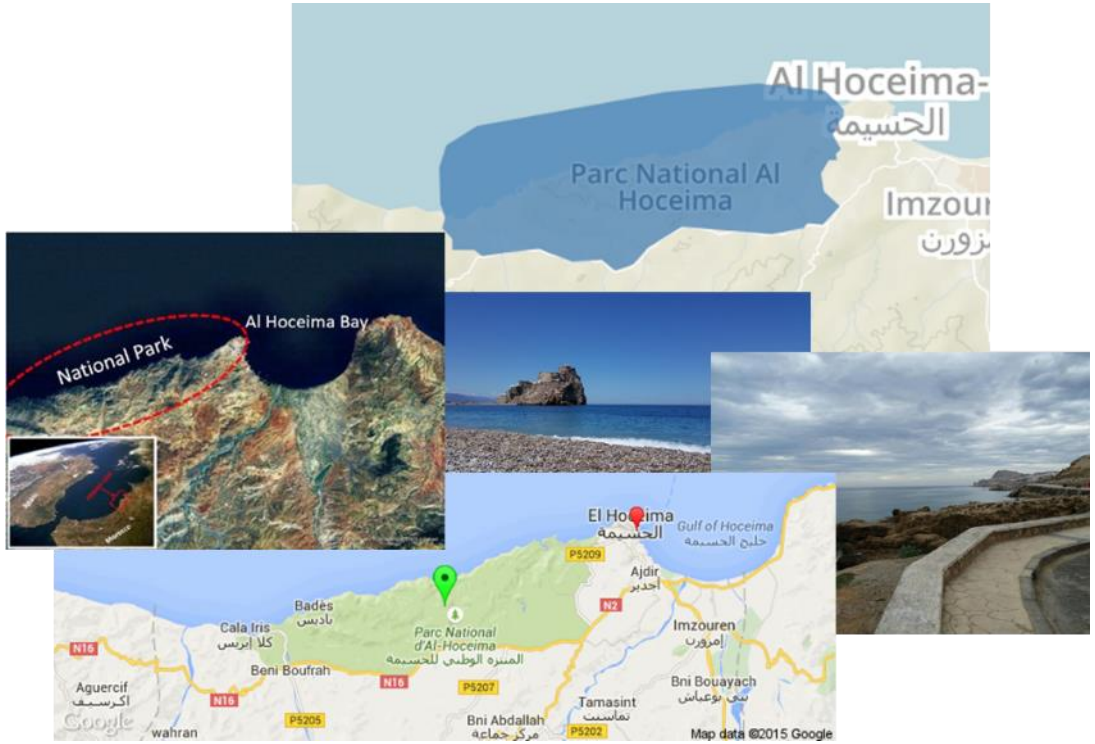
Total **park** area: **480** km^2

Coastline: **40** km

Marine area: **196** km^2

Good water quality
one of the **cleanest**
parts of the entire Med

Moroccan coast: very **rich**
in species **biodiversity**



*The **fish fauna** is particularly rich and includes both **Mediterranean and Atlantic species** coming in through the nearby Strait of **Gibraltar** (Nibani 2010).*

MARINE PROTECTED AREA of the NATIONAL PARK Al-Hoceima


Giant limpet *Patella ferruginea*


Short-beaked common dolphin
Delphinus delphis


Medit. monk seal *Monachus monachus*


Bottlenose dolphin *Tursiops truncatus*


Striped dolphin
Stenella coeruleoalba

MARINE PROTECTED AREA of the NATIONAL PARK Al-Hoceima

Purse seining

Scuba spear-fishing

Trawling: 14 vessels
2200 t/year

Dynamite fishing: 10-15 individuals
367 t/year

Small-scale commercial/subsistence fishing:
~ 3650 fishermen, **1500** t/year (Nibani 2010)

Copper sulphate fishing for **octopus:**
≥ 15 local fishermen

Fishing *is the second* ***important activity*** *of the coastal population being for a long time oriented to the* ***sea*** *(after agriculture).*

ODYSSEA

GFCM Mediterranean Geographical Sub-Areas (GSAs)

