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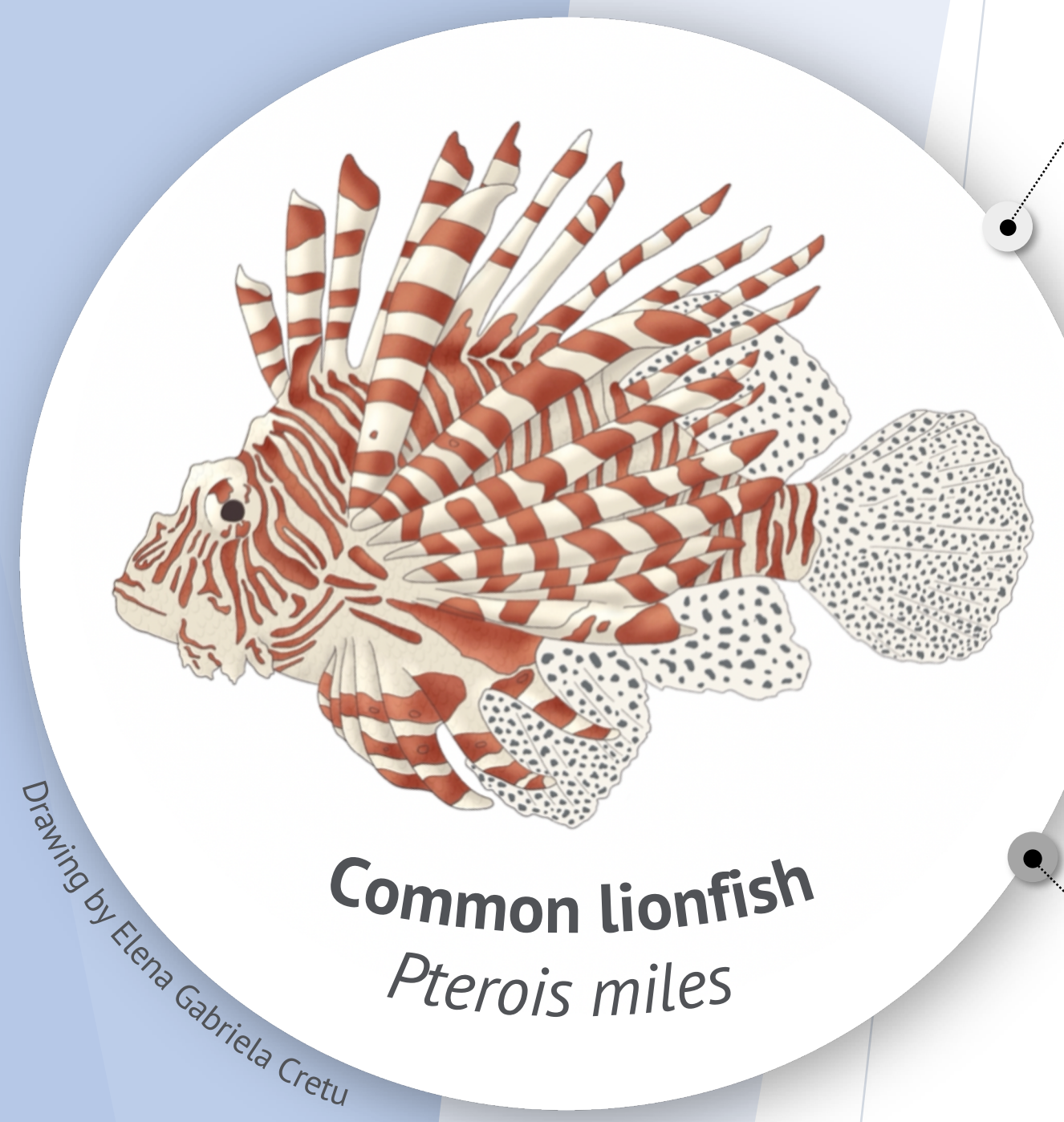
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Would it be an ecological disaster if the common lionfish (*Pterois miles*) arrived to the Catalan coast?

