



Flanders
State of the Art

Interactions between invasive Ponto-Caspian goby species and their impact on native fishes in a large lowland river system

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21st ICAIS, 27 – 31 October 2019

RESEARCH INSTITUTE
NATURE AND FOREST

Objectives

Did native fish community in Border Meuse change as a result of the emergence of Ponto-Caspian gobies?

Were there interactions between the Ponto-Caspian gobies themselves?

- ▶ River Meuse (border between Flanders and the Netherlands)
- ▶ Data obtained from fish stock assessments through electric fishing (wading or from boat) along the Border Meuse
- ▶ Dataset includes data collected between 1998 and 2019 (not sampled all years) and 21 fishing locations, not each location is sampled on every occasion
- ▶ We used one model for a before and after analysis (before-after) and a what-if analysis on the "after" part (control vs. impact, where control = "linear growth" and impact = "observed average growth").

Ponto-Caspian gobies in the Border Meuse

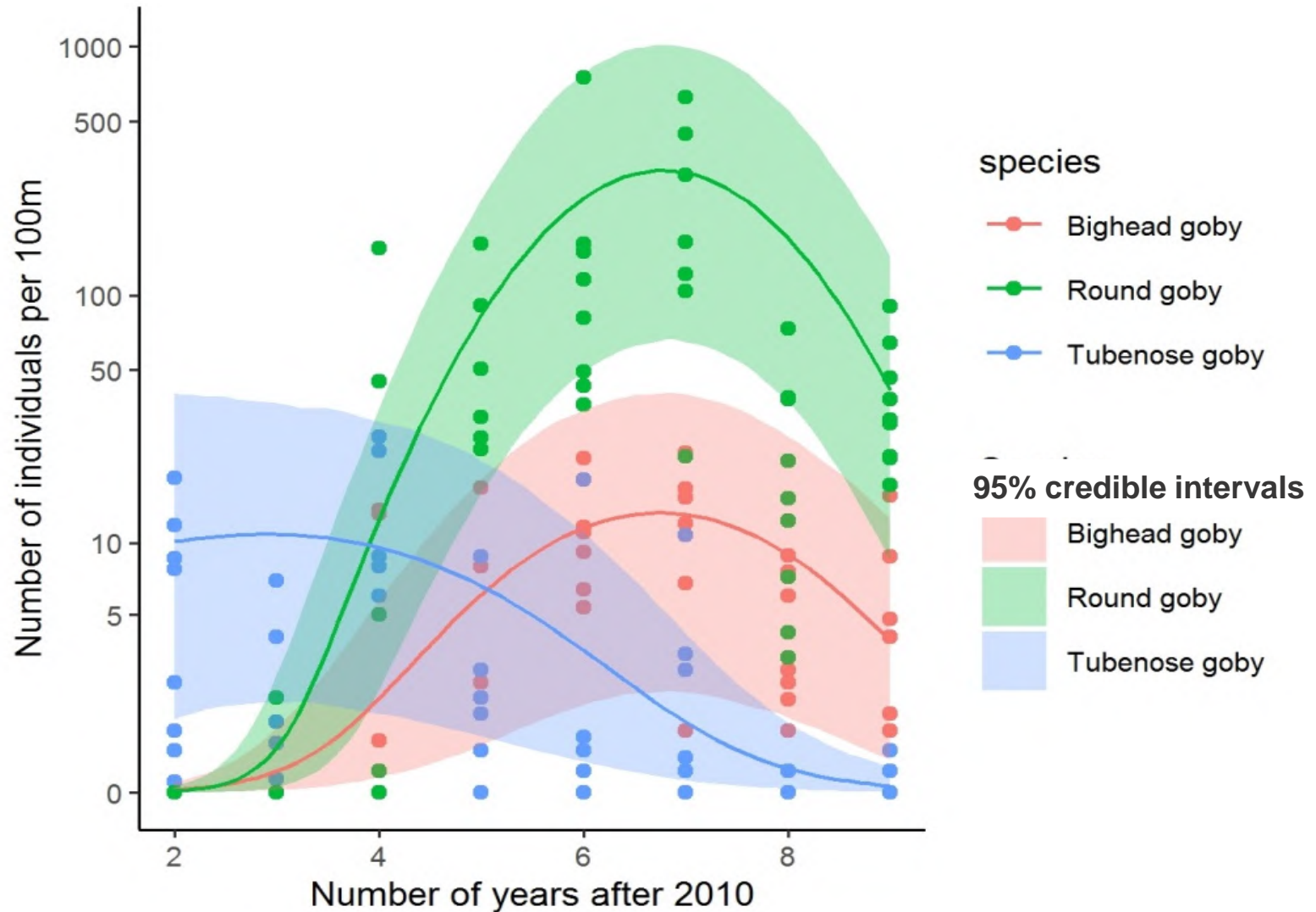
- ▶ Tubenose goby *Proterorhinus semilunaris* (since 2010?)
- ▶ Round goby *Neogobius melanostomus* (2013)
- ▶ Bighead goby *Ponticola kessleri* (2013)



