COREBIO: Conditions, Resources, Enemies, and Biodiversity. Forces Structuring Marine Communities of the Shallow Adriatic Sea

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CIMMAR
CENTER FOR INTERDISCIPLINARY MARINE AND MARITIME RESEARCH

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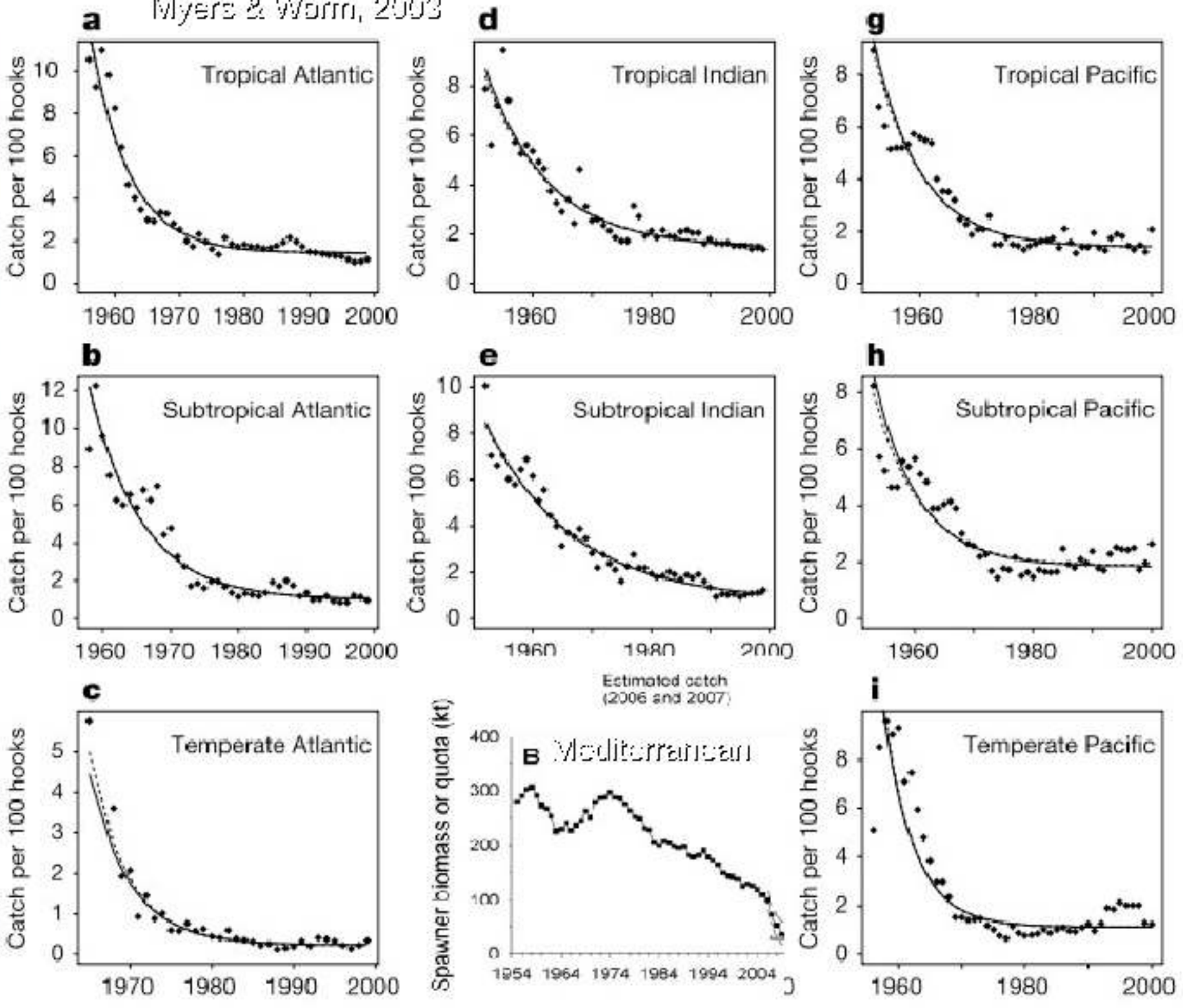
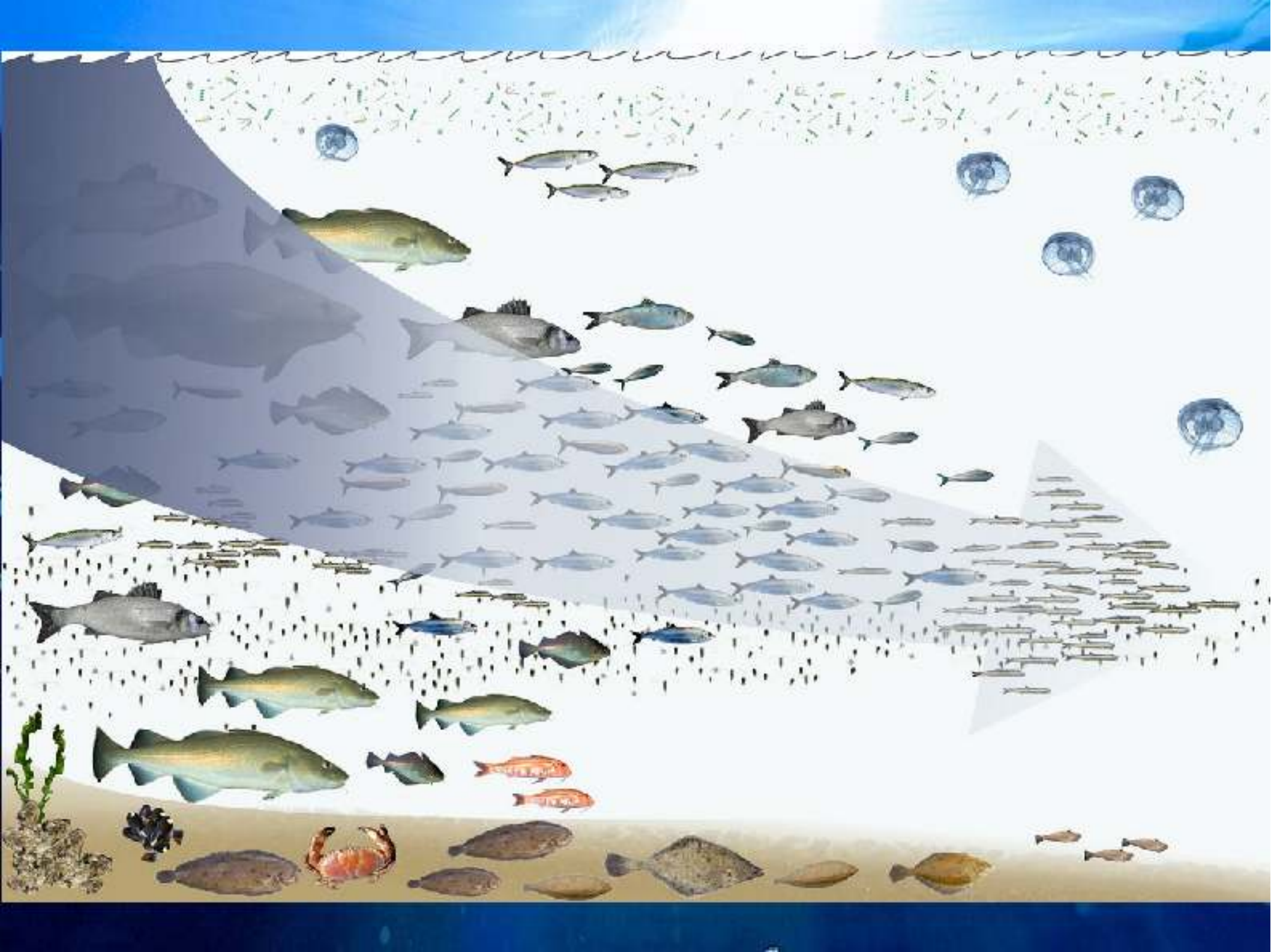
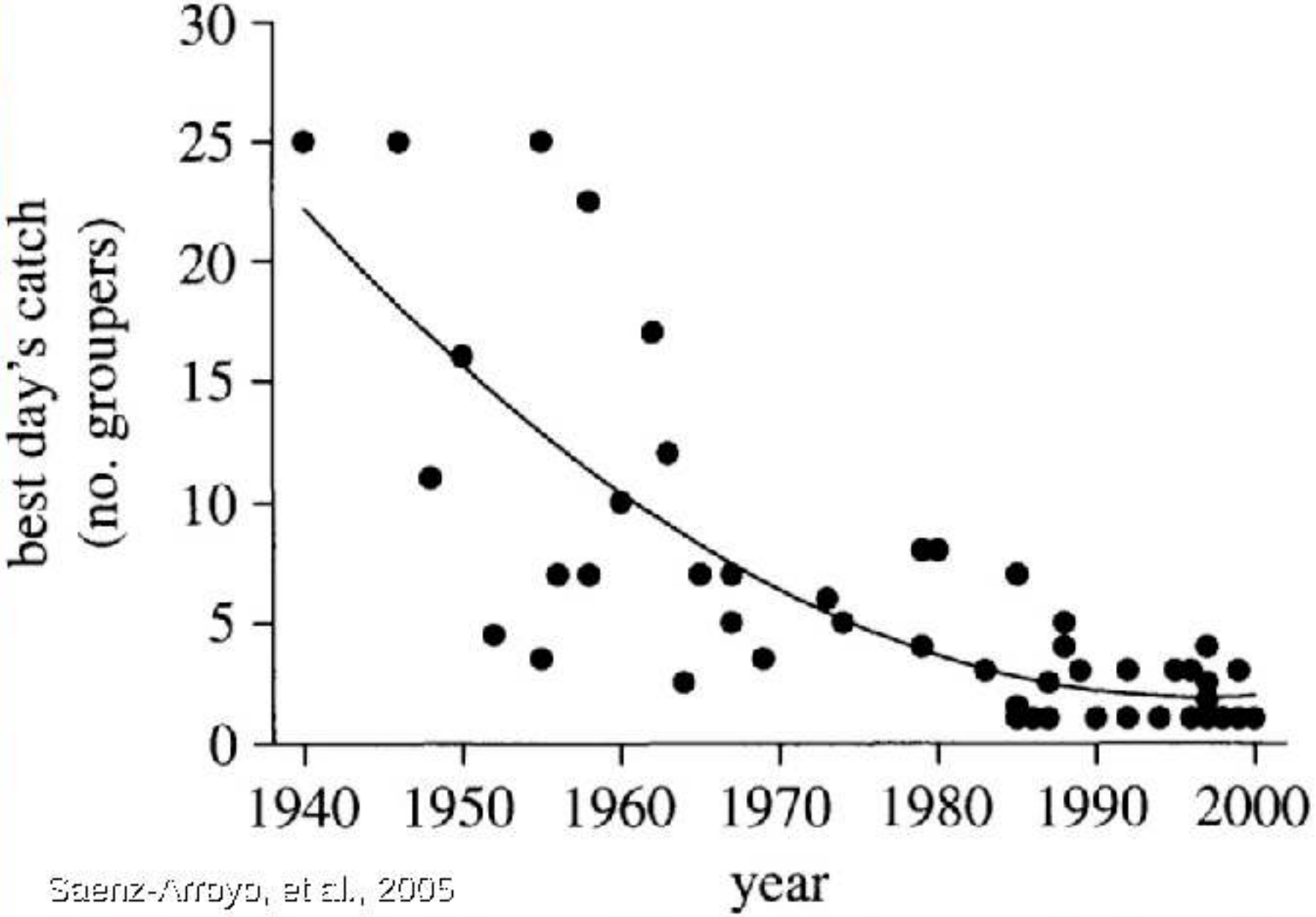
Outline of talk