INTRODUCTION

MATERIALS & METHODS

RESULTS & DISCUSSION

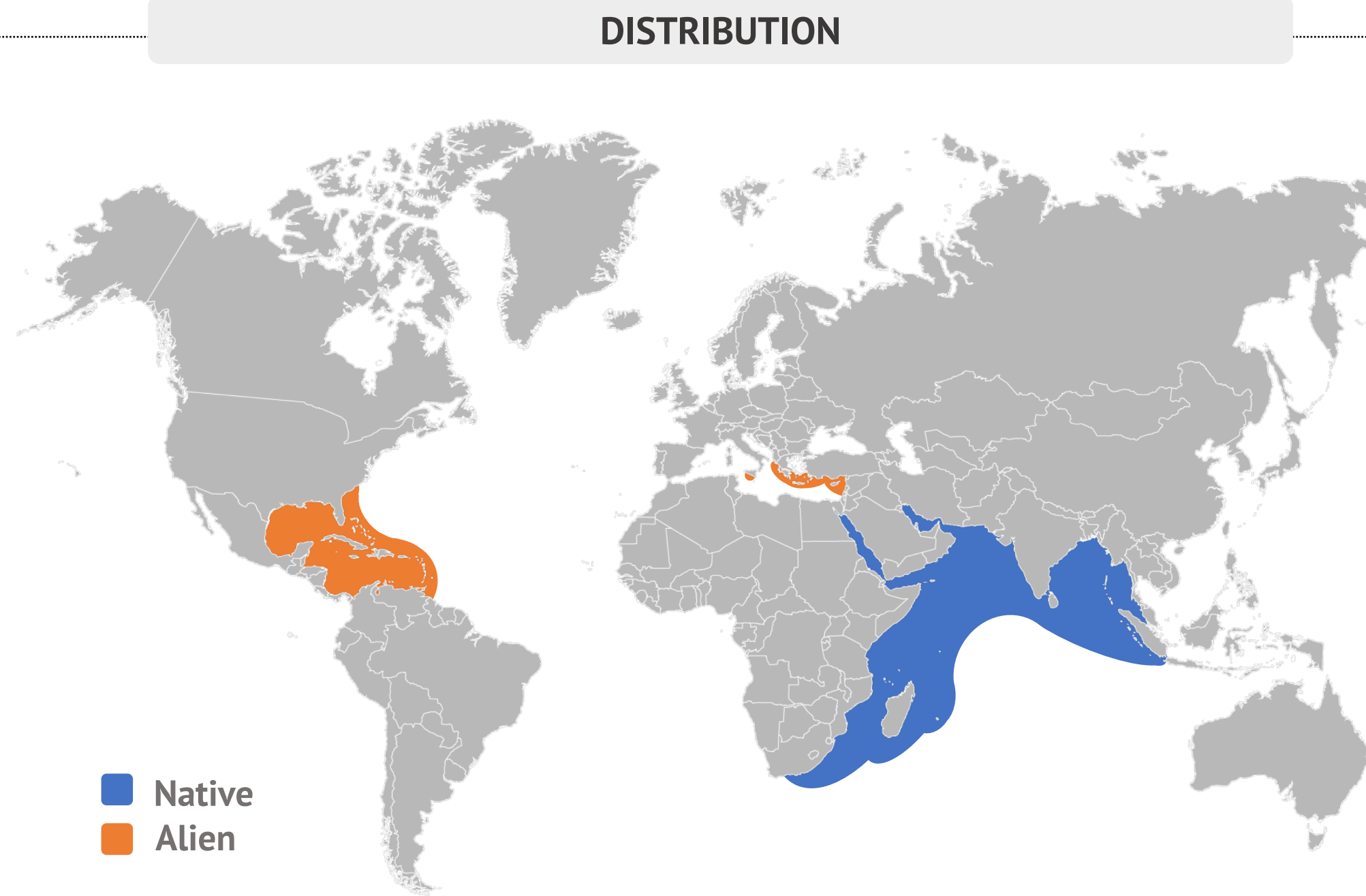


Common lionfish
Pterois miles

Drawing by Elena Gabriela Cretu

GENERAL TRAITS
Measures 20-25 cm, reddish with dark stripes, venomous spines, pectoral fins and first dorsal developed ¹
HABITAT
Coastal, reef-associated. Wide range of eco-physiological tolerance: 0-85(300)m of depth and temperature $\geq 10^{\circ}\text{C}$ ¹
DIET
Voracious mesopredator (up to x30 stomach volume) and generalist feeding (fish and crustaceans) ²
REPRODUCTION & LIFE CYCLE
Gonochoristic, external fecundation, spawn all year round and rapid growth ² , maximum age of 30 years ³

= HIGH INVASIVE POTENTIAL !



