Trends in lamprey populations in France

Identification and classification of factors in the decline

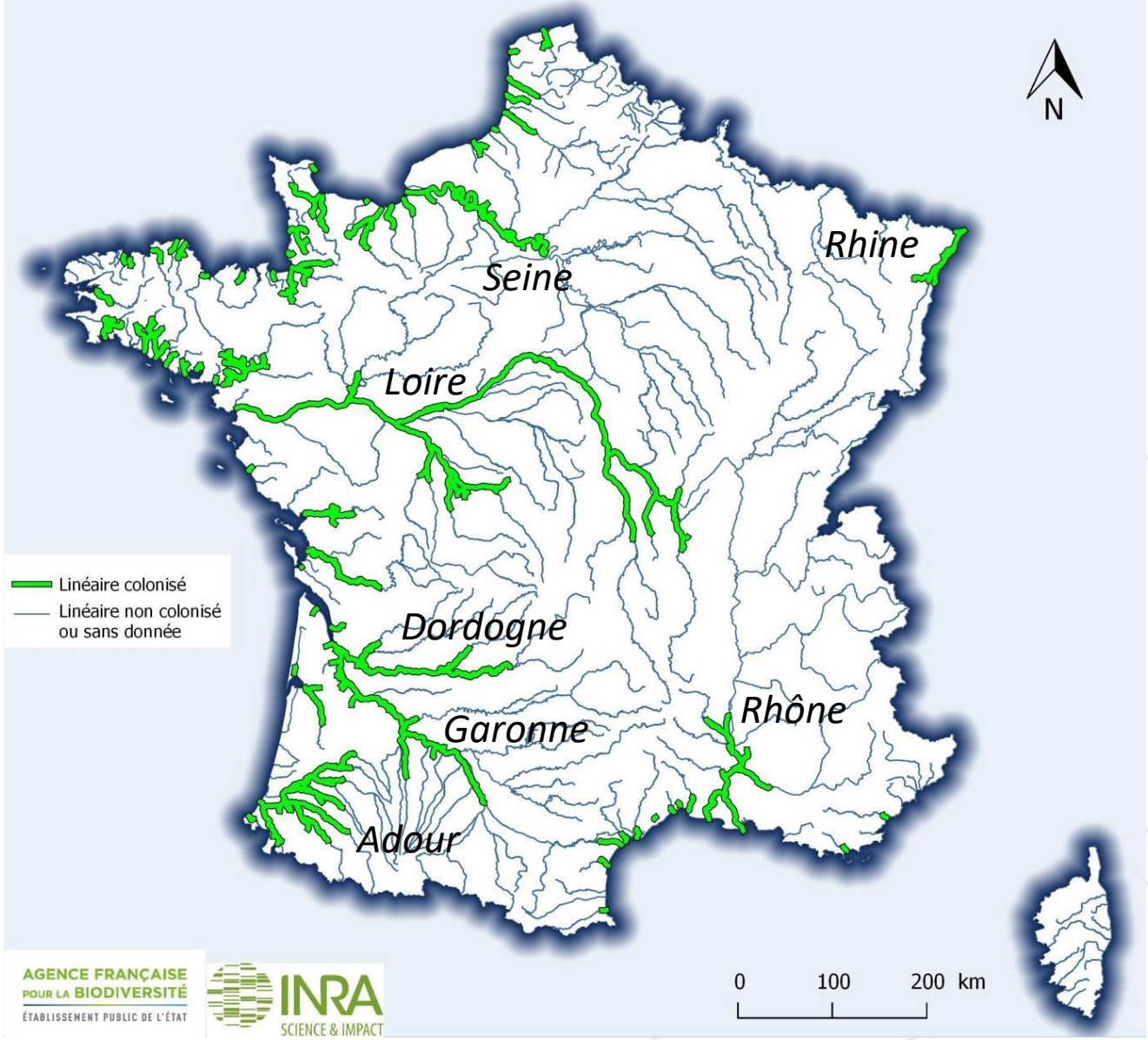
Marius Dhamelincourt - Laurent BEAULATON

French distribution of sea lamprey

Watercourses colonized (André et al. 2018)

Green = rivers colonized

Grey = uncolonized or no data



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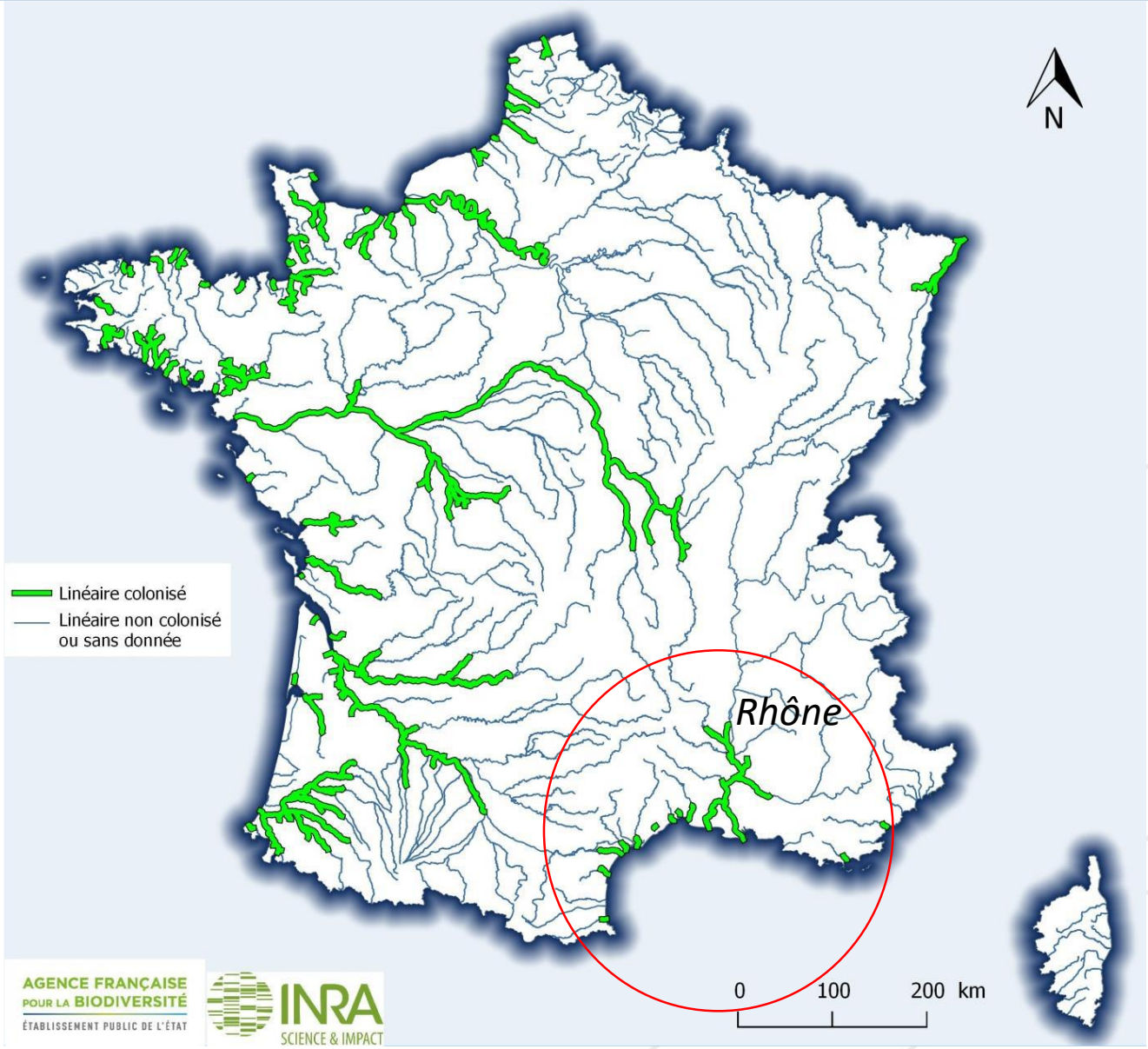


