

Annex: detailed evaluation of the impact studies

Danube River regulation between rkm 1380 – 1433

Documents evaluated

This evaluation has been based on the following documents (all but one in Croatian):

Original document name	English translation	Acronym used
Studija o utjecaju na okoliš zahvata uređenja vodnog puta i regulacijskih radova na r. Dunav od 1380 do 1433 r.km. 468 pp., Hidroing d.o.o., Osijek, January 2012.	EIA study of the project on waterway regulation and regulatory works at the Danube R. from rkm 1380 to rkm 1423.	EIS
Studija o utjecaju na okoliš zahvata uređenja vodnog puta i regulacijskih radova na r. Dunav od 1380 do 1433 r.km. Netehnički sažetak. 32 pp., Hidroing d.o.o., Osijek, January 2012.	EIA study of the project on waterway regulation and regulatory works at the Danube R. from rkm 1380 to rkm 1423. Non-technical summary.	EIS-NTS
Studija. Glavna ocjena prihvatljivosti zahvata za ekološku mrežu. Zahvat: Regulacijski radovi na rijeci Dunav od 1380 do 1433 r.km. 159 pp., Ires Zagreb, April 2011.	A study. Main assessment of the acceptability of the project for the ecological network. Project: Regulatory works at the Danube River from rkm 1380 to rkm 1423.	AA
Comments on the EIS for the Danube Regulation project in Croatia 1380 to 1433 rkm by Zelena Akcija, WWF, EuroNatur, Ökobüro and Justice and Environment. 38 pp., March 2012.		NGO comments

Previous complaints and documents provided by the NGOs were also taken into account.

The project and its objectives and aim

The river Danube intersects Croatia between its rkm 1295,5 and rkm 1423, i.e., in a length of about 130 km. The project in question, commissioned by the Croatian Agency for Waterways, concerns almost half of it, encompassing the stretch between the confluence of Drava R. and Danube at rkm 1380 and the boundary with Hungary at rkm 1423.

The objectives of the project, according to the EIS, are:

- implementation of objects for navigation safety
- implementation of objects for river regulatory line establishment.
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The detailed aims (EIS) are:

- establishment of the Danube waterway
- riverbank stabilisation
- protection of the banks from erosion
- correct conduct of ice and deposits (sediments).
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The justification of the need of the project is:

- poor maintenance of the waterway during last 20 years due to war events and lack of funding
- obligation to improve the waterway to enable it to reach the Class VIc waterway parameters according to the AGN
- necessity to protect the riverbanks from erosion which, among others, threatens the extremely valuable natural area of the Nature Park Kopački Rit.
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The project consists of two basic types of constructions:

- groynes (T or L-groynes, to be decided later on in the planning process)
- bank reinforcement.
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As technical alternatives, two other types of structures have been proposed – parallel structures and chevrons. All these structures are depicted and described in the EIS.

A part of the structures already exist; they are planned to be reconstructed only (however this initial statement is not correct – 23 of the 28 structures are in fact entirely new – see below for details).

All constructions should be made of natural material (stone), the fact used by the proponents as an argument that the project will harmonically fit into the environment.

All constructions were originally planned at the level of SNV + 1 m (explanation: “SNV” means “average low water”, constructions should have had their crest 1 meter above this water level). The minimum parameters should be: regulatory width of the river 300 – 450 m, radius of curves 1600 m (exceptionally 1000 m). These parameters refer to the recommendation of the Danube Commission from 1988.

Alternative solutions were proposed, consisting of:

- building of several transverse thresholds in the riverbed instead of the lateral structures, especially groynes
- lowering of the crest level of all structures at the level SNV + 0 (i.e., one meter lower than was the original project)
- decrease of the number of structures.

Mitigation measures were proposed: opening of several blind armlets along the stretch in question (by removal of old artificial constructions preventing the connection of the arms with the main riverbed), improving ecological conditions in those blind arms.

The EIS states that the reasons why finally the alternative SNV + 0 was chosen were:

- smaller amount of material needed for the constructions,
- smaller area of the riverbed occupied by the constructions (more precisely, their fundament mattresses)
- lower implementation costs.

9 originally proposed structures were situated into the mating and hibernation places of fish, therefore they have been assessed as having significant impacts on the environment, and their construction cancelled. 6 structures have already been built or are currently under construction. They are situated in the most threatened part of Danube (rkm 1405 – 1407) and their execution should above all protect the Nature Park Kopački rit from tearing the river bank and flooding the protected area. In fact, these structures have not been assessed neither before nor in the scope of this EIS/AA.

14 structures, mainly within the Nature Park Kopački rit, were proposed in locations which are of high ecological value and where there is not an urgent threat of destruction. Therefore, continuous monitoring of the status of these locations – both from the erosion and nature protection points of view – has been proposed to see if the destruction of the river banks and, together with it, also the valuable natural habitats, occurs. If this is the case in the future, particular actions should be proposed and the proposed structures should be subject to an independent AA; they are, however, excluded from the current project.

Five so-called mitigation measures have been proposed in order to improve the morphological status of the riverbed, including removal of some old regulatory structures. They will consist in opening of old blind armlets of the Danube. The largest of them is that at Stari Dunav (Old Danube) between rkm 1418 – 1423 – 5 km of the armlet should be cleared from the sediments.

The project was subject to a hydraulic model which has shown that during the next 30 years implementation of the project would lead to the deepening of the river bed by 4 cm, which will increase the expected natural deepening by another 36 cm.

Reference for the project and related projects

The current project is based on the common Danube regulation project from 1970s – its part relevant for former Yugoslavia, proposed in 1978. It has adopted the navigation parameters recommended by the Danube Commission in 1988.

Plans for regulation/improvement of all remaining parts of Croatian Danube exist and have already been subject to EIA. “Project of rehabilitation of the riverbed and right riverbank between rkm 1350 – 1380” was subject to EIA in 2008, and “Project of rehabilitation of the riverbed and right riverbank between rkm 1320 – 1350” in 2010. EIS for all these projects has been prepared by the same company - Hidroing d.o.o., Osijek.

The main objections against the project made by NGOs

According to the NGOs (NGO comments):

- this Croatian Danube regulation project is threatening international key protected areas of about 50,000 ha and of outstanding natural values in Europe, i.e. Ramsar sites, future Natura 2000 sites and part of the core zone of the nominated Transboundary UNESCO Biosphere Reserve “Mura- Drava-Danube”, the best preserved river stretch along the ca.1900 km long upper and middle Danube section;
- the technical planning of this project was using a completely wrong approach that is considered as old-fashioned and conflict-provoking but certainly not meeting the modern international standards to which Croatia is committed to (including the *point Statement on Navigation and Environmental Protection*, the *EU PLATINA Manual and the European Commission Guidance Document on Inland waterways along Natura 2000 Rivers*);
- the regulating structures already approved and built without any previous EIA or SEA must be also included in a new combined project planning and EIA; the EIA has to be transboundary;
- the EIA has important gaps and weaknesses of data and information that are too substantial to even start an EIA;
- does not *properly and sufficiently* assess the following:
 - the real transport needs for this project (how much is navigability in this section below international standards for navigability?) nor
 - the real impacts of foreseen interventions on:
 - Future navigability (actual benefits)
 - Danube ecosystems and their functions
 - Water bodies
 - Hydromorphology
 - Existing sediment deficit and balance (river bed incision problem)
 - the European importance of the affected protected areas with their key species and habitats
 - Cumulative effects of existing and planned IWT projects in the wider area
 - Transboundary impacts

- other possibly affected uses such as drinking water supply, agricultural water uses, flood retention, forestry, fisheries, local development plans and climate change.

Comparison of the project's objectives and reality

Before any evaluation of the quality of EIS (for the AA, see further) it seems to be useful to look at the objectives of the project, its real design, and the facts underpinning the objectives.

As mentioned above, there are two main objectives of the project:

- i) to improve the navigability of the Danube stretch in question, and
- ii) to prevent riverbank destruction.

A. Meeting the objectives by the original and new design

Original project consisted of 57 structures proposed to meet its objectives. On the basis of EIS, 23 of these structures have been either cancelled or their execution postponed in the future, depending on the results of a continuous monitoring the results of which should show if they are really needed. 6 structures have been restored without any assessment on the grounds of urgency.

- ***Comment: How is it possible that decreasing the project's extent by 40 % does not affect its objectives?***

B. Justification of the project by abandonment of maintenance works

One of the main justifications for execution of the project is that due to war events the maintenance of the whole Danube stretch has been abandoned, and that renewal of maintenance works is necessary for safe navigation. One would expect that the focus of the project will lie with rehabilitation/upgrading of existing structures.

- ***Comment: It should be noted that from 28 structures finally planned within this project, only 5 are the existing ones (to be restored) while 23 of them are new ones, situated in parts of the river where have been no artificial structures until now.***

C. Justification of the project for safe navigation

One of the two major objectives of the project is to ensure safe navigation, and especially to resolve 7 so-called bottlenecks threatening it. It is striking that all these bottlenecks are situated in those parts of Danube which have never been regulated before, i.e., since the 19th century when the major meanders were cut and Danube got today's shape. Danube is a very powerful and dynamic river here and all its parts which are naturally prone to

rapid hydromorphological changes were identified already a century ago. However, any more specific description how these bottlenecks impact the navigation is missing. There is no data on the navigation itself. This needs to be clarified.

The answer may be given by one of the NGO documents – comments of Croatian Society for Bird and Nature Protection from March 2012, submitted to the Ministry of Environment and Nature Protection of Croatia during the public hearing of the EIS: since the decay of former Yugoslavia in 1991, there has been no record on the river transport on Danube through the Croatian stretch of this river. No data exist on number of vessels nor the tonnage of goods transported via Danube. The only information available is that on the amount of cargo embarked and disembarked in the Croatian port of Vukovar – but there are no data on cargo transit which represents the major part of all river transport.

- ***Comment: how is it possible that the eminent threat to navigation allegedly arises just at parts of the river traditionally unmanaged until now since 19th century?***

Another reason by which the current project is being justified is the alleged obligation to improve the Danube waterway to meet the parameters required by AGN for waterway Class VIc. *Like in other cases of Croatian rivers (e.g. Sava River), this is a misinterpretation of the AGN requirements: countries Parties to the AGN are required to improve their waterways to meet the relevant standards once they approach the river regulation – but not vice versa, i.e., regulation works are not required in order the country met the relevant standards.*

D. Anti-erosion measures

Formulation of the other main objective of the project – prevention of erosion processes destroying the right riverbank of the Danube – makes an impression of imminent threat to the whole 53-km-long stretch. Explicitly highlighted was the risk to the Nature Park Kopački rit: about 14 structures were originally proposed along the Danube River crossing the Park. However, as a response to the negative opinion of the Park administration, 9 of them were cancelled without any impact on meeting the objective of the project. Only 6 out of 57 originally proposed structures have been subject to an emergency regime (consequence of which, by the way, has been that they have not been subject to any assessment) due to proven risk of bank deterioration. Nowhere in the EIS has any other urgent need for bank rehabilitation been mentioned.

Quality of the EIS

Croatian EIA procedure includes the stage of scoping: competent authority (in this case the former Ministry of Environment, Spatial Planning and Construction) decides about the scope of the EIS prior to its commissioning at a licensed firm. Such a decision was issued for this project on 2nd July 2010, and required, among others, to assess impact on fauna and flora, as well as to take into account all direct and indirect possible impacts of the project on the environment. The required scope of this EIS embraces all possible impacts.

The proper EIS, however, despite its volume lacks many of expected (required) chapters. There is one short chapter about the impact on protected areas which, however, overlaps with sites of ecological network – therefore, they are all treated within the self-standing document on assessment of impacts on sites of ecological network. No other impacts on nature have been described nor assessed – no flora, no fauna, no other assets protected by Croatian law like forest and wetland ecosystems. Any modeling or even description of expected impacts on hydrology of underground water – factor having the decisive impact on ecosystems in the entire floodplain – is missing. The whole EIS only focuses on direct impact of planned structures on the riverbed and riverbanks.

- ***Comment: some crucial chapters common in standard studies of this kind are missing***

Appropriate assessment

Following the Croatian law, appropriate assessment represents a self-standing document numbered here as Chapter 4 of the EIS. AA was prepared by another licensed firm – Ires Zagreb.

AA correctly identified sites of ecological network (= future Natura 2000 sites) which may be influenced by the project:

- Kopački rit (HR2000394), Šire područje Drave (HR5000013) and Batina Dunavac (HR2001044) (pSCIs)
- Podunavlje i donje Podravlje (HR1000016) (SPA)
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Impact on some other sites of ecological network was excluded due to their large distance from Danube, which may be considered correct.