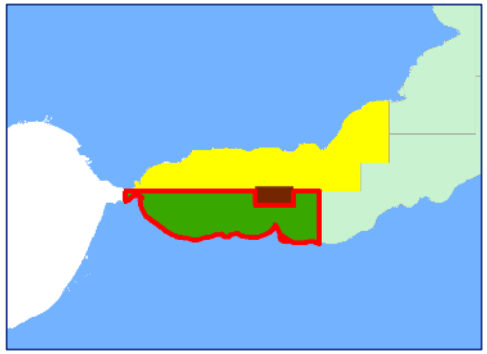
GSA 1: **Northern Alboran Sea** 33156 km^2

GSA 2: **Alboran Island** 2229 km^2

GSA 3: **Southern Alboran Sea** 22588 km^2

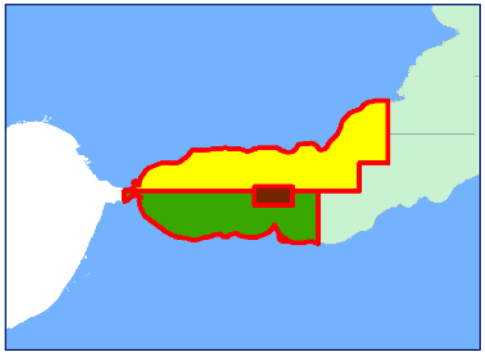
ODYSSEA

Alternative No. 1



ECOPATH

Alternative No. 2



Southern Alboran Sea 22588 km^2

Entire Alboran Sea 57973 km^2

DATA FOR MEDITERRANEAN MOROCCO

≥ 60 fish and invertebrate species landed 25-30000 t/year

Species (ASFIS species)	Scientific name	2014-2016 (t/year)
1. European pilchard(=Sardine)	*Sardina pilchardus*	11392
2. Octopuses, etc. nei	Octopodidae	3286
3. Jack and horse mackerels nei	*Trachurus* spp.	2566
4. Bogue	*Boops boops*	1659
5. Atlantic chub mackerel	*Scomber colias*	1249
6. Marine fishes nei	Osteichthyes	1235
7. Sardinellas nei	*Sardinella* spp.	880
8. Swordfish	*Xiphias gladius*	787
9. European anchovy	*Engraulis encrasicolus*	469
10. Weevers nei	*Trachinus* spp.	404
11. Frigate and bullet tunas	*Auxis thazard, A. rochei*	394
12. Marine molluscs nei	Mollusca	369
13. Surmullets(=Red mullets) nei	*Mullus* spp.	353
14. Atlantic bluefin tuna	*Thunnus thynnus*	327
15. European hake	*Merluccius merluccius*	290
16. Natantian decapods nei	Natantia	285
17. Axillary seabream	*Pagellus acarne*	284
18. Common pandora	*Pagellus erythrinus*	268
19. Cuttlefish, bobtail squids nei	Sepiidae, Sepiolidae	192
20. Sargo breams nei	*Diplodus* spp.	145

Need for this information **per fishing fleet**

plus **discards**

DATA FOR MEDITERRANEAN MOROCCO

Statistical reports for **coastal** and **artisanal fisheries**

National Fisheries Office (provided by AGIR)

Need for information on **tons** of fish and invertebrates **per species** and **per port**

plus **discards**

PRODUITS COMMERCIALISES DE LA PECHE COTIERE ET ARTISANALE PAR ESPECE AU COURS DES ANNEES 2015 ET 2016

	Poids en Tonne 2015	Poids en Tonne 2016	Valeur en KDH 2015	Valeur en KDH 2016	Variation Poids	Variation Valeur
POISSON PELAGIQUE	***1132236***	***1225055***	***2714887***	***2826837***	***8%***	***4%***
SARDINE	840188	912218	1702013	1807418	9%	6%
ESPADON	1330	1224	71376	73140	-8%	2%
CHINCHARD	33146	36929	132612	147547	11%	11%
MAQUEREAU	161418	206062	332309	431348	28%	30%
ANCHOIS	16695	17501	134917	92246	5%	-32%
SABRE	4646	5959	39606	53772	28%	36%
BONITE SARDA	3600	2295	30664	20141	-36%	-34%