“Regional” management of diadromous fish (inland)

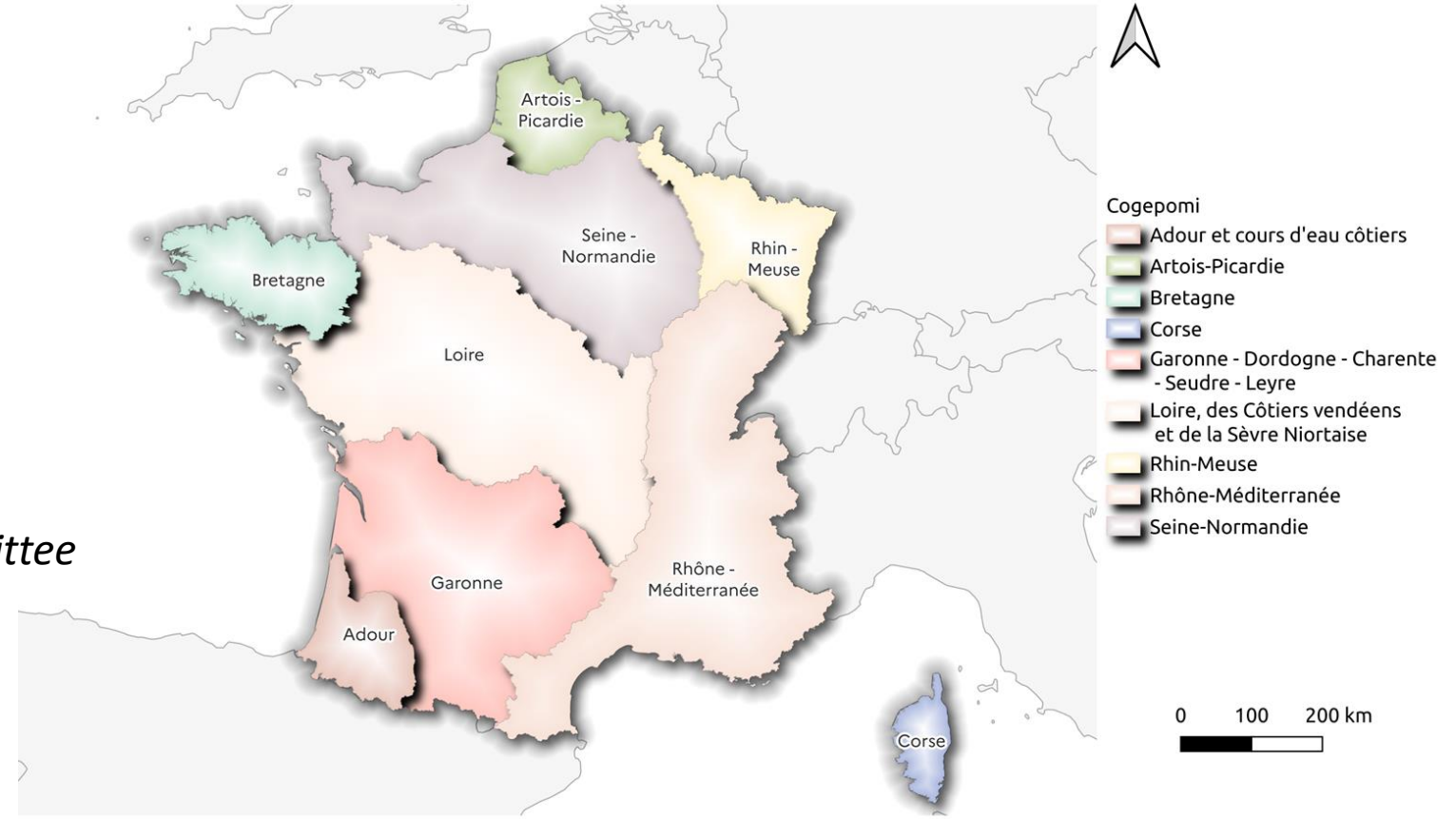
For fresh- and brackish waters :

- **Administration + stakeholder**
- **6 years management plan (PLAGEPOMI)**
- **PLAGEPOMI written by COGEPOMI**
- **Since 1994**

COGEPOMI = migratory fish management committee

PLAGEPOMI = migratory fish management plan

Les comités de gestion des poissons migrateurs (COGEPOMI)

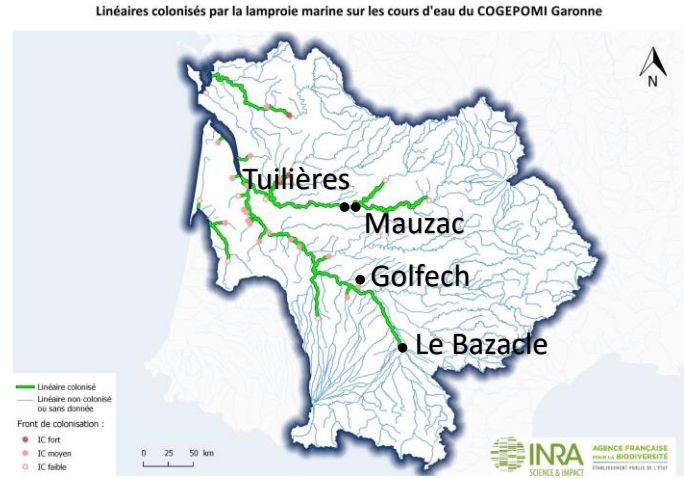


Population dynamics: an example

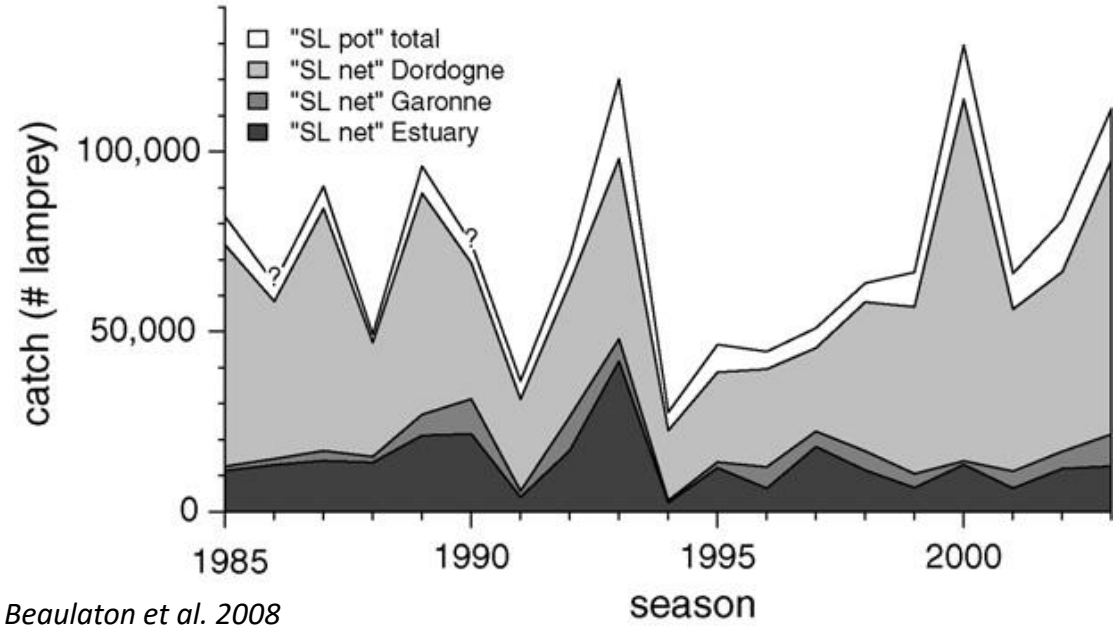
Gironde/Garonne/Dordogne/Charente watershed