A. Working method

The authors of AA visited the project area and undertook one-day-long boat trip along the whole stretch (53 km), making photo documentation at envisaged locations of particular structures. No other field work was done, the whole AA has been a desktop study.

A project impact zone was arbitrarily chosen as a strip by 1 km on both sides of the longitudinal axis of the river while the floodplain reaches up to 8 km at some places – the authors considered it as sufficient.

AA only assessed the adjusted, alternative project consisting of 28 structures at the level SNV + 0, not the original version (57 structures).

The proper assessment was procedurally done in a standard way: target features of particular sites of ecological network were evaluated as to their presence or absence in the zone of impact; for those present there, likely impacts during preparation, construction, and operation of particular structures were described and their significance estimated. In the end, conclusion for every site as to its integrity was given.

Monitoring programme was proposed and the mitigation measures described in more detail with some hints for their execution.

As regards the particular procedural steps of the AA, they have formally been met.

B. Assessments

Direct impact on floodplain habitats, especially the alder and willow forests 91E0, was described precisely as the expected land occupation caused by particular structures can be well estimated. AA also claims that the new structures, particularly the groynes, will lead to an increase in area of willow forests due to rapid sedimentation of gravel and sand behind the groynes and fast overgrowing by young trees: all current structures along Danube have undergone such development, and there is no doubt that it will be the same here. The overall land occupation is minimal in both absolute figures and relative percentage of such habitats compared to their total area within the sites. Thus, it can be agreed that this type of impact is insignificant.

Impact on bird species nesting in the sand river banks (Sand Martins, *Riparia riparia*) which are planned to be reinforced by stone is also assessed as insignificant. This assessment is based on the fact that the stone embankment will only be done at the level of SNV + 0, i.e., about 2 meters below the nests, so that the birds will not be prevented from using their nests even after. However, data collected by the NGOs from other affected stretches of the middle and lower Drava river recently regulated show direct causal relationship between construction of such embankments and disappearing of Sand Martins.

The decline of population of this species during last several years is alarming (2005: 12,232 pairs, 2010: 3,172 pairs), and proposed constructions will definitely contribute to worsening of this situation: it has to be considered that neither the EIA nor the AA describe exact performance of planned measures – they explicitly refer to “later stages of preparation of construction projects of particular structures”. However, recent practice in Croatia shows that especially embankments are being made in such a way which is incompatible with the existence of Sand Martin.

For all other habitat types and species representing the target features of sites of ecological network, any quantitative data on possible impacts of construction are missing. The authors of AA admit some impacts on them but at the end, without introducing any factual justification – they conclude that the impact will be insignificant (moderate). For some habitat types, they say that “the project impacts less than 1 % of the area of habitat following the “Habitat Map of the Republic of Croatia”” – a formulation which does not allow to decide if “1 % of area within the site” or “1 % of the area within the country” is meant – a difference more than substantial. (In addition to it, there is no rule that if the impact of given project embraces less than 1 % of the occurrence of the target feature within the area it should automatically be considered insignificant.)

As the species regards, formulations like “the given project cannot significantly affect the entire population of this species” only support the fact that neither quantitative nor qualitative assessment has preceded the conclusions about the impact significance.

Impact on hydrology of the floodplain and related changes on the ecosystems there (including habitats and species which are target features of sites of EN) is not described at all. The only figure, deepening of the riverbed by 4 cm during the next 30 years (due to implementation of the project), is considered insignificant compared to expected natural deepening by 36 cm during the same period. However, these 4 cm represent an increase of the natural impact by 11 %. Even if there are no legally binding rules for AA, impact of such size is usually considered highly significant.⁴

C. Mitigation measures

Clearing and opening of five blind armlets along the project area have been proposed as mitigation measures. It has not been stated neither in the EIS nor in AA which impacts should be mitigated and why: there is no causal connection between the project, its impacts on target features of particular sites of the ecological network, and the proposed mitigation measures.

Such mitigation measures are justified by improvement of ecological conditions in the wider area. However, they have been proposed without any preceding biological assessment of their planned locations. Without detailed zoological and botanical inventory of these sites, such measures can make a lot of harm to biodiversity in two ways:

- first, in all cases removal of old regulatory structures is planned, enabling the blind armlets to be re-connected with the main stream of Danube. Numerous examples of such measures implemented thorough Europe have shown that such measures lead to a dramatic change of fauna and flora of such habitats: they had been inhabited by animals and plants typical for dead water while after reconnecting such fauna and flora is replaced by completely different set of species accommodated to running water; this may lead to loss of valuable associations.
- Second, within these measures clearing of 5-km-long Stari Dunav is planned, including removal of all sediments. This will definitely cause destruction of all living organisms in this armlet and especially if carried out during the mating period (the documents do not mention any timing of proposed measures) it may severally affect local populations of amphibians, reptiles, ornithofauna, etc.

D. Conclusion

Based on a single-day site visit and a follow-up desktop study not underpinned by any exact mapping, inventorying nor investigation, the authors conclude (AA p. 106):

“Having in mind everything mentioned until now, the author of this study is of that opinion that the given project in a variant submitted will have no significant impact on hydromorphological characteristics of this stretch, and that if the proposed measures are

followed the impacts on conservation objectives of the ecological network will be scaled down as much as possible.”

- Such a statement is based purely on a subjective opinion of the authors – for such a conclusion, no “appropriate assessment” was needed. To be justified, such conclusion should have been supported by real quantitative and qualitative assessment which was not carried out.

Overall conclusions

The objectives of the project are not properly explained nor justified by any real need or urgency of the proposed measures – maybe with an exemption of those 6 structures already under construction due to emergency which, however, have not been subject to any assessment (neither EIA nor AA).

The project itself does not take into account anything else than the technical demands. 40 % of all proposed structures have been cancelled simply on a basis of negative opinion of the Administration of Nature Park Kopački rit – i.e., without any assessment – while the project objectives have allegedly remained unaltered.

The project ignores all recent documents relevant for Danube, especially the “Joint Statement on Guiding Principles on the Development of Inland Navigation and Environmental Protection in the Danube River Basin” (2007) and the “Platina Manual on Good Practices and Sustainable Waterway Planning” (2010).

The EIS is – despite its volume – full of considerable gaps, and does not provide answers regarding the impact of the (not satisfactorily justified) project on the environment.

The AA, in fact, does not possess its most important component – the proper assessment of significance of impacts on the target features of sites of ecological network. The conclusions about “moderate” or “insignificant” impacts usually follow the statements that neither quantitative nor qualitative data were available.

Recommendations

The evaluated project refers in its design back to 1978, i.e., more than 40 years ago. It lacks any reference to other than technical aspects – and even these technical aspects are not detailed enough, non-convincing, and there does not seem to be any urgency. The EIS does not meet the standard required for environmental impact assessments (nor the requirements of the scoping authority), and the appropriate assessment, based on single-day field work and a desktop study without any additional research, is too weak.

The project if allowed to take place will even in its reduced form affect 53 km-long stretch of Danube which has been evaluated – together with the Danube delta – as its best preserved part with maintained ecological functions. It is therefore evident that any planning of navigation or regulatory works should not be separated from considering the ecological values of the wider area: river basin approach instead of “river stretch approach”, as well as planning of sustainable use of the river, should be a must.

The optimum way would be to prepare joint (= navigation, environment, nature protection, NGOs) strategic plan for conservation and use of Danube River at Croatian territory (i.e., not only these 53 km) – independently assessed by a SEA procedure – which would take into account all concerns, international commitments, relevant EU legislation, requirements of local inhabitants, etc. Such a plan must inevitably include concerns of Republic of Serbia.

In any case, the current project, should be reconsidered and the EIS (incl. AA) refused for lacking elementary standards of environmental impact assessments and appropriate assessments.

- six brook mouths
- 70 km of drainage canals

The canal would shorten the waterway in the direction south by about 80 km, north by more than 400 km.

Even though the canal crosses a plain landscape its implementation would nevertheless result in excavating of around 54.121 mio. m³ and fixing of around 53.838 mio. m³ of soil, build in 2.6 mio. m³ of rocks, 260,000 m³ of concrete and 20,000 t of steel.

Justification of the project is that it should be part of a multimodal corridor going from Danube to Sava, continuing by upgrading of the Sava waterway up to Sisak, and then being linked with planned railway Zagreb – Rijeka.

The complaint

Main elements of the complaints:

1. Old fashioned project dating back to 18th century
2. No consideration of JOINT STATEMENT on Guiding Principles for the Development of Inland Navigation and Environmental Protection in the Danube River Basin and EU-PLATINA Manual
3. No evident approximation to EU law (FFHD, BD, WFD, FD) and applying strategic planning and appropriate assessments
4. No SEA and transboundary EIA/Espoo with Serbia
5. ICPDR is neither informed nor involved
6. Sava commission is not involved
7. No stakeholder involvement including the NGO sector from the beginning
8. Potential impacts on unique protected areas:
 - Sites of National Ecological Network (Spačvanski bazen HR1000006 and Sava river HR2001116) and planned Natura 2000 sites
9. No economic feasibility for such project
10. Impact in largest and best preserved alluvial hardwood forests in the Danube Basin
11. Navigation on the Sava as interest is decreasing and prognoses are not in line with European development of water transport (alternative rail transport as alternative)

The evaluation

As in previous cases, the main aim of this evaluation was to study the full Croatian versions of the EIA documents and to focus on quality and appropriateness of the assessments. The actual need and justification for the project itself (including its economic feasibility) and its compatibility with existing “good practice documents” for the Danube river basin were not evaluated.

a) The EIS as a whole

Project documents available are a bit confusing. The first EIA was carried out as early as in 1996. Then, however, it was decided to redo it, and the new EIS comes from 2009: this

was the document we used for the present evaluation. However, some parts of the text are dated as being from 2005 – 2006, i.e., from the period when the current Act on Nature Protection already was in force but did not contain provisions about the national ecological network (the latter were amended in 2007).

The EIS describes two sites of the national ecological network even though the network did not come into force until 2007, and specifies that the proposed Danube – Sava canal will intersect at least one of them (HR 5000006 – Spačvanski bazen). But it provides no evaluation of the potential impacts of the project on this site.

Moreover, as the canal runs into the Sava river it is apparent that there is a strong likelihood of an impact on another site - the Sava (HR2001116). This should at least have been commented on – which has not been the case.

Partial finding No. 1: the canal Danube – Sava crosses two sites of national ecological network – future Natura 2000 sites. One of them was mentioned in the EIS, the other not. However, there is no assessment of the possible impacts of the project on these sites. As the EIS comes from 2009 and ecological network was established as early as in 2007 there is no explanation for this omission.

b) EIS and impact on fauna and flora

24 pages (Book “F”) of the EIS was devoted to the references to numerous specialized studies carried out during the preparation of the project dealing with various aspects of fauna and flora. From the titles of these studies it is obvious that they must have contained species lists and probably also qualitative descriptions of species’ populations.

The same holds true for habitat types, especially forest ones. However, in the EIA itself there is no list of potentially affected species nor habitats. Respective chapters of the EIS are rather general, speaking about the general impacts, general measures to protect species, but nothing can be assigned to particular species or locations of their (sub)populations.

The common feature of Croatian EISs in the field of species protection is the misunderstanding of the legal requirement **to prevent extinction of any local population of protected species** as a requirement to prevent the extinction of the species as a whole. It is present in this study, too, as can be illustrated by the following wording (p. B 25):

<p>B.1.2.8 Utjecaj na biljni i životinjski svijet</p> <p>Tijekom građenja postojat će sasvim određeni negativni učinci na kopnenu vegetaciju i životinjski svijet. Utjecaj na</p>	<p>B.1.2.8 Impact on flora and fauna</p> <p>During the construction particular impacts on terrestrial vegetation as well as fauna will occur.¹ Impact on fauna will depend on</p>
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<p>životinjski svijet ovisit će o izvođenju radova u vrijeme reproduktivnog razdoblja pojedinih životinjskih skupina. Tijekom izvođenja radova trajno će se ukloniti dijelovi postojećih staništa, tako da će na zaposjednutom području nestati uvjeti za neke životne zajednice koje ga danas naseljavaju. Staništa na kojima se izvode radovi, a koja se trajno gube, bilo u cijelosti ili djelomice prema Corine Biotopes klasifikaciji staništa spadaju u kategoriju 2 površinske vode, 3 šikare i travnjaci, 4 šume, 5 močvare te 8 poljoprivredni predjeli, ukupno oko 3 817 ha (3 518 ha zaposjeda kanal i pripadajući objekti, a 299 ha deponije otpada). Dakle s područja zaposjedanja nestat će biljne vrste i zajednice, dok će većina životinjskih vrsta napustiti područje gradilišta. ...</p> <p>Međutim, važno je da zbog izgradnje neće doći do nestanka niti jedne biljne i životinjske vrste.</p>	<p>implementation of works during the reproductive period of individual animal groups. During the construction parts of existing habitats will be removed, and at the occupied area conditions for maintenance of some current groups will disappear. Habitats in which works will be implemented and which will permanently get lost, either as a whole or their parts, are according to Corine Biotopes habitat classification categories 2 open waters, 3 scrubs and grasslands, 4 forests, 5 wetlands as well as 8 agricultural areas (3,518 ha occupies the canal and connected objects and 299 ha depository of waste). Hence, from the occupied territory plant species and associations will disappear while majority of animal species will leave it. ... Nevertheless, important is that due to the construction no plant or animal species will get extinct.</p>
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This is a systemic mistake which can be found in any of the EIS, showing a long-term absence of methodical guidance by relevant authorities.

