



# DELTA AND WETLANDS

(BOOK OF ABSTRACTS)

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INSTITUTUL NAȚIONAL DE CERCETARE-DEZVOLTARE  
„DELTA DUNĂRII” – TULCEA

Tulcea - Str. Babeșeg 165 Cod B20112 tel. (+4 0240) 531520 fax (+4 0240) 533547 e-mail office@ddni.ro web <http://www.ddni.ro>

# DELTAS AND WETLANDS

## (Book of Abstracts)

# Vol. 7

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### 11. PRELIMINARY RESULTS ON THE ASSESSMENT OF DANUBE RIVER FISH SPECIES MIGRATION BEHAVIOR IN RELATION TO THE IRON GATE I AND II DAM USING ACOUSTIC TELEMETRY EQUIPMENTS

Hont Ștefan , Paraschiv Marian, Økland Finn, Cvijanovic Gorcin, Smederevac Lalic Marija, Lenhardt Mirjana, Hoedl Edith, Iani Marian

*Danube Delta National Institute for Research and Development: 165 Babadag street, Tulcea - 820112, Romania, E-mail: [stefan.hont@ddni.ro](mailto:stefan.hont@ddni.ro)*

The dam's construction without fish passes had a major impact, obstructing migratory fish populations from moving between different parts of the river systems and utilize they key habitats. Fish species and fish populations are depending on long migrations are most seriously affected by river fragmentation. Building well-functioning fish passage systems for migratory fish species at Iron Gate I (rkm 943) and Iron Gate II (rkm 863), is crucial for strengthening and re-establishing Danube's River migratory fish populations. Between March and May 2021, 112 fish specimens were captured downstream Iron Gate II dam. All the fish was previously tagged with 69 KHz ultrasonic transmitters an released upstream Iron Gate II dam reservoir (53 fish) and downstream Iron Gate II dam (59 fish). Some of the acoustic transmitters are equipped with depth sensors, which provide information of water depths used by fish. Fish movements was recorded by a network of 18 ultrasonic automatic Vemco VR2w receivers (10 downstream the iron gate II dam and Gogosu branch, 6 in the IG II lake and 2 receivers at the Iron Gate I dam ) with a 15 months battery life, positioned in Danube River. Downloading and interpreting recorded data by these receivers will be an important starting point for "We Pass 2" project that will begin in fall of 2021, when will be realized high resolution recordings of 3D fish movements, for finding the best technical solution for their passing upstream or downstream of dams.

### 12. LONG TERM WETLAND-RELATED LAND COVER AND USE CHANGES IN ROMANIA

Petrișor Alexandru-Ionuț, Petrișor Liliana Elza

*Sos. Pantelimon nr. 301, bl. C1, ap. 13, sect. 2, 021619, Bucuresti, Romania, E-mail: [alexandru\\_petrisor@yahoo.com](mailto:alexandru_petrisor@yahoo.com)*

Starting from the importance of wetlands, assessed through the perspective of the ecosystem services provided, but also from the fact that the chaotic development of Romania, characteristic to transition countries, resulted into important land cover and use changes, this study aims to assess the effect of these transitional dynamics against the wetlands. The study uses geospatial data, analyzed based on computing the area covered by different uses or affected by changes. The findings indicate an alarming trend, consisting of a continuous loss of the wetland areas. While the limitations inherent to using CORINE data do not allow for discerning the intricate mechanisms of change, the overall picture requires immediate action on behalf of the authorities for avoiding further losses.

### 13. CLIMATE CHANGE VULNERABILITY AND RISK ASSESSMENT FOR PROPOSED SOLUTIONS WITHIN DANUBE DELTA LIOP PROJECT

Rădulescu Daniela, Coman Cristina, Cooper Jonathan

*JBA Consulting , IRLANDA, 24 Grove Island, Corbally, Limerick, ROMANIA, Av. Petre Cretu, Nr. 34, Sector 1, Bucharest, E-mail: [Daniela.Radulescu@jbaconsulting.ro](mailto:Daniela.Radulescu@jbaconsulting.ro)*

In order to raise awareness, the current programming period (2014-2020) included the climate change requirements into the preparation and implementation of programs and projects by analyzing how climate risk management and project adaptation issues are concerned. Climate change vulnerability and risk assessment involves identifying the climatic hazards to which the project is vulnerable, assessing the level of risk and integrating adaptation measures to reduce this risk to an acceptable level. The main pillars of the assessment are represented by the sensitivity analysis, evaluation of exposure, vulnerability analysis, risk assessment and identification and evaluation of adaptation measures / options. The article presents a case study of climate change vulnerability assessment for the Prevention and diminishing of the effects of floods over settlements in the Danube Delta Project (under LIOP financing) and how the results of the assessment are used to inform the decision-making process as the project develops. Eight climatic hazards which proved to be relevant for the project investments were analyzed in the case study, such as extreme temperatures and precipitation, floods, water availability / drought, sea level rise, water/soil salinity, coastal erosion and wind regime. For the