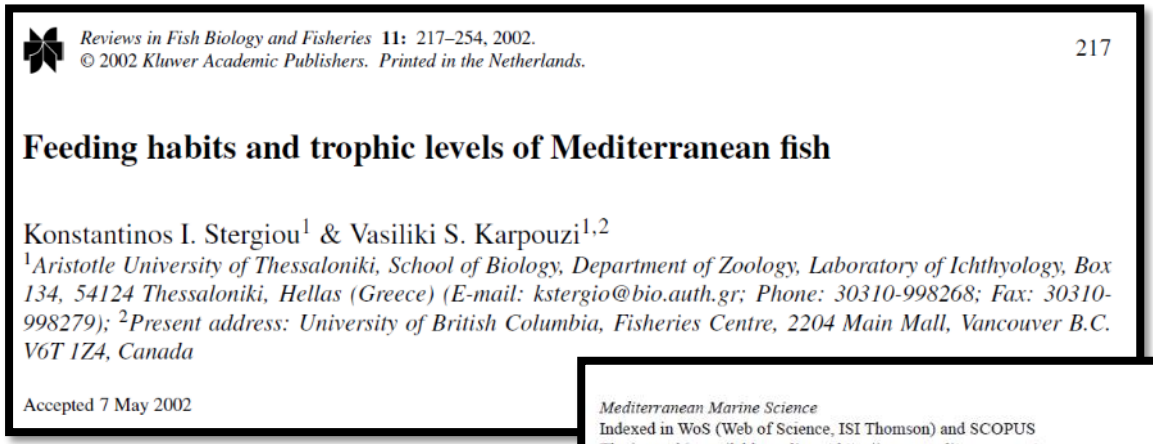
DATA FOR MEDITERRANEAN MOROCCO

Potential **functional groups** and **fishing fleets** for the Ecopath model

Low trophic level	Invertebrates	Fish	Other
1. Phytoplankton	4. Zooplankton	12. Red mullets	28. Seabirds
2. Discards	5. Benthic invertebrates	13. Anglerfish	29. Dolphins
3. Detritus	6. Benthic small crustaceans	14. Flatfishes	30. Monk seal
	7. Polychaetes	15. Other gadiforms	
	8. Lobsters & crabs	16. Hake	
	9. Natantia (shrimps)	17. Other demersal fishes	
	10. Octopuses & cuttlefish	18. Bogue	
	11. Squids	19. Sharks & rays	
		20. Demersal rays & skates	
		21. Anchovy	
		22. Sardine	
		23. Horse mackerels	
		24. Mackerels	
		25. Other Small pelagic fishes	
		26. Large pelagic fishes	
		27. Medium pelagic fishes	

Potential fleets
1. Purse seiners
2. Trawlers
3. Small scale vessels
4. Dynamite fishing
5. Copper sulphate fishing
6. Scuba spear fishing

DATA FOR MEDITERRANEAN MOROCCO



Reviews in Fish Biology and Fisheries **11:** 217–254, 2002.
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Feeding habits and trophic levels of Mediterranean fish

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Accepted 7 May 2002

Diet composition for **fish** from **literature reviews** (Mediterranean)

Review Article

Mediterranean Marine Science
Indexed in WoS (Web of Science, ISI Thomson) and SCOPUS
The journal is available on line at http://www.medit-mar-sc.net
DOI: http://dx.doi.org/10.12681/mms.1968

An update on the feeding habits of fish in the Mediterranean Sea (2002-2015)

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Handling Editor: Argyro Zenetos

Received: 3 November 2016; Accepted: 16 December 2016; Published on line: 9 February 2017

P/B, **Q/B** from **FishBase**

Year of the model will depend on **best data availability**

CONCLUSIONS: WHAT IS NEEDED

Data and guidance from **local experts**: **Mediterranean Morocco** and **South Spain** (?)

Landings and **discards per species** and **per fishing fleet**

Water column temperature data

Phytoplankton (or **chlorophyll**) and **zooplankton** data

Biomass data independent from commercial fisheries: scientific **surveys**, stock **assessments**