Partial finding No. 2: the assessment of impacts on species does not take into account the local (sub)populations of particular species – which should be the purpose of this part of the EIS – but only generally the species as a whole. From such a perspective, with an exception or several endemic species, such an “assessment” is absolutely pointless and does not enable to reveal the impacts of the given project on any species.

c) Proposals for monitoring

The EIS contains apparently a quite extensive section on monitoring of flora and fauna. The first impression is that it complies with the requirement of the EIA Directive to propose monitoring as an intrinsic part of the EIA procedure, and to utilize the results of the (future) monitoring to adapt the project accordingly.

¹ Any specification of these impacts on particular species is missing in the whole EIS.

According to the spirit of the EIA Directive, such monitoring is intended to monitor the status of selected species on particular locations, taking into account the “zero status” recorded prior to implementation of the project, and to take appropriate measures if the results show that the status of given species at given location starts to deteriorate.

Under the title “monitoring”, this project proposes something different: in fact, it should be measures to enable fundamental description of particular species, i.e., rather an inventory:

<p>Kniha C – Mjere: Praćenje faune kopnenih kralješnjaka: Praćenje faune kopnenih kralješnjaka treba usmjeriti na inventarizaciju i popis svih kralješnjaka u zoni budućeg VKDS te na ugrožene i osjetljivih vrsta kako bi se sakupila baza podataka koja bi sačinjavala podlogu za kvalitetnije i učinkovitije mjere zaštite pojedinih skupina i vrsta, ali i njihovih staništa. Napokon, stalnim praćenjem sezonskih kao i višegodišnjih promjena utvrdit će se nove spoznaje o kretanju pojedinih vrsta, njihovom zadržavanju i korištenju pojedinih staništa ovog područja te njihovoj brojnosti i fluktuacijama.</p>	<p>Book C – Measures: Monitoring of fauna of terrestrial vertebrates: Monitoring of terrestrial vertebrates should focus on inventory and description of all vertebrates within the zone of future canal as well as of threatened and sensitive species, in order to get a database representing the background for more quality and effective measures for protection of particular groups and species as well as their habitats. Finally, by permanent monitoring of seasonal as well as multiannual changes new data on the movements of individual species, their occurrence as well as use of individual habitats within this area, and their abundance and fluctuations will be gathered.</p>
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Even the basic methods presented at particular species groups are directed to deliver basic data on the species in the area but not on their status. The other problem is that it has not been defined which species, and where, are expected to be impacted: the canal will be a new construction crossing the area in length of more than 60 km, thus affecting dozens or even hundreds of localities with occurrence of various animal and plant species and associations – some of them can be impacted directly (land take), some indirectly (change of habitats, change in hydrological regime, origin of new habitats inhabited by species not native to the area, etc.), and monitoring should, in principle, take into account all these factors.

Last but not least, it is not clear what countermeasures could be taken if monitoring reveals some changes in existing species: once the canal is constructed it will be in place regardless any (negative) impacts on the living organisms. It seems that the purpose of monitoring is not well understood, maybe again due to an absence of methodological guidelines.

Partial finding No. 3: monitoring is not designed in a way enabling to detect changes in particular population of particular species compared to the “zero state” before the project has started; it is rather about gathering elementary data about the occurrence and abundance of particular species (inventory) and only subsequently to focus on monitoring some changes – without specification of particular populations and their exact locations.

Conclusions

Due to an absence of any particular data on species and habitat types, impacts of the proposed canal Danube – Sava cannot be assessed

Although the canal should cross two sites of national ecological network (= future Natura 2000) neither an appropriate assessment was executed nor explanation why AA had not been needed was delivered.

Requirements for the protection of protected and threatened species are misunderstood at the level of the entire species, not of the local populations.

Neretva delta project

Documents evaluated

This evaluation has been based on the following documents (all in Croatian):

Original document name	English translation	Acronym used
Studija o utjecaju na okoliš pilot projekta Navodnjavanja Donje Neretve - podsustav Opuzen. 219 pp., Institut IGH, d.d. Zavod za planiranje, studije i zaštitu okoliša, Zagreb.	EIA study for the pilot project "Irrigation of Lower Neretva River – subsystem Opuzen".	EIS Opuzen
Studija prihvatljivosti zahvata za prirodu. Navodnjavanje Donje Neretve, podsustav Opuzen. 88 pp., Oikon d.o.o., Zagreb.	Appropriate Assessment study. Irrigation of Lower Neretva River, subsystem Opuzen.	AA Opuzen
Studija o utjecaju na okoliš pilot projekta Navodnjavanja Donje Neretve - podsustav Koševo – Vrbovci. 162 pp., Institut IGH, d.d. Zavod za planiranje, studije i zaštitu okoliša, Zagreb.	EIA study for the pilot project "Irrigation of Lower Neretva River – subsystem Koševo - Vrbovci".	EIS Koševo – Vrbovci
Studija prihvatljivosti zahvata za prirodu. Navodnjavanje Donje Neretve, podsustav Koševo - Vrbovci. 78 pp., Oikon d.o.o., Zagreb.	Appropriate Assessment study. Irrigation of Lower Neretva River, subsystem Koševo - Vrbovci.	AA Koševo – Vrbovci

The project and its objectives

Briefly, in 2010 a project was submitted on improvement of irrigation of the whole area. The total of 5370 ha of agriculture land should be newly irrigated by pipelines instead of canals, which would enable to exactly measure the amount of consumed water by particular users. While the minimum discharge in the river is 50 m³/s, the total water consumption needed for running the irrigation system is 4.6 m³/s. The project would consist of two new pumping stations, micro-reservoir Lađište with a capacity of 100,000 m³ and a force main network. Penetration of salt from the sea should be stopped by new reclining dam on the Neretva river. Operation of this reclining dam would be seasonal from April to September.

From the technological point of view, project is divided into two parts: so-called “subsystem Opuzen” consisting of the movable dam, accumulation reservoir Ladište and irrigation system of the lowest part of the Neretva River delta, and “subsystem Koševo – Vrbovci” which is only an irrigation system of the smaller upper part of the Neretva delta. Separate EISs as well as AA assessments were prepared for these two parts of the project.

The objectives of the project have been described as follows: “The aim of irrigation project at Lower Neretva is establishment of a relationship between planned agricultural production and physical characteristics of the site, especially climate, soil and delivery of quality (fresh) water...The proposed solution of irrigation will secure a stable production and is technically feasible, economically acceptable and profitable during its operation.”

Despite the intense use for agriculture, the whole area has retained its unique character from the nature and landscape points of view; therefore, it has been declared a Ramsar site and several national protected areas (zoological reserves) and seven sites of ecological network (= future N2K sites) are located here.

The complaint

The NGOs complained, in summary, for the following:

- project itself does not have any ecological perspective – its only aim is an increase in agricultural production;
- the very existence of the Ramsar site has not been even mentioned in the documents;
- no assessment why fresh water in the Delta is missing has been done;
- no documentation of the illegal land-use and no solution of the actual transformation problem of prime natural habitats into plantations and intensively used agricultural plots has been given (the accelerated land-use and intensification of the production is one of the major impacts of the project which has to be described in the EIA);
- proposed protection and mitigation measures are extremely general and thus not applicable - a clear list of indicators to be defined and mapped in advance is missing;
- it is not possible to define any impact of the project based on the data and provisions provided by the EIA;
- there has been no assessment of the fish migration in the Delta and especially in the part which will be impacted by the project: if there is no assessment, how is an EIA possible?
- allegedly, irrigation is planned also to area famous for its dry submediterranean grasslands traditionally used as pastures; these “biodiversity hot-spots” would be destroyed if irrigated.

The evaluation

The main aim of this evaluation was to study the full Croatian versions of the EIA/AA documents;

a) the EISs

A. General focus

Justification of the project is to increase effectiveness of the agricultural production in the area, to prevent illegal use of irrigation water (now – open canals, in the future – pipe lines with watermeters), and to improve the quality of agricultural land due to lowering the level of gradual salinization of the terrestrial part of Delta. As the main tool for the latter objective, reclinable dam should be of crucial importance: during the dry months of the year when the marine water penetrates up to Metković (20 km upstream of the estuary) it is impossible to take water from Neretva River for irrigation, and this salt water causes gradual salinization of the land and the groundwater; the dam should enable to stop the penetration of the salt water completely, thus contributing to gradual de-salinization of the area and enabling to draw the water for irrigation immediately from Neretva River (today, such water it is caught at the territory of Bosnia and Herzegovina about 30 km upstream and led to the Neretva Delta by artificial canals).

B. The scope of EIS

The EIS has a very detailed analytical part, including description of the regulation works on Neretva from 17th century up to 1980s. As regards flora, fauna and protected areas, the description of protected fauna and flora does not contain any evaluation of either absolute or relative importance of particular phenomena: species and habitats have been described in a similar way as pedology, hydrology and other environmental aspects. Existing protected areas have been mentioned, as well as the fact that the area is a Ramsar site – but without any quantification nor description of its importance from both national and international perspective (as the objective of the Ramsar site is to protect wetlands providing refuge to migratory waterfowl, i.e., is of international importance). As regards the ecological network (= future Natura 2000), the EIS refers to the AA study which is a self-standing document.

C. Assessment of impact on biota

The EIS proceeds from the leading idea that prevention of further salinization as well as provision of more fresh water in the delta can, in general, have positive impacts on biota. It recognizes that the only real problem could be the dam creating an impermeable barrier during 6 months of the year. However, as a part of the dam, fish pass has been proposed; according to the EIS this fishpass would solve the issue of permeability for migratory fish species if it is designed as proposed in the AA study. Therefore, all partial assessments as well as the summary assessment of the project resulted in the statement that project

will have no significant impacts on the environment and that it will have positive impacts on some of its components.

b) the AAs

Both AAs have identical structure and approach as they were drafted by the same persons.

From the structural perspective it starts with the brief description of the project, exhaustive description of all sites of ecological network (= future Natura 2000) within the impact zone of the project, listing the target features and exclusion of those which cannot be impacted by this type of the project. Then, all target features identified as potentially capable of being affected are described in detail. A chapter follows which is – from the methodological perspective – difficult to understand (but seems to be an intrinsic part of all AAs in Croatia): for every site of ecological network, two sets of information are provided by the Decree on establishment of ecological network from 2007: first, list of target features; second, list of conservation measures necessary to maintaining the sites in good state. Now, the AA contains a section describing possible impact of the project on particular *conservation measures* of each target feature and excluding those measures which cannot be impacted. Example: conservation measure “To restore wetland habitats along the river” can be impacted by the project (allegedly positively) while the other “To regulate fishing and to prevent poaching” is not relevant for this type of the project. There are dozens of such conservation measures especially for larger sites of ecological network (e.g., SPA HR 1000031 and pSCI HR 5000031 Delta Neretve which mutually overlap have an area of 24,900 ha) and assessment of impact of the project on them represents an important part of the AA study.

The AA Koševo – Vrbovci came to a conclusion that replacement of today’s surface irrigation system by a pipeline can only improve the situation in the respective area.

The AA Opuzen focused one by one to all three elements of this sub-system: accumulation Lađište, proper irrigation pipeline system and the reclinable dam in the Neretva River. The whole system should operate as follows: after a dam will have been built the penetration of the salt water into Neretva River upstream will be stopped the newly built pumping station will pump the water into the Lađište accumulation. From there, water will flow down by gravitation through the pipelines and irrigate the farmland.

Impact of the Lađište accumulation has been assessed by zero as it does not affect any target feature of the ecological network.

Impacts of the pump station, the inflow pipeline as well as gravitation pipelines have been assessed as slightly negative during the construction (digging the ditches and removal of existing vegetation) and moderately positive during the operation (increased inflow of freshwater in the area).

