

Fish migratory behaviour in proximity to the Iron Gate dams

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Introduction

River infrastructures, such as hydropower plants Iron Gate I (IG; rkm 943) and II (rkm 863) represent major obstructions to fish migration in the Danube River.

Knowledge about fish behaviour and movements in the vicinity of major river structures is required to build effective fish passages to protect migratory fish species, with acoustic telemetry being an useful method for observing such behaviour.



Iron Gate I (Danube rkm 943)

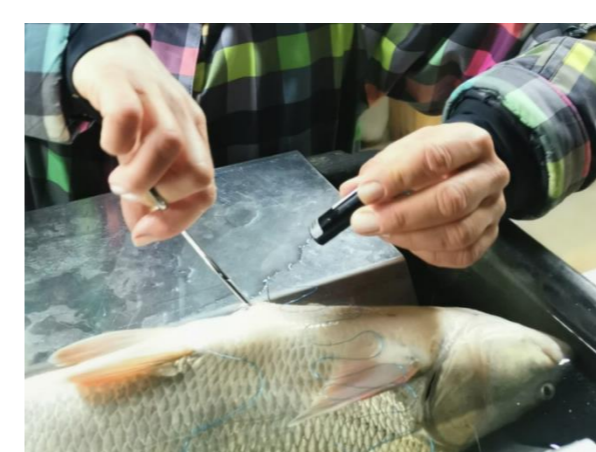


Iron Gate II (Danube rkm 863)

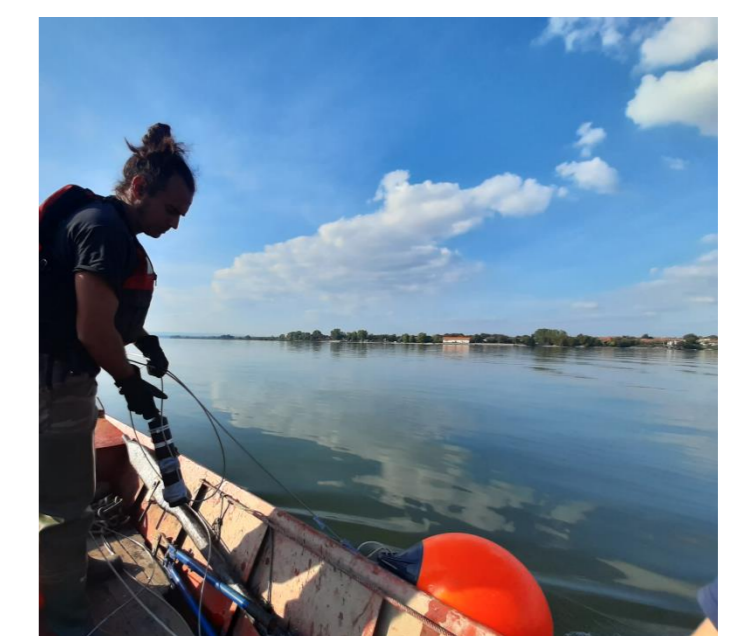


Material and methods

Acoustic telemetry method was used to track fish movements and migrations. The fish was tagged with a transmitter implanted into the body cavity. The tag signals are detected when the fish is near a receiver (hydrophone).

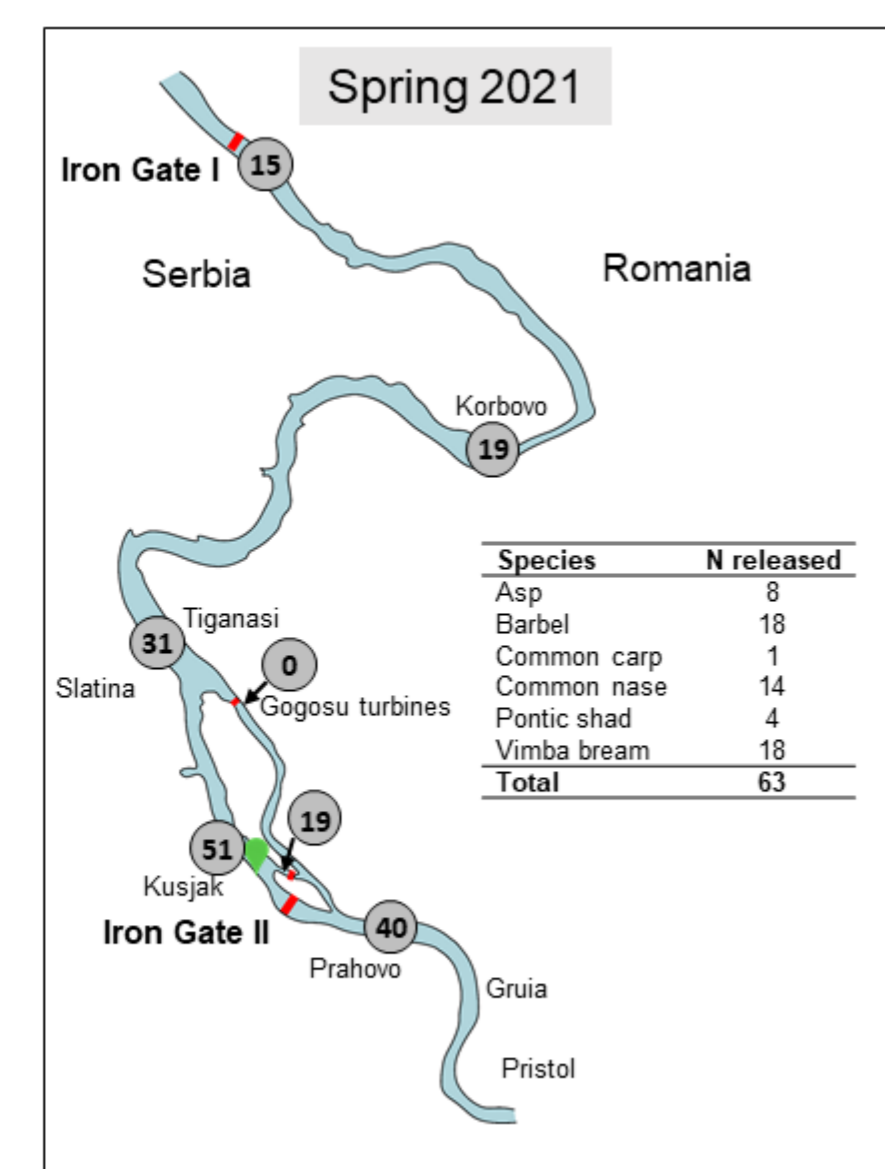
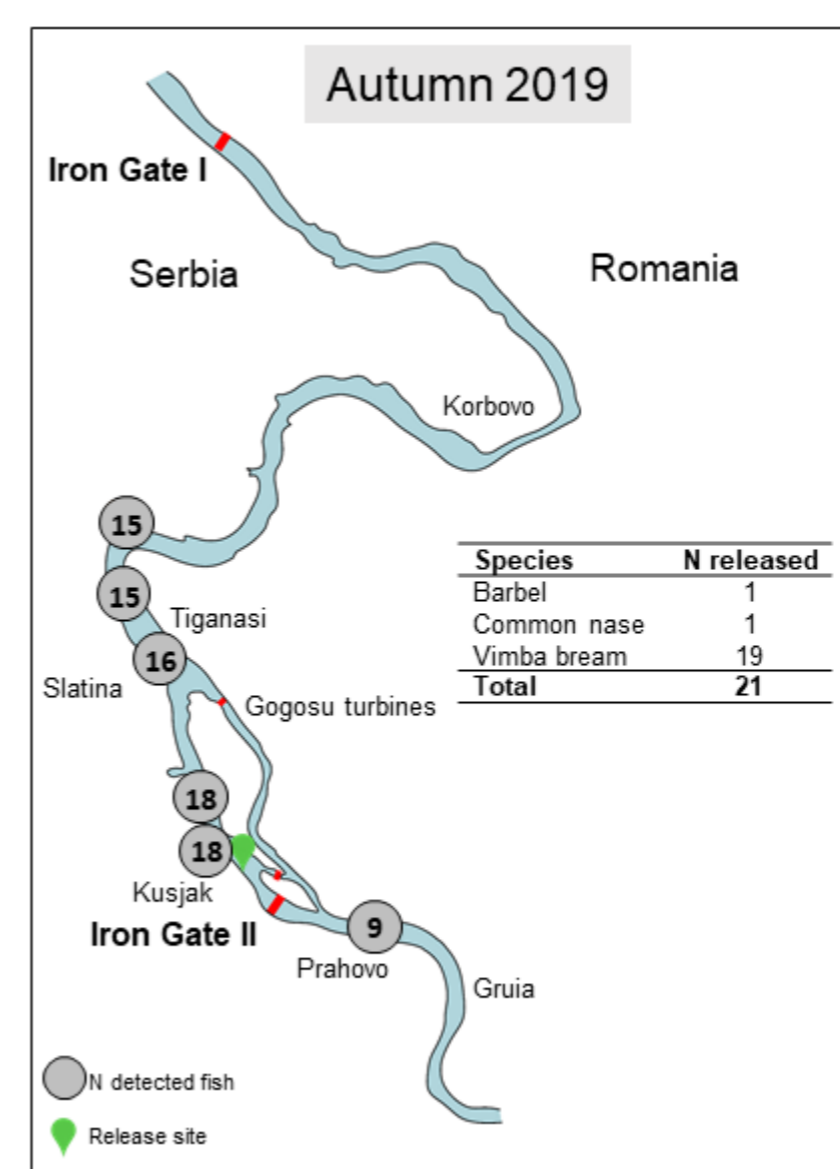
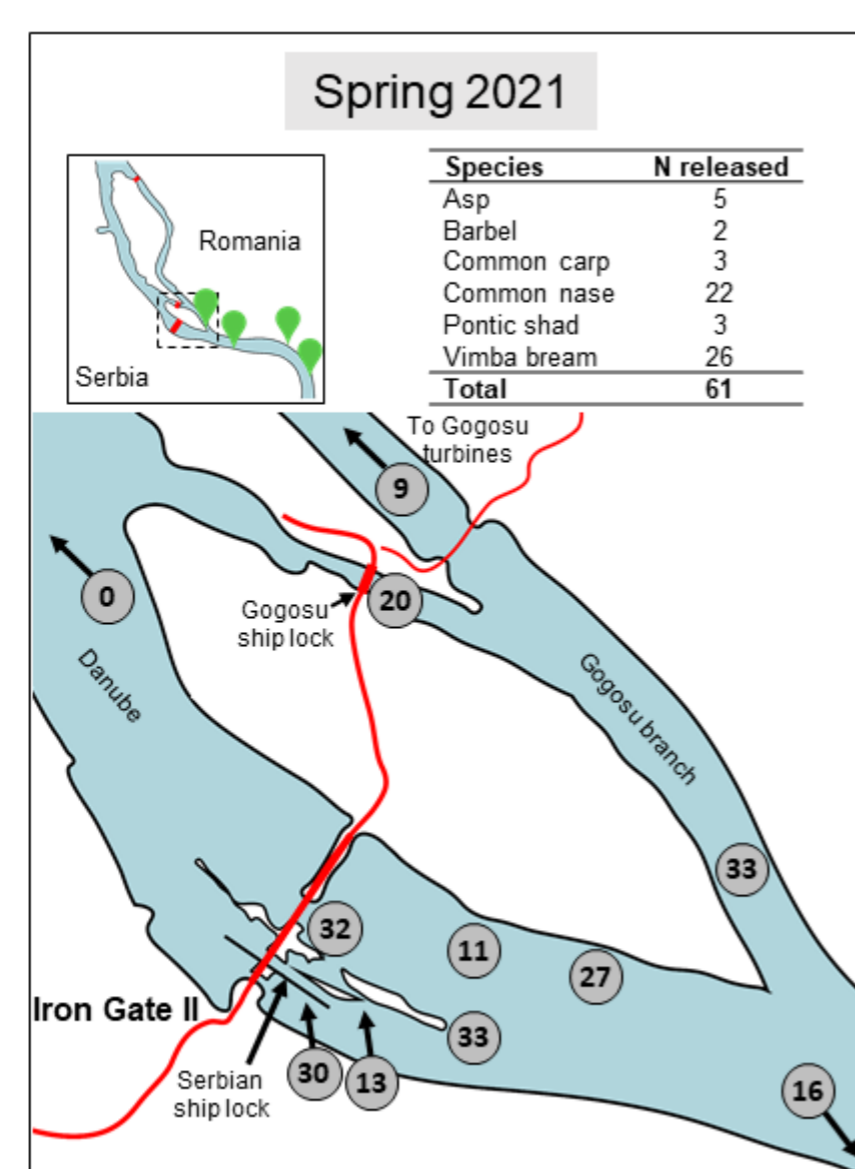
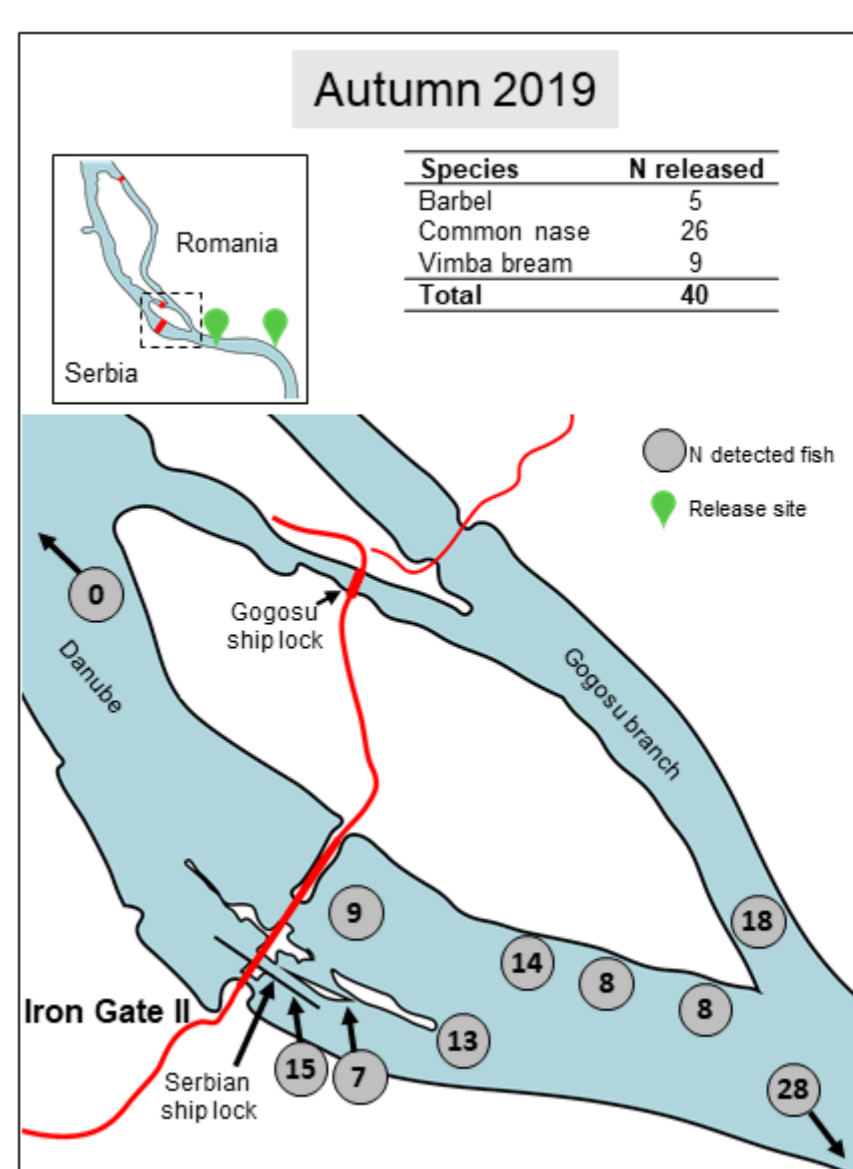


From autumn 2019 to the spring 2021, the movement of 185 fish (sterlet, barbel, nase, vimba bream, asp, Pontic shad, eel, carp) were monitored in the Danube River upstream and downstream of the IG II dam. The movements of tagged fish were recorded by a combination of automatic tracking of fish passing receivers deployed in the river and manual tracking by boat.



Results

Of the 101 fish released downstream of IG II, 48% moved upstream from their release site and were detected close to IG II. The remaining 84 tagged fish were released in the reservoir between IG I and II, with 49% of fish moving further upstream in the reservoir and 18% reaching IG I, while 48% of the tagged fish moved in a downstream direction and were recorded below IG II. No fish released downstream of IG II were detected in the reservoir between two dams, which indicates that the ship locks on either side of the river do not represent viable routes for upstream migration around IG II. There was also no clear pattern in which side of the river tagged fish preferred to move along.



Conclusion

To conserve migratory fish species, dam management strategies that take into account the behaviour of fish around such structures is necessary. Acoustic telemetry can be used to inform and guide towards construction of the safe fish passage or adapt structures to improve the movement and fish migration.

Acknowledgements

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