- IMPACTS**
- Competition with native species
 - Predation of native species
 - Alteration of:
 - Habitats
 - Nutrient cycles
 - Energy reservoir
 - Local extinctions
 - Regional fish abundance
 - Species richness
 - Tourism

OBJECTIVE

To study which ecosystemic impact would have the arrival of *Pterois miles* to the Catalan coast through habitat characterization and the inclusion of *P. miles* in the food webs

HABITAT CHARACTERIZATION

Gathering of information about habitat and interactions of *P. miles* in the **Eastern Mediterranean**



Selection of the equivalent **Catalan habitat** using "Manual d'Habitats Litorals de Catalunya"

11.24141+
Rocky, calm and well-lit infralittoral bottoms without fucal algae

Choice of a reference model according to study area, objective and species (Michailidis et al., 2019)⁴



Classification of the fauna and flora of the Catalan habitat in **functional groups** according to the reference model



CONSTRUCTION OF THE TROPHIC MODEL

Data input extracted and/or modified from bibliographic information (biomass, production, consumption, trophic level, diet...)



Construction of trophic models using Ecopath with Ecosim 6.6.5 (previous, final, control, x2 and x3 *P. miles* biomass)



Extraction of the results obtained with Ecopath with Ecosim



HABITAT SPECIES



Images source: WORMS & FishBase

FUNCTIONAL GROUPS

1. Phytoplankton
2. Phyto-benthos
3. Micro & mesozooplankton
4. Macrozooplankton
5. Gelatinous plankton
6. Polychaetes
7. Benthic small crustaceans
8. Benthic invertebrates
9. Shrimps
10. Crabs & lobsters
11. Octopuses & cuttlefish
12. Squids
13. Native mullids
14. Demersal fishes (mixed bottom)
15. Lionfish
16. Eels & morays
17. Small sharks
18. Small benthopelagic fishes
19. Medium benthopelagic fishes
20. Small pelagic fishes
21. Large pelagic fishes
22. Turtles
23. Bottlenose dolphin
24. Seabirds
25. Detritus