The only problematic issue was the reclinable dam. Its construction and principle should be as follows: a concrete plateau with an dimension of 27 x 110 m will be constructed on the bottom of Neretva River (which is 110 m wide and 11 m deep at this location) south of town of Opuzen. On this plateau, 5 reclinable elements of the dam will be fixed on so-called “gallery”, each having dimensions 20 x 9 m. They can be laid down parallel with the bottom; even then, however, the whole river bottom will be disrupted by a concrete barrier 5 m high and 11 m wide lying on the concrete plateau of 2 m height and 27 m width. Once the inflow of the fresh water starts to decrease (in dry months of the year) the particular elements of the dam will be gradually put up (this process will be automatically steered by the discharge rate). When the influx is lowest they will become perpendicular to the bottom thus making a 9-m-high dam across the whole river. By that, the water level of the Neretva River will increase by 60 cm which will affect the water body upstream up to Metković – the length of this increased water level is not mentioned in the EIS but can be estimated by 12 km upstream.

To enable the fish migration, an unspecified fishpass has been planned at one side of the dam. For smaller boats with the draught up to 5.20 m, a lock chamber 7 x 24 m is proposed at the opposite side of the dam. For the vessels with higher draught – which will pass “several times a week” – it is planned that one of the segments of the dam will be reclined and then lifted up again. Reclining of the dam will lead to discharge of the water from the artificial “lake” upstream the dam; the refilling of the “lake” will last several hours.

The dam should have two main purposes: first, to enable to caught fresh water for irrigation systems and second, to prevent salt water penetrate upstream. As the salt water is heavier than the fresh one it penetrates along the river bottom while the fresh water “glides” above it. To prevent such situations, at the roots of the dam elements there will be openings enabling the fresh water from the “lake” upstream the dam to “jet” downstream and to stop the salt water from penetrating upstream.

Three species of migratory fish were identified by the AA study as being potentially affected by this measure: *Allosa fallax*, *Anguilla anguilla* and *Petromyzon marinus*. Therefore, the AA study – after an extensive discussion of the ecological requirements of these species – has proposed a set of detailed measures consisting of:

a) detailed study of migration of fish (in general) through Neretva River, with particular attention to the above three species;

b) set of many parameters of the future fishpass (or fishpasses one of the requirements is to decide if single or two fishpasses are needed) based on results of that study.

All the requirements for these measures are given in the following table: it has not been translated as its purpose is to show how detailed instructions have been prescribed by the AA for the future work:

12. Izraditi glavni projekt riblje staze u skladu s rezultatima o migraciji riba te uključiti slijedeće smjernice.
a. Prilikom dizajniranja staze predvidjeti načine na koje se mogu onemogućiti ilegalne aktivnosti izlova koje će se nesumnjivo pojaviti, zbog koncentracije riba na područjima uz i oko ribljih staza. Ulaz i izlaz u prolaz bi trebalo projektirati da ne budu dostupni niti s rijeke, niti s obale.
b. Ulaz treba biti lociran na mjestu gdje ribe imaju lagan i neometan pristup, na lokaciji gdje se ribe koncentriraju prilikom kretanja uzvodno.
c. Treba osigurati da ribe budu minimalno uznemiravane bukom i vibracijama do kojih dolazi radom objekata koji sudjeluju u radu pregrade na rijeci, npr. kompresorske stanice. Obzirom na to, planirani položaj riblje staze na suprotnoj obali od kompresorske stanice je prikladan.
d. Spriječiti direktno osvjetljavanje staze, a difuzno osvjetljavanje svesti na najmanju moguću mjeru.
e. Prilikom određivanja dimenzija staze treba uzeti u obzir prosječnu duljinu najveće vrste za koju se očekuje da će koristiti stazu i dopustivu razliku u razini vode (za rijeku Neretvu vjerojatno minimalno 0,5 m u doba najnižeg vodostaja, ali je navedeno potrebno odrediti nakon istraživanja).
f. Kako bi se omogućio prolazak svim jedinkama potrebno je izgraditi potreban broj segmenata tako da razlika u razini vode između bazena bude maksimalno 0,2 m ($\Delta h = 0,2$ m) te da pri tome uzrokuje maksimalno strujanje od 2 ms ⁻¹ pogotovo na prijelazima između segmenata te na izlazu iz riblje staze. Ovdje su navedene samo maksimalne vrijednosti, a završne vrijednosti je potrebno prilagoditi prema rezultatima istraživanja riba.
g. Staza bi trebala imati ugrađene strukture koje formiraju zone za odmor ribe, osobito za slabije jedinke ili manju ribu koji su slabi plivači.
h. Dno riblje staze bi trebalo biti cijelom svojom dužinom prekriveno sa slojem krupnog/grubog supstrata (debljine barem 0,2 m). Takvo dno treba biti kontinuirano duž cijele staze i uključivati oba otvora staze, te se nastavljati i izvan otvora (kontinuirani prijelaz između dna staze i dna/obale rijeke). Drvo, ako se koristi, ne bi smjelo biti kemijski tretirano.

Based on *assumption* that such well-designed, functional fishpass (or fishpasses) will mitigate all impacts of the dam on the above migratory species the AA Opuzen has concluded that the impact of the dam would be non-significant and, therefore, the whole irrigation project will have no significant impact on the sites of ecological network and their integrity.

Evaluation of the AA and EIS documentation

a) AA studies

AA Koševo – Vrbovci seems to be acceptable, above all as this part of the project seems to be conflict-free. As the AA Opuzen regards, the most problematic issue is represented by the reclinable dam and its impacts on the water fauna of the Neretva River.

The assessment is incomplete for the following reasons.

i) Neretva River and its delta serve as a mating and feeding place for more than 100 species of fish. Three of them are migratory but it does not mean that the rest does not need to move along the riverbed in both directions during their regular way of life. In

addition to it, many other living organisms, especially invertebrates – both freshwater and marine – use to use the river as their habitat, just because of its brackish character.

ii) A concrete plateau serving as the foundation for the reclinable dam will cross the whole river in a form of a block 27 x 110 m of 2 m height. On this plateau, another block with a dimension of 11 x 110 m and 2 m height will be fixed. This giant threshold in the riverbed will definitely change the river environment, hydrological circumstances, bottom characteristics, etc. Just its physical impacts on the dynamic of river flow and associated changes in the hydromorphological structures may significantly affect all animal and plant communities of the bottom, as well as all swimming organisms. Any assessment of this impact is missing.

iii) When the dam is lifted up all river organisms normally passing along the bottom will be prevented from continuing their normal way of life. Among them many target features of ecological network including endemic fish species occurring only in the Neretva catchment. Impacts on these species have not been studied. Even if it is dealt with in the future within the study required by the AA it is obvious that one or two fishpasses addressed to three explicitly migratory species (with seasonal migrations of a very specific character) cannot solve the problem of all other non-migratory organisms during their everyday movements along the bottom. Impact on such species can be detrimental and can highly exceed the impacts on the migratory species.

iii) For 6 months a year the dam will change the hydrological circumstances in Neretva River at length of about 12 km upstream. Letting down and reclining of the dam elements during the transit of big vessels will again act on the hydrological circumstances in this whole stretch – how, it could only be said using a hydraulic model. However, no such modeling has been envisaged.

iv) All good practice guidelines for appropriate assessment, as well as some official interpretations of Art. 6.3 of the Habitats Directive, insist that this assessment can only be done based on the *proposed solution*. Any assumption cannot be taken into account as there is neither proof of the efficiency nor willingness of the proponent to implement the assumed measures. In this very case, neither inventory nor migration study of the fish fauna had been done before both EIA and AA; however, the AA study *assumed* that in the future all missing information would be gathered, right solution proposed, and based on this (unjustified) assumption it concluded that there would be no significant impact. **Such an approach is not acceptable.**

v) Last but not least, as mentioned in the description of the technical solution of the dam, at the basis of movable elements there will be openings serving as “jets” to prevent the salt water to penetrate upstream. However, it is well known that just the migratory fish species are guided to the fishpasses by so-called “guiding ray” of water of sufficient speed and power: these species migrate against the direction of this guiding ray. It may easily happen that the speed and strength of the water rays gushing from the openings at the bottom of the dam could exceed those parameters of the water stream in the fishpass

(fishpassess). If this is the case the fish cannot find the fishpass, and if the water rays from the openings of the dam were too powerful they could remain highly attractive for the fish but at the same time prevent them to penetrate through the dam. In such a case, the whole migration would be prevented with fatal consequences for the migratory fish species in question. Therefore, not only a fish (and other water organisms) migration study is needed but also modeling of the speed and strength of the water rays from the openings at the bottom of the dam – this could probably be possible to model using a hydraulic mathematical model.

b) EIS

Some of the objections mentioned in the previous section are probably more relevant to the EIS rather than to the AA: for example, the inventories and migratory study as regards fish (but also other water organisms moving along the Neretva River) should be prepared within the framework of the EIS. Also, the same objection applies: any conclusion about the significance of impacts – neither EIA nor AA – cannot be based on an assumption that some additional studies will be done in the future, the project will be harmonized with their (currently unknown) requirements and then it will have no impact.

Nevertheless, the general impression from the EIS is that as regards the impacts on fauna, flora and habitats they have been seriously underestimated (or – rather – not assessed at all) compared to the assessment of impacts on other components of the environment.

Responding to the objections of the NGOs

This evaluation has been carried out because of the NGOs who challenged the EIS and AA. In conclusion, their objections can be responded as follows.

Objection	Evaluation
project itself does not have any ecological perspective – its only aim is an increase in agricultural production	Statement justified
very existence of the Ramsar site has not been even mentioned in the documents	It has been mentioned but without any description of the significance of the Ramsar site and without any evaluation of the impacts on it
no assessment why fresh water in the Delta is missing has been done	Statement not justified. The reasons for the decrease of the freshwater flow in Neretva River as well as increase in salinization have been well described (impact of Upper Horizons projects in

	Bosnia and Hercegovina, extraction of gravel bank at Neretva estuary, decrease of the bottom level of the river due to zero transport of sediments from upper stretches of the river caused by the dams upstream)
no documentation of the illegal land-use and no solution of the actual transformation problem of prime natural habitats into plantations and intensively used agricultural plots has been given (the accelerated land-use and intensification of the production is one of the major impacts of the project which has to be described in the EIA)	Statement justified – the project takes as granted that agricultural production has to be increased
proposed protection and mitigation measures are extremely general and thus not applicable - a clear list of indicators to be defined and mapped in advance is missing	Statement justified
it is not possible to define any impact of the project based on the data and provisions provided by the EIA	The EIS concludes that there will be no significant impact – but based on existing data only, without trying to get additional (missing) data
there has been no assessment of the fish migration in the Delta and especially in the part which will be impacted by the project: if there is no assessment, how is an EIA possible?	Statement justified
allegedly, irrigation is planned also to area famous for its dry submediterranean grasslands traditionally used as pastures; these “biodiversity hot-spots” would be destroyed if irrigated	This assumption cannot be either confirmed nor denied: neither EIS nor AA do not specifically mention the area of “Luke” at all, therefore, no impact assessment not AA dealt with this area

Conclusions

It can be concluded that all important objections of the NGOs have been justified.

There is no doubt that the given project would improve the agricultural production in the Neretva Delta. However, the objective of EIA is not to support the concern of the project proponent but to assess impacts on the environment, highlighting its

most sensitive components. This has not been the case here. The AA has omitted some potentially very significant impacts and its conclusion has been based on an assumption which had not been proposed by the project itself.

On the basis of the current data it cannot be said that the project will have adverse impacts on biotic components of the environment; however, its conclusion that there will be no significant impacts is not justified.

Ombla power plant project

Documents evaluated

This evaluation has been based on the following documents (all in Croatian):

Original document name	English translation	Acronym used
HE Ombla. Studija utjecaja na okoliš. 195 pp., Hrvatska elektroprivreda, Zagreb, 1999.	Power station Ombla. EIA study.	EIS
Utjecaj HE Ombla na faunu šišmiša u Vilinoj špilji i mjere zaštite. 33 pp., Zoological Institute of the Mathematical - Natural Science Faculty of the Zagreb University, 2008.	Impact of the Power station Ombla on the bat fauna of the Vilina špilja cave and protection measures.	Bat study

The project and its objectives

About 3 km N of the city of Dubrovnik, the shortest Croatian river Ombla – 35 m long (some sources speak about 50 m) – empties into the long and narrow Adriatic bay called “Rijeka Dubrovačka” and discharges into the sea. The flow rate of this unique river, collecting its water from about 600 km² catchment in the karstic region of Croatia and Bosnia and Herzegovina, fluctuates between 2.3 – 113 m³/sec, with an average value of 23.9 m³/sec. This underground flow goes through the main inflow canal situated at minus 50 m under the sea level and has been used for decades for supplying the city of Dubrovnik with drinking water.