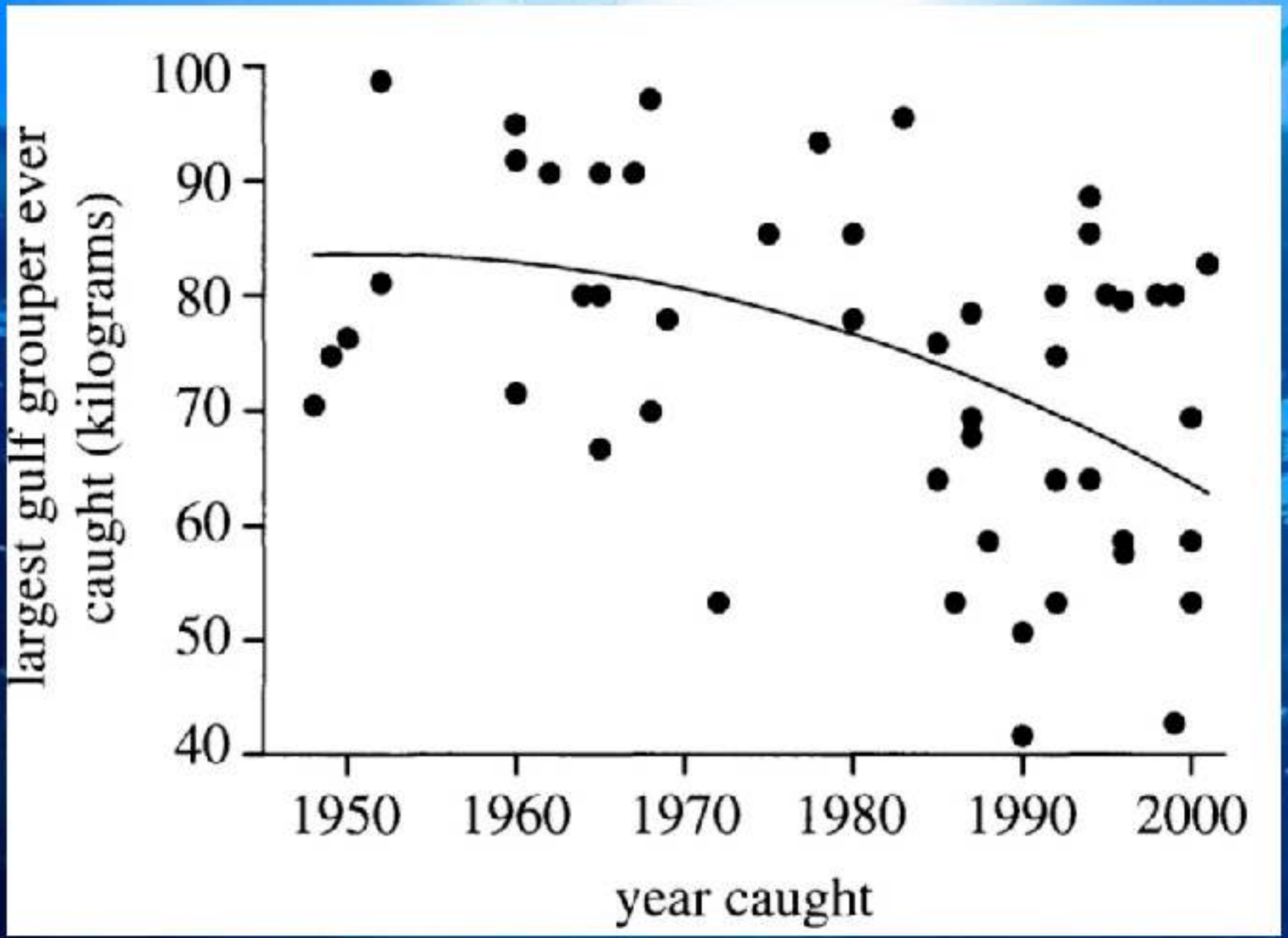
- S. Schultz:
  - Snapshot of Adriatic biodiversity and threats
  - COREBIO Goals
  - COREBIO Methods
- D. Pejdo:
  - Synopsis of BRUV methodology
  - Invitation to participate

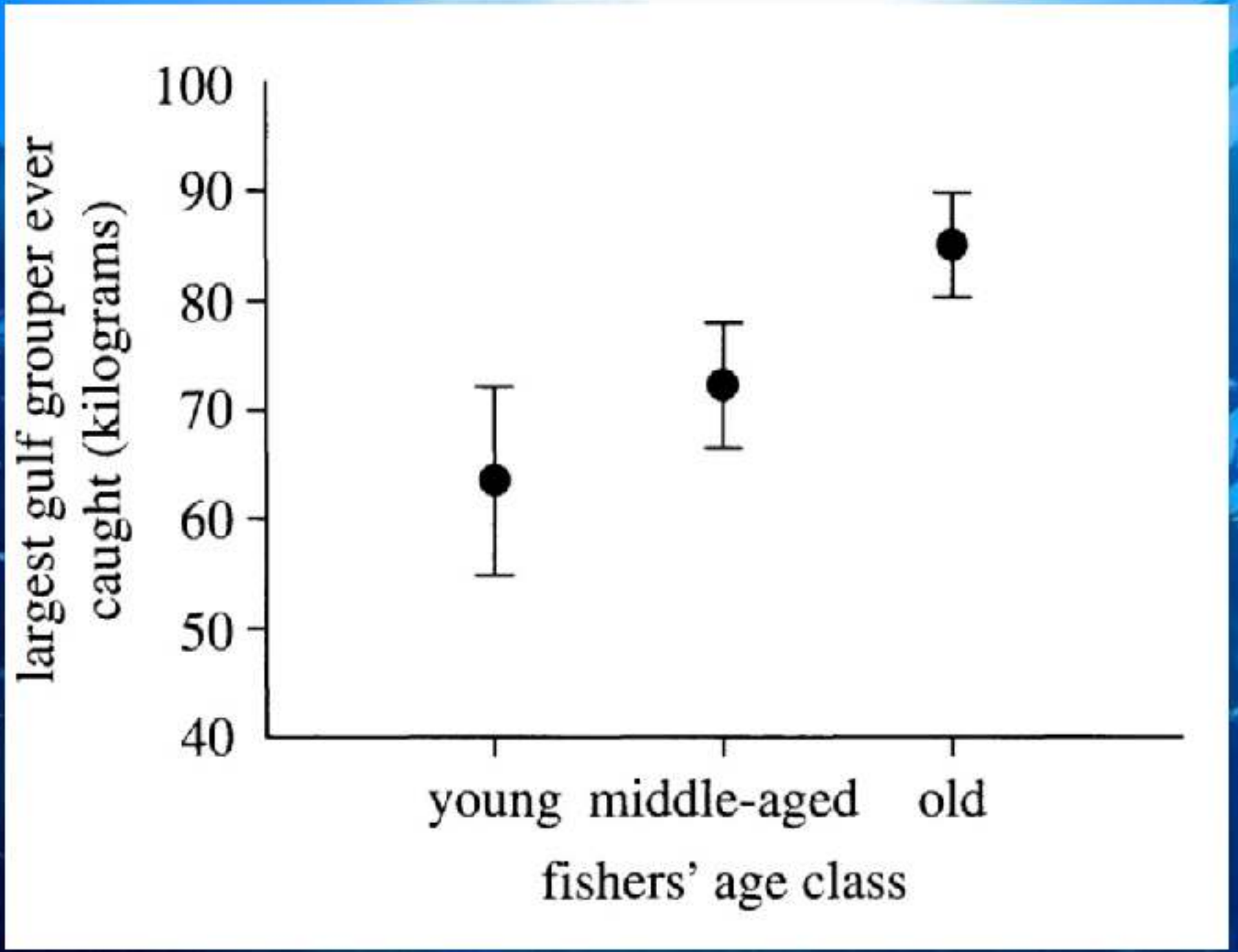

Myers & Worm, 2003
a
Tropical Atlantic
Catch per 100 hooks
b
Subtropical Atlantic
c
Temperate Atlantic
d
Tropical Indian
e
Subtropical Indian
Estimated catch
(2006 and 2007)
B Mediterranean
Spawner biomass or quota (kt)
g
Tropical Pacific
h
Subtropical Pacific
i
Temperate Pacific





Saenz-Arroyo, et al., 2005


largest gulf grouper ever caught (kilograms)
100
90
80
70
60
50
40
1950
1960
1970
1980
1990
2000
year caught


largest gulf grouper ever caught (kilograms)
100
90
80
70
60
50
40
young
middle-aged
old
fishers' age class

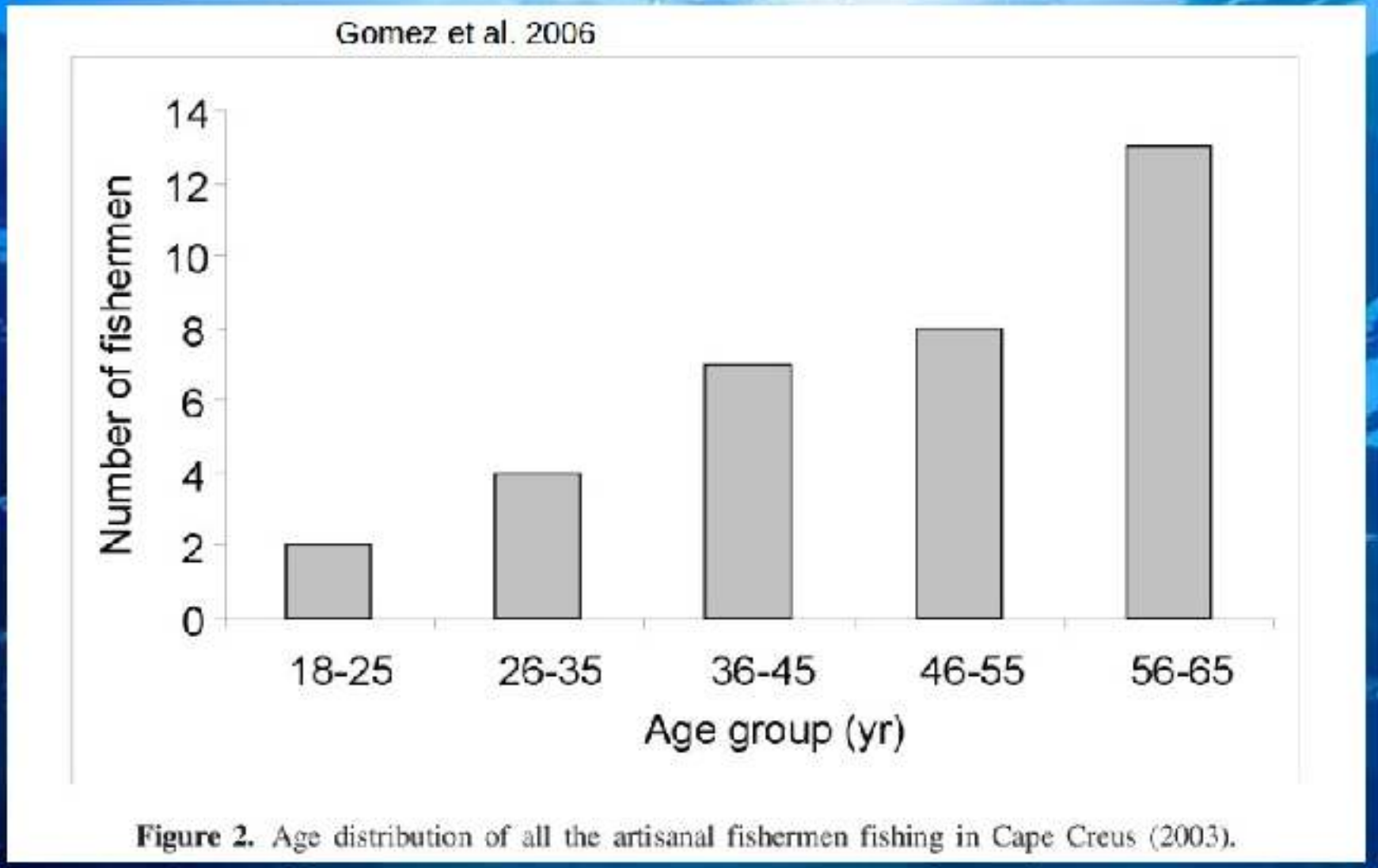
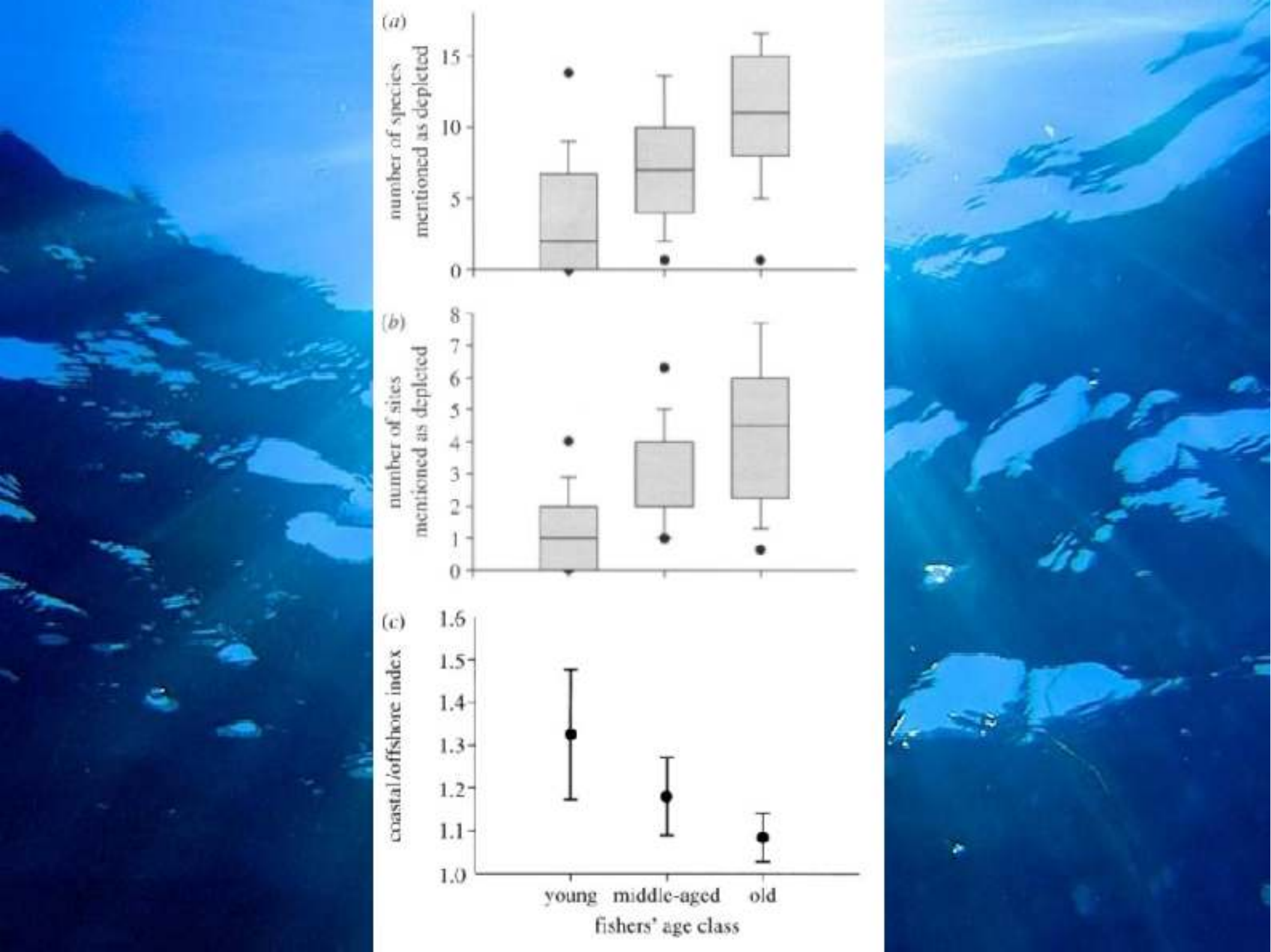
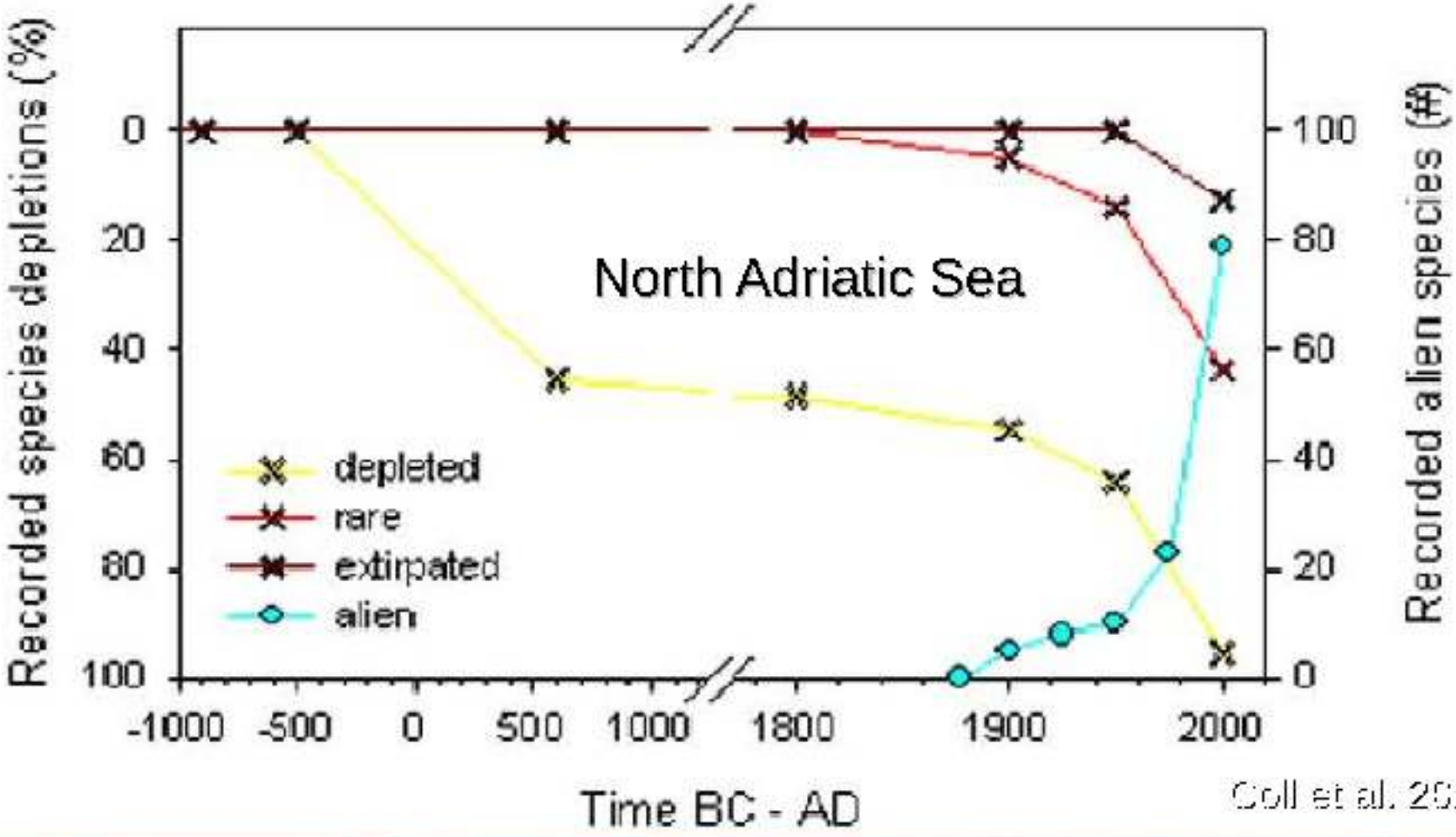