## Preliminary results on the assessment of Danube River fish species migration behavior in relation to Iron Gate I and II dam using acoustic telemetry equipment

Ștefan HONT<sup>1</sup>, Marian PARASCHIV<sup>1</sup>, Finn Økland<sup>2</sup>, Gorcin Cvijanovic<sup>3</sup>, Marija Smederevac Lalic<sup>3</sup>, Mirjana Lenhardt<sup>3</sup>, Edith Hoedl<sup>4</sup>, Marian Ion IANI<sup>1</sup>

<sup>1</sup> Danube Delta National Institute for Research and Development, Babadag Street 165, 820112 Tulcea, Romania,

<sup>2</sup> Norwegian Institute for Nature Research (NINA)

<sup>3</sup> Institute for Multidisciplinary Research (IMSI), University of Belgrade (UB), Belgrade, Serbia

<sup>4</sup> International Commission for the Protection of the Danube River (ICPDR)

Corresponding address: [marian.iani@ddni.ro](mailto:marian.iani@ddni.ro)

**ABSTRACT:** The dam's construction without fish passes had a major impact, obstructing migratory fish populations from moving between different parts of the river systems and utilize they key habitats. Fish species and fish populations are depending on long migrations are most seriously affected by river fragmentation. Building well-functioning fish passage systems for migratory fish species at Iron Gate I (rkm 943) and Iron Gate II (rkm 863), is crucial for strengthening and re-establishing Danube's River migratory fish populations. Between March and May 2021, 112 fish specimens were captured downstream Iron Gate II dam. All the fish was previously tagged with 69 KHz ultrasonic transmitters an released upstream Iron Gate II dam reservoir (53 fish) and downstream Iron Gate II dam (59 fish). Some of the acoustic transmitters are equipped with depth sensors, which provide information of water depths used by fish. Fish movements was recorded by a network of 18 ultrasonic automatic Vemco VR2w receivers (10 downstream the Iron Gate II dam and Gogosu branch, 6 in the IG II lake and 2 receivers at the Iron Gate I dam) with a 15 months battery life, positioned in Danube River. Downloading and interpreting recorded data by these receivers will be an important starting point for "We Pass 2" project that will begin in fall of 2021, when will be realized high resolution recordings of 3D fish movements, for finding the best technical solution for their passing upstream or downstream of dams.

### MATERIAL AND METHODS

#### Installing the acoustic receivers in the river

A total of 18 receivers was installed : 10 downstream the Iron gate II dam, & Gogosu branch, 6 in the IG II lake and 2 receivers at the Iron Gate I dam



(A)-Receivers installed at the Iron gate I, attached to the concrete walls of the power plant on the right bank of the Danube River in Serbia and on the left bank in Romania; (B)-Receiver installed at the Iron gate II, upstream Romanian ship locks; (C)- Receivers location at the Iron Gate II; (D) & (E) Receivers installed downstream Iron Gate II main turbines, during the retrieval for downloading the data;



(F)- Sterlet sturgeon tagging at Gruia / rkm 851; (G)- V9 acoustic transmitter used for tagging fish in the Iron Gate II area (197 days estimated tag life); (H)- Barbel (*Barbus barbus*) after was implanted with an acoustic tag; (I)- Barbel (*Barbus barbus*) in the recovery tank before to be released in Danube River.

\* All the fish was tagged using anesthetic (ethanol with clove oil 9/1) and followed a special tagging protocol that was previously tested and adjusted in the field .

### RESULTS AND DISCUSSION

A number of 112 adult fish of 9 species were tagged (57 in Serbia and 55 in Romania):

1 asp (*Leuciscus aspius*), 7 pontic shad (*Alosa immaculata*), 19 barbel (*Barbus barbus*), 5 common carp (*Cyprinus carpio*), 35 nase (*Chondrostoma nasus*), 1 sterlet (*Acipenser ruthenus*), 44 vimba bream (*Vimba vimba*).

In Romania was tagged 55 fish (2 barbel, 4 common carp, 22 nase, one sterlet and 26 vimba bream) 26 specimens were captured at rkm 853 and 29 specimen at rkm860. The tagged fish was released in Danube rkm 851 and others in Gogosu branch, about one kilometer upstream of the confluence with Danube River.