In 1980, an idea of possible use of this powerful water source for production of electricity emerged. It was included into local spatial plans, and preparatory works begun. The idea is based on the fact that river Ombla originates from the huge underground canal above which there are more than 200 m of porous limestone rocks settled in impermeable flysch rock wall several hundred metres high. If this porous rock was injected with concrete and all caverns and canals plugged up to the elevation of 130 m above the sea level an underground accumulation of huge amount of water would originate.

Due to the height difference from minus 50 m up to plus 130 m the hydrostatic pressure of this volume of water would be sufficient to drive turbines producing electricity. The water flowing into the turbines through huge artificial canals (about 5 m in diameter) and a collective shaft would then continue to the original (current) spring of the Ombla river and

then to the sea. By a system of flow-around channels the minimum biological discharge would always be ensured; if the water level was low (spring, summer) only one small turbine would be in operation while at high water the entire energy of all the accumulation would be used. All the machinery, canals etc. would be hidden underground with only single control building newly built on the surface.

To build the inner underground accumulation, the limestone rock walls would be injected with concrete in a three-stepped curtain about 50 m wide and about 180 m high. Injections are supposed to plug all natural cavities in the rock so that an underground construction resembling a dam will develop. At the level of 130 m above the sea level, a safety overflow should prevent flooding of the cave systems located immediately above the water accumulation – but partly also below this level (see further). In addition to the energetic use, a collector for a new water line to feed the wider Dubrovnik region is planned within the location of the underground power station.

About 8 metres above the planned highest level of the underground accumulation, the “Vilina špilja” (“Nymph Cave”), an extensive underground cave system, is located. Shortly after the entry the caves fall down below the level of +130 m, and the caves called “Visoka dvorana” and “Koraljni kanal” are definitely deeply below this level, too (the difference can be around minus 40 metres). Therefore, it is apparent that once the accumulation is full the lower elevations of the cave system could be flooded due to exudation (leaking) of water through the porous rocks.

The EIS

In 1989, a preliminary project was prepared and approved by the Yugoslav authorities. Subsequently, Croatia declared independence and the war started, followed by occupation of the wider Dubrovnik region by the Yugoslav army until the end of 1990s. Then, however, the work continued and in 1999, the EIS was prepared, discussed, and approved following to the legislation in force at that time.

The biological part of EIS is very simple and succinct. It evaluated impacts on the scenery as the region of Ombla spring had been “protected scenery” since 1964. Impact was considered none due to the underground character of the project. Then, underground fauna was briefly described (one page in total), including two species of endemic crustaceans which, however, did not belong to the protected species of Croatia at that time. No protected species according to the law were found, and “if they were there, it was not their permanent habitat but they had been transported there by the underground streams from the wider watershed” (Section A.3.15) – a justification for their exclusion from any impact assessment. Last but not least, impacts on bats known to occur in the Vilina špilja cave system were described and assessed as insignificant. It makes no sense to evaluate if this approach corresponded to that time legislation (probably yes) but it can be concluded that EIA basically ignored the fauna issues.

The level at which biodiversity was assessed can be documented e.g. on the section B.1.4.8. "Impact on soil, flora and fauna" which has just one paragraph on biodiversity issues saying: "Machinery of the power plant, except for the control building, is situated underground, in order to minimise the input of the power station on soil, fauna and flora to the lowest level possible....Bat colonies inhabiting the Vilina špilja will have left the cave due to the disturbance during the construction, and most likely will return to the cave again."

So the overall conclusion of the impacts on the living world: "The project, once in operation, due to maintaining the current discharge at the spring of the Ombla River, will have no adverse impacts on the current associations of water habitats at Ombla and Rijeka Dubrovačka" **is not acceptable.**

The bat study

In 2008, a group of scientists delivered a study commissioned by the investor describing the results of their long-term investigations of the Vilina špilja and several other caves in the wider vicinity of Dubrovnik as regards the bat fauna.

Between 2000 and 2008, they investigated the cave in various seasons and came to following conclusions:

- a) Vilina špilja does not serve as a hibernation place for bats.
- b) From spring to autumn, the cave system supports following species: *Rhinolophus blasii*, *R. euryale*, *R. ferrumequinum*, *R. hipposideros*, *Myotis blythi*, *M. emarginatus*, *Miniopterus schreibersii*.
- c) The total number of individuals exceeds 8,000 thus making the Vilina špilja the most important summer roosting place for bats south of the Neretva River and the thirteenth out of 20 of the most important bat caves in Croatia.
- d) The originally proposed design of the Ombla project could endanger these bats as due to the soaking of the water through the porous rocks most of the cave system could be flooded during the high water.

Therefore, in collaboration with the investor and the project architect the authors were seeking for appropriate mitigation measures. As they wrote, they finally found such a solution consisting of new drainage tunnel going down from the lower parts of the Vilina špilja cave system into the lower levels of the rock outside the dam made from the concrete injection curtain; this tunnel would lead all water soaking into the Vilina špilja system outside of the whole accumulation (and further to the spring of Ombla river) which should enable the bottom of caves be kept dry.

Opinion of the authors of the bat study was that if this measure is implemented and no works in the caves are allowed from April to November the bats will resettle the Vilina špilja cave again.

Conclusions and recommendations

The EIA as described itself was extremely brief – just one para about fauna and flora – and did not seem to be based on any field surveys or detailed literature reviews. Unsurprisingly therefore it concluded that there were no impacts foreseen. It is beyond the possibility of this evaluation to determine if the result of the EIA done over 13 years ago are still valid today (although the subsequent bat surveys would indicate otherwise).

Thus, it is highly possible that the results of EIA for Ombla project are legally valid even though the quality of the EIA is very poor when it comes to fauna and flora impacts and does not justify its conclusion of no impacts.

In 2007, the Croatian ecological network was declared by the Governmental decree, and Vilina špilja became one of its sites as well as the proposed Natura 2000 site (HR2001010). Five species of bats, as well as the critically endangered olm *Proteus anguinus*, have become its target features². Under the normal circumstances, an appropriate assessment of the Ombla project should be carried out – however, the permitting procedures had been completed far before the site was designated.

Another problem of the “Ombla case” is that this underground cave system is inhabited by unique underground fauna, especially of crustaceans and fish communities including many endemic species (and many unknown completely to science). While the habitats for bats will probably be maintained by the proposed drainage of the bottom of the lowest caves of the Vilina špilja system all animal world below it, i.e., in the inflow canals, cavities and other (unknown) caves in the wider area, will be destroyed (permanently flooded) forever. However, this fauna does not enjoy any protection as it was either unknown when the lists of protected species were compiled or remains unknown to science completely. Thus, paradoxically, the most valuable species can legally be destroyed and enjoy no protection compared to some other, less threatened species which are on the lists.

Another issue which has never been mentioned is that the majority of the cave and canal systems included in the Ombla project lie in Bosnia and Herzegovina: the project is going to bury the underground world of another country which, due to its difficult political, economic and ethnic situation is not inclined to require e.g. a transboundary EIA.

It has also to be noted that in the whole EIS no energetic gains have been mentioned. Having in mind the extreme fluctuations of discharge of the Ombla River (from 2 to 113 cubic meters per second) it would be interesting to know how technically and economically viable the project will be in terms of:

i) the total amount of electricity expected to be produced per year, and

² The EIS mentioned that according to the local people “olm should have occurred there”; however, no evidence confirming or denying it was given within the EIA procedure.

ii) the distribution of energy gains during the year.

The former data would show the absolute importance of this new source of energy e.g. for the wider area of Dubrovnik (i.e., what percentage of the total consumption of energy could be supplied by this new source), the latter can exist on its own or if it needs to be supplemented by another source(s) during the seasons when the water discharge is extremely low. The EIS speaks only about the advantages of the new source of energy and that it has been in line with all planning documents but does not mention any *need* or *urgency* of this project.

According to public sources (press), in the wider area towards NW a new, huge project of a cascade of dams called “Upper Horizons” is under preparation in Bosnia and Herzegovina; at the same time, at Cavtat, SE of Dubrovnik, another energetic project “Dubrovnik II” is under preparation, representing a final step in a cascade of dams of the Trebinje area (again, most of its reservoirs lie/should be located in Bosnia and Herzegovina). All these projects will have serious impacts on water circumstances and the whole karstic region of the wider area.

They have never been assessed from either the perspective of wider hydrological connections or impact on fauna or the living world of the surface rivers, especially Neretva River; most of them are to be implemented on the territory of Bosnia and Herzegovina but with direct (not assessed) impacts on the Croatian territory. If all of them, including that on Ombla, are implemented the significant and irreversible impacts on future Natura 2000 sites as well as unique underground fauna are guaranteed even though this cannot be underpinned by any appropriate assessment now.

Conclusions/recommendations:

As the permits for this project were delivered some years ago, it is not possible to review this project in the context of article 6.3. However in view of the serious concerns expressed by the NGOs on the impact of the project and the very poor quality of the EIA it would be very useful to get the following information:

- **Confirmation whether the Authorities really intend to implement the project. What is the economic/technical basis for this in terms of the total amount of electricity expected to be produced per year, and the distribution of energy gains during the year; this should be compared with the production of all other currently implemented energy projects in the wider area.**
- **Confirmation that if the project does go ahead the recommendations for mitigation measures in the bat survey will be implemented in full – i.e., installation of the new drainage tunnel and constructions works to be done outside the summer roosting period of April to November. Otherwise there may be a case to answer for as regards Article 6.2 of the Habitats Directive in due course.**

- It would also be important to ask what studies have been done to assess the impact of the project on the olm and the habitat 8310 (both protected under Habitats Directive)
- Consideration of the cumulative effect of this project and the other grand schemes foreseen for the area which could collectively have a major impact on these cave systems and their species.

Sava Waterway Regulatory Works

Documents evaluated

This evaluation has been based on the following documents (all in Croatian):

Original document name	English translation	Acronym used
Uredjenje savskog plovnog puta i odredjivanje regulacijske linije Save od Račinovaca do Siska. Studija o utjecaju na okoliš. Knjiga 1 i 2. 333 pp., VPB d.d., Zagreb, 2010.	Regulation of the Sava waterway and determination of the Sava regulatory line from Račinovac up to Sisak. EIA study. Books 1 and 2.	EIS
Uredjenje savskog plovnog puta i odredjivanje regulacijske linije Save od Račinovaca do Siska. Studija o utjecaju na okoliš. Knjiga 3. Studija glavne ocjene prihvatljivosti zahvata za ekološku mrežu. 87 pp., VPB d.d., Zagreb, 2010.	Regulation of the Sava waterway and determination of the Sava regulatory line from Račinovac up to Sisak. EIA study. Book 3. Appropriate Assessment study	AA

The project and its objectives

For details of the project, see “New river regulation projects along Croatia’s major rivers (Danube, Drava, Mura, Sava, Neretva) – threat to proposed Natura 2000 sites” from 2nd June, 2011.

Briefly, in 2010 a project was submitted having the following objectives:

- a) restoration of the Sava river waterway (384 km)
- b) improvement of the waterway from AGN Class III up to Class IV (minimum profile 70 x 2.5 m) and wherever possible, Va.

The minimum radius of curves for the bi-directional navigation is 360 m. However, in some sections the real radius of Sava is only 150 m. As this project has not envisaged any digging through existing curves (only the natural riverbed should be followed) it is expected to have 21 sections with one-directional navigation only. However, on page 13 of the EIS reads: “However, after the implementation of envisaged digging through in the future, navigation will become bi-directional” (No nakon izvedbe predviđenih prokopa u budućnosti, plovidba će postati dvosmjerna).

The project should consist of reconstruction of current constructions and building of the new ones, as well as of deepening of the bottom. The purpose of the construction is to compensate the effect of dredging so that the decline of the water level after the works will have been implemented should not be more than 10 cm compared to the current status.

Three types of constructions are envisaged: groynes, embankments, and thresholds. 106 new groynes are envisaged, as well as reconstruction of 12 old ones. Embankments: on the left river bank 6.855 km on new ones and 34.776 km of reconstruction of current ones is envisaged (41.635 km in total). On the right river bank, 13.084 km of new embankments and 8.606 km of reconstructed ones are planned (21.690 km in total). Altogether, 63.325 km of embankments will be both newly constructed or restored. Four transverse thresholds are planned. Bottom deepening should lead to the production of 1,734,000 m³ of gravel.

No alternative solution has been assessed: “the purpose of the EIS was not to compare any other solutions as the investor alone had evaluated possible alternatives prior to this EIS” (p. 28).

