

Project *brief*

Thünen Institute of Fisheries Ecology

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Silver eel escapement in the River Ems

Lasse Marohn¹, Leander Höhne, Marko Freese, Jan-Dag Pohlmann, Reinhold Hanel

- Central objective of European eel management is the increase of silver eel escapement.
- In Germany, a specially developed population model is used to estimate the number of silver eels that leave German river basin districts.
- In order to validate this model, an exemplary investigation was made in the Ems river to determine whether the modeled escapement figures correspond to reality.
- The results show that the actual number of escaping silver eels from the Ems is significantly lower than predicted by the model.

Background and aims

To protect eels, the EU requires that a certain number of eels can successfully migrate to the sea from each European river system. Since quantitative surveys of eel escapement are complex, evaluation of the achievement of management objectives is often carried out by using population models. Results of these models are mostly subject to large uncertainties. The BALANCE project combined a mark-recapture study with acoustic telemetry in the Ems river over a period of two years to obtain a robust quantification of migrating eels (silver eels) from this river system. The results were compared with predictions of the eel population model used in Germany in order to validate it and to identify potential for improvement.

Objectives

By comparing model predictions with the actual migration numbers observed in the Ems, conclusions were drawn about the quality of the German eel model in the study area and about the modeled numbers of escaping silver eels. In addition, the effect of developmental stage and different environmental parameters on the migration behavior of eels was investigated.

Key findings

The project results show that the actual total escapement of silver eels from the studied area of the Ems is significantly lower than assumed. The modeled estimate exceeds the observed outmigration by about six times. In previous evaluations of the German eel model, the escapement of eels was also repeatedly overestimated. The main migration period of silver eels reached

from mid-September to the end of January in the 2020/21 migration season and to February in 2021/22 (Fig. 1). The onset of silver eel migration correlated with decreasing temperatures in autumn and current velocity also played an important role. The results also show that silver eels caught in spring often interrupted their migration.

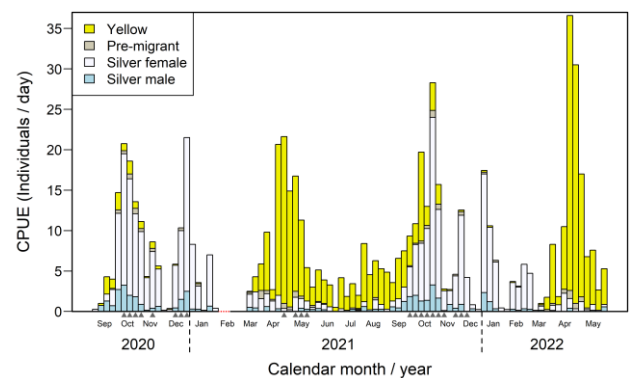


Fig. 1: The eel catches reflect the seasonality of silver eel migration (white and blue bars. Source: Höhne et al. 2023).

Conclusions

A systematic overestimation of silver eel escapement leads to an over-optimistic view of the stock situation and jeopardizes the implementation of appropriate and necessary protection measures. Therefore, model results should not be used for the implementation of German eel management if they are not adapted and validated to river-specific conditions.

Further Information

Contact

¹ Thünen Institute of Fisheries Ecology
lasse.marohn@thuenen.de
www.thuenen.de/fi

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Höhne L, Pohlmann JD, Freese M (2023) Minimally invasive collection of biometric data including maturation stage on European Eel using photography. Mar Coastal Fish 15(2):e10239

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