- **Largest population in Gironde/Garonne/Dordogne basin : maximum of 134 000 lampreys caught in 2000 (Beaulaton et al., 2008)**

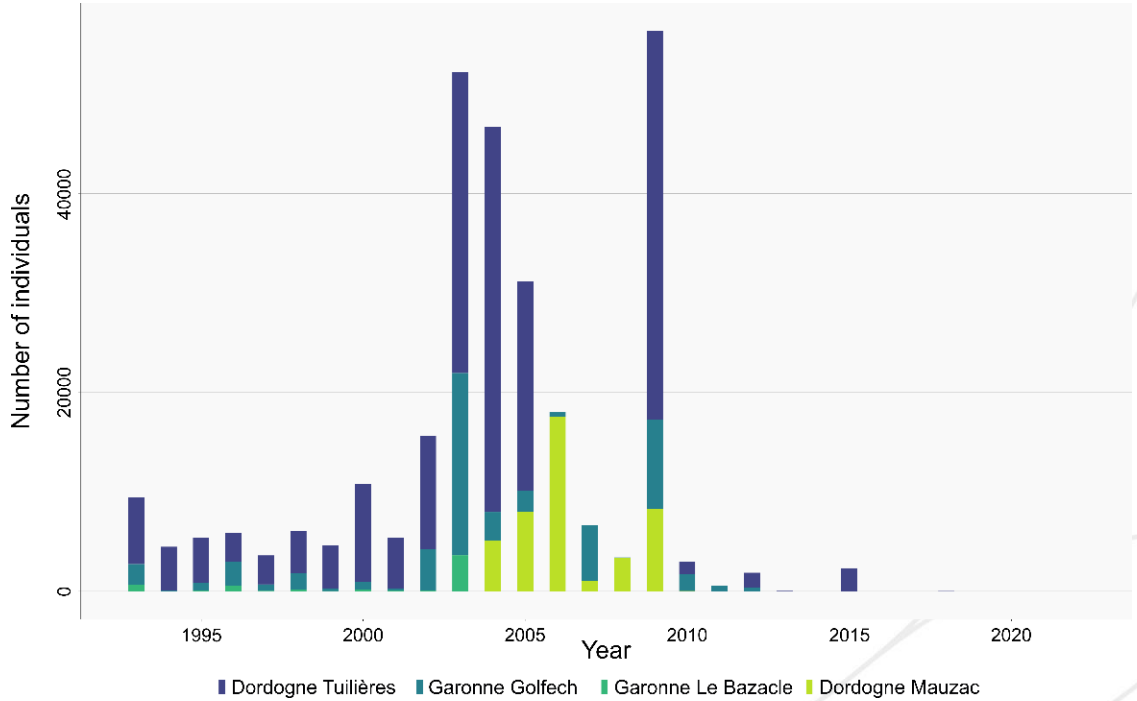
- **Strong decrease since ≈ 2010**



André et al. 2018



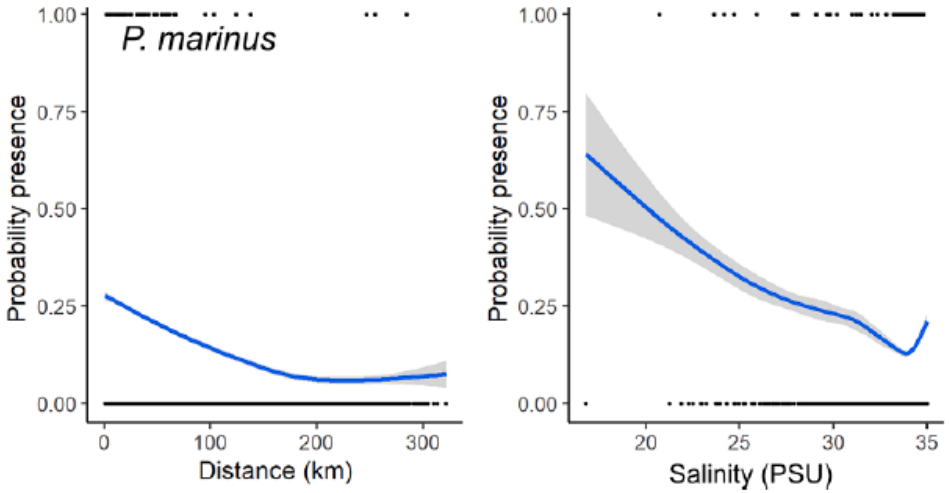
Beaulaton et al. 2008

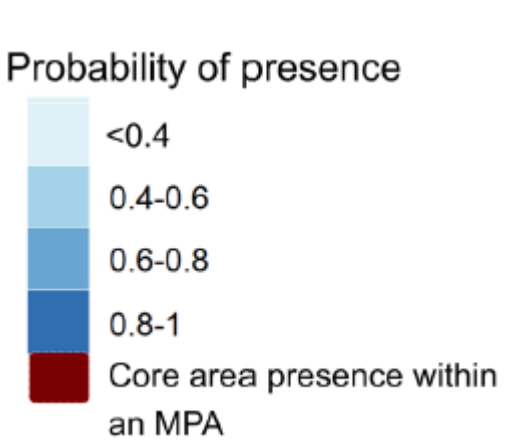


Sea lamprey distribution at sea

Elliott et al. 2021, 2023

- **High presence of anadromous species within MPAs**
- **Useful tool for effective management and conservation**





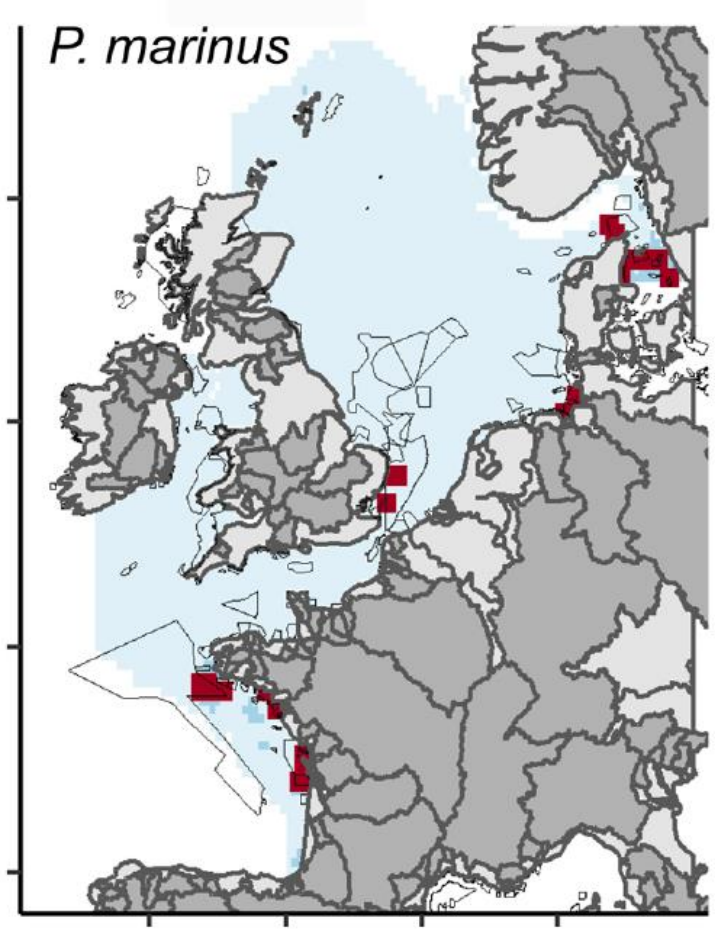
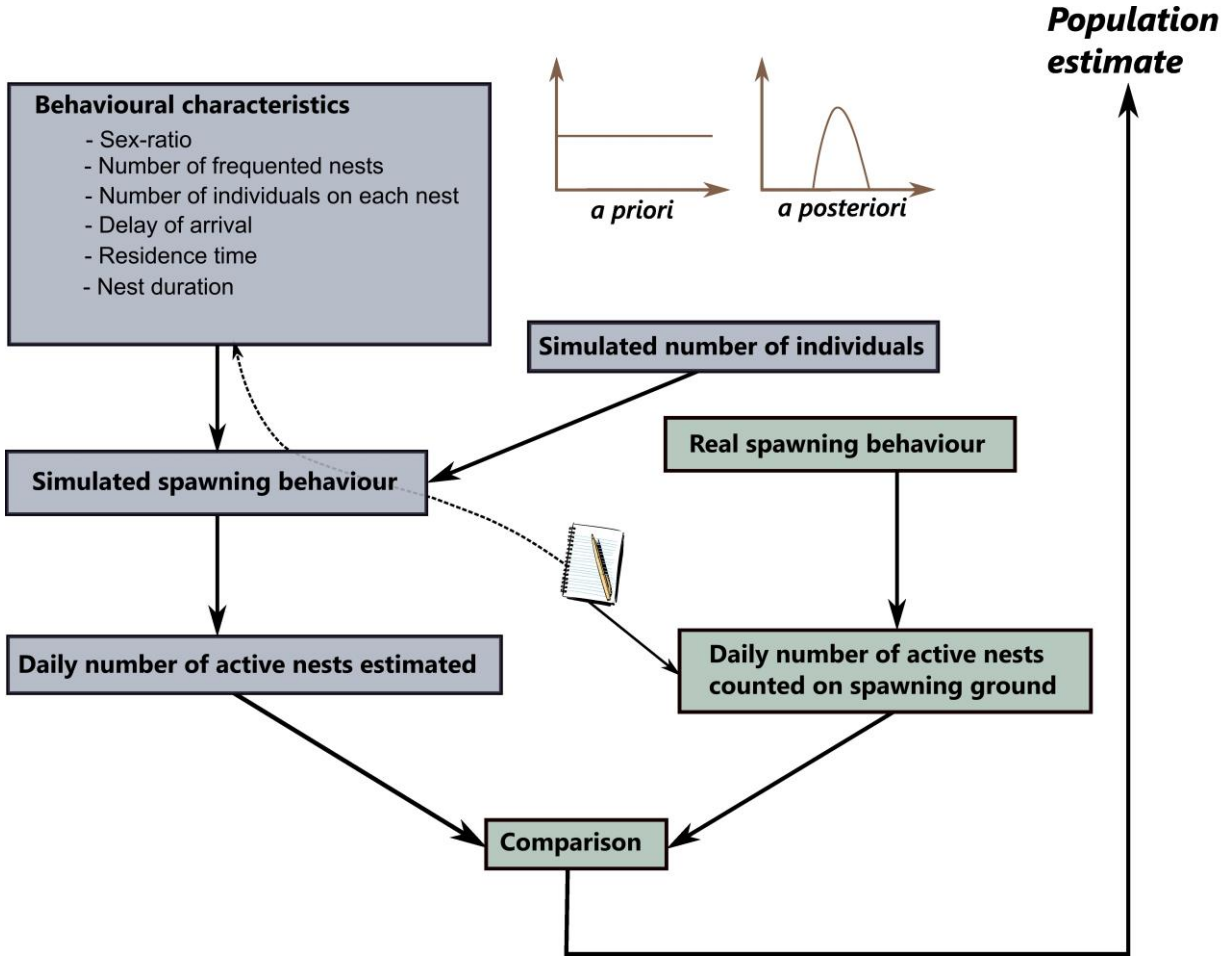


Fig. 3. Diadromous fish hierarchical species distribution model environmental predictor effects. NetPP = Net Primary Production, C = Course grain, M = Mud, S = Sand, R = Rock. The solid line represents the smooth function estimate; the shaded region represents the approximate 95 % credibility interval. Boxplot blue stars represent means and small black dots the predictions.

Sea lamprey population estimation

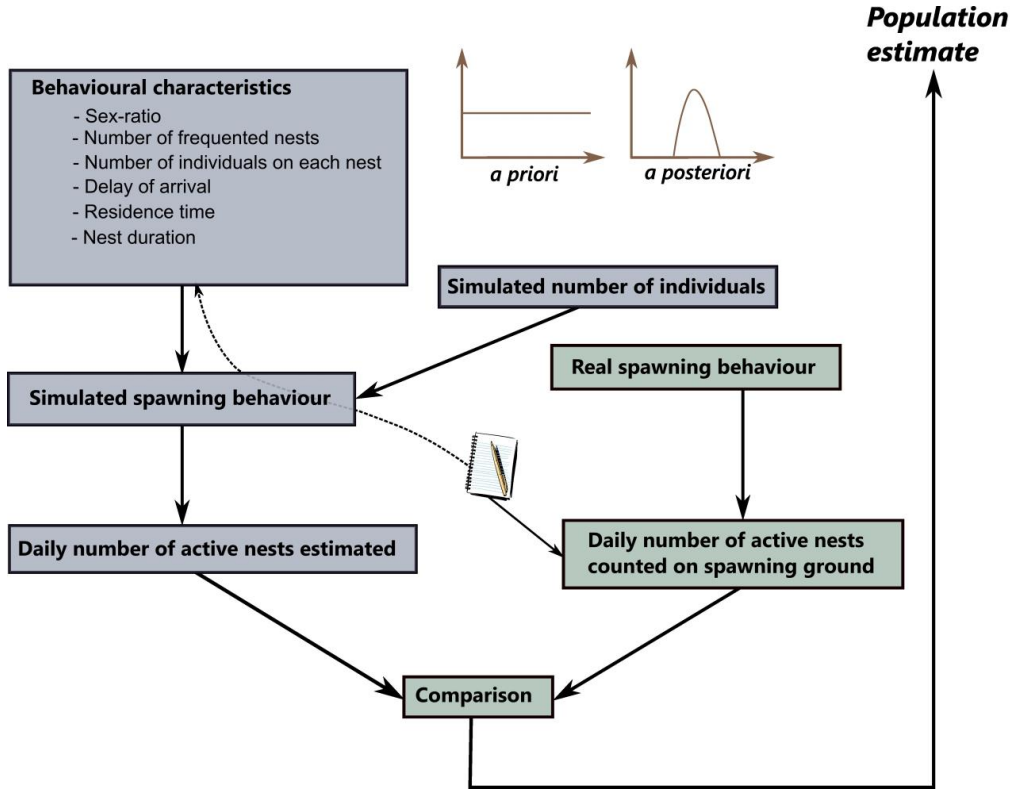
Dhamelincourt et al. 2023



ABC model for sea lamprey : model functioning

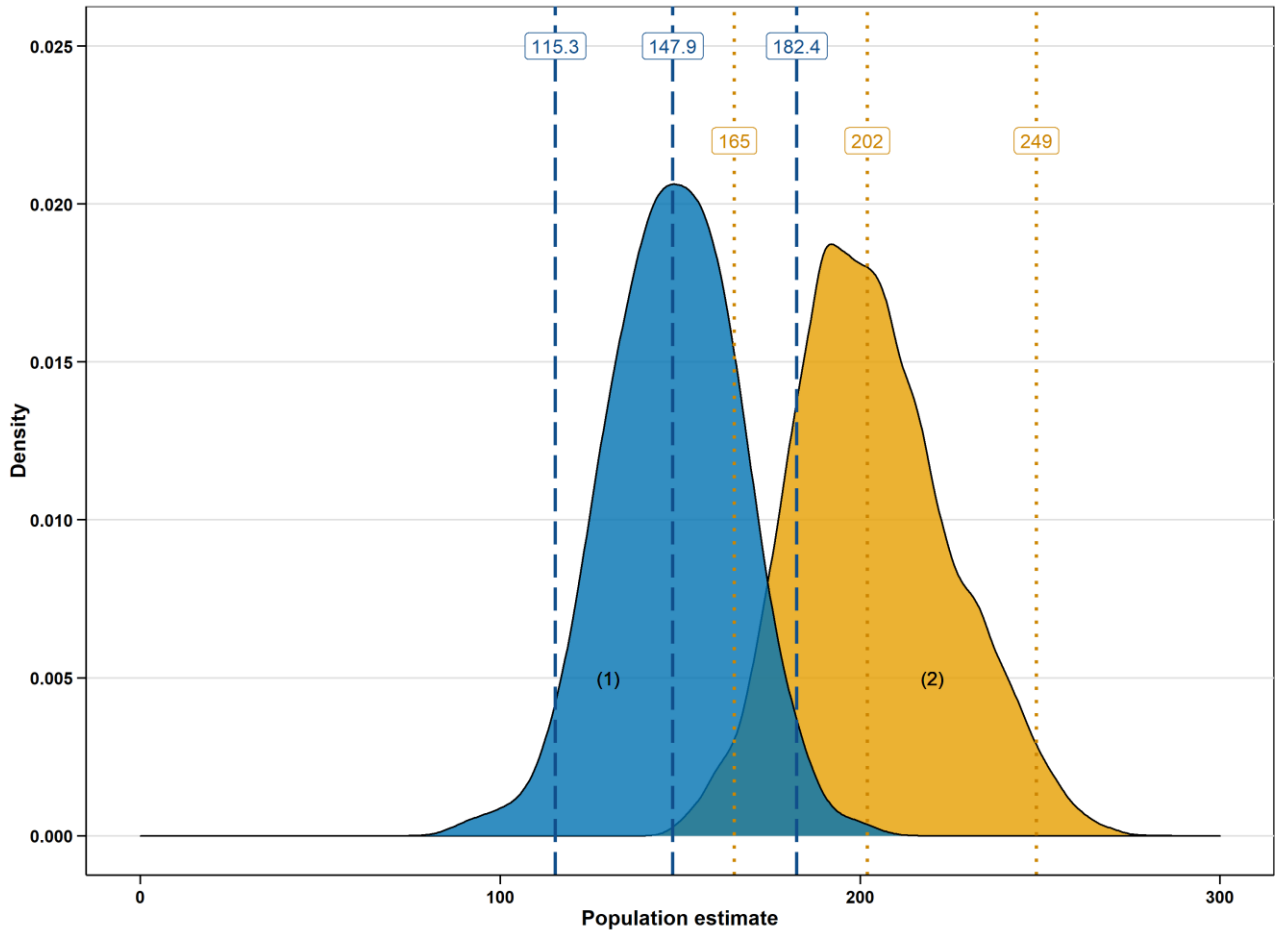
Sea lamprey population estimation

Dhamelincourt et al. 2023



ABC model for sea lamprey : model functioning

ABC model
CMR model



Sea lamprey population estimation

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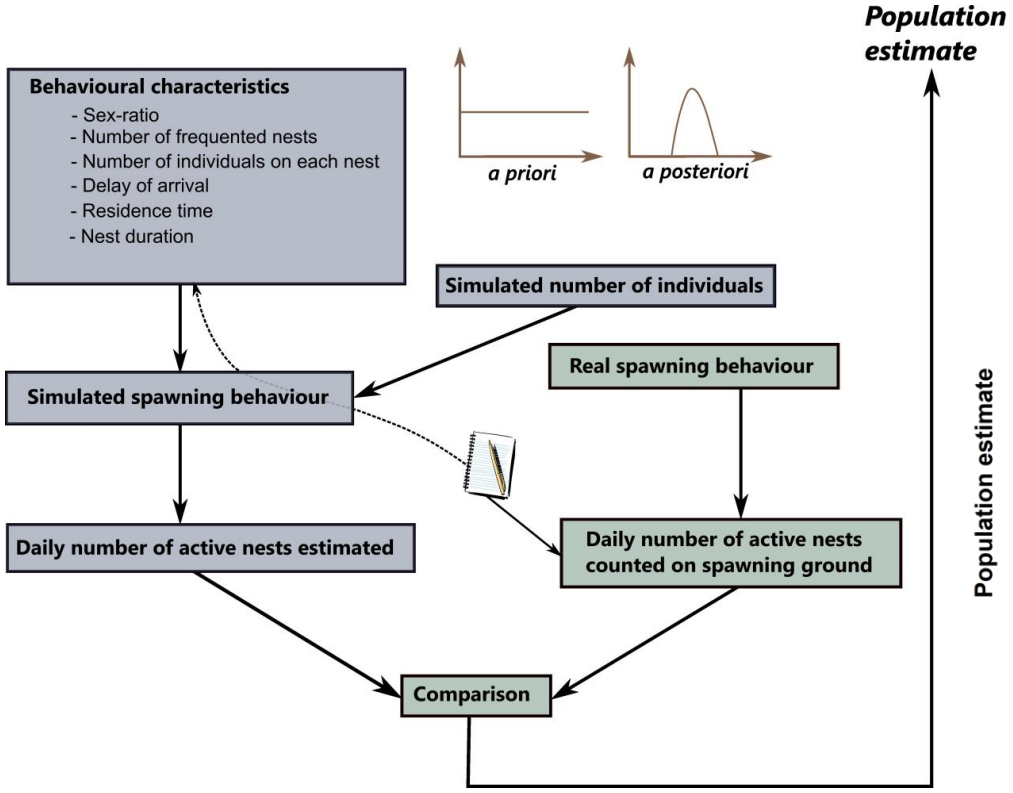
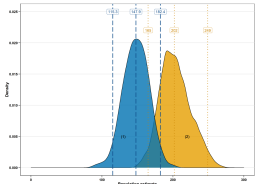
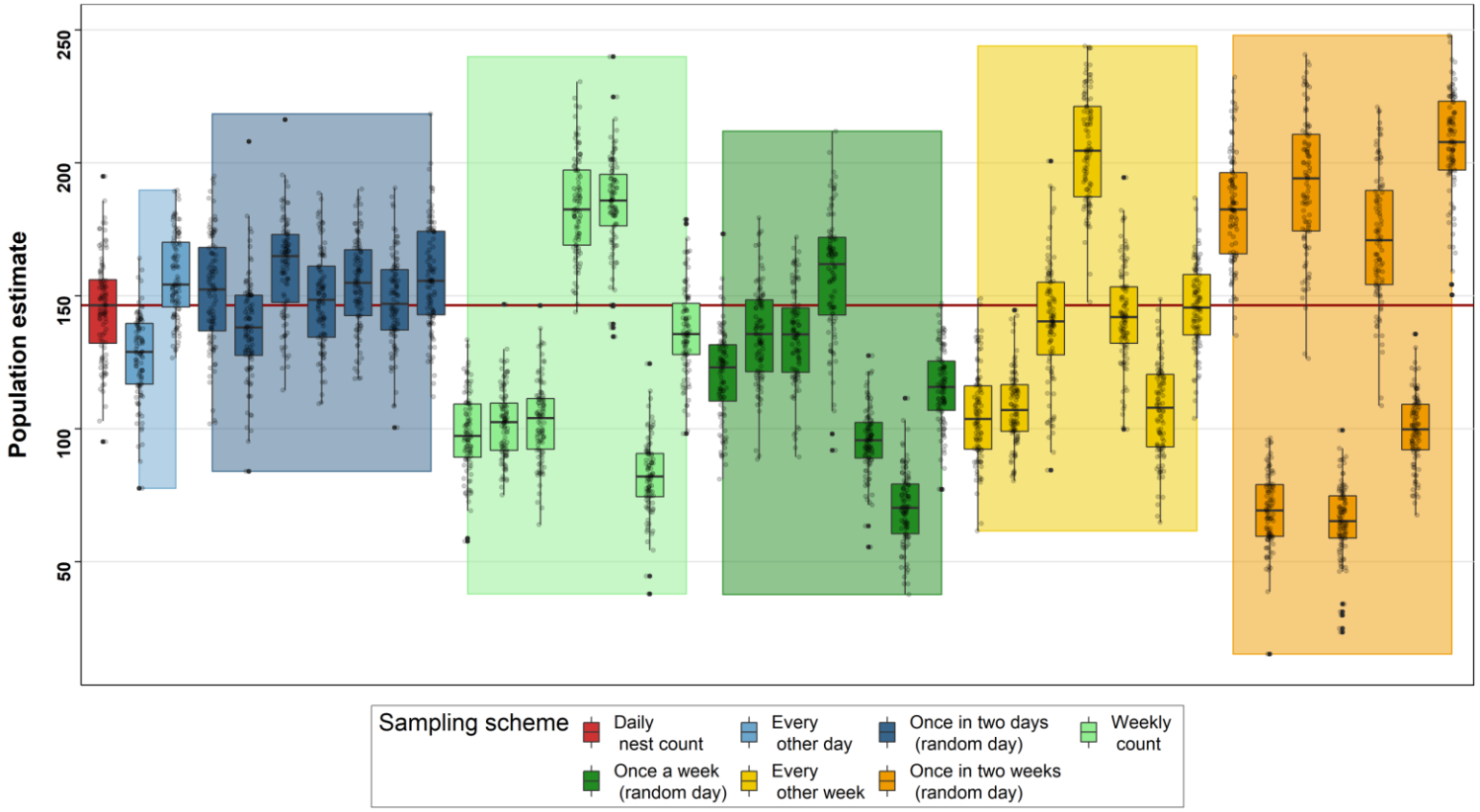


ABC model for sea lamprey : model functioning



ABC model
CMR model

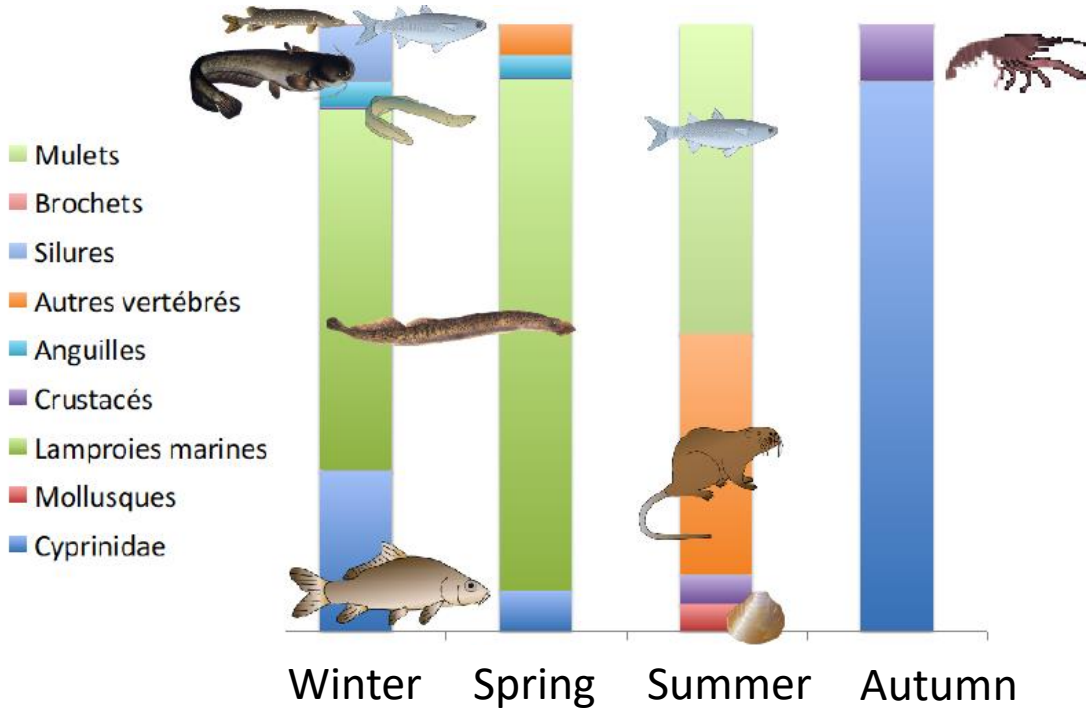


Predation

Wels catfish predation

- Garonne/Dordogne : **80 %** of 49 marked lamprey predated (Boulêtreau et al., 2020)
- Loire : **82 %** of 121 marked lamprey predated before spawning (Trancart et al., 2023)
- The largest individuals have a higher marine signature (Trancart et al., 2023)
- Opportunism with regard to obstacles (Trancart et al., 2023)

(Trancart et al., 2023)



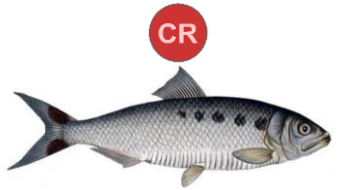
Biomass ingested

Lamprey and shad synthesis work

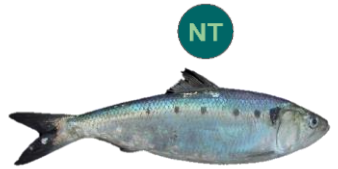
Working plan

Petromyzon marinus

Lampetra fluviatilis



Alosa alosa



Alosa fallax

Alosa agone

9 experts

Expert elicitation

11/12 identified threats

Literature

Dynamic Factor Analysis (DFA) with time series

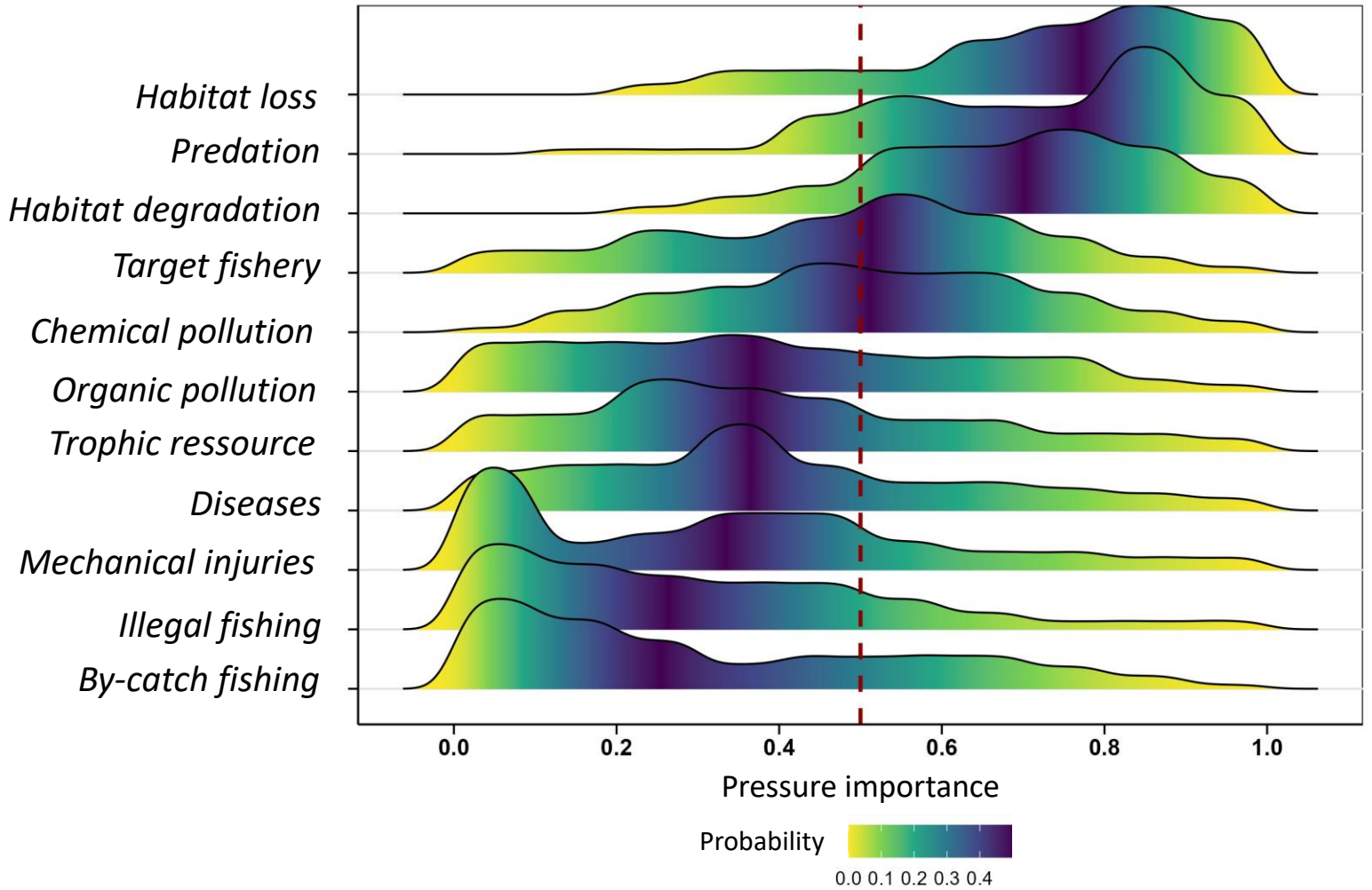
Identification of main trends and threats and recommendations on future research

Lamprey and shad synthesis work

Results (elicitation)

Expert elicitation

- **Each expert gave an interval between 0 and 1**
- **Distribution made on these intervals**



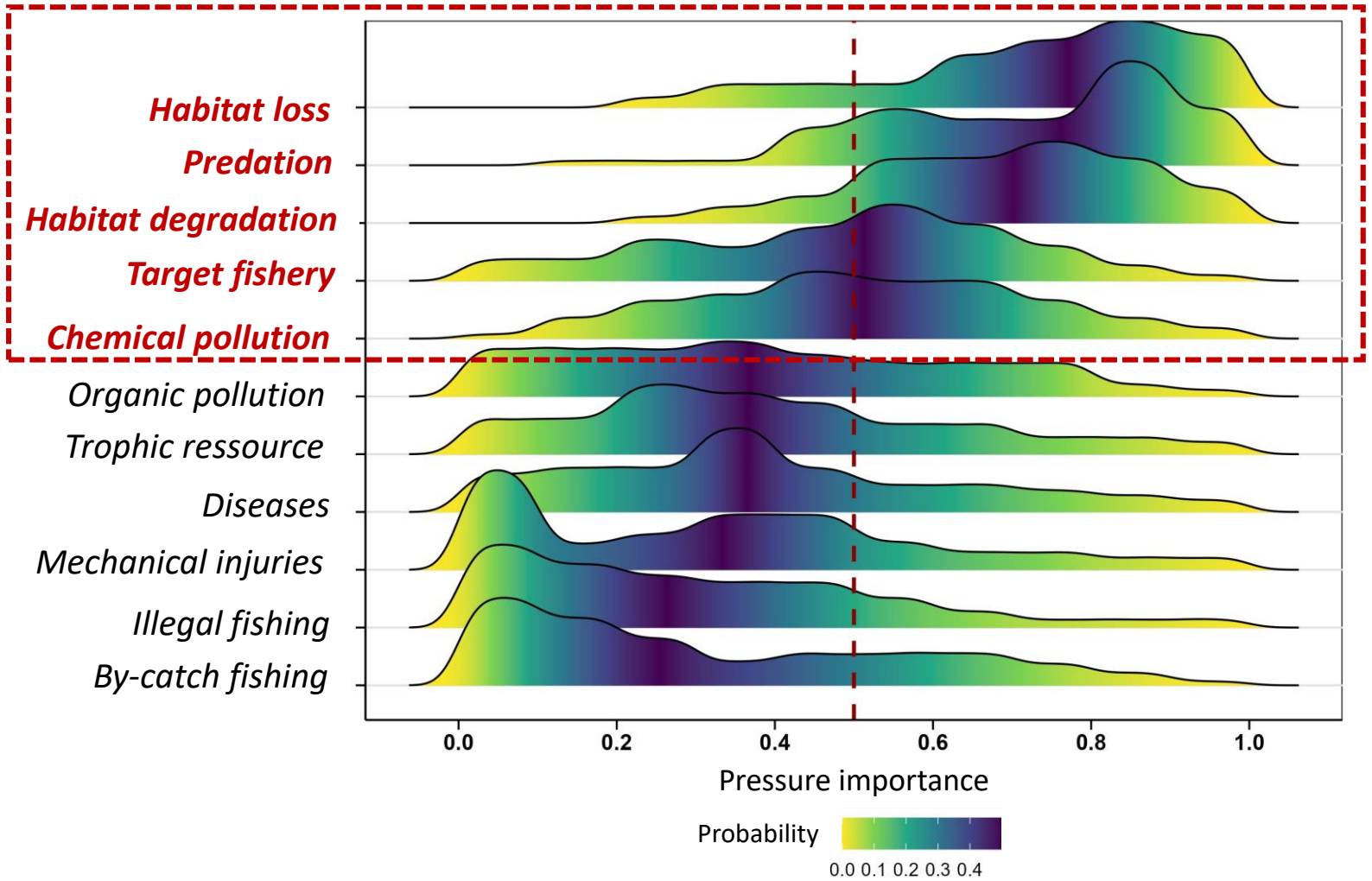
Lamprey and shad synthesis work

Results (elicitation)

- Each expert gave an interval between 0 and 1
- Distribution made on these intervals

➔ **Priority research on 5 pressures**

Expert elicitation



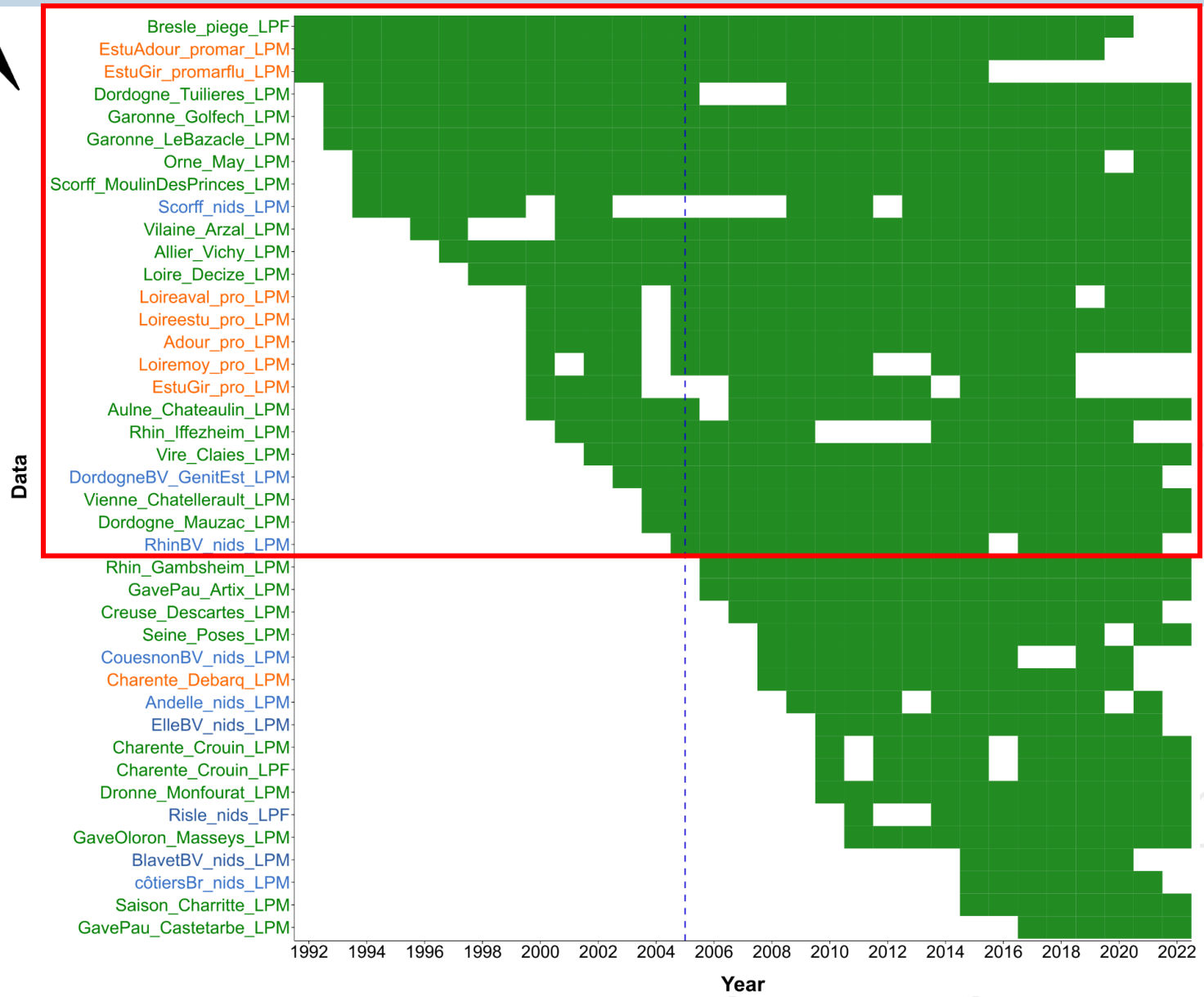
Lamprey and shad synthesis work

Type and number of datasets

- **Fishing data : 8 series**
  (SNPE/CESMIA, estuary professional fishing, fish markets)
- **Counts at stations : 24 series**
- **Nest counts : 9 series**

➔ **For DFA : only data from at least 2005 retained :**

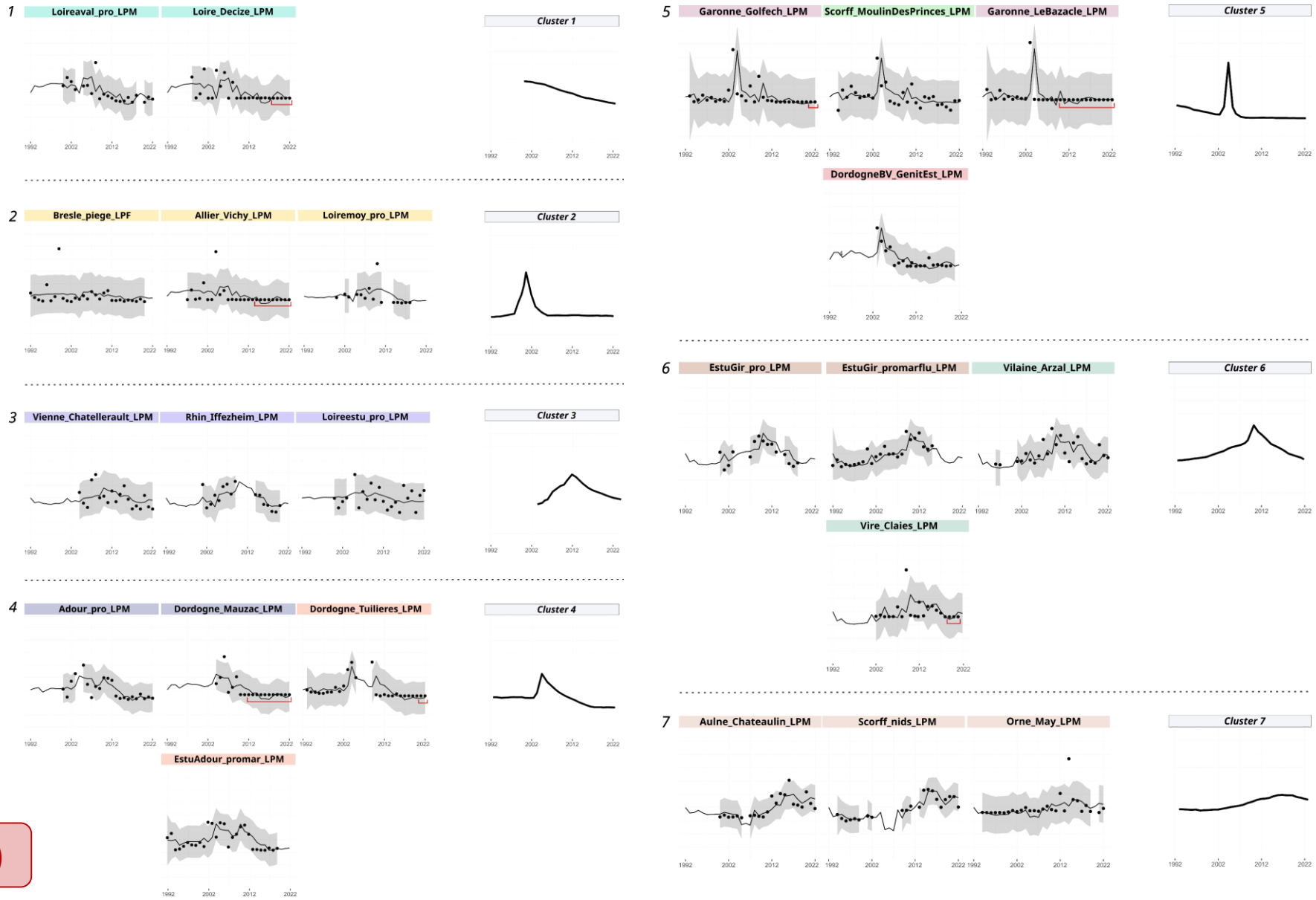
- **Fishing data : 7 series**
  (SNPE/CESMIA, estuary professional fishing, fish markets)
- **Counts at stations : 14 series**
- **Nest counts : 3 series**



Lamprey and shad synthesis work

Results (DFA)

- **7 clusters**
- **Mainly decreasing trends**



Dynamic Factor Analysis (DFA)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Lamprey and shad synthesis work

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