The complaint

The NGOs complained, in summary, for the following:

- EIS is lacking a 1) quantitative, 2) qualitative and 3) long-term assessment of the impacts on the natural riverine corridor based on international standards as hydromorphological and ecological classification of the status and is ignoring the riverine dynamic and natural changes of the meandering Sava River, the most important ecological factor;
- ecological characteristics and hydromorphology of the Sava river basin have not been assessed;
- only the immediate vicinity of the proper river is taken as an impact zone instead of the whole floodplain;
- huge amount of gravel to be excavated has not been challenged by the EIS despite the fact that the lack of sediments is one of the biggest challenges of Sava and is one of the reasons of the lowering of the riverbed by 1.2 – 2 m during the period 1973 – 2010; the issue of sediment transport has not been treated at all;
- while the project consists of two interlinked parts – deepening of the bottom and building of regulatory constructions - EIS only deals with the latter: impacts of deepening have not been assessed at all;
- precise location of particular constructions remains unknown so that also their impact could not be evaluated;
- no alternatives have been assessed;

- impact on most of species present in the area has not been assessed (e.g., from 237 recorded bird species, impact has been evaluated on 8 of them only);
- main initial statement of the AA that “as most of negative impacts on biodiversity already has been existing the envisaged project cannot have additional significant impacts” is completely wrong;
- for these and many other objections, the EIS should be refused as it contradicts all international standards for implementation of such studies, as in fact, this is not a study assessing impacts on the environment but a study supporting investor’s aim to implement the project.

The evaluation

The main aim of this evaluation was to study the full Croatian versions of the EIA/AA documents.

a) *the EIS*

A. Project description

Despite full of technical details, this section of the EIS does not enable to locate particular constructions nor to compare it with location of valuable habitats and habitats for species – any of such data are missing.

B. Scope of the EIS

EIS only focuses on the proper river and does not take into account the surrounding floodplains.

C. Description of biodiversity

This section brings long and sometimes detailed lists of habitat types and species occurring along Sava, however, without location nor data on their sizes/areas. It is obvious that the authors of EIS undertook two one-day investigations (dates are not given) to check e.g. the presence of some vertebrates in the area; no systematic and tailor-made research was conducted (for the project worth of more than € 81 million) for any of the taxonomic group.

D. Assessment of impacts

After extensive sections listing various data and containing descriptions of particular environmental factors, one would expect the proper assessment of impacts of particular project’s factors.

However, such assessment cannot be found. A highly illustrative example may become description of one of rare bird species – White Tailed Eagle, *Haliaeetus albicilla*.

<p>(<i>Haliaeetus albicilla</i>) se gnijezdi u velikim vlažnim područjima, uz šaranske ribnjake i velike rijeke. Gnijezdi se u šumama, a hrani se uglavnom ribom ili vodenim pticama. Stoga je ovisan o oba staništa: šumskom i vodenom, u ovom slučaju riječnom. Savski sprudovi i plićaci su njegova optimalna hranilišta. Za vrijeme izgradnje regulacijskih građevina doći će vjerojatno do negativnih utjecaja na njega. Na nacionalnom nivou je ugrožen (EN), a populacija je procijenjena na 135-170 parova. Na europskom nivou je rijedak (Rare). Na Savi od Siska do državne granice obitava 50-60 parova štekavaca, što čini 35 do 40 % od ukupne nacionalne populacije. Stoga je savska populacija značajna na nacionalnom nivou. Planirani zahvat, odnosno njegov utjecaj, neće biti znatan i populaciju neće znatnije ugroziti.</p>	<p><i>Haliaeetus albicilla</i> nests in extensive wet areas, next to carp fishponds as well as to large rivers. It nests in forests and feeds mainly on fish and waterfowl. Therefore it depends on both habitats: forest and water, in this case riverine. Sava river banks and shallow places represent his optimal feeding places. During the building of regulatory construction it will likely be adversely affected. It is endangered at the national level (EN) and its population is estimated for 135 – 170 pairs. It is marked as „rare” at the European level. Sava from Sisak to national border is inhabited by 50 – 60 pairs of this eagle, which represents 35 – 40 % of its total national population. Therefore, its population at Sava river is important at the national level. The planned project, resp. its impact, will not be significant and will not significantly endanger its population.</p>
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In this way, „assessment” on all habitats and species has been conducted:

- first, habitat/species is described (usually so detailed data as in the case of eagle are missing, no population estimates neither at the national level nor in the project area are mentioned)
- it is mentioned that significant part of its population should be under the impact of the project
- finally it is stated that the impact will not be significant – without any justification, without any underpinning with neither quantitative nor qualitative data (simply „I think that...”).

The way how the authors of the study consider the project’s impacts can be illustrated by another example, also dealing with birds:

<p>D.1.1. UTJECAJI NA VRSTE PTICA RIJEČNOG</p>	<p>D.1.1. IMPACTS ON BIRD SPECIES OF THE RIVERINE</p>
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STANIŠTA	HABITAT
<p>Rijeka Sava i njena dolina imaju vrlo bogatu ornitofaunu zbog mnoštva raznolikih staništa koje je rijeka stvorila i koje održava plavljenjem. Na tom području nalaze se dva područja važna za ptice Nacionalne ekološke mreže: Donja Posavina i Jelas polje s ribnjacima i poplavnim pašnjacima uz Savu. Oba područja su važna i na međunarodnom nivou. Iako je rijeka Sava ta područja oblikovala i održava ih, smatra se da planirani radovi na uređivanju plovnog puta neće imati utjecaja na njih. Razlog za takvo mišljenje je u tome što rijeka Sava utječe na ta područja samo za visokih voda kada ih plavi. S obzirom da izgrađena nova "pera" na visoke vode nemaju utjecaja, zahvat neće imati utjecaja na okolna područja.</p>	<p>River Sava and its valley possess very rich ornithofauna due to variety of different habitats created by the river and maintained through flooding. In this area, two SPAs of national ecological network occur: Donja Posavina and Jelas polje with fishponds and flooded pastures along Sava. Both these areas are important also at international level. Although the river Sava has formed and maintained these areas it is considered that the planned works to regulate the waterway will have no impact on them. Reason for such opinion is that Sava river only affects these areas at high water levels when it floods them. Due to the fact that newly established "groynes" are expected to have no impact on the high waters the project will have no impact on adjacent areas.</p>

The above example shows a pure "engineering" approach ignoring basic knowledge on hydrogeology of the floodplains: in addition to more than 100 new groynes, 20 km of new and 43 km of restored embankments are envisaged, with possible (but unidentifiable due to lack of any data) significant impacts on many bird as well as many other species.

E. Evaluation of impact on species

Similarly, one can observe permanent misunderstanding of the concept of species protection: on page 214 the EIS says that „Međutim, važno je da zbog izgradnje neće doći do nestanka niti jedne životinjske vrste“ – „Nevertheless, important is that due to the construction (of the project) no one animal species will get extinct“. However, species protection concept both of the Birds and Habitats Directive as well as Croatian Nature Protection Act focuses on local (sub)populations of particular (protected) species, not on the total population of a species as a whole – but every EIS repeats the same sentence quoted above.

b) *the AA*

Due to the extraordinary length of the project area, following sites of ecological network (and future Natura 2000 sites) likely to be impacted have been identified:

SACs	SPAs:
<ul style="list-style-type: none"> ▪ Sava (HR2001116) ▪ Lonjsko polje (HR2000416) ▪ Sunjsko polje (HR2000420) ▪ Dolina Une (HR2000463) ▪ Vlakanač – Radinje (HR2000424) ▪ Jelas polje (HR2000425) ▪ Dvorina (HR2000426) ▪ Gajna (HR2000427) ▪ Sava-Štitar (HR2000431) ▪ Spačvanski bazen (HR5000006) ▪ Dražiblat (HR2000417) ▪ Krapje đol (HR2000418) ▪ Donji Varoš kod Okučana (H2000830) 	<ul style="list-style-type: none"> ▪ Donja Posavina (HR1000004) ▪ Jelas polje s ribnjacima i poplavnim pašnjacima uz Savu (HR1000005) ▪ Spačvanski bazen (HR1000006)

For any of these sites, list of their target features³ with description of their biology was given and conclusion was made about the presence or absence of likelihood of significant impact of the project on them.

However, the conclusion about the presence/absence of such likelihood of significant impact has not been justified: in most target features (e.g., in all fish species!) the AA simply says “Zahvat neće značajno utjecati na ovaj cilj očuvanja.” (“Project will have no significant impact on this conservation objective.”)

As a methodological approach for a decision about the likelihood of an impact, following has been mentioned:

Uz pomoć svega navedenog procijenjeno je ima li utjecaja pojedinog objekta zahvata na neki od ciljeva očuvanja ekološke mreže. Kod stanišnih tipova značajnim utjecajem smo smatrali gradnju ili rekonstrukciju objekta zahvata (pero, prag, obaloutvrda) na lokaciji rijeke s obalom obraslom vegetacijom koja predstavlja stanišni tip – cilj očuvanja pojedinog područja ekološke mreže. Dakle, utjecaji se	By means of all above-mentioned, it has been assessed if there was impact of individual objects of the project on any of conservation objectives of the ecological network. As regards habitat types, as significant impact the construction or restoration of an object (groyne, embankment, threshold) at a place with the river bank overgrown by vegetation representing a habitat type – conservation
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³ The Croatian Nature Protection Act uses the term „ciljevi očuvanja“ – “conservation objectives” – instead of “target features” or “qualifying features” but the meaning is identical: habitat types and/or species for which the given site was designated.

odnose na sve objekte zahvata koji dolaze uz stanišne tipove koji prema karti staništa i terenskom uvidu obrastaju obale Save u pojedinom području ekološke mreže.	objective of particular site of ecological network - was considered. Hence, impacts refer to all objects of the project which occur along with habitat types which following the habitat map as well as the field investigation cover the banks of Sava in particular sites of ecological network.
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In some sites, possible impact on particular habitat types and species was identified, as exemplified on kingfisher *Alcedo atthis* in the site Donja Posavina (HR1000004):

“MOGUĆ NEGATIVAN UTJECAJ – izgradnja 3 i rekonstrukcija 19 obaloutvrda, izgradnja 69 i rekonstrukcija 9 pera” (**“POSSIBLE ADVERSE IMPACT** – construction of 3 and reconstruction of 19 embankments, construction of 69 and reconstruction of 9 groynes”).

Following this list of “possibly adversely impacted” species and habitat types, a chapter **“K.3.1.2. Utjecaji zahvata na ciljeve očuvanja ekološke mreže“** („Impacts of the project on the conservation objectives of the ecological network“) follows with a table with the final „assessment“ of the impacts. For the kingfisher in the above site of ecological network, this „assessment“ reads as follows:

Donja Posavina (HR1000004)	Vodomar - <i>Alcedo atthis</i>	Zbog pojedinačnog gniježđenja i vrlo malog broja novih obaloutvrda neće biti utjecaja na ovaj cilj očuvanja područja ekološke mreže.
	Kingfisher	Due to sporadic nesting and very small number of new embankments there will be no impact on this conservation objective of the site of ecological network.

To sum up the procedure:

- a) Evaluation is done site by site of all target features of particular sites of ecological network. For each of them, statement on likelihood of presence/absence of an impact of the project is done – without any justification for those excluded from any possible impact.
- b) For some target features, likelihood (possibility) of significant impact due to direct contact with particular constructions is mentioned.
- c) At the end, possibility of impact on all those target features is excluded without underpinning it by any quantitative nor qualitative data.

A brief section entitled **„K.3.1.1. Utjecaji zahvata na cjelovitost područja ekološke mreže“** („Impacts of the project on the integrity of sites of ecological network“) follows. It is

fully incomprehensible: first, instead of „site integrity“ it speaks about the „integrity at the level of the entire network“; second, definitions of the „integrity“ being composed of „structure, viability and changes in the course of time“ are hardly understandable. According to the AA, integrity of any of the sites in question has been impacted.