Interactions between invasive Ponto-Caspian goby species



Trends in numbers of Ponto-Caspian gobies in the Border Meuse



Impact of PC gobies on native fishes in a large lowland river



Decline in small benthic species

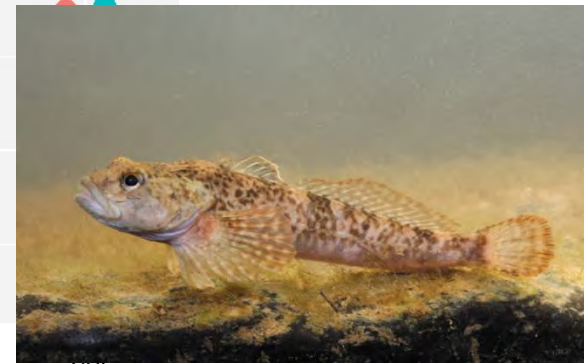
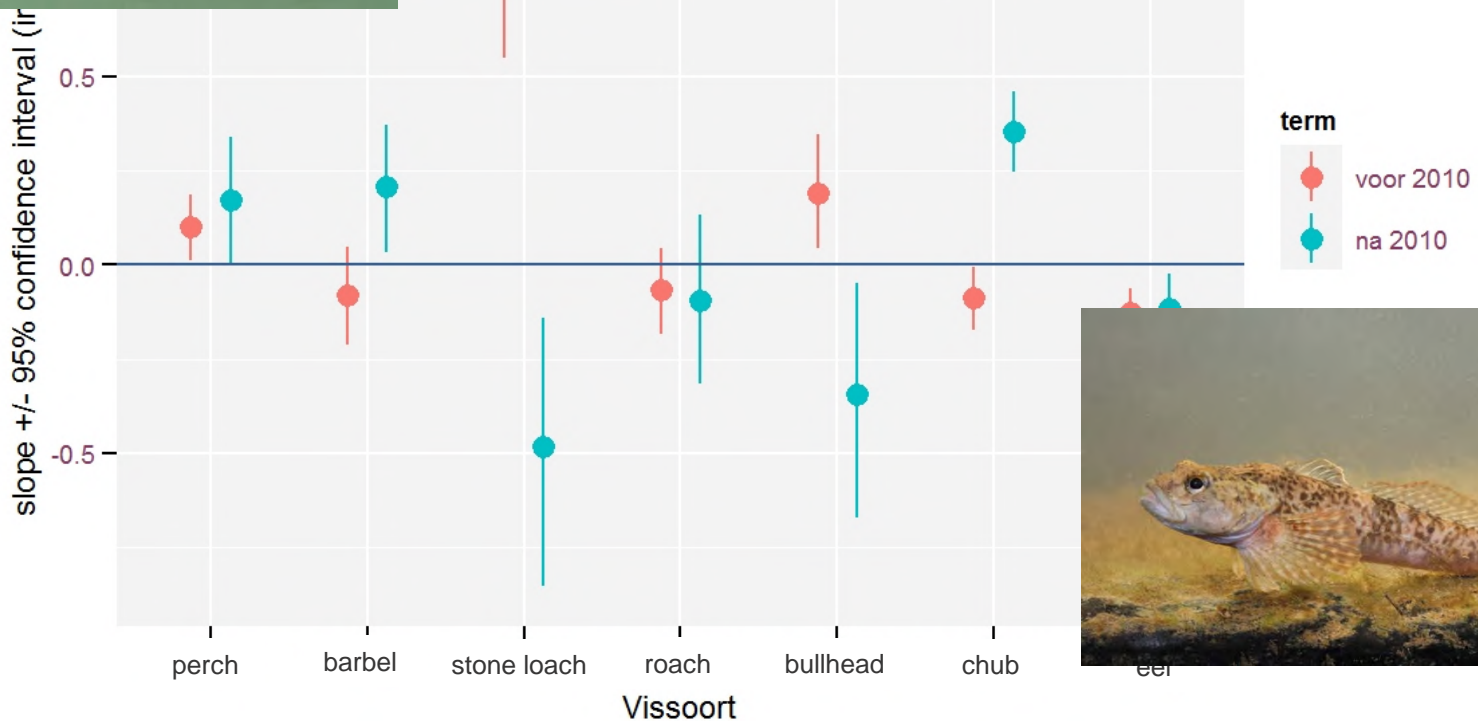
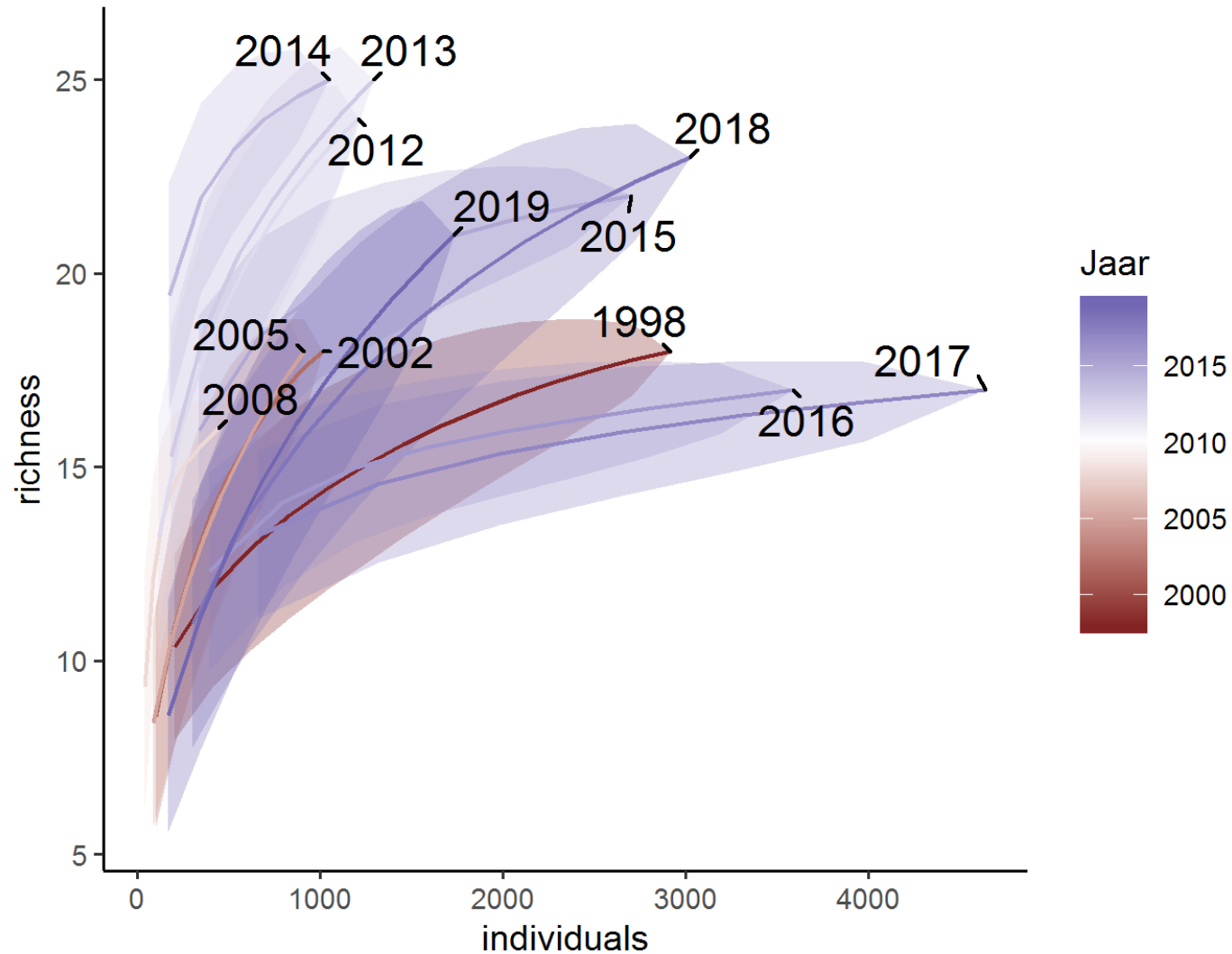


Fig 1: Estimates for the slope of the year effects before and after PC-goby invasion. Based on a mixed model with random intercept for location along the river Meuse.

Trend in species richness



Expected number of species



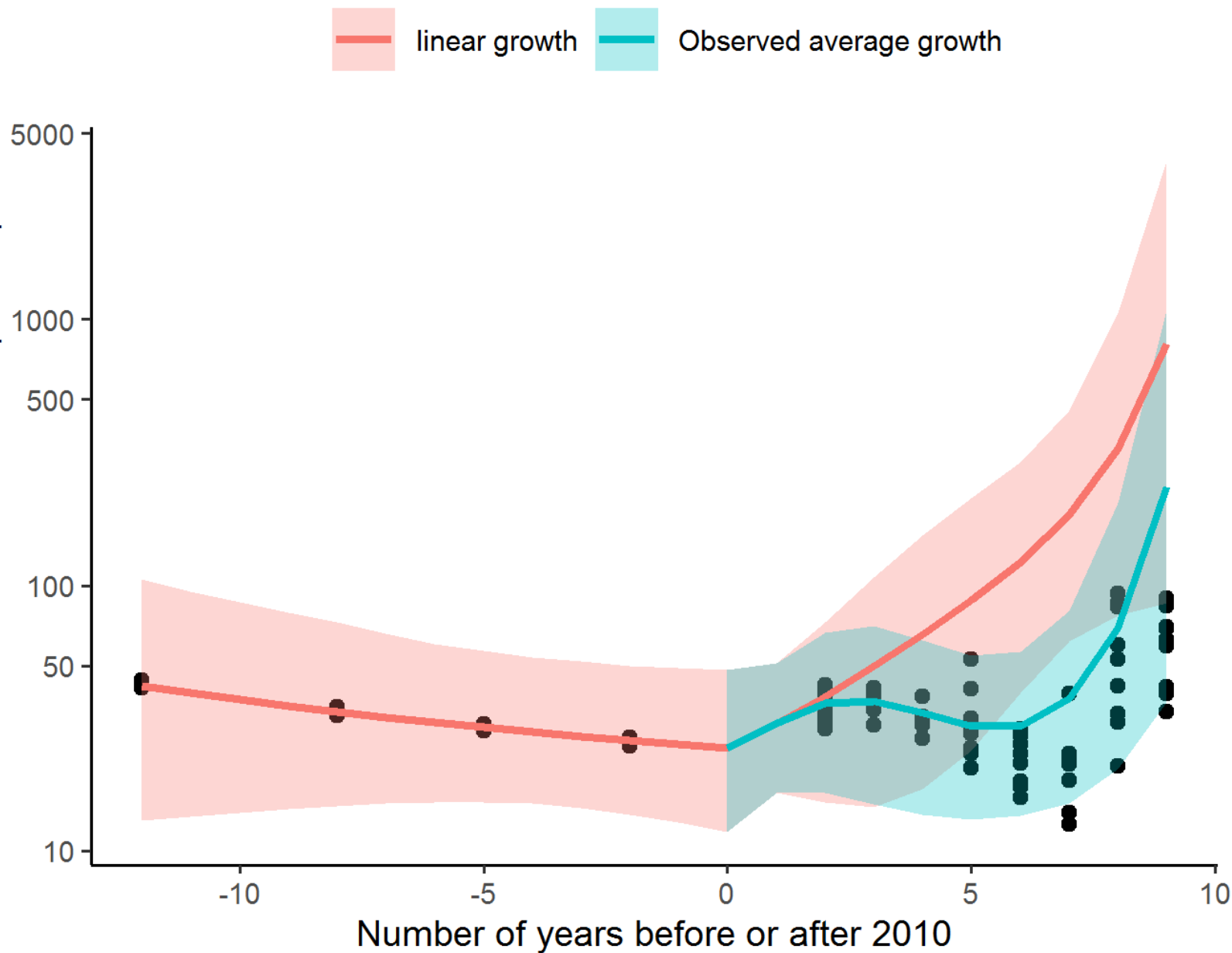
Expected number of species (including P.C. Gobies) as a function of accumulated numbers of individuals caught (+/- 95% confidence intervals).

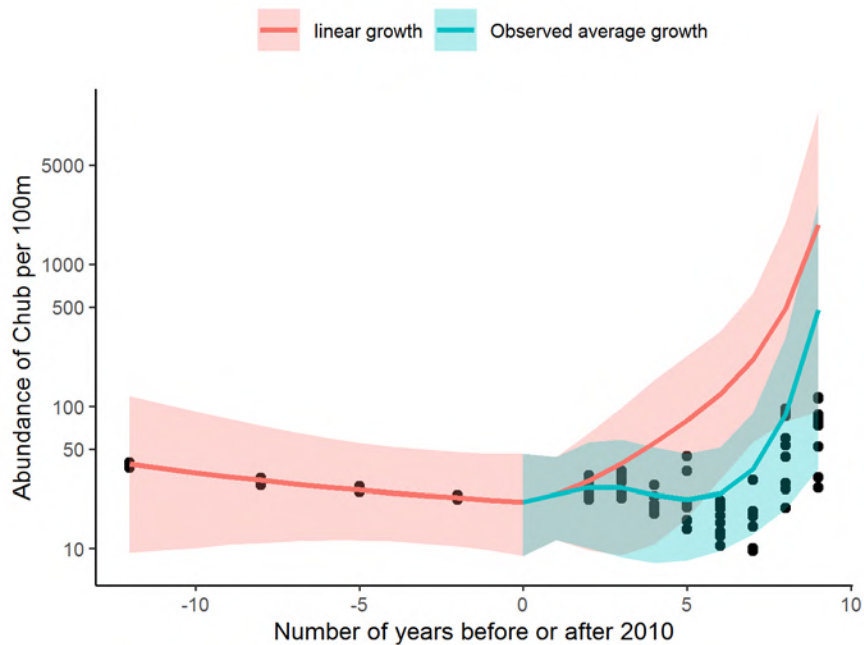
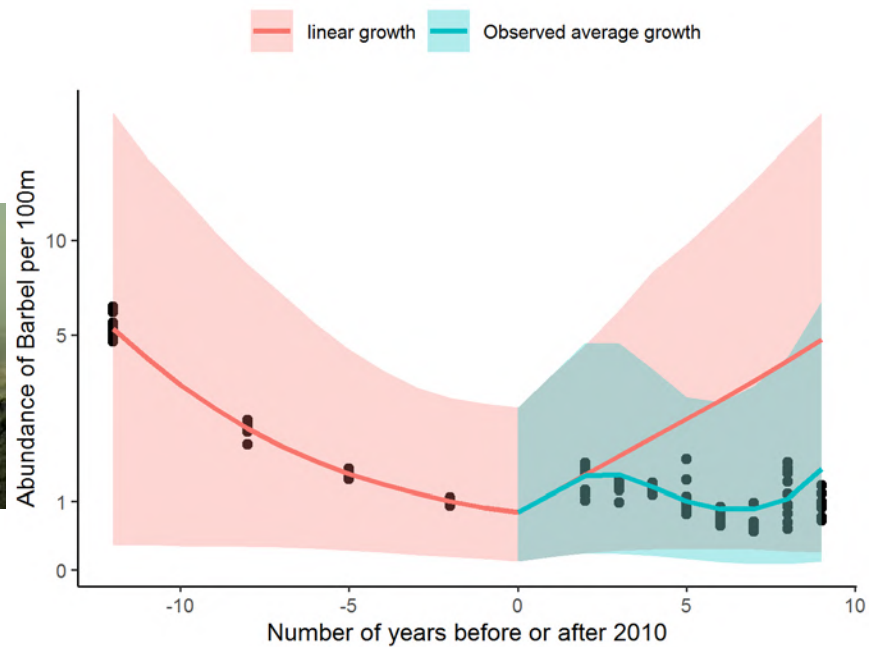
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Predicted effect (+/- 95% credible intervals) of abundance of PC gobies (explosive growth versus no invasion) on typical, native species abundance.

Abundance of selected native fish species per 100m





Conclusions

- ▶ It takes some years (post-invasion) before impact becomes clear
- ▶ Ponto-Caspian gobies interact between themselves
- ▶ Presence of Ponto-Caspian gobies impacts native fish fauna
 - Small benthic species nearly disappeared
 - Reduced species richness
 - Lower abundances
- ▶ Some native species take advantage (PC gobies as food?)
- ▶ Constraints
 - No presence/absence data, only before/after situation
 - Different sampling conditions? Discharge, velocity, turbidity, ...
 - Low number of specimens of benthic species
 - Unfavourable sampling conditions and partially restructured river banks at some sampling sites in 2018

FIRST RECORD OF THE NAKED GOBY, *GOBIOSOMA BOSC* (ACTINOPTERYGII: PERCIFORMES: GOBIIDAE), FROM THE ZEESCHELDE, BELGIUM

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► https://www.aiep.pl/volumes/2020/0_3/volume.php



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THANK YOU

Questions?

