

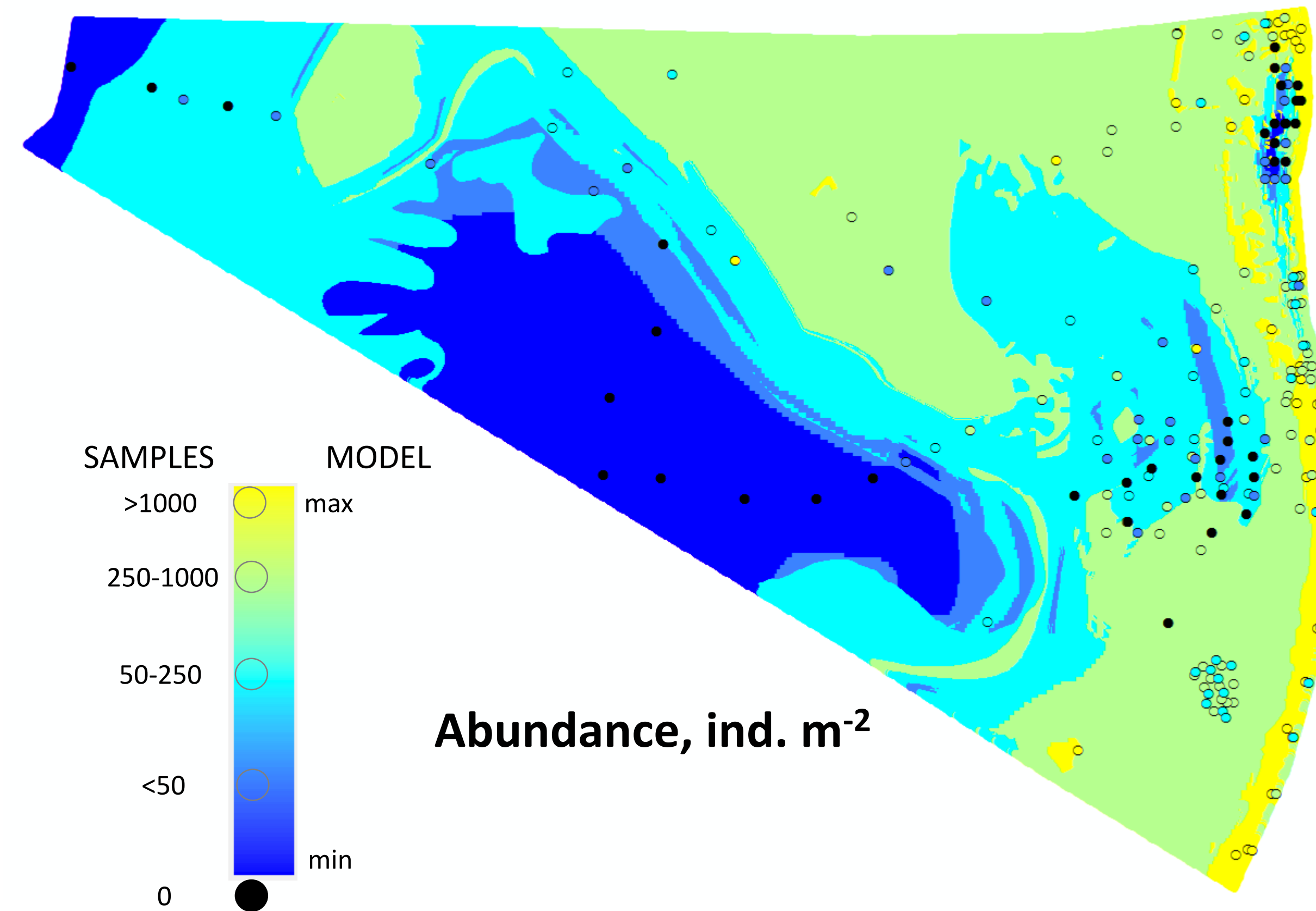
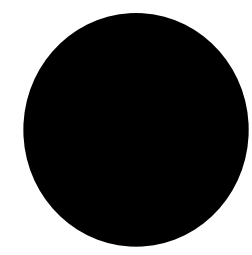
# ECOLOGICAL NICHE MODELLING OF NON-INDIGENOUS SPIONID *MARENZELLERIA SP.* IN THE SE BALTIC SEA

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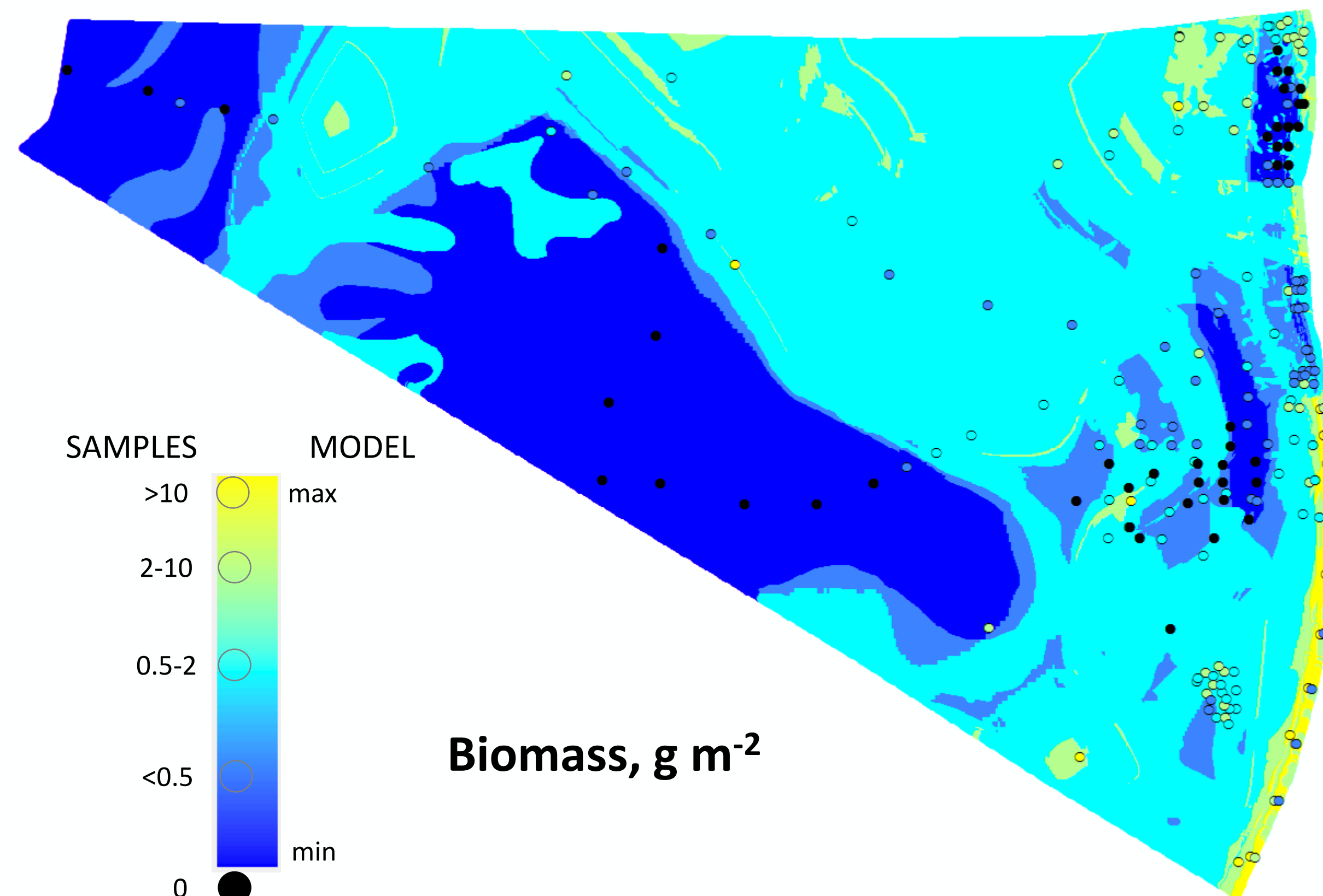


## FEW FACTS

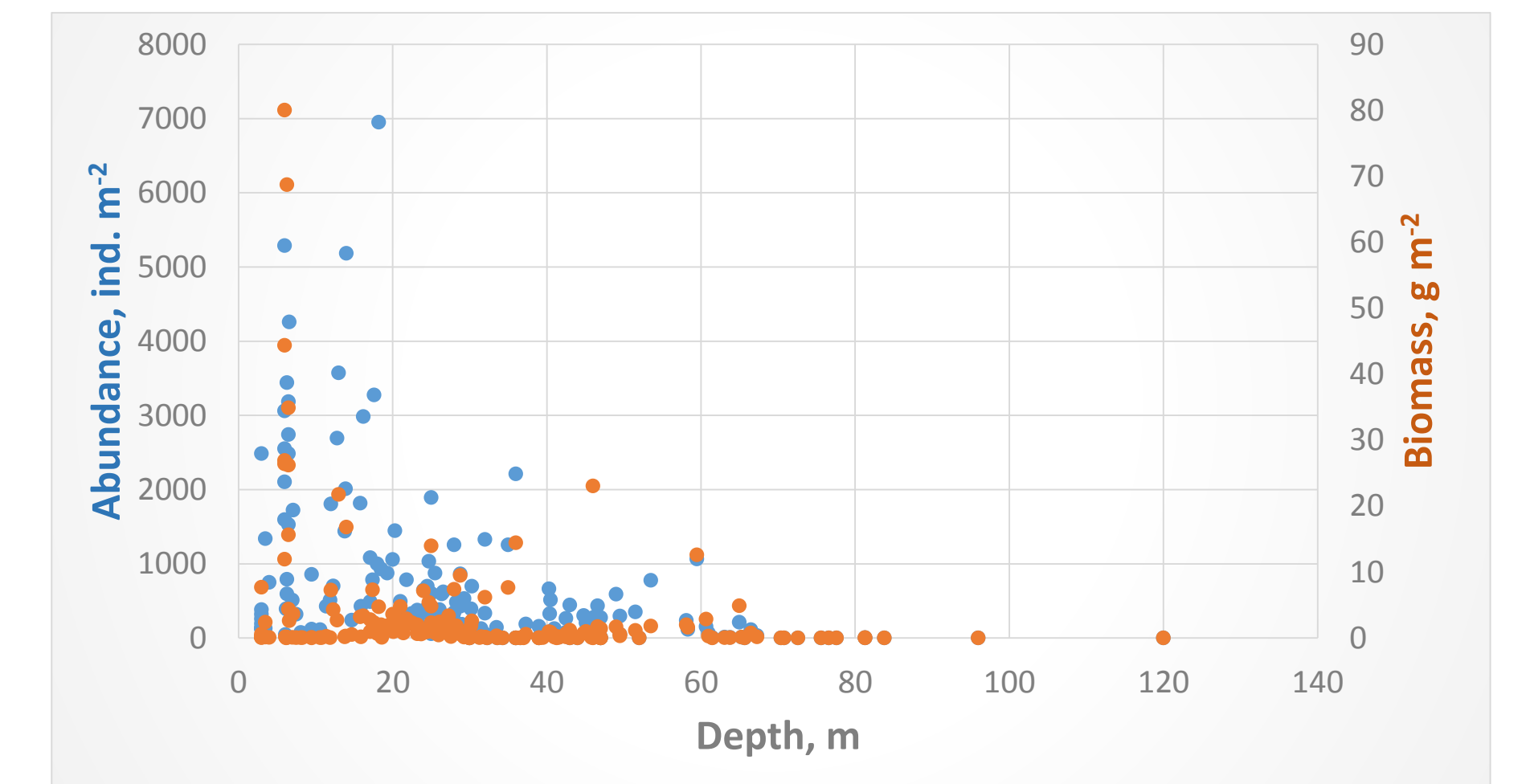
- The arrival of non-indigenous polychaete *Marenzelleria sp.* to the Lithuanian marine waters was recorded in 1989.
- Since then this spionid is established in the whole marine area: from coastline mobile sands to sub-halocline muddy bottoms.
- It took just a couple of years for the population to explode from single individuals to thousands per square meter.
- Today this red gilled worm enjoys a respectful share of almost every local soft bottom benthic community in Lithuanian marine area.



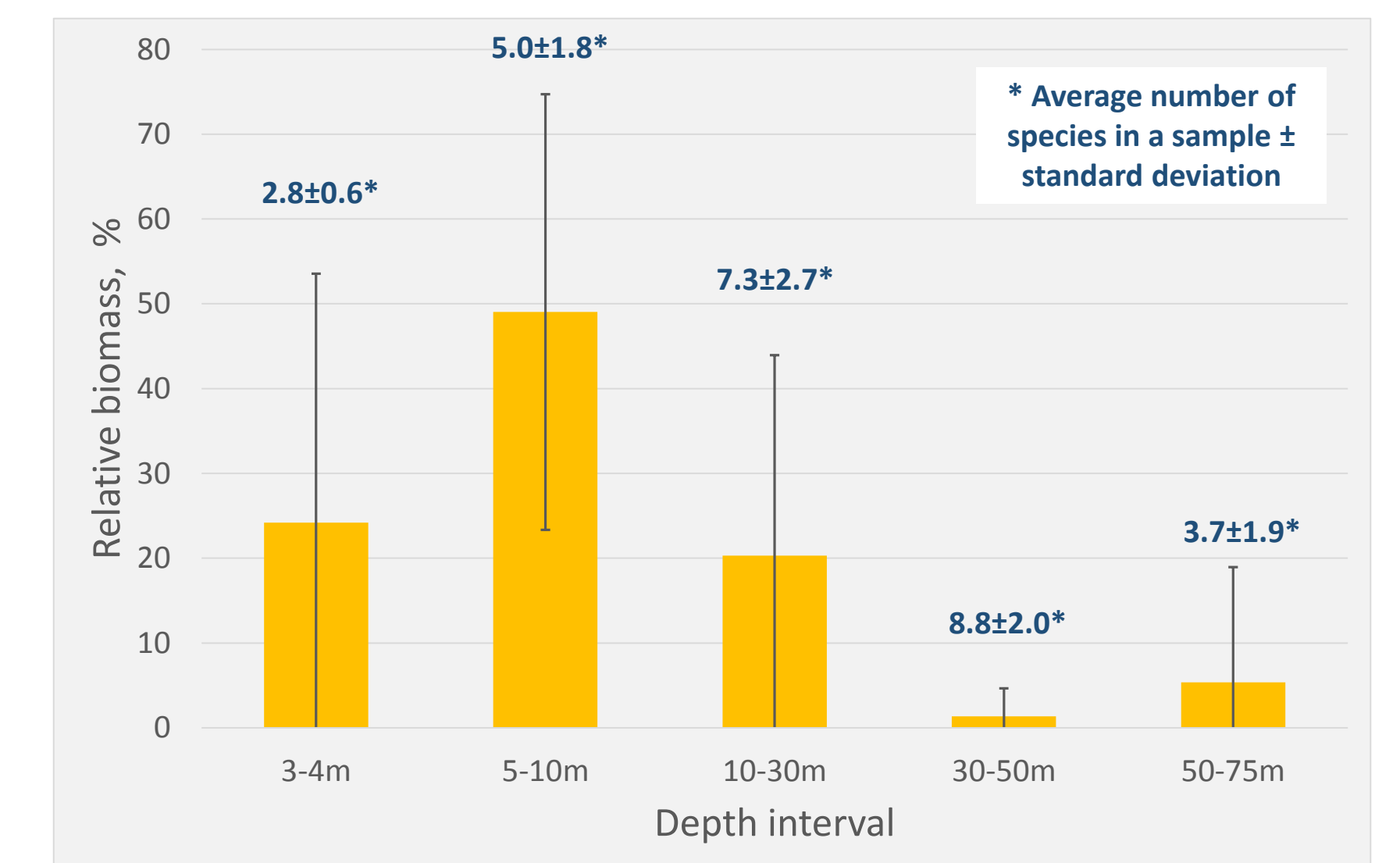
Modelled abundance of *Marenzelleria sp.* in Lithuanian marine area. Sampled abundance  $768 \pm 1117$  ind.  $m^{-2}$ . MAD = 317.2; RMSE = 448.2;  $r = 0.81$ . Most important predictors: sediments, salinity, oxygen concentration, orbital velocity.



Modelled biomass of *Marenzelleria sp.* in Lithuanian marine area. Sampled biomass  $4.30 \pm 10.59$  g  $m^{-2}$ . MAD = 3.24; RMSE = 8.50;  $r = 0.58$ . Most important predictors: salinity, sediments, orbital velocity.



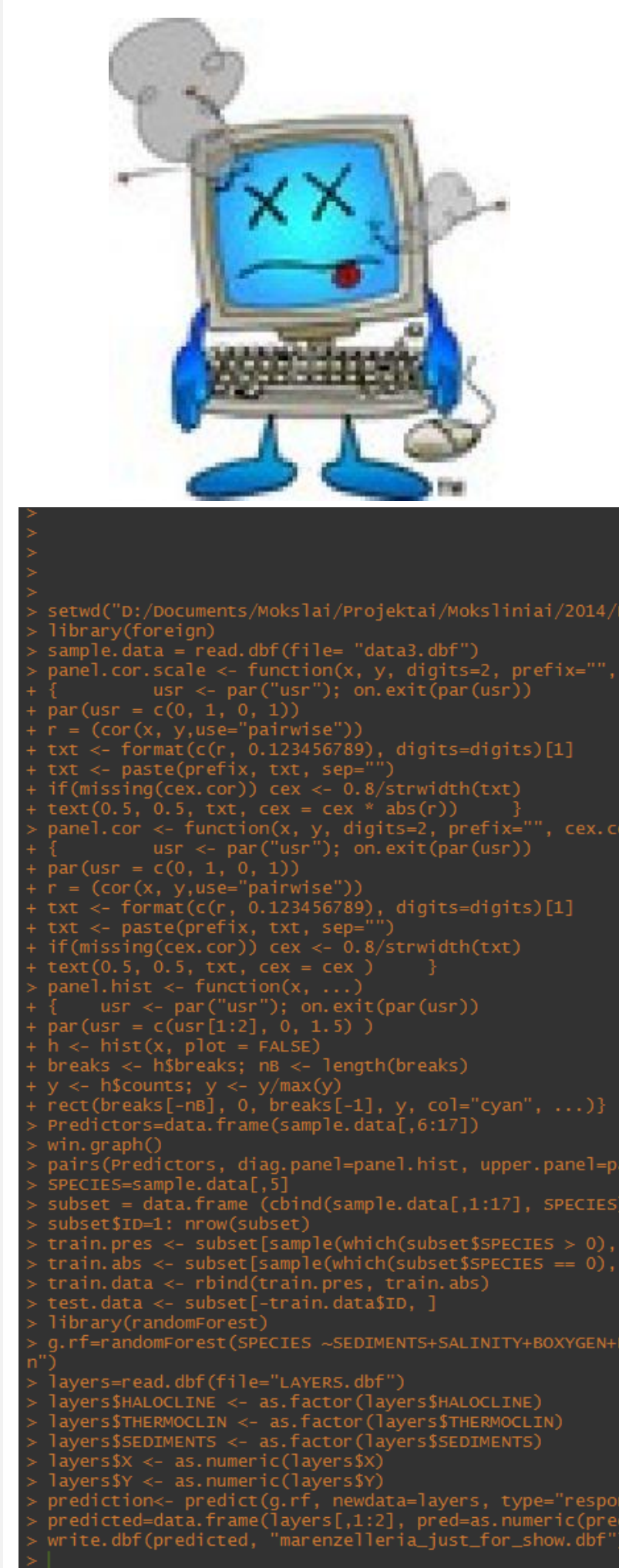
Highest densities of *Marenzelleria sp.* are observed in sandy coastal area, while it is still abundant down to the halocline. Maximum depth – 81 m.



Relative biomass of *Marenzelleria sp.* in a sample is highest at shallow depths where local species richness is relatively low.

## NICHE MODELLING

- Model:** Random forests regression model (Breiman 2001) implemented in the “randomForest 4.6-10” package (Liaw, Wiener 2002) within the R environment.
- Biological data:** 205 sampling sites during 1998-2014.
- Environmental data:** depth, sediment types, near bottom orbital velocity, current velocity, salinity, oxygen concentration, Secchi depth, temperature, topographic features.
- Validation:** train/test -> 70/30, mean absolute deviation (MAD) and root mean square error (RMSE) of predictions, correlation (r) between observed and predicted values.



## CONCLUSIONS

- The highest abundance and biomass of a non-indigenous spionid *Marenzelleria sp.* was observed in the shallow coastal areas, where local species richness is the lowest due to natural roughness of mobile sand habitat.
- It is yet to be unfold if the invader occupied empty niches, that are found more easily in severe environments, or outcompeted local species.