In the end, final conclusion of the entire AA reads:

<p>K.4. ZAKLJUČAK</p> <p>Većina negativnih utjecaja po biološku raznolikost i ekološku stabilnost područja ekološke mreže (posebice rijeke Save) već postoji (produbljenje korita, pad razine podzemnih voda, smanjenje meandara i prostora za njihovo nastajanje, količina donesenog materijala). Stoga predviđena rekonstrukcija i dogradnja vodnih građevina neće imati izrazitih, kako pojedinačnih tako i kumulativnih utjecaja s do sada provedenim regulacijskim aktivnostima rijeke Save.</p> <p>Kako se u ovoj fazi uređenja plovnog puta ne predviđa prokop meandara i dodatno skraćivanje toka Save, niti dodatno vađenje riječnog nanosa (samo premještanje), zbog ranijih negativnih utjecaja, predviđena rekonstrukcija i dogradnja vodnih građevina, na srednjoročnoj osnovi može poboljšati sadašnje hidrološko stanje unutar rijeke Save, pa onda i u ostalim područjima ekološke mreže koja o njoj ovise.</p> <p>Stoga ovaj zahvat, sa stanovišta utjecaja zahvata na ciljeve očuvanja i cjelovitost područja ekološke mreže, neće imati značajniji utjecaj, te se može smatrati prihvatljivim.</p>	<p>K.4. CONCLUSION</p> <p>Majority of negative impacts on biodiversity and ecological stability of the sites of ecological network (especially of the Sava river) has already been existing (deepening the riverbed, decline of the groundwater level, decrease in meanders as well as the room for their origin, amount of introduced sediments). Therefore, the envisaged reconstruction and construction of water objects will have no significant – neither individual nor cumulative – impacts compared to up-to-now realised regulatory works at the Sava river.</p> <p>As at this stage of regulation of the waterway neither digging through of any meander as well as further shortening of the flow of Sava is envisaged, nor additional excavation of river sediments (only their replacement), due to earlier adverse effects the envisaged reconstruction and construction of water objects may, at the middle-term level, improve the current hydrological status inside the Sava river, and then, subsequently, also in other sites of ecological network which depend on it.</p> <p>Hence this project, from the perspective of an impact of the project on conservation objectives as well as integrity of the sites of ecological network, will have no more significant impact and, therefore, may be considered as acceptable.</p>
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In the final section of the AA study, mitigation measures have been proposed – in fact a single measure saying that embankments should not project from the water level.

Conclusions

It can be concluded that all major objections of the NGOs have been justified.

The real challenge is the approach to such development projects in general and understanding of EIA as well as AA. It is obvious that the development projects do not take the nature and biodiversity objectives into account as their intrinsic part. The purpose of this evaluation is not to challenge the economic legitimacy of the project. However, proper impact on nature and biodiversity assets is clearly missing. Even though the project has been included in spatial plans, EIA (including AA) cannot be considered just as a formal tool how to confirm its feasibility, it needs to be a tool of evaluating its environmental impacts. In addition, the following main issues need to be pointed out:

1. Scoping of EIA

It is a specific administrative procedure during which the competent authority prescribes the scope of the EIS. This procedure of scoping does not seem to be open to public – it is an administrative procedure between the competent authority (Ministry) and investor. Therefore, there is neither possibility for the concerned public to influence the scope of future study nor to control if e.g., the competent authority respects the recommendations/requirements of other concerned authorities (e.g., in the field of nature protection).

2. Technical expertise of companies authorised to undertake the EIA (and AA)

Despite the very complex rules for companies (legal persons) which apply for a license to carry out the above studies it seems that once such companies meet the formal requirements there is no check of quality of their work. As the studies are a collective work one can hardly identify the authors of particular sections and suggestions. The companies are paid by the investor and there is no mechanism how to verify their products.

3. Decision of zone of impact of given projects

It seems that there are no national guidelines recommending how to establish the zone of possible impact of particular projects. Thus, in the given case only the flow of Sava river was taken into account – based on the decision of authors of EIA and AA – without taking into account possible wider relationships with the floodplain and adjacent areas. By narrowing the possible zone of impact in such a way, some of the conclusions on lack of impacts may be considered justified: in many cases there is really no impact on the proper river but there might be some on adjacent areas – if these are excluded from the assessment before it starts then formally “no impact” can be considered as a “true result”.

4. Absence of justification of decision about impacted/not impacted target features

Decisions on what habitats/species are likely to be impacted are subjective and not underpinned by any – even very simple – justification. Simply “impact is excluded” – as the authors of the study have said so.

5. Absence of any assessment of significance of impacts

Almost no quantitative and/or qualitative data are given, and even if they are (which is very rare) they are not followed by any consideration on the significance of the impact: looking at the above example of White Tailed Eagle, the EIA study says that up to 40 % of its national population may be impacted, but concluding in the following sentence that the impact cannot be considered significant – without any single justification.

6. Wrong understanding of the species protection concept

The provisions of the Nature Protection Act (transposing the EU Nature Directives also in the field of species protection) are interpreted so that if the species as a whole is not threatened by extinction due to the project there cannot be any significant impact. Such an approach can justify any harmful project, maybe with an exception of impacts on some endemic species, and fully contradicts both law and the ecological requirements.

Thus, it seems that changes in system of both EIA and AA – at least in the field of impact on biodiversity assets – are necessary. Without them, any of the studies submitted in the framework of the given project cannot be considered as meeting the requirements of both EIA and Nature legislation.

Drava – Mura confluence case

N2K sites affected by the project

Following sites of the national ecological network (future pSCIs and SPA) overlapping with project area will be impacted:

- HR5000013, Drava (pSCI)
- HR2000399, Veliki Pažut (pSCI)
- HR1000014, Gornji tok Drave (SPA)

These sites have the following target features (including those at national level)(those affected by the project indicated in colour):

HR5000013, Drava
Target features : <i>Gymnocephalus baloni</i> ; <i>Emys orbicularis</i> ; <i>Gobio albipinnatus</i> ; <i>Aspius aspius</i> ; <i>Umbra krameri</i> ; <i>Bombina bombina</i> ; <i>Castor fiber</i> ; <i>Hyla arborea</i> ; stream fungi; <i>Zingel streber</i> ; other species threatened at European and national level; <i>Misgurnus fossilis</i> ; <i>Gymnocephalus schraetser</i> ; <i>Astacus astacus</i> ; <i>Pelecus cultratus</i> ; <i>Triturus (crystallus) dobrogicus</i> ; <i>Lutra lutra</i> ; <i>Cobitis elongatoides</i> ; Odonata; <i>Sabanejewia balcanica</i> ; A.2.7.1.1. with <i>Myricaria germanica</i> ; 3150

HR2000399, Veliki Pažut
Target features : <i>Castor fiber</i> ; E.1.1.2. (91E0*), D.1.1.

HR1000014, Gornji tok Drave
Target features : <i>Phyloscopus trochilus</i> ; <i>Sterna hirundo</i> ; <i>Sterna albifrons</i> ; <i>Actitis hypoleucos</i> ; <i>Luscinia svecica</i> ; <i>Haliaeetus albicilla</i> ; <i>Alcedo atthis</i> .

Explanation: *Myricaria germanica*: significantly affected target feature;

Sterna hirundo; *Sterna albifrons*; *Actitis hypoleucos*; *Luscinia svecica*; *Haliaeetus albicilla*; *Alcedo atthis*: temporarily affected target features (data from the AA study made by the Oikon company – see section A.4).

The course of AA

The project proponent - Hrvatske vode – VGO (branch) Osijek – started the procedure of screening for AA in mid-2008. Due to the opinion of SINP saying that significant impacts on sites of ecological network cannot be excluded the main assessment had to be carried out. The AA study was elaborated by the company Oikon d.d.o. in April 2009. The conclusion of the main assessment was a confirmation of significant adverse impact on the habitat type *91E0 (its endemic Croatian subtype (Galio-Salicetum albae Rauš 1973) due to direct removal of about 4.5 ha of it during the digging of the cunette as well as construction of the access road. Further, impacts (above all due to noise) on the above bird species were also envisaged; however, due to right timing of the construction (winter period) this impact could be completely avoided. The AA study also assumed temporary impacts on most of the target features of the site “Drava”; it claimed, however, that such impacts would only be insignificant.

Possible cumulative effects were discussed but after analysing the available data the AA study came to the conclusion that they would not occur.

In 2010, the same company Oikon was commissioned by the project proponent to elaborate another study which is obligatory according to the Croatian law – a study of imperative reasons of overriding public interests and compensatory measures. This study was completed and submitted in September 2010 and is a part of documents representing the file (Vađenje šljunčanog nanosa iz korita rijeke Mure na lokaciji ušća Mure u Dravu rkm 236. Obrazloženje o razlozima prevladavajućeg javnog interesa s prijedlogom kompenzacijskih uvjeta. - Excavating of gravel sediments from the Mura riverbed at the location of estuary of Mura into Drava. Explanation of reasons of overriding public interest with a proposal of compensatory conditions).

As regards the description of imperative reasons of overriding public interest (IROPI), it was mentioned the following:

- In 1996 two alternatives were proposed. In cooperation with Croatian and Hungarian experts the current one was chosen as “having higher quality” (no explanation given in the current document);
- In 1997 the Croatian side implemented first technical measures but the main works – cutting the cunette – did not occur;
- in 2008, Hungary urges prompt implementation of measures due to risk at the Hungarian bank of the Mura river;
- in the same year, Hungary elaborated the technical study including AA for the Hungarian riverbank; the whole project was assessed as “acceptable” from the point of view of Hungarian N2K sites
- in 2009, Hungary developed a hydraulic model of the current confluence and presented it to the Croatian authorities and NGOs; this model confirmed the necessity of the project as perforation of the last barrier between the Drava and Mura rivers is to be expected any time.

The chapter on IROPI does not have any summary; the list of above facts is considered as a sufficient justification.

According to Croatian legislation, if the IROPI test is affirmative the project proponent is obligated to propose suitable compensatory measures. It was another task of the above study of Oikon. However the study does not deal with any compensation of 4.5 ha of poplar-willow habitats directly destructed by digging the cunette. It only goes into the issue of compensation of naked gravel banks (0.96 ha destructed), and especially those with “false tamarix” *Myricaria germanica*, critically endangered pioneering species occupying temporary gravel levees (banks). In Croatia it was known to be located in Sava and Drava rivers; on Sava River it went extinct in 20th century and on Drava river its population has decreased dramatically after about 50 hydropower plants had been constructed in Austria, Slovenia and Croatia. The site in question hosts two locations of *M. germanica* – one of the last locations in Croatia:

Two possible ways of compensations of the gravel banks with their pros and cons were discussed:

- leaving the dredged material on the banks of the new cunette for natural sedimentation and establishment of natural gravel and sand banks (risk: improbability to predict location and size of such natural banks)
- artificial dumping of the gravel and sand in suitable locations to establish new gravel banks.

As the latter option was preferred it was necessary to assess its feasibility. As the transport of dredged sediment on ships proved itself not feasible (insufficient draught of the river) the only way was to deposit the excavated material around the location of the project, i.e., on the other banks of the cut islet or of the peninsula upstream. However, the study showed that none of existing gravel banks there is suitable for such measures.

Therefore, the only option for compensating the disappearing gravel banks was to leave the excavated sediment on the slopes of the newly dug cunette for natural loss by erosion and subsequent sedimentation by the river Drava starting immediately after the perforation of the peninsula between Drava and Mura.

Special attention was paid to the locations of *M. germanica*. It was documented that the two locations within the scope of the planned project were currently threatened by natural succession including overgrowing by the invasive species *Amorpha fruticosa*. It was estimated that without any management these two locations would disappear within a couple of years. Therefore, the proposed compensatory measures were directed to stop the natural succession, to remove the other scrubs and young trees (willows) gradually overgrowing the shrubs of *M. germanica* and to monitor both the status of their (sub)populations and the hydraulic conditions on their locations with an aim to undertake technical measures if the results of monitoring showed continuation of negative trends.

The complaints

In December 2010, NGOs – both national and international – submitted an open complaint to the Commission in this case. Its main points are the following:

- description of the state-of-the-art; Hungary started with local bank protection on the left bank of Mura in 2010 following EIA which included AA;
- May 2010 – the Croatian MoC rejected the project on the basis of AA;
- September 2010 – the procedure of IROPI (including proposing compensatory measures) started, now the Government’s decision is awaited;
- the whole project reflects an outdated water management approach of both HR and HU;
- no alternative was assessed, no updated modern practices are used, no transboundary EIA was carried out;
- the NGOs are concerned that the regulation planned within the framework of this project will soon be succeeded by other regulation works needed for the maintenance of the new riverbed; in addition, they mention another regulation project planned jointly by HR and HU water management authorities between rkm 232 – 242 (i.e., the project in question would become part of this larger project) without any SEA, EIA nor AA;
- the current project contradicts the EU law;
- the current project goes against the results of an expert mission sent by the Commission to Drava River in 2009, as well as the results of the 2007 – 2009 Twinning Project focused on implementation of the Water Framework Directive in Croatia;
- while at the upper stretches of Drava River in AT and SI several EU-funded restoration projects are being implemented, the still *natural* stretch of Drava/Mura in Croatia is to be regulated downstream – it is against any logic;
- the project contradicts the effort of MoC to declare the whole area as a Regional Park Mura – Drava⁴;
- the decision of IROPI will serve as a precedent for all other interventions into N2K sites in Croatia;
- the complaint accuses the HR authorities of breaching the EU law (not specified);
- the complaint invites HR and HU to seek for a sustainable alternative.

NGOs also sent a complaint to the Ambassador of Hungary, probably in early 2011. His reply from February 2011 describes in points the history and conclusions of the planning process leading to the current project. The current solution is justified as being the cheapest one. Ambassador repeatedly emphasized that all steps on the Hungarian side were undertaken with full awareness of the Croatian authorities and that all steps were first approved by the joint Croatian – Hungarian committee for Drava - Mura water management.

Evaluation

Compliance with the national law

⁴ That regional park – one of Croatian national categories of the protected areas – was already designated in early 2011. However, its protection is substantially compromised by the proper by-law on establishing it which explicitly says that the interest on nature protection in this Regional Park does not represent an overriding public interest over the economic concerns. Nevertheless, the site in question remains also part of the national ecological network and future Natura 2000 and as such is subject to the AA procedure as described in this evaluation.

As regards the national ecological network (including future N2K sites), Croatian NPA prescribes the particular steps of the AA procedure; the following table shows whether they were met by the assessment of the current project:

Step/NPA Article	Presence/absence in the current procedure
Screening (Art. 37a)	Done
Main assessment (Art. 37b)	Done
- with an assessment of other feasible alternatives	Missing – explicitly mentioned in the decision of MoC by which the project is rejected (unless the IROPI procedure starts)
IROPI test (Art. 37c)	In progress
Proposal of compensatory measures (Art. 37c)	Proposed
Government’s decision on authorization/rejection of the project ⁵	Awaited

The main problem – also compared with the requirement of Art. 6(4) of the Habitats Directive – is that no assessment of any alternative solution has been carried out, even though such alternative exists. The fact that the other proposed alternative was rejected probably for either technical or political reasons as early as in 1996 does not mean that the requirement of Art. 6(4) and corresponding Croatian law does not apply: within the AA procedure, evidence should be submitted that

- either other feasible alternative to the project does not exist at all, or
- that the impact of the other alternative(s) is comparable or even more severe than of the project.

The fact that in 1996 the alternative was rejected automatically excludes the former condition of the previous sentence: nowhere in the files is written that that alternative was rejected due to its non-feasibility (and due to its nature – digging and widening another canal/current arms of the Drava river – it is apparent that from the technical point of view it would be as feasible as the current project). **Therefore, any evidence of likely impact of the alternative on the target features of all three sites of national ecological network is missing, and any continuation of the authorization procedure according to Art.**

⁵It is not fully clear whether the priority habitat type 91E0 is or is not affected. If affirmative the only reason for the authorization of this project – provided all preceding steps were successfully met – would be public safety (NPA Art. 37c); if the reasons were different and Croatia already was EU member, opinion of the Commission would be obligatory. However, “public safety” has not be mentioned as the reason for this project; on the other hand, Croatia has not been EU MS yet so that the obligation to ask for an opinion has not applied yet.

6(4) without meeting its first prerequisite does not make sense. Whether this is also breaching of the Croatian law cannot be decided by this evaluation (it is a purely legal question); however, if Croatia claims full compliance of its AA procedure with the EU directives it should be so, too. If this is the case, to comply with the law, Government of Croatia should stop the IROPI procedure now and reject the present project until all other viable alternatives (= at least that from 1996) have been properly assessed.

Correctness of the AA procedure

The AA study from 2009 was not available for this evaluation. However, the IROPI study made by Oikon in 2010 summarizes the main assessment study in considerably large detail; as the author of that study was the same it can be assumed that the information on the content and scope of the main assessment study is sufficient⁶.

The main assessment focuses on the direct impacts of the current project on those parts of the site which are to be immediately affected by it: the newly dug cunette, the part of the current peninsula to be perforated by Drava River, and all adjacent zones. This approach has resulted in a conclusion that only two habitat types would significantly be affected while any impact on species (= target features of the affected N2K sites) were considered insignificant and temporary.

However, little attention was paid to the impacts caused by the hydromorphological changes after the project would be implemented (NB in the draft Commission guide on inland waterway developments affecting Natura 2000 rivers the problems caused by hydromorphological changes are strongly emphasised as the impacts on Natura 2000 features can be potentially very significant especially for projects on still relatively natural river stretches).

Today, river Drava has two arms, one mainstream and the other lateral. This lateral arm, according to the AA study, hosts a breeding place of various fishes and at the same time represents an important feeding place of two bird species which are target features of the overlapping SPA (*Sterna hirundo* and *S. albifrons*) – an argument serving as a justification for the project rejection by the MoC by its decision following the AA but fully neglected in the IROPI study. (the full version of that is available at "www.min-kulture.hr/userdocsimages/priroda%20nova/rje%C5%A1enje,%20svibanj,%20Kineta%20Mura%20Drava.PDF")

Once the project is implemented the mainstream arm would lose its function; for its very existence, the AA study admits that possibly hydrotechnical measures would be needed to secure minimum inflow there. Current lateral arm has not been mentioned at all. It is highly probable that this lateral arm would be subject to rapid sedimentation and – maybe – disappearance; the development of the (current) mainstream arm is difficult to predict (as no modelling was done) but would definitely depart from the current state, and loss of

⁶ Nevertheless it would be useful to have a copy of the original AA to double check this and check also the basis upon which the assessment of impacts was made.

many current habitats of species is to be expected. Such considerations – according to the documents available – were not done at all.

Therefore, a serious doubt remains if the AA was done correctly in terms of

- **the scope of impact of the planned project (lack of consideration of other impacts than just direct land take and temporary disturbance)**
- **induced impacts on the riverbeds with changed function (no modelling undertaken of possible impacts on hydromorphological aspects – this is normal good practice for river engineering projects)**
- **the number of target features possibly affected by the project and especially by its indirect impacts.**

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Another problem concerns the compensatory measures. First, the only real measure foreseen is related to the loss of 0.96 ha of gravel and sand banks. The gravel and sand banks are to be compensated by natural activity of the rivers when dispersing the excavated material downstream; there is no warranty that new gravel banks will materialise – any prediction is impossible as the hydraulic model developed by Hungary only focused at the impacts of the penetration of the peninsula and hit of the waters of Drava river on the Hungarian left bank of Mura – neither hydraulic circumstances nor the natural sedimentation downstream was investigated.

Thus, the main objective behind the compensatory measures set in Art. 6(4) of the Habitats Directive – to maintain the overall coherence of the N2K network in the given country by securing the same amount and quality of target features as those which are to be destroyed – is not met.

Second, any replacement (compensation for) of 4.5 hectares of cut alluvial forests (partly belonging to the EU habitat type *91E0?) has been mentioned at all.

Third, if the assessment of impacts would take into account also the induced impacts on the current river arms of Drava (to become lateral with absolutely different water regime) and, subsequently, the circle of target features significantly affected by the project would increase the proposal of compensatory measures should be amended accordingly; their feasibility should be examined first.

Approach of Hungary

It goes beyond the scope of this evaluation to judge whether Hungary contradicted the EIA Directive as well as its national legislation when did not launch the transboundary EIA for the Hungarian part of the project. However, the same can be said for Croatia.

From the available documentation it seems that no EIA was carried out despite the fact that Croatian legislation valid at the time of application for AA prescribed screening for need of EIA for “Kanali, nasipi i druge građevine za obranu od poplave i erozije obale”

(canals, embankments and other constructions for prevention from flood and bank erosion” - point No. 4 of Annex III of the Government Decree on Environmental Impact Assessment, NN 63/08 – amended in 2009 with this obligation remaining the same). Possible argumentation that the project is planned on the basis of joint Croatian – Hungarian cooperation in the field of water management of the area in question and that all steps were approved by the joint Croatian – Hungarian commission (or committee) for water management can hardly have any legal value.

Public safety

The justification of the current project from both Croatian and Hungarian sides is protection of a (public) railway on the left (Hungarian) bank of Mura river. Any of the documents presented does not describe how serious is the level of risk to this railway if Drava penetrates the peninsula prior to the envisaged works being done, or if not done at all. Also, none of the documents uses the term “public safety”.

The following questions remain unanswered:

- Is there any other way or any technical alternative how to protect the railway?
- If affirmative, what would be its costs, including all planning and preparatory works?
- How much time in total would such potential alternative require to be realized from the stage of an idea into full implementation, taking into account all official authorization procedures?
- What is the likely rate of damage caused by penetration of Drava river through the peninsula resulting in direct thrust on the riverbank with the railway?

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Public participation and consultation

There have been some important developments in recent years as regards the kind of river engineering projects that are being advocated through different international River Conventions – in particular for the Danube. The International Commission for the Protection of the Danube River (ICPDR) in particular has been pushing very strongly for all new projects on the Danube and its tributaries to adopt a more integrated approach to river engineering based on ‘working with nature’ (see box at end of the evaluation for details).

This recommends in particular that river engineering projects take account of the river dynamics and hydromorphological functions at a very early stage in the project design stage so as to minimise the potential negative impacts on the river environment and if possible even create win-win solutions on already heavily degraded rivers (to be in accordance with the no-deterioration requirement of the WFD in particular).

The Joint Statement also strongly recommends the use of the participatory approach to project design whereby NGOs and other river stakeholders are consulted early on in the

design to try to find equitable solutions rather than waiting for a conflict during the AA/EIA procedure which usually is done once the project design has already been finalised.

Whilst Croatia has endorsed the Joint statement for the Danube (which applies for its whole basin including tributaries) it seems that the water authorities are not in any way applying these recommended standards to their projects. These are not legal requirements but they do run counter to international commitments they have made.

New developments after 2011's submission of the above evaluation

The above evaluation was submitted to the Commission in July 2011. In 2012, however, new facts came to light partially based on publicly accessible data and further information from the NGOs.

First, in May 2011, river Drava penetrated by a new side arm into river Mura. The penetration occurred about 120 m south of the expected break-through predicted by the mathematical model. In early 2012, another smaller side arm penetrated the isthmus between the two rivers; this side arm is functional during high water only. The former penetration is about 30 m wide, shallow, and water of Drava does not seem to threaten the left (= Hungarian) Mura river bank. **Thus, it is apparent that the behavior of the river is different from those predicted by the mathematical model, which puts in doubt the whole idea of the project.**

Second, in early 2012 works on Hungarian side . embankments and two groynes – were completed. The Hungarian bank of Mura is now fully protected from floods. Moreover, the new groynes direct the waters of Mura – Drava back towards the Croatian territory (= two islands in the confluence). **It is apparent that the works on the Hungarian side have fully secured the river bank against erosion and that there is no threat to the railway. Moreover, geological map of the area of confluence of Drava and Mura show that the Mura riverbed lies on hard rocks and never in the past was subject to any meandering – contrary to the riverbed of Drava which lies on movable sediments and historically has been relocated many times.** Therefore, the assumption that the waters of Drava penetrating into Mura would cause high erosion of the left Mura river bank is unjustified and contradicts the known history of this flow.

A series of GPS-based records of erosion and sedimentation of the main watercourse of Drava river made by NGOs during last decennium show that there is no indication of any erosion towards the Hungarian riverbanks. Just opposite, in the bend of the left Mura riverbank, sedimentation (instead or erosion) has occurred during last several years. On the other hand, erosion of the left island in the confluence continues to occur – but not in its upper (northern) part while in its southern part, i.e., towards the Croatian mainland. Therefore, it is apparent that within certain period of time the left island will disappear, being replaced by another feature originating from sedimentation; however, the river dynamics seems to be different than those predicted by the mathematical model. Therefore, it is highly probable that implementation of the project – i.e., cutting the cunette

through the right (eastern) island – would not follow the natural behaviour of the river Drava and would create an unnatural situation which the nature would solve in its own way – however, in this case totally unpredictable. Therefore, the most effective and nature-friendly way would be to leave the rivers to go their own way; as the Hungarian side is fully protected and the today's main arm of Drava on the Croatian is also protected by an embankment, there is no threat to any mainland and the rivers can only naturally change the islets and riverbanks between the embankments.

Recommendations

After the 2011 natural development at the confluence, and in light of the new facts about the behaviour of the rivers, it seems that implementation of the original project would represent unjustified wasting of resources with very doubtful results.

AA of the project was not done properly, omitting to assess some of the impacts of the planned project; if the project should continue the assessment would require a substantial amendment. However, as the situation on the spot has changed, it is questionable if a new AA would not be needed.

The procedure of IROPI should not continue as it would break the current Croatian law implementing Art. 6.4 of the Habitats Directive. There is another technically feasible solution as described in the application of Hrvatske vode for the IROPI procedure; such solution should first be subject to the AA and only then the process of establishing IROPI should continue.