For more details, visit



FOOD WEB

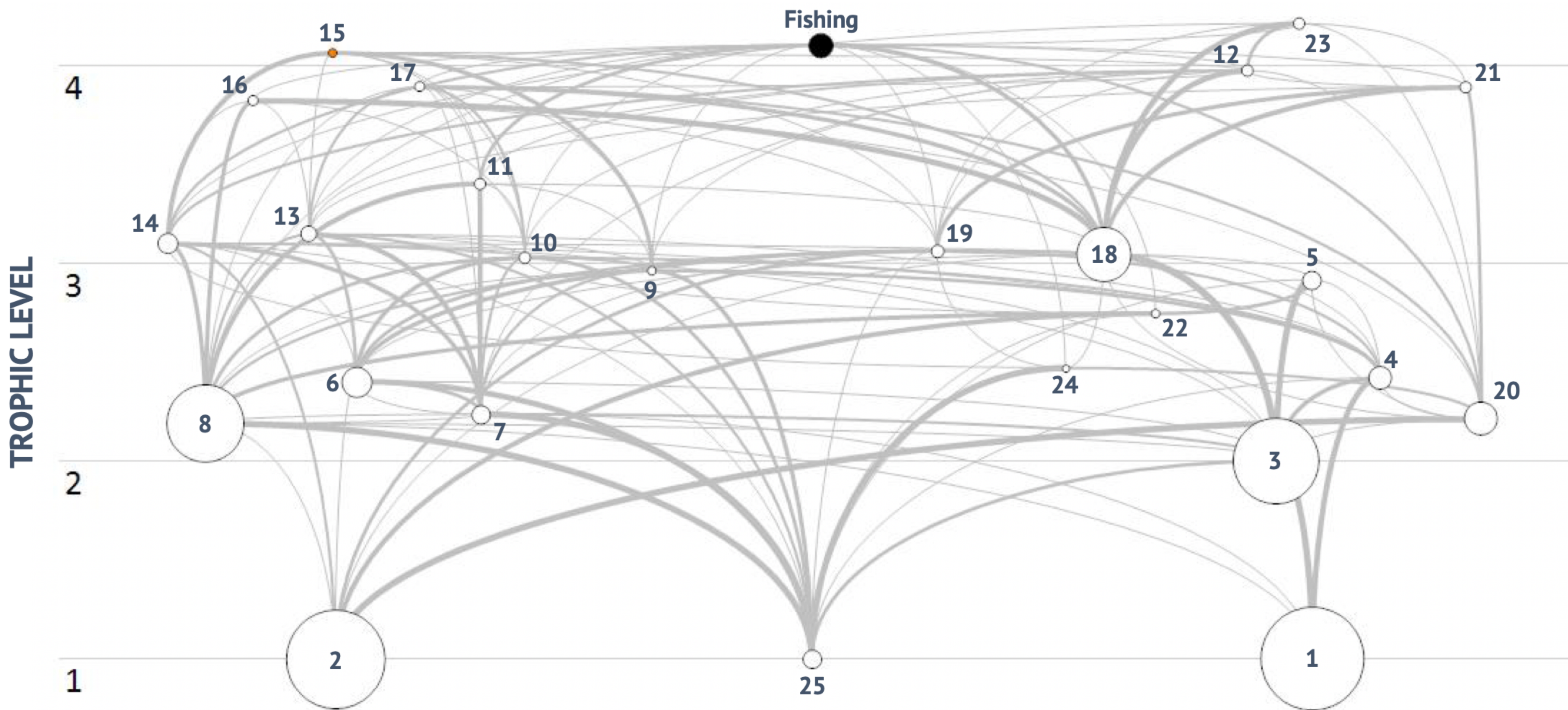


Fig. 1. Flow diagram of the final trophic model of the Catalan coastal habitat 11.24141+. Lines represent trophic flows in the system and circles represents functional groups. Circle area is proportional to biomass and line thickness to magnitude of trophic flow. Vertical axis represents increasing trophic level and horizontal axis indicates the pelagic (right) or demersal (left) nature of functional groups. Fishing = landings + discards.

MIXED TROPHIC IMPACT

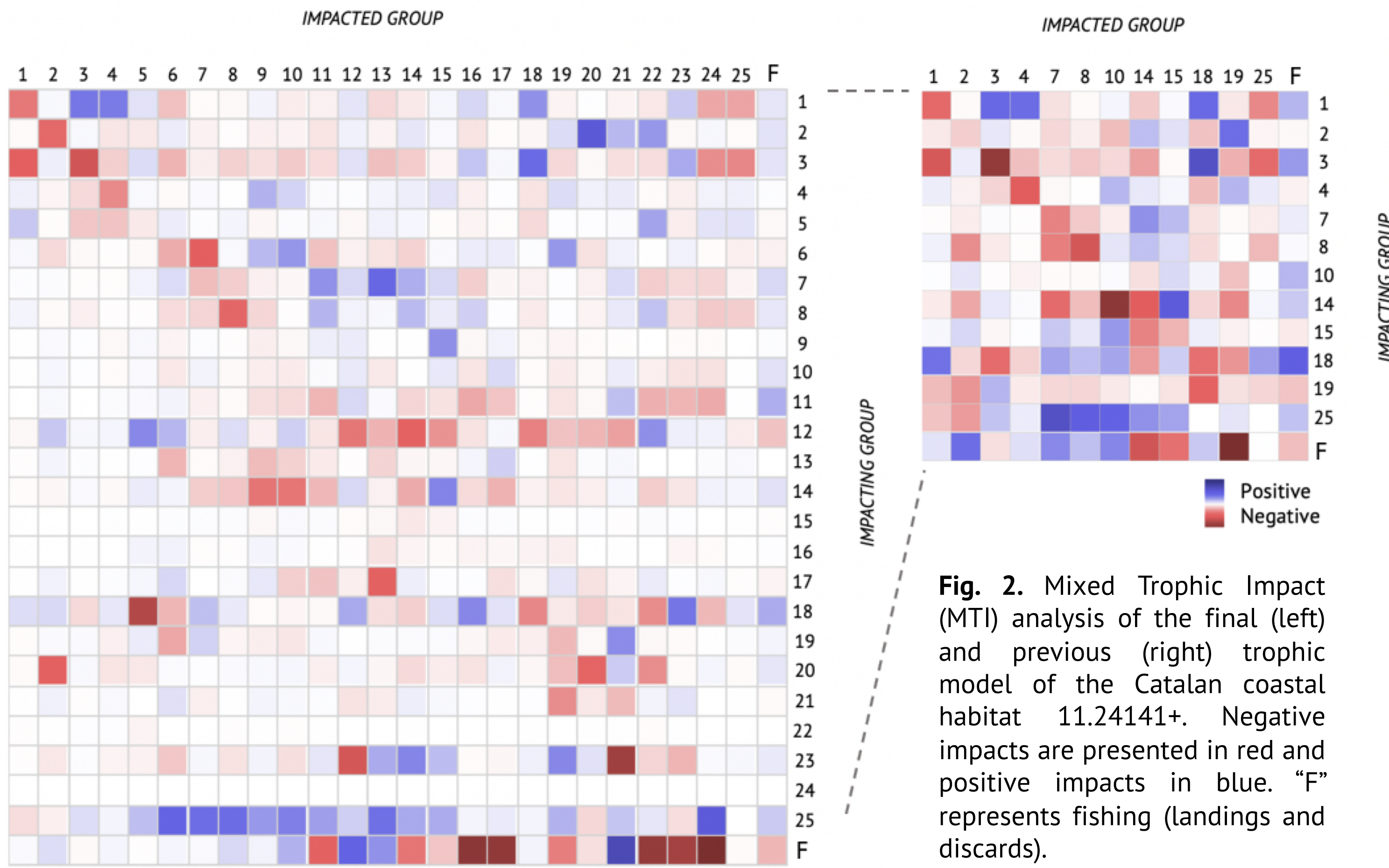


Fig. 2. Mixed Trophic Impact (MTI) analysis of the final (left) and previous (right) trophic model of the Catalan coastal habitat 11.24141+. Negative impacts are presented in red and positive impacts in blue. "F" represents fishing (landings and discards).

Table 1. Shannon's diversity index and Mean Trophic Level (MTL) values for each trophic model of the Catalan habitat.

	MODEL			
	Control	Final	Biomass x2	Biomass x3
Shannon's diversity index	1,990	1,992	1,994	1,995
Mean Trophic Level (MTL)	2,77	2,82	2,82	2,82

KEY POINTS:

Impacts on biodiversity \neq trophic impacts

Biodiversity

Major benthopelagic connection: a change within the system (predation, competition by *P. miles*) will probably end up affecting the rest

Shannon's diversity index increases as the biomass of *P. miles* increases (Intermediate Disturbance Hypothesis?)

Trophic impacts

Mean Trophic Level (MTL) shows a **healthy ecosystem**¹, even with *Pterois miles* (Table 1)

Predation of small benthopelagic fishes, including *Chromis chromis*, with a **fundamental ecological role**, as it **channels nutrients** and is a **food source**⁵

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- ¹ Froese, R., & Pauly, D. (2020). FishBase. Retrieved from: www.fishbase.org
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- ⁴ Michailidis, N., Corrales, X., Karachle, P. K., Chartosia, N., Katsanevakis, S., & Sfenthourakis, S. (2019). Modelling the role of alien species and fisheries in an Eastern Mediterranean insular shelf ecosystem. *Ocean and Coastal Management*, 175(November 2018), 152-171.
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GENERAL REVIEW



Faster approach to the actions needed to conserve and protect the biodiversity of affected habitats, functional groups and species



Limited model!
Future projections should be made to see the evolution of lionfish's density and its impact on local fish communities