Strategic Environmental Assessment Study of the Multiannual Programme for the Construction of Regulation, Protection and Land Reclamation Water Facilities for the period until 2030

Non-technical Summary

Zagreb, August 2022.

Project	**Multiannual Programme for the Construction of Regulation, Protection and Land Reclamation Water Facilities for the period until 2030**
Type of documentation:	Strategic Environmental Assessment Study
Contract No:	1333-19
Project Manager:	**Željko Koren,** dipl. ing. građ. CE, PMP
OIKON d.o.o. Members of the expert team who are on the list of consent to perform professional environmental protection work	**Božica Šorgić**, mag. chem., PhD (Coordination, integration, introduction, air quality, mitigation of climate changes, waste management - QC) **Željko Koren,** dipl. ing. građ. (Coordination, Spatial plans analysis - QC) **Vladimir Kušan,** mag. ing. silv., PhD, CE (soil and agriculture, forests and foresting, QC) **Ana Đanić,** mag. biol. (biodiversity, protected areas) **Nikolina Bakšić Pavlović**, mag. ing. geol., CE (water and water management) **Tena Birov,** mag. ing. prosp. arch., CE (landscape) **Goran Gužvica,** mag. geol., PhD (biodiversity, protected areas) **Nela Jantol**, mag. oecol. et prot. nat. (biodiversity, protected areas) **Dalibor Hatić,** mag. ing. silv. (forests and foresting, game and hunting) **Ivona Žiža**, mag. ing. agr. (soil, agriculture, land use)
OIKON d.o.o. Members of the expert team who are not on the list of consent to perform professional environmental protection work	**Nebojša Subanović,** mag. phys. et geophys. (climate and climate changes) **Lea Petohleb**, mag. ing. geol. (water and water management, geology, hydrogeology) **Prof. Milorad Mrakovčić, PhD** (biodiversity) **Jurica Tadić**, mag. ing. silv. (biodiversity, protected areas) **Matija Kresonja**, mag. prot. nat. et amb. (protected areas)

	Ksenija Hocenski, mag. biol. exp. (biodiversity, protected areas) **Monika Petković,** mag. educ. biol. et chem. (biodiversity, protected areas, water and water management) **Blaženka Sopina**, M. Sc. (biodiversity, protected areas) **Jelena Mihalić**, mag. ing. prosp. arch. (landscape) **Andrea Neferanović**, mag. ing. silv. (forest and forestry) dr. sc. **Ivan Tekić,** mag. geogr. et mag. educ. geogr. (soil and agriculture) **Željko Čučković**, univ. bacc. inf. (GIS data analysis)
Appropriate Assessment	
OIKON d.o.o. Members of the expert team who are on the list of consent to perform professional environmental protection work	**Vladimir Kušan,** mag. ing. silv., PhD, CE AA leader **Ana Đanić,** mag. biol., AA leader **Goran Gužvica,** mag. geol., PhD **Tena Birov,** mag. ing. prosp. arch., CE **Nela Jantol**, mag. oecol. et prot. nat.
OIKON d.o.o. Members of the expert team who are not on the list of consent to perform professional environmental protection work	**Monika Petković,** mag. educ. biol. et chem. **Ksenija Hocenski**, mag. biol. exp. **Matija Kresonja**, mag. prot. nat. et. amb. **Jurica Tadić,** mag. ing. silv. **Blaženka Sopina**, M. Sc.
External experts:	
HIDROINŽENJERING d.o.o.	**Ana Turčinov Mikulec**, dipl. ing. geol. (water)
Prosliva d.o.o.	**Marko Augustinović**, mag. ing. silv. (game and hunting)
Team members that were employed in OIKON d.o.o.	**Rita Guić,** mag. oecol. (AA, biodiversity, protected areas) **Vjera Pavić,** mag. biol. exp. (AA, biodiversity, protected areas)

	Klara Mahmić, mag. geogr. (spatial planning, inhabitants, cultural heritage) **Nataša Obrić,** mag. ing. aedif., mag. ing. geoing. (noise and infrastructure, geology QC) **Zrinka Mesić**, mag. biol., PhD (AA, biodiversity, protected areas) **Mihaela Trčak,** mag. ing. agr. (soil, agriculture, land use) **Silvia Ilijanić Ferenčić**, mag. geol. (geology, hydrogeology QC, water and water management) **Ana Knežević,** mag. ing. prosp. arch. (landscape) **Matko Čvrljak**, mag. archeol. (cultural heritage)
Director	**Dalibor Hatić**, mag. ing. silv.