In Serbia from all 57 fish captured (1 asp, 7 pontic shad, 17 barbel, 1 common carp, 13 nase and 18 vimba bream) downstream Iron Gate II dam at Prahovo rkm 860, 53 fish was tagged and released upstream of the dam at Kusjak rkm 865. From all the fish tagged and released at Kusjak rkm 865, 15 specimens (9 vimba, 5 barbel, 1 Nase) moved upstream IG II reservoir for a distance of 77 km reaching the IG I dam in a few days (table 1).

Preliminary data show that fish released into the Iron Gate II lake reservoir migrate upstream even if the water flow in the lake is relatively small.

Table1: Fish captured in Danube River at Prahovo rkm 860 ( right bank) and released upstream in the Iron Gate II lake at the Kusjak ( rkm 864.5), that migrate upstream 79 km, up to the IG I dam (rkm 942.3)

Nr. crt.	Fish File No.	Fish species	Date of tagging and release	Release site	Receiver installed on the right bank rkm 843 (RS) - date			Receiver installed on the left bank rkm 843 (Ro) - date		
					First detection	last detection	No of detections	first detection	last detection	No of detections
1	21_01_06_05	vimba	23-Apr-21	Kusjak rkm 864.5 / right bank	29-Apr-21	15-May-21	1116	28-Apr-21	15-May-21	1123
2	21_01_06_15	vimba	23-Apr-21	Kusjak rkm 864.5 / right bank	10-May-21	21-May-21	1694	10-May-21	22-May-21	148
3	21_01_06_18	barbel	24-Apr-21	Kusjak rkm 864.5 / right bank	29-Apr-21	2-Jun-21	2226	28-Apr-21	17-Jun-21	2829
4	21_01_07_11	barbel	30-Apr-21	Kusjak rkm 864.5 / right bank	2-May-21	10-May-21	1500	2-May-21	10-May-21	1053
5	21_01_06_16	vimba	23-Apr-21	Kusjak rkm 864.5 / right bank	3-May-21	12-May-21	1388	3-May-21	11-May-21	382
6	21_01_06_12	vimba	23-Apr-21	Kusjak rkm 864.5 / right bank	29-Apr-21	2-Jun-21	4648	30-Apr-21	23-Jun-21	2805
7	21_01_08_05	nase	9-May-21	Kusjak rkm 864.5 / right bank	-	-	-	12-Jun-21	22-Jun-21	45
8	21_01_06_07	vimba	23-Apr-21	Kusjak rkm 864.5 / right bank	1-May-21	1-May-21	93	30-Apr-21	1-May-21	4
9	21_01_07_13	barbel	30-Apr-21	Kusjak rkm 864.5 / right bank	8-May-21	9-May-21	4	8-May-21	12-May-21	815
10	21_01_06_14	vimba	23-Apr-21	Kusjak rkm 864.5 / right bank	3-May-21	12-May-21	384	3-May-21	9-May-21	376
11	21_01_07_15	vimba	30-Apr-21	Kusjak rkm 864.5 / right bank	3-May-21	10-May-21	743	3-May-21	11-May-21	227
12	21_01_06_06	vimba	23-Apr-21	Kusjak rkm 864.5 / right bank	5-May-21	13-May-21	130	11-May-21	13-May-21	41
13	21_01_06_11	vimba	23-Apr-21	Kusjak rkm 864.5 / right bank	6-May-21	6-May-21	380	-	-	-
14	21_01_07_17	barbel	30-Apr-21	Kusjak rkm 864.5 / right bank	3-May-21	3-May-21	43	-	-	-
15	21_01_07_14	barbel	30-Apr-21	Kusjak rkm 864.5 / right bank	14-May-21	14-May-21	28	-	-	-
					<b>14 fish</b>			<b>12 Fish</b>		
					Total detections			Total detections		
					14377			9848		





THE XXVIII-TH DDNI SCIENTIFIC EVENT COMUNITY

DELTA AND WETLANDS

# DIPLOMA

Environmental factors, Ecological Restoration & Anthropic Impact

## BEST POSTER

*is assigned to*

Ștefan Hont, Marian Paraschiv, Finn Okland, Gorcin Cvijanovic,  
Marija Smederevac Lalic, Mirjana Lenhardt, Edith Hoedl, Marian Iani

**Preliminary results on the assessment of Danube River  
fish species migration behavior in relation to the  
Iron Gate I and II dam using acoustic telemetry equipments**

*at XXVIII-th DDNI Scientific Event Comunity - „Deltas and Wetlands” held at  
„Danube Delta” National Institute for Research and Development - Tulcea  
from 13 - 18 September 2021*

*Chairperson Dr. biologist Marian TUDOR*  
DANUBE DELTA NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT TULCEA

*Tulcea, September 2021*