Figure 2. Age distribution of all the artisanal fishermen fishing in Cape Creus (2003).


(a)
number of species mentioned as depleted
0
5
10
15
(b)
number of sites mentioned as depleted
0
1
2
3
4
5
6
7
8
(c)
coastal/offshore index
1.0
1.1
1.2
1.3
1.4
1.5
1.6
young
middle-aged
old
fishers' age class


North Adriatic Sea
Recorded species depletions (%)
Recorded alien species (#)
Time BC - AD
depleted
rare
extirpated
alien
0
20
40
60
80
100
-1000
-500
0
500
1000
1800
1900
2000
Coll et al. 2010

Adriatic marine fish biodiversity

- 410 marine fish species
- = 70% of all taxa reported in the Mediterranean
- 7 endemic to the Adriatic – karst
- > 36 (9%) species are threatened, mainly due to overfishing
- Only 16/36 are legally protected
- IUCN Red List

Critically Endangered

7 species

Acipenser gueldenstaedtii
Acipenser naccarii
Anguilla anguilla
Dipturus batis
Huso huso
Squatina oculata
Squatina squatina

Endangered

6 species

Epinephelus marginatus
Glaucostegus cemiculus
Mobula mobular
Rhinobatos rhinobatos
Rostroraja alba
Thunnus thynnus

Vulnerable

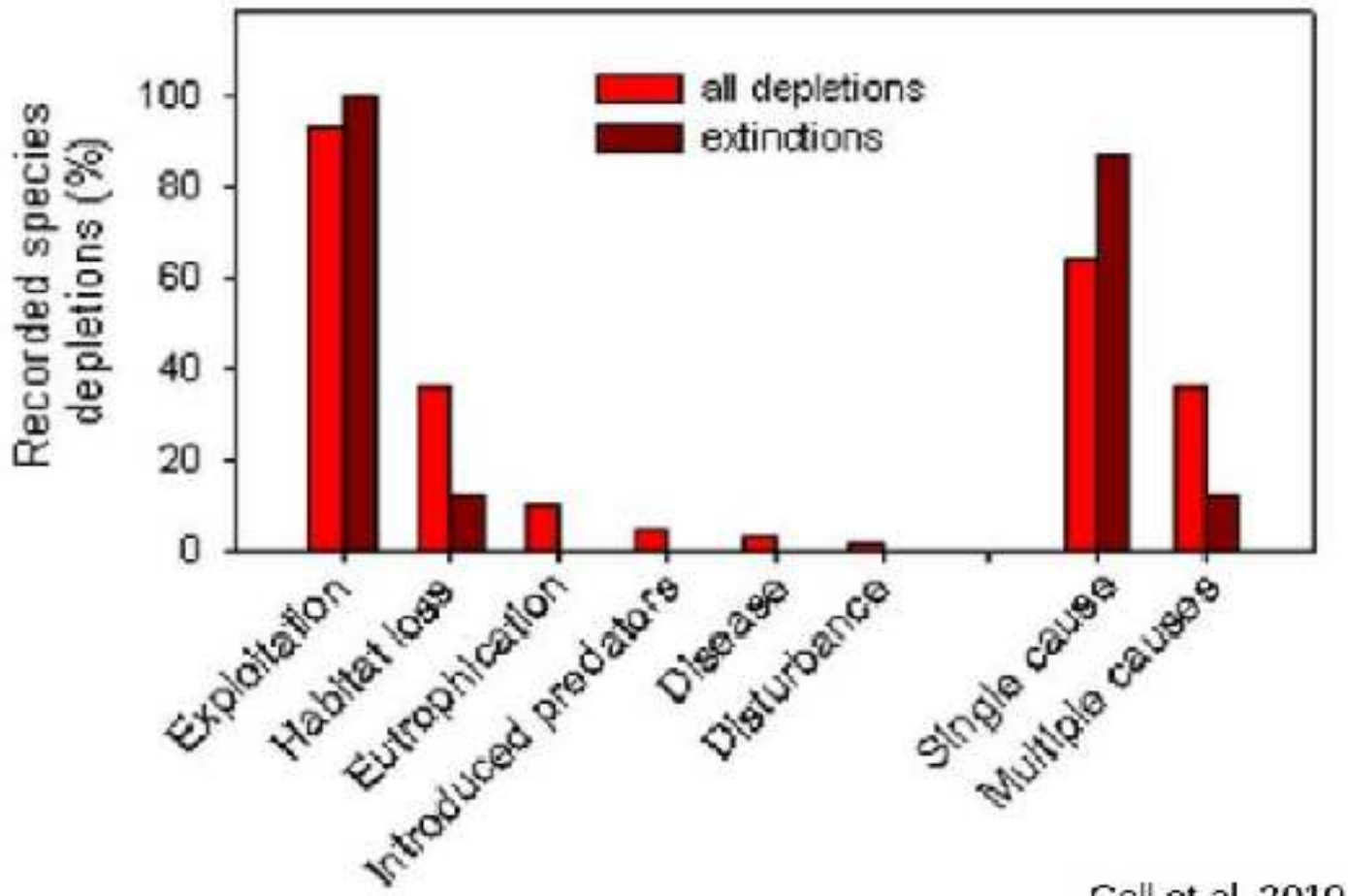
Alopias vulpinus
Carcharhinus plumbeus
Carcharias taurus
Carcharodon carcharias
Cetorhinus maximus
Dentex dentex
Galeorhinus galeus
Gymnura altavela
Isurus oxyrinchus
Labrus viridis
Leucoraja circularis
Mustelus mustelus
Oxynotus centrina
Sphyrna zygaena
Squalus acanthias

15 species

Near-threatened

Carcharhinus brachyurus
Carcharhinus brevipinna
Carcharhinus limbatus
Dipturus oxyrinchus
Epinephelus aeneus
Pagellus bogaraveo
Prionace glauca
Scyliorhinus stellaris

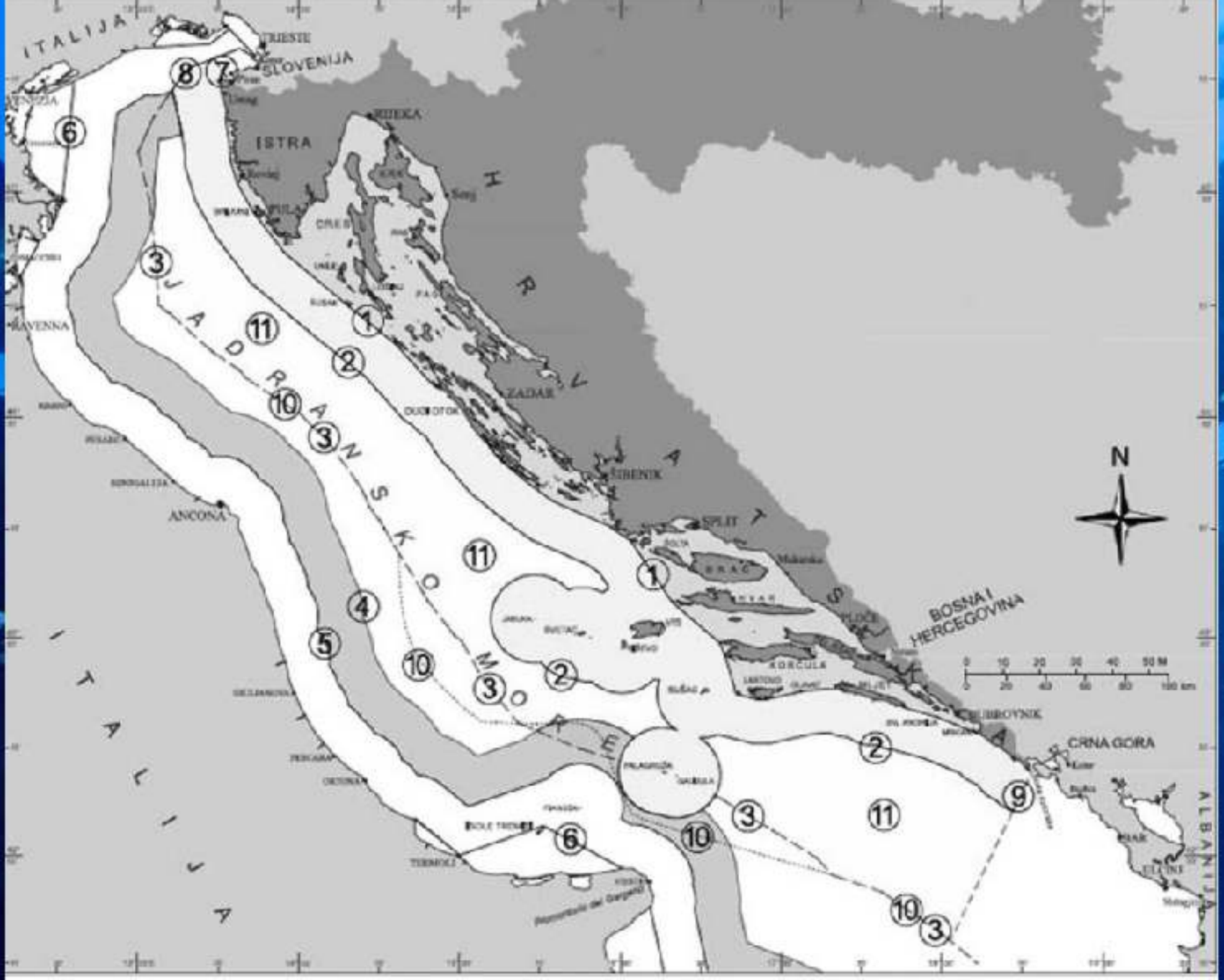
8 species

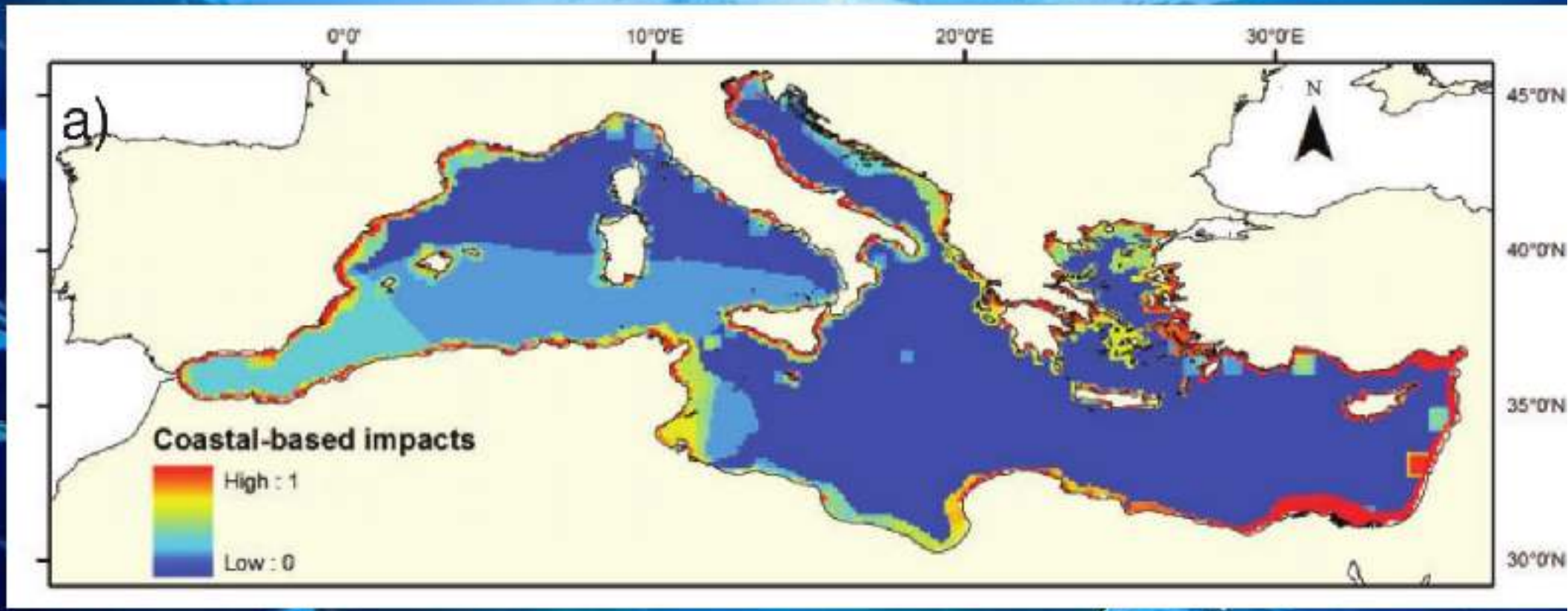


Coll et al. 2010

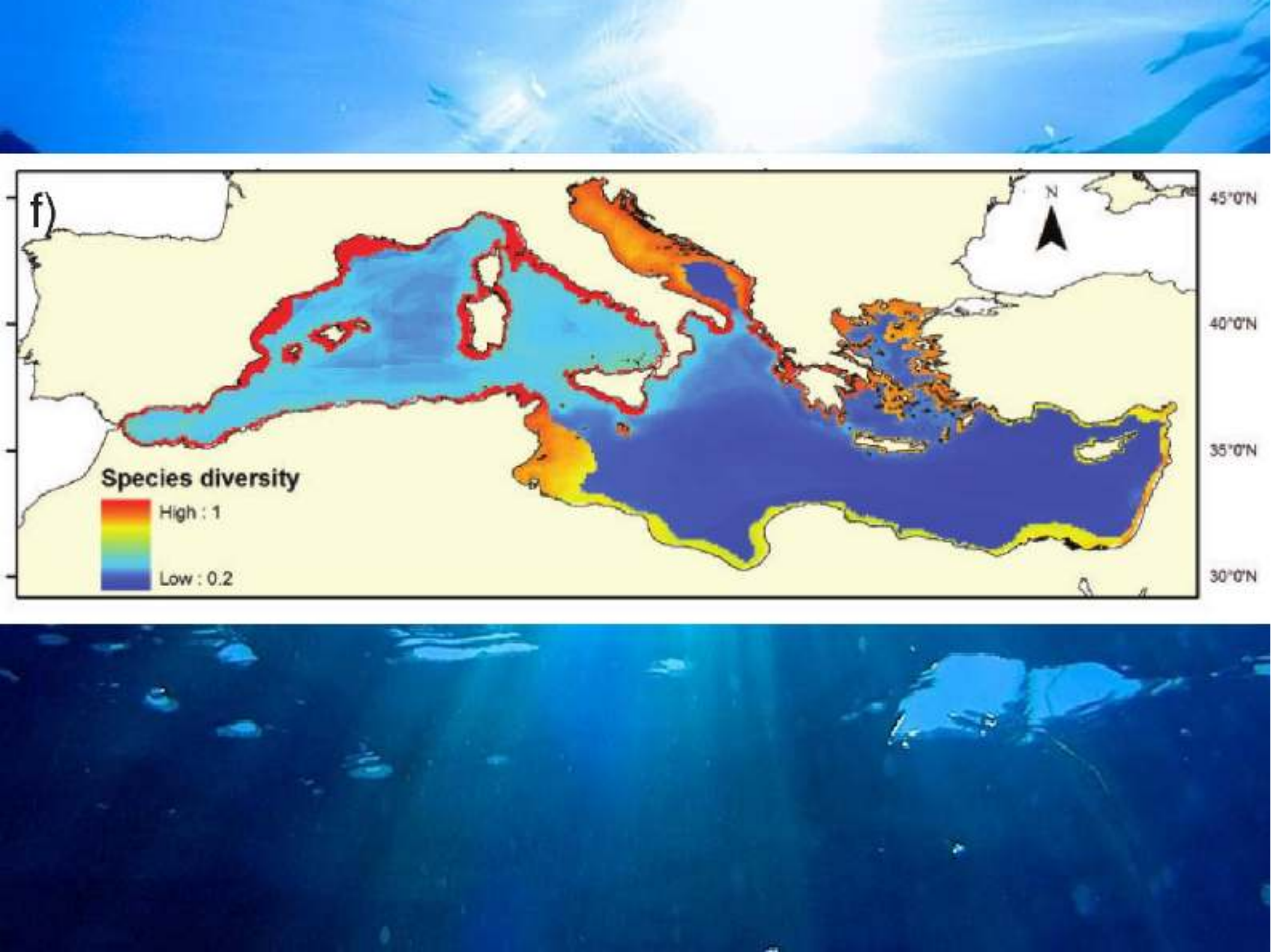

Habitat loss:
a problem mainly outside Croatia

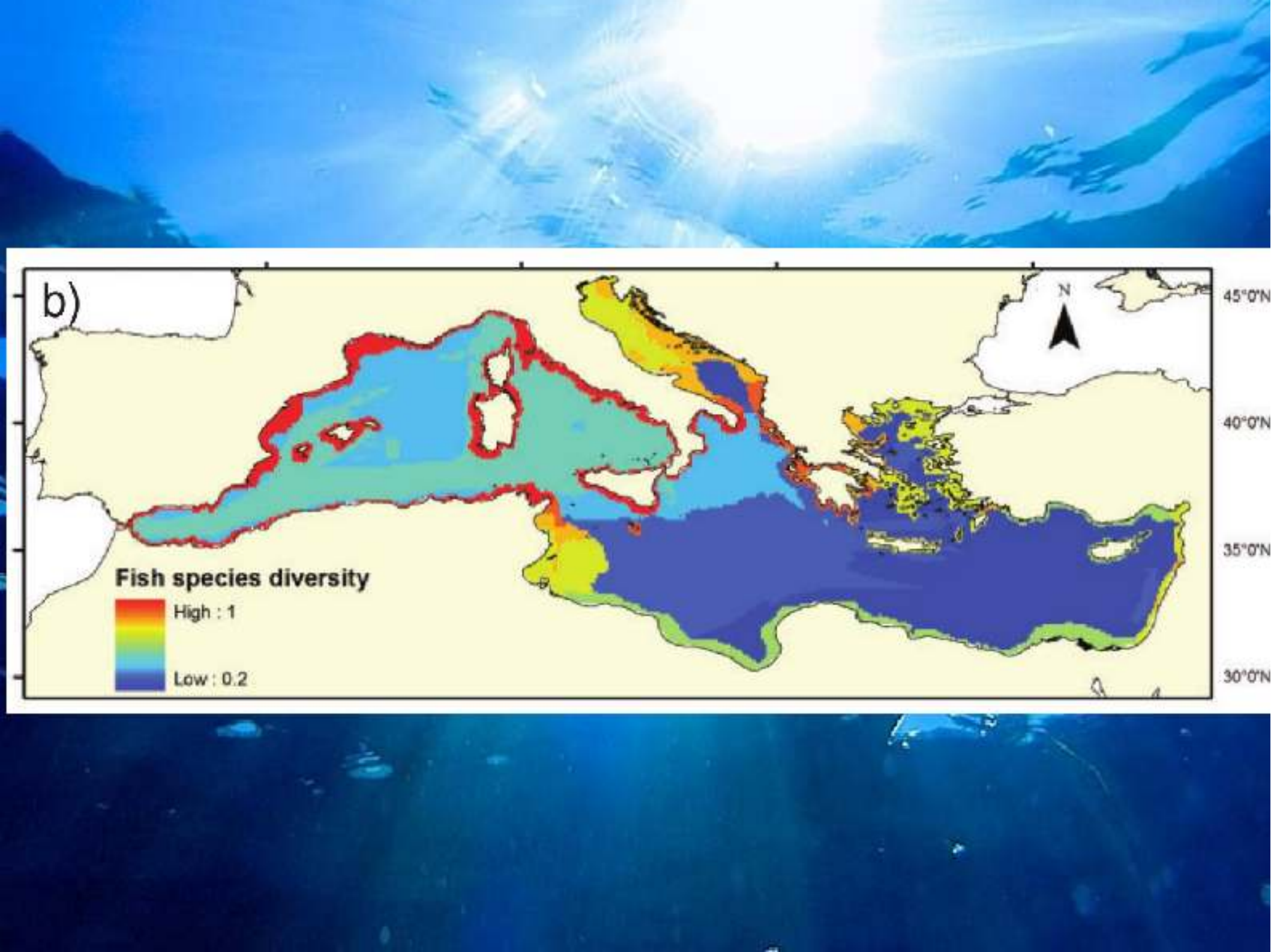
Habitat loss

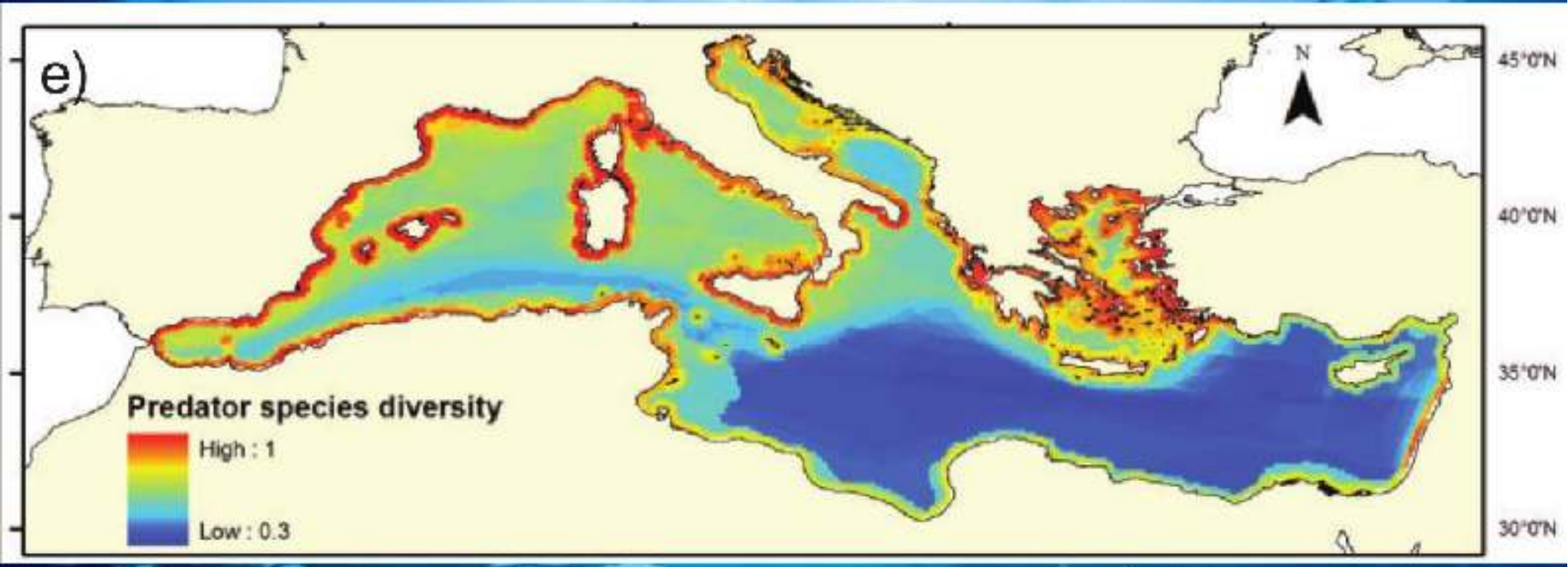

ITALIJA
TRIESTE
SLOVENIJA
RIJEKA
ISTRA
RAVENNA
ANCONA
ZADAR
ŠIBENIK
SPLIT
BRAČ
HVAR
KORČULA
BOSNA I HERCEGOVINA
DUBROVNIK
CRNA GORA
ALBANIJA
JADRANSKO MORE
ITALIJA
N
0 10 20 30 40 50 M
0 20 40 60 80 100 km


a)
0°0'
10°0'E
20°0'E
30°0'E
45°0'N
40°0'N
35°0'N
30°0'N
N
Coastal-based impacts
High : 1
Low : 0

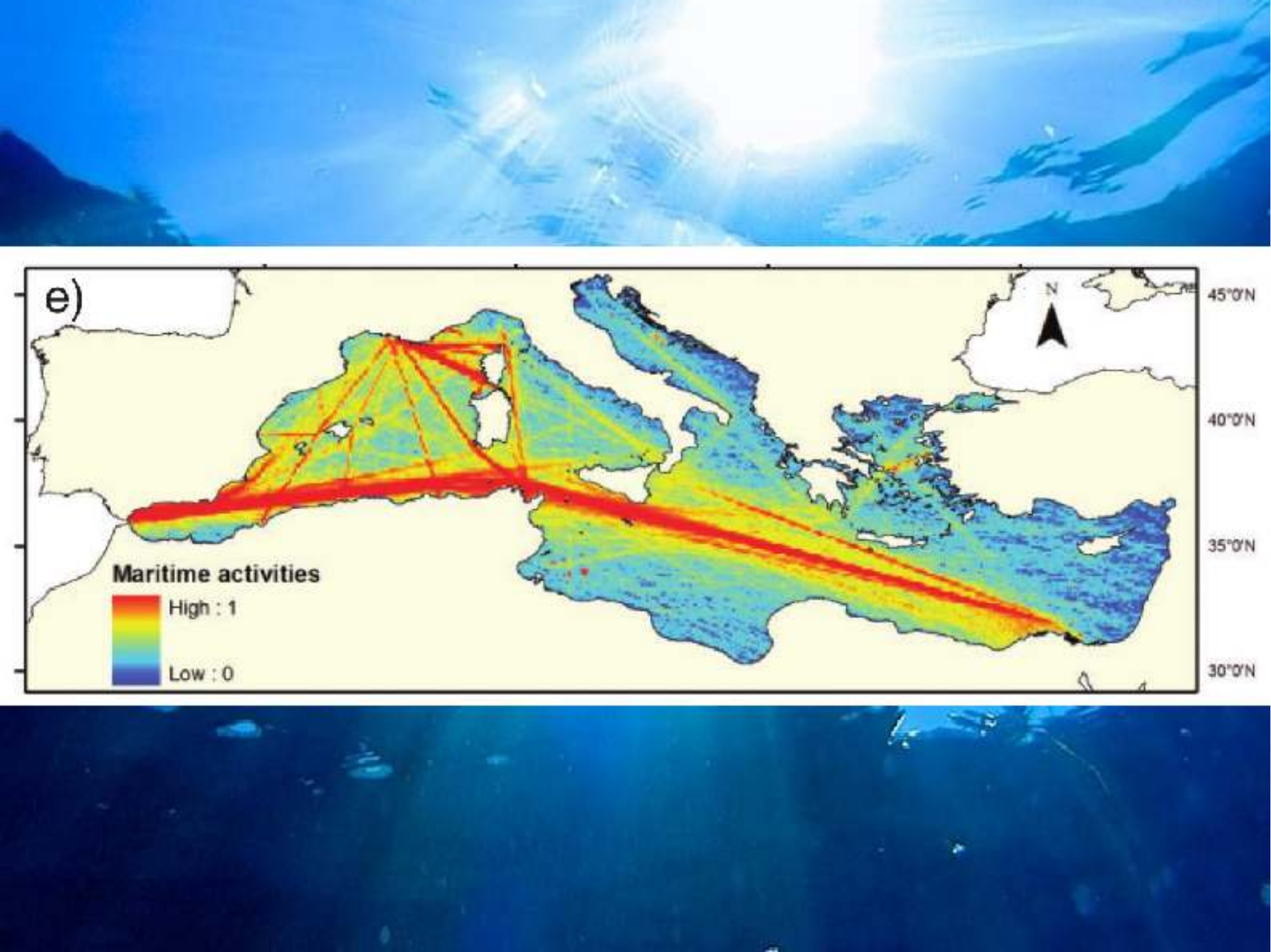

Marine resources

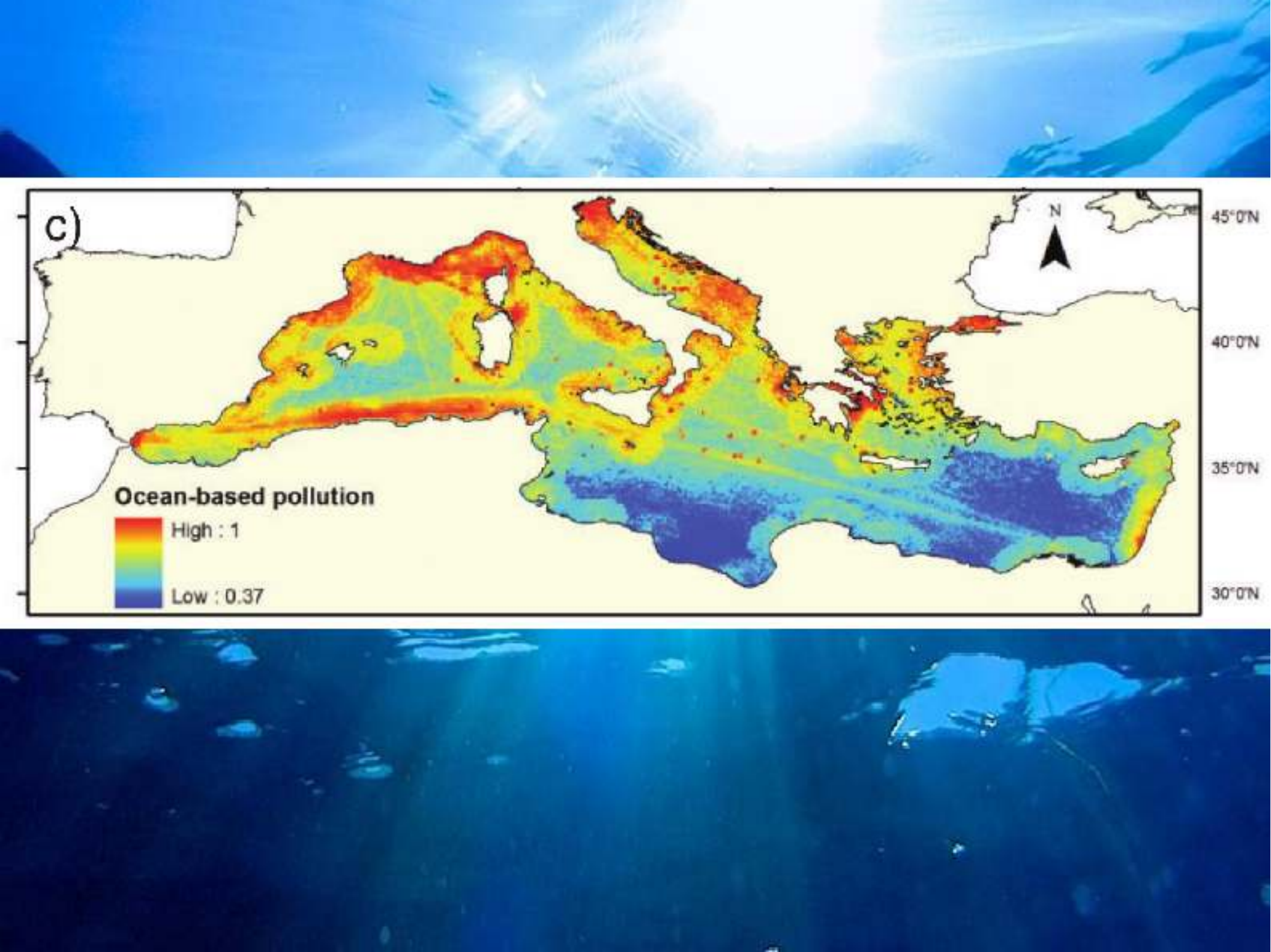

f)
N
45°0'N
40°0'N
35°0'N
30°0'N
Species diversity
High : 1
Low : 0.2

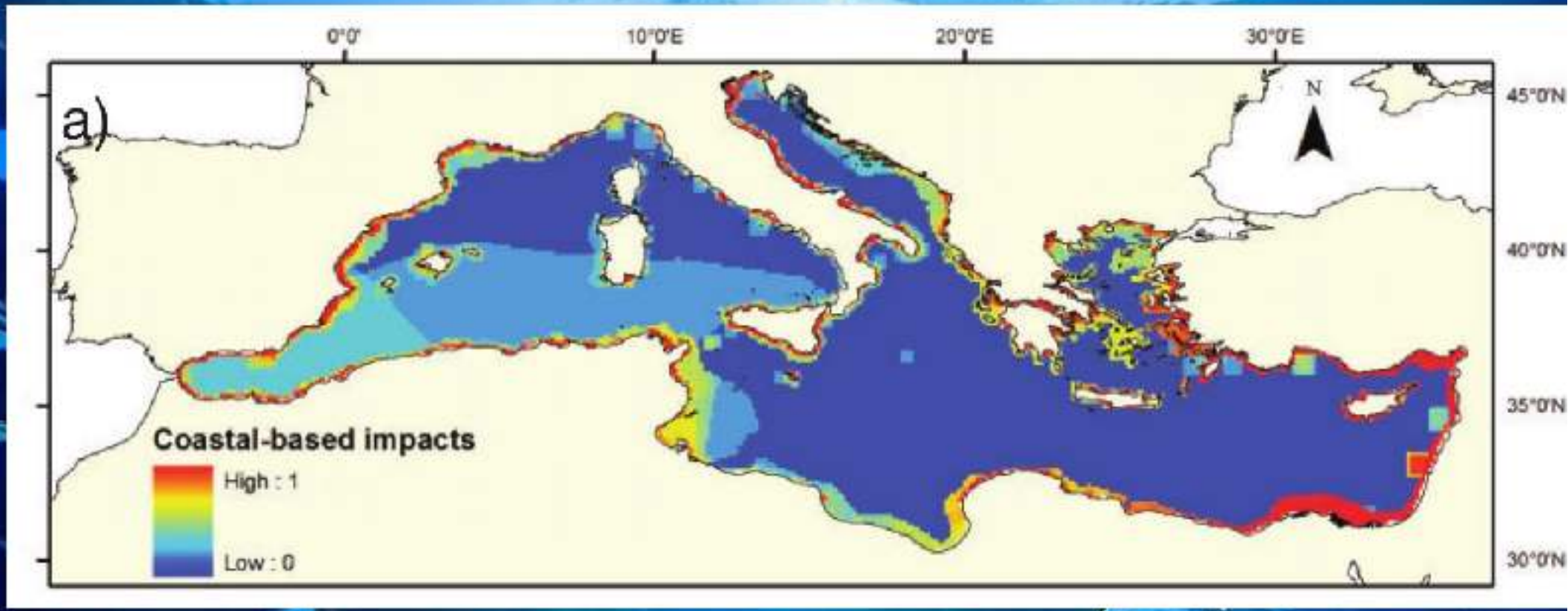

b)
N
45°0'N
40°0'N
35°0'N
30°0'N
Fish species diversity
High : 1
Low : 0.2


e)
N
45°0'N
40°0'N
35°0'N
30°0'N
Predator species diversity
High : 1
Low : 0.3


Impacts


e)
N
45°0'N
40°0'N
35°0'N
30°0'N
Maritime activities
High : 1
Low : 0


c)
N
45°0'N
40°0'N
35°0'N
30°0'N
Ocean-based pollution
High : 1
Low : 0.37


a)
0°0'
10°0'E
20°0'E
30°0'E
45°0'N
40°0'N
35°0'N
30°0'N
N
Coastal-based impacts
High : 1
Low : 0

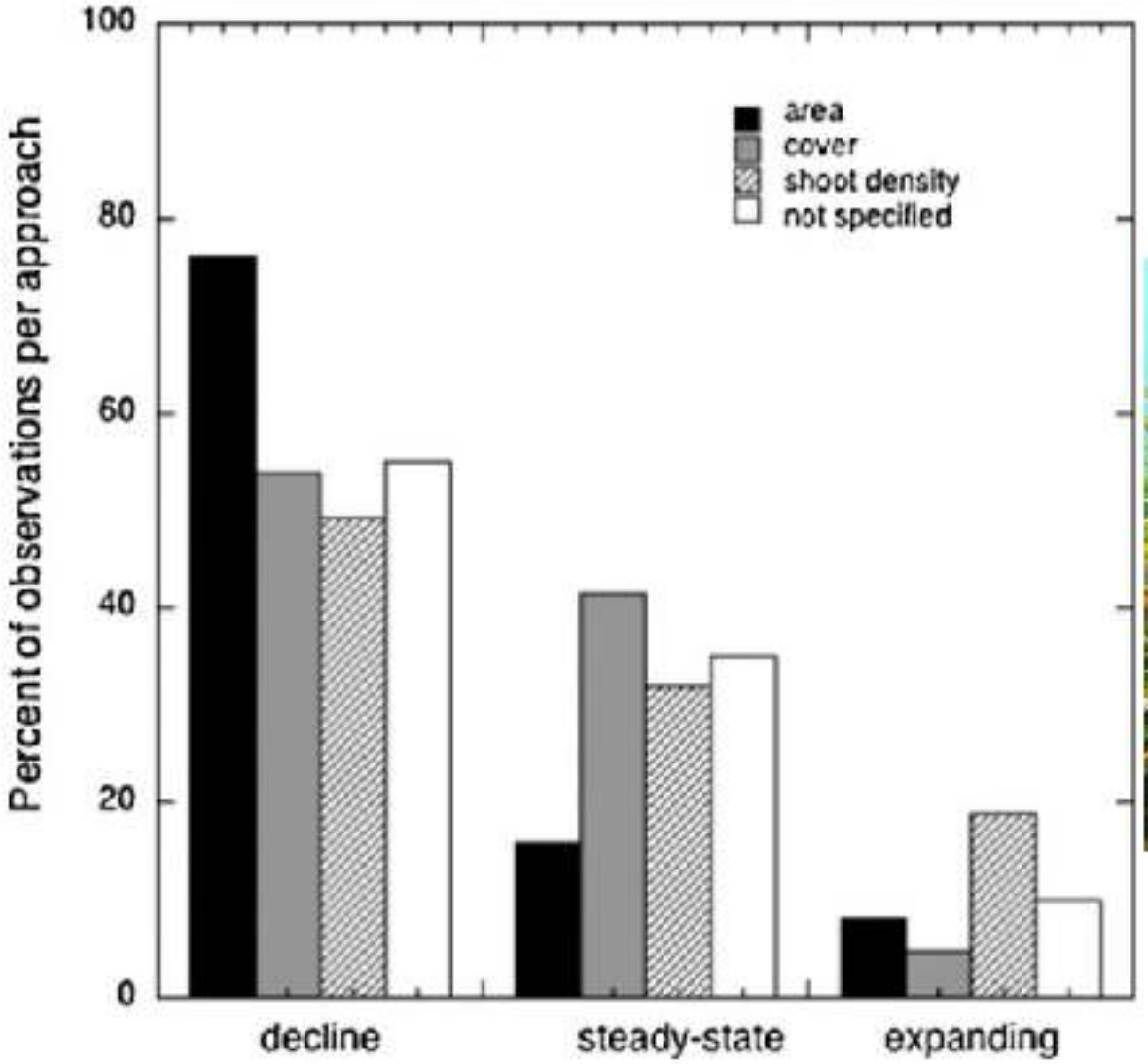


Fig. 4. Percentage of observations of *Posidonia oceanica* meadows declining, expanding, or in steady state in the Mediterranean Sea during the last century assessed by examining meadow areal extent (black bars), cover (grey bars), shoot density (hatched bars) or without indicating the assessment approach (white bars).

Marba et al. 2014

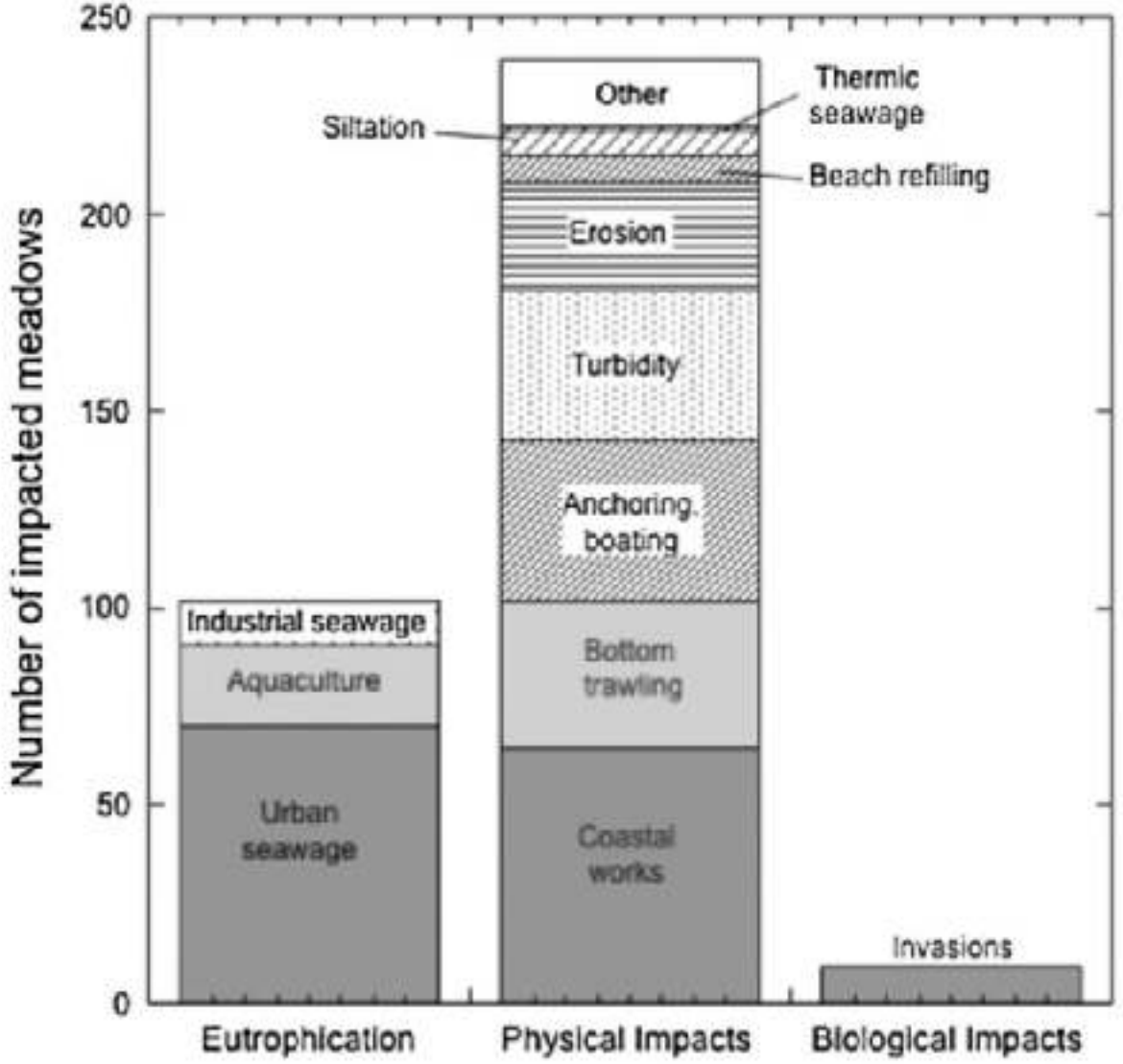
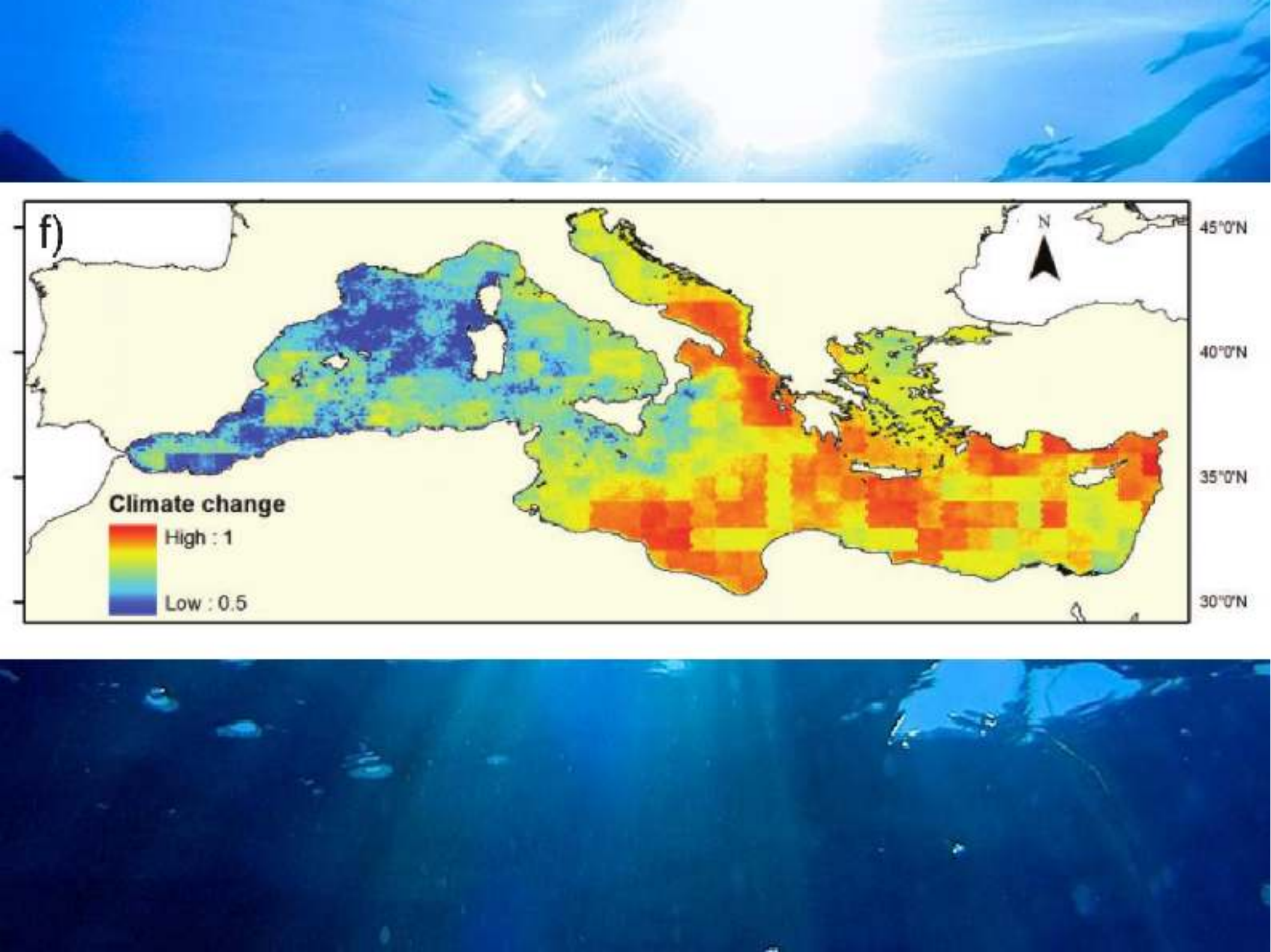
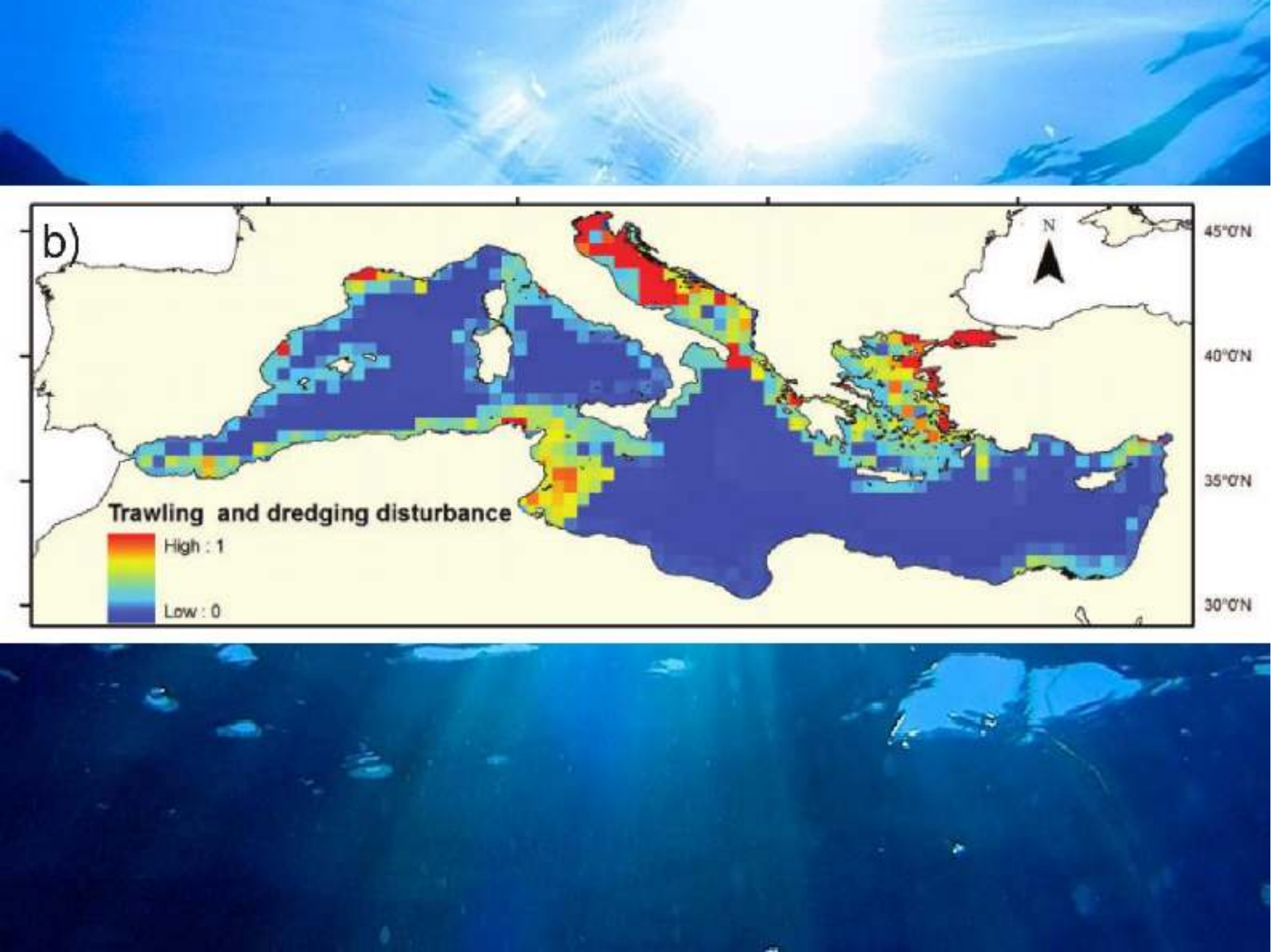
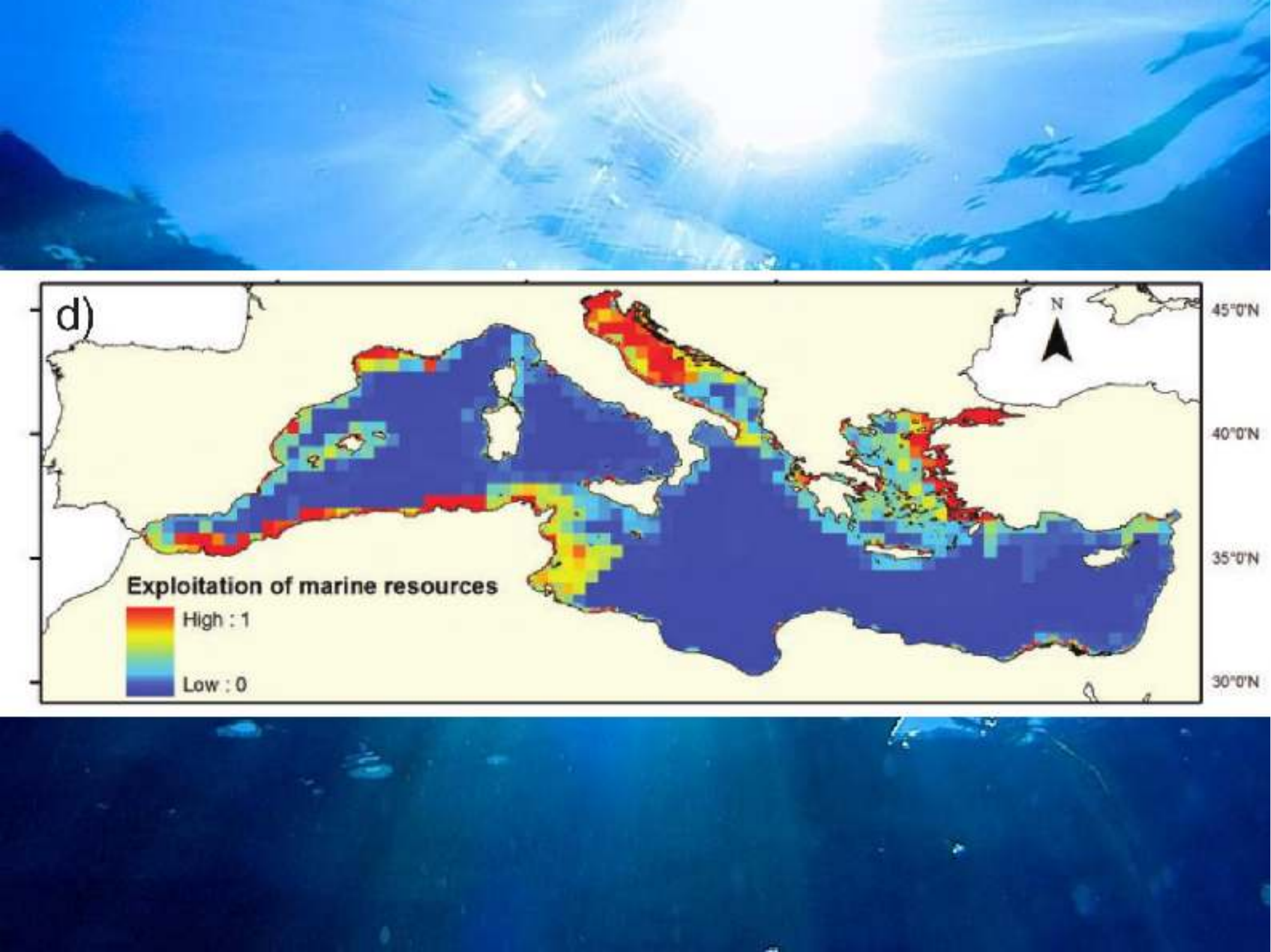


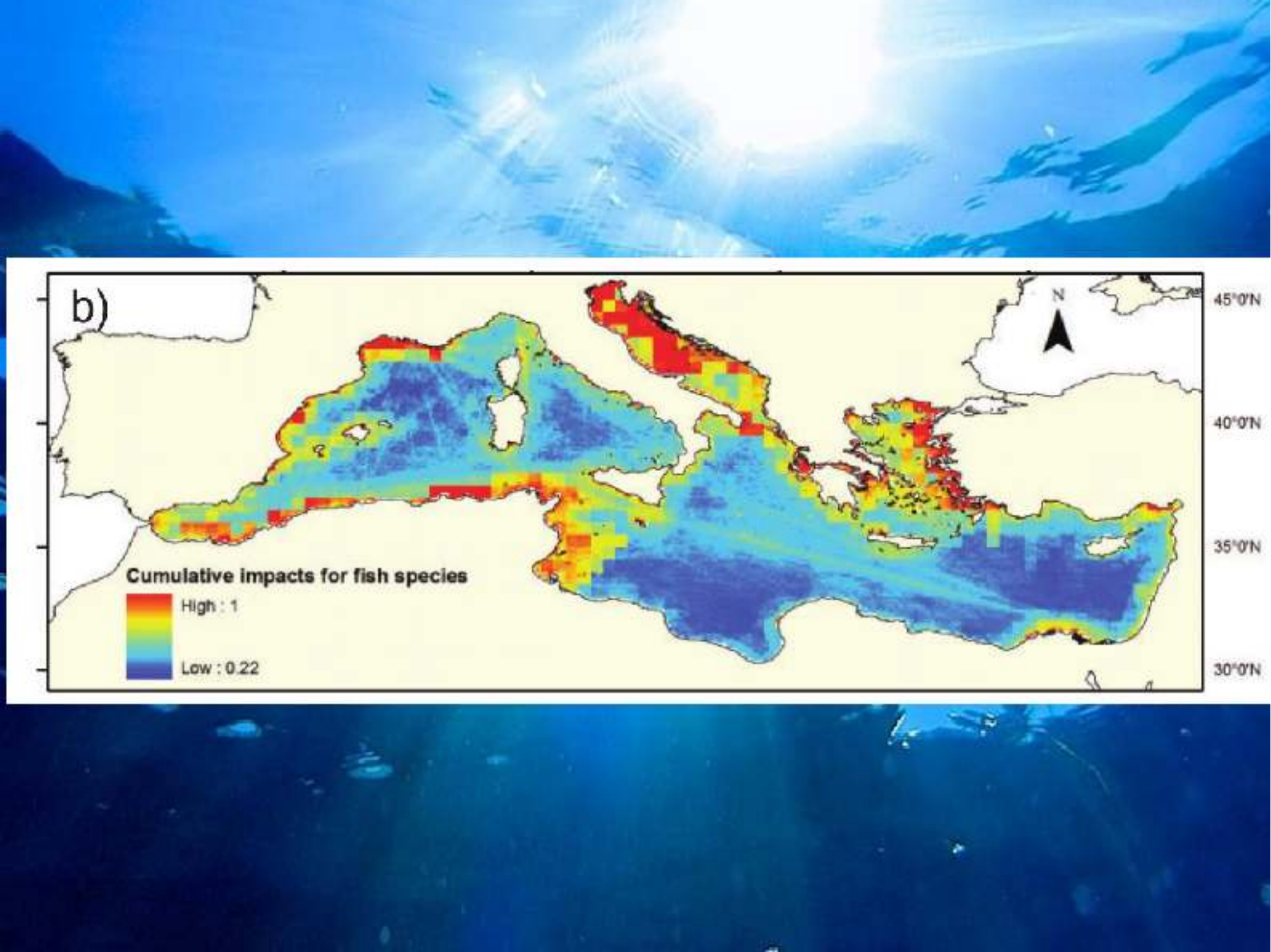
Fig. 5. Pressures identified as causes of *Posidonia oceanica* declines. The graph shows the number of meadows impacted by each pressure.

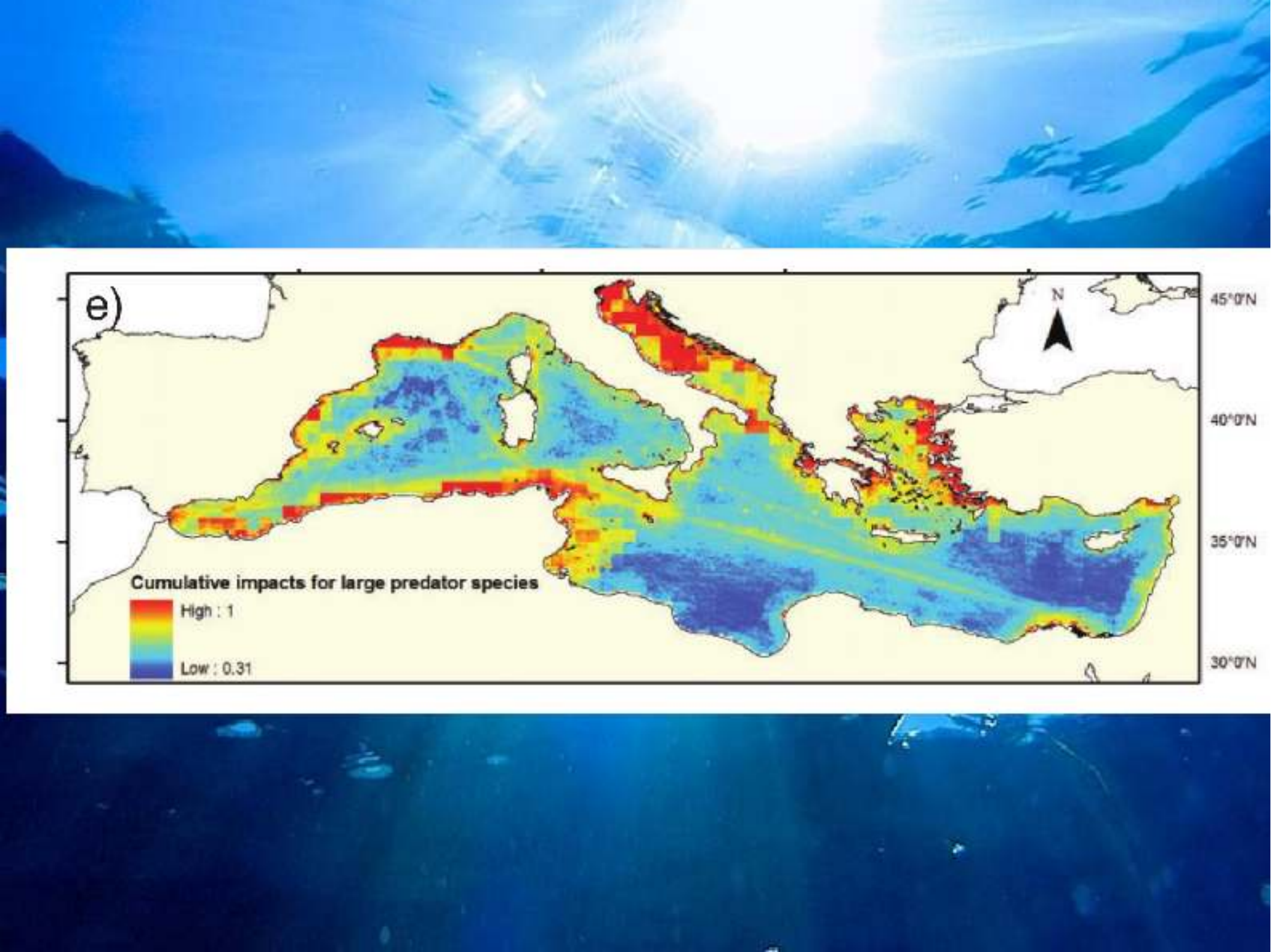
Marba et al. 2014

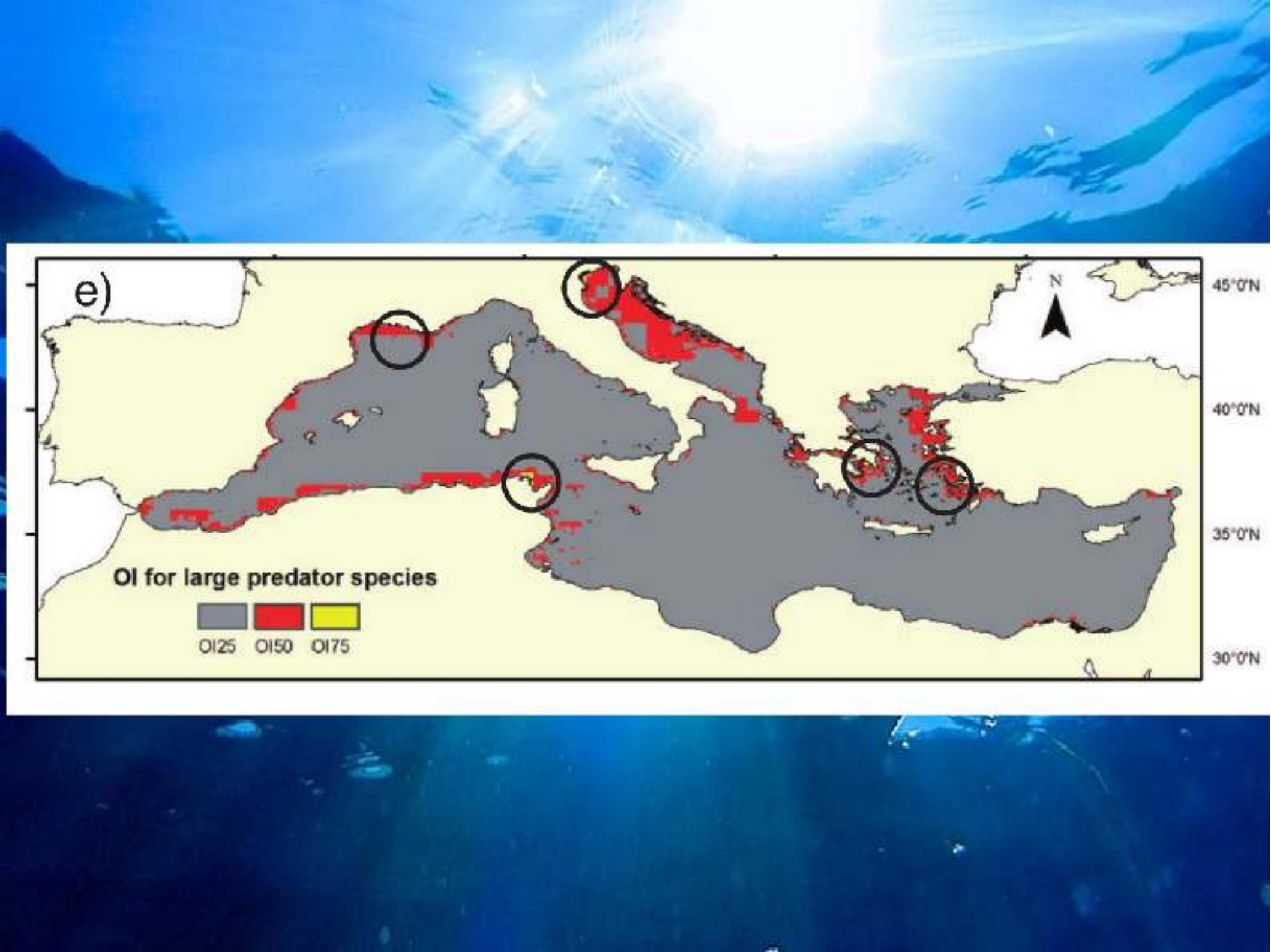

f)
N
45°0'N
40°0'N
35°0'N
30°0'N
Climate change
High : 1
Low : 0.5

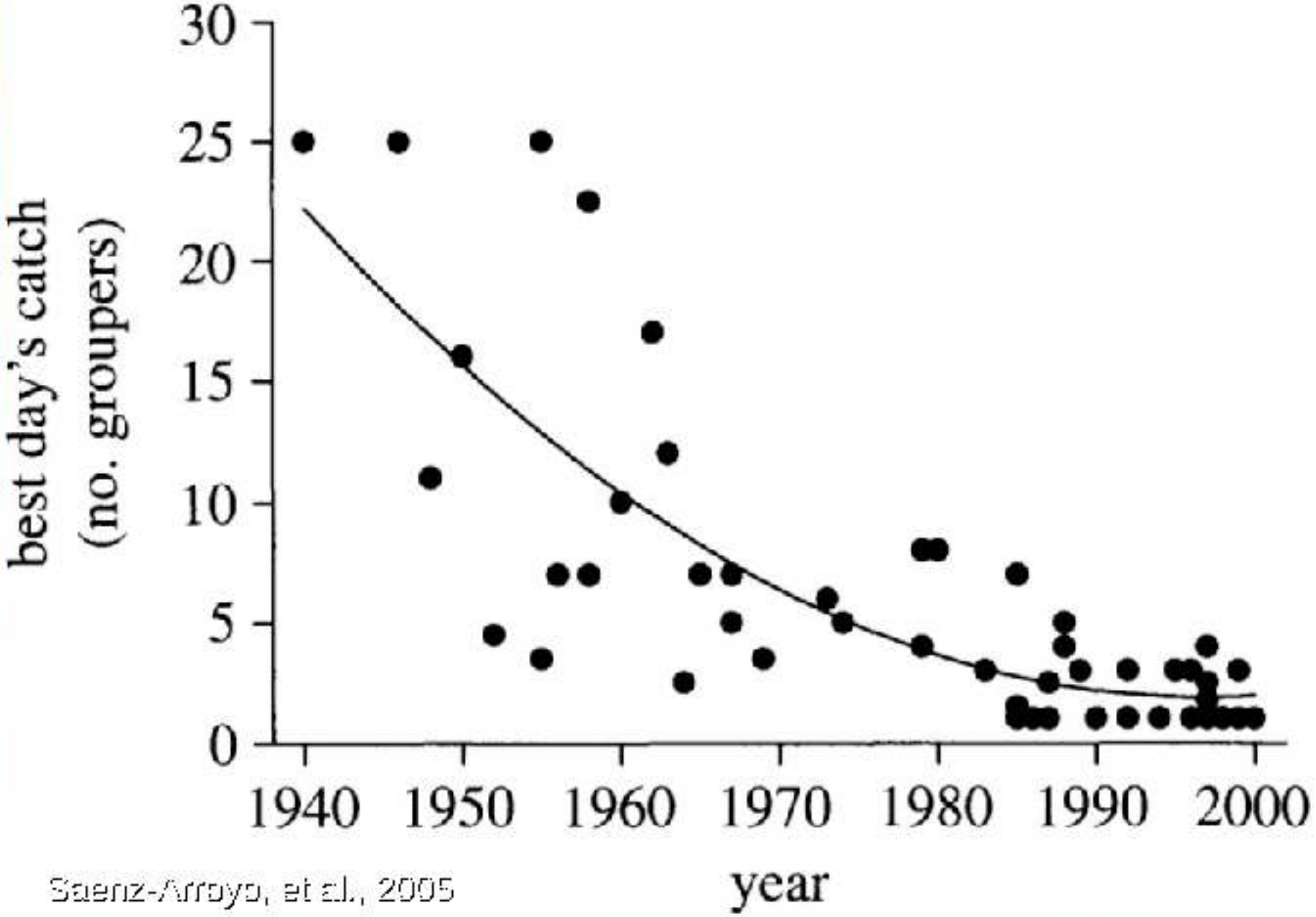

b)
N
45°0'N
40°0'N
35°0'N
30°0'N
Trawling and dredging disturbance
High : 1
Low : 0


d)
N
45°0'N
40°0'N
35°0'N
30°0'N
Exploitation of marine resources
High : 1
Low : 0


b)
N
45°0'N
40°0'N
35°0'N
30°0'N
Cumulative impacts for fish species
High : 1
Low : 0.22


e)
N
45°0'N
40°0'N
35°0'N
30°0'N
Cumulative impacts for large predator species
High : 1
Low : 0.31


e)
N
45°0'N
40°0'N
35°0'N
30°0'N
OI for large predator species
OI25
OI50
OI75



Saenz-Arroyo, et al., 2005

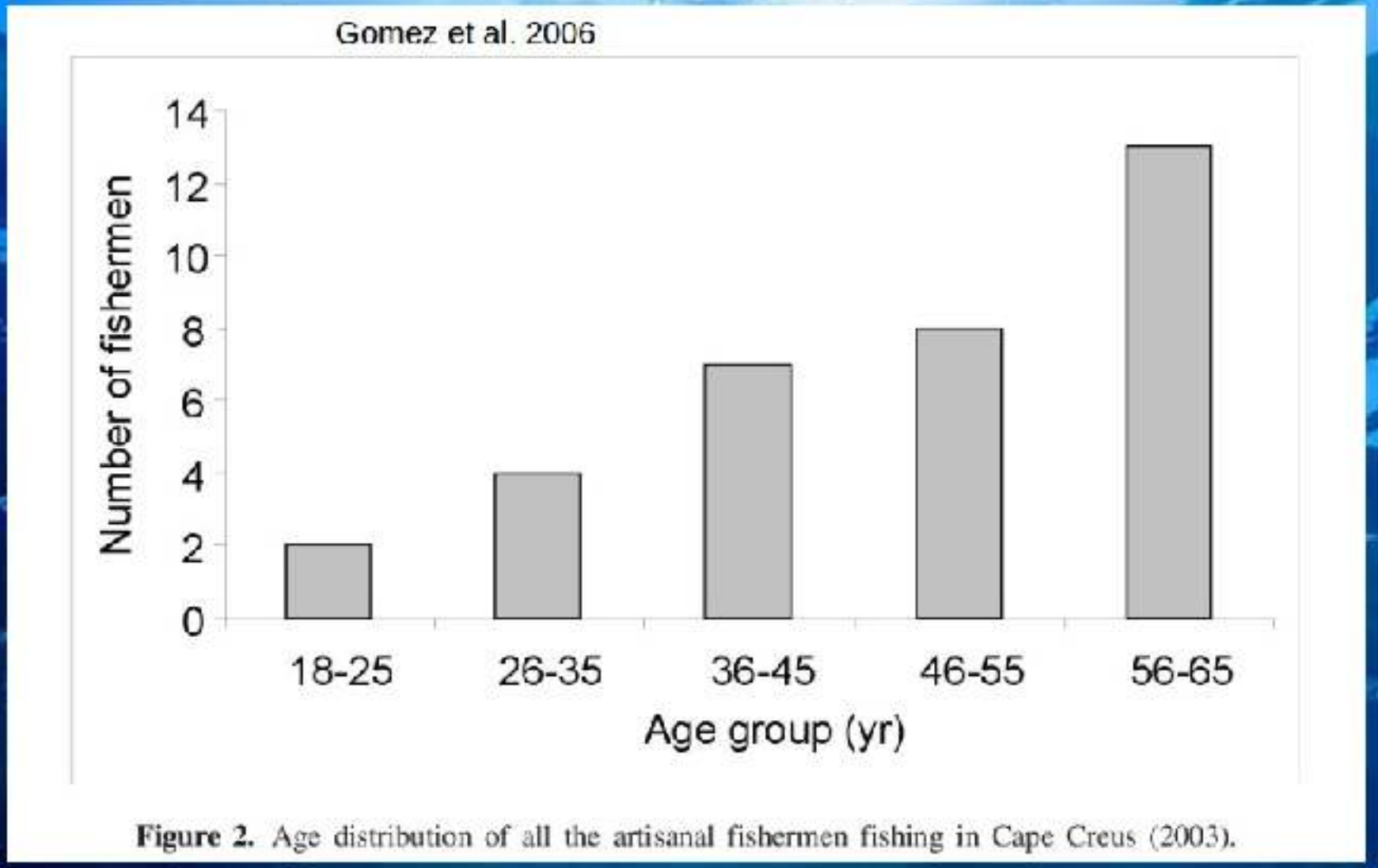


Figure 2. Age distribution of all the artisanal fishermen fishing in Cape Creus (2003).