Content

LIST OF ABBREVIATIONS

EM	Ecological network
IPCC	Intergovernmental Climate Change Panel
IS	Irrigation system
MINGOR	Ministry of Economy and Sustainable Development
OG	Official Gazette
RegCM	Regional Climate Model
SEA	Strategic Environmental Assessment
GWB	Groundwater body
WMD	Water Management Departments

1 Introduction

According to the Article 43 of Water Act (Official Gazette 66/19, 84/21), the Multiannual Programme for the Construction of Regulation, Protection and Land Reclamation Water Facilities for the period until 2030 (hereinafter referred to as the Multiannual Programme) defines water management for activities of protection against adverse effects of water and irrigation. It determines individual projects, the method and period of implementation, participants in implementation, investment amounts and sources of funds, and the order of priority in implementation, where applicable.

The Multiannual Programme is prepared by Hrvatske vode (Croatian waters), and it should be adopted by the Government of the Republic of Croatia. According to the Article 43, paragraph 2, of Water Act (Official Gazette 66/19, 84/21), the Multiannual Programme must be harmonized with the Water Management Strategy and the River Basin Management Plan. Compliance with European directives such as the Water Framework Directive (2000/60/EC) and the Flood Risk Assessment and Management Directive (2007/60/EC) is also necessary.

The previous Multiannual Programme was developed and adopted back in 2015 (Official Gazette 117/15), when the River Basin Management Plan 2013-2015 was in force. It is a framework investment programme into: (i) water regulation for the protection from adverse effects of water through the construction of regulation, protection and basic land reclamation water facilities, which can serve for receiving and evacuation of floods; and (ii) irrigation through the construction of water facilities for irrigation. The presented investments are dealt with in two separate units for the reason that they have different starting points, objectives, beneficiaries, sources of financing, technical and financial aspects.

The implementation of the previous Programmme is foreseen over a long period, with the possibility of adaptation, in order to achieve clearly described goals and priorities, as well as to control activities and monitor the achieved effects. Although the Programme considered a longer period of time (2013-2022), the implementation of projects was primarily focused on the first program period ending in 2017, after which the proposed list of projects will be updated in order to better adapt to new needs and align with the current River Basin Management Plan).

In parallel with the preparation of the Multiannual Programme, the process of strategic environmental assessment of the Multiannual Programme is carried out according to the Law on Environmental Protection (Official Gazette 80/13, 153/13, 78/15, 12/18 and 118/18) and the Regulation on Strategic Environmental Assessment of the Strategy, Plan and Program (OG 3/17).

The strategic environmental assessment procedure (hereinafter: SEA) was launched in September 2018 with the adoption of the *Decision on the implementation of the strategic environmental assessment procedure of the Updated Multiannual Programme for the Construction of Regulation, Protection and Land Reclamation Water Facilities (CLASS: 325-09/ 07-01/01, Reg. No: 517-07-1-3-1-18-8 from 06.09.2018)*. The competent authority for the SEA procedure is the Ministry of Economy and Sustainable Development (formerly the Ministry of Environmental Protection and Energy).

The area covered by the Multiannual Programme is the whole Croatia, and thus the area of strategic environmental assessment is the same as the coverage of the Multiannual Programme, while Strategic

assessment study analyses projects in relation to each WMD - water management department (Croatian: Vodnogospodarski odjel- VGO).

For the purpose of determining the content of the Strategic Study, the Competent Authority obtained opinions from the bodies and/or persons designated by special regulations on the content and level of coverage of the data that must be analysed in the Strategic Study. In order to harmonize opinions on the content of the Strategic Study and determine the final content, the Competent Authority held consultations with the bodies that submitted opinions on the content of the Strategic Study during the process of determining the content of the Strategic Study. After obtaining the opinions of bodies and/or persons designated by special regulations, on January 23, 2020, the Competent Body issued a Decision on the contents of the Strategic Environmental Impact Study of the Updated Multiannual Programme for the Construction of Regulation, Protection and Land Reclamation Water Facilities (CLASS: 325-09 /17-01/01, Reg. No: 517-07-1-20-17).

A strategic study on the impact on the environment is prepared as an expert basis for the implementation of the SEA procedure. The strategic study determines, describes and evaluates likely significant impacts on the environment that may arise from the implementation of the Multiannual Programme and proposes environmental protection measures and a monitoring program depending on the identified impacts. The company OIKON d.o.o. – The Institute of Applied Ecology from Zagreb is authorized to prepare the Strategic Study on the impacts of the Multiannual Programme on the environment and has the Consent of the Ministry of Economy and Sustainable Development for the performance of professional environmental and nature protection work, including the preparation of strategic studies.

The procedure of the preliminary assessment of acceptability for the ecological network was carried out, and the Ministry of Environmental Protection and Energy issued a Decision, CLASS: UP/I 612-07/17-60/147, REG.NO: 517-05-2-18-6 dated July 26, 2018 that for the planned Updated Multiannual Programme for the Construction of Regulation, Protection and Land Reclamation Water Facilities, it is necessary to carry out the Appropriate Assessment.

1.1 Multