

FISH MIGRATION UPSTREAM THE WEIR PLACED NEAR THE FERDINAND BRIDGE OF ORADEA CITY

Răzvan VOICU, Ecaterina LUCA, Liliana VOICU

National Institute of Hydrology and Water Management

Șos. București-Ploiești 97, București, cod 013686, România, Tel.: +40-21-3181115, Fax.: +40-21-3181116
Email: razvan.voicu@hidro.ro, ecaterina.luca@hidro.ro, liliana.voicu@hidro.ro

Abstract

The paper deals with an European theme of great interest, whose issue is related to longitudinal connectivity interruption of heavily modified water courses and improving the ecological status of damaged lotic systems, having as goal achieving the environmental objectives, set by the Water Framework Directive. In this respect, it is necessary to propose viable solutions for longitudinal connectivity restoration of water courses that lead to facilitate fish migration and improving their ecological potential. The aim of this work was to propose a technical solution for fish migration upstream the weir, placed near the Ferdinand (Center) bridge on the Crișul Repede River, in Oradea City, to help some economic value fish species to migrate upstream.

Keywords: fish migration, longitudinal connectivity, discharge sill, Crisul Repede

1 INTRODUCTION

The subject of the article represents a theme of interest regarding interruption of longitudinal connectivity of rivers, created by the presence of transversal obstacles, which resulted in stopping the fish migration on the analyzed reach of the Crișul Repede river.

The selected case study – Ferdinand bridge weir - is placed on the water body Crișul Repede→Bonor→ boundary (RW3.1.44_B7) that has been designated as heavily modified water body due to the presence of 15 transversal obstacles that transform the flow regime into a lentic system (Anexa 6.2..., 2007).

Based on this situation paper is focus on the possibility to restore longitudinal connectivity of Crișul Repede river presenting a case study for which was proposed a technical solution to ensure fish migration upstream the analyzed weir.

Technical data regarding the analyzed case study, data on water quality and about fish species present in the study area were collected from Crișuri Water Basin Administration and during the field campaigns.

1.1. STUDY AREA

The study area is located in the lower basin of the Crișul Repede River, west part of Romania (Figure 1).

In this place Crișul Repede riverbed is regulated and has a width of 50 m, a flow rate of 22.3 m³/s and a flow velocity of 0,4 m/s (Anexa 6.2..., 2007, Studii..., 2011-2012).

The Ferdinand Bridge weir selected as a case study is located on the Crișul Repede River, near the City Hall of Oradea, being known as the Centre Bridge or the Hall Bridge (Figure 2).

The weir selected for analyses as a case study has 50 m width and 1.5 m height with 1 m fall, being built to stabilize the river bed near the Ferdinand bridge. It consists of a weir crest, a stilling basin, end sill and a fixed risberme totally submerged under water.

According to the reference situation (Bănărescu, 1964), the study area is situated in the nase fish zone. The targeted migratory fish species are the common nase (*Chondrostoma nasus*), the barbel (*Barbus barbus*) and the common bream (*Abramis brama*), which are protected at the national and international level (Bern Convention, Habitat Directive, Red List etc.).

Also, the proposed solution is characterized by high practicality because it can be successfully used in developing measure plan regarding the ensuring of longitudinal connectivity of the rivers from the Crișuri catchment, which will be updated in 2015.

REFERENCES

- Banarescu, P. 1964, *Fauna R.P.R.* [*Fauna of P.R.R.*], Edit. Academiei Române, Bucuresti, 915 p. [in Romanian]
- Diaconu S. 1999, *Cursuri de apa. Amenajare, impact, reabilitare* [*Watercourses. Planning, impact, rehabilitation*], Edit. *H*G*A, Bucuresti, 189 p. [in Romanian]
- Voicu R., Luca E., Voicu L. 2013, Facilitation of fish migration upstream the Centre Bridge on the Crișul Repede River, "*Ovidius*" *University Annals of Constanta, Series CIVIL ENGINEERING*, Year XV–Issue 15 (2013), Section VI, pp 281-286.
- Voicu R., Luca E. 2013, Solution to facilitate fish migration upstream of the weir located on the Crișul Repede River, near the Dacia Bridge, *Scientific Conference of the National Institute of Hydrology and Water Management, Bucharest, September 23-26*, .
- ***Anexa 6.2. Justificarea desemnării corpurilor de apa puternic modificate si artificiale din Spațiul Hidrografic Crișuri, 2007 [*Annex 6.2. Justification for designation of heavily modified and artificial water bodies in Crisuri hydrographis space*], PMB Crisuri. www.rowater.ro/dacrisuri
- ****Atlasul Cadastrului Apelor din Romania* 1992, [*Atlas Water Cadaster of Romania*], 1992, Edit. Ministerul Mediului, Acvaproiect, S.A., Bucuresti, 694p. [in Romanian]
- ***Fotografii realizate in cadrul deplasarilor pe teren, februarie, aprilie 2013.
- Monografia hidrologică a bazinului hidrografic Crisuri* [*Hydrological monography of Cris basin*], 1966, Edit. Institutul de Studii si Cercetari Hidrotehnice, 234p.
- ****Studii Hidrologice Anuale la s.h. Oradea*, [*Annual Hydrological Studies*], 20011-2012, Arhiva INHGA, București.
- ****Tehnici bioingineresti de restaurare ecologică a cursurilor de apă, suport pentru realizarea obiectivelor de mediu prevăzute de Directiva Cadru a Apei. Studiu de caz* [*Bioengineering techniques of ecological restoration of water courses - support for environmental objectives set by the Water Framework Directive*], 2013, Studiu arhiva INHGA, Bucuresti. [in Romanian]
- ****Solutii pentru refacerea conectivitatii longitudinale a Crisului pe sectorul dintre pragul Pod CFR si barajul de priya CET1 Oradea* [*Solutions for longitudinal connectivity restoration of Crisul Repede river on the reach betwin CFR bridge weir and CET1Oradea water supply dam*], 2013, Brosura INHGA, Bucuresti, <http://www.inhga.ro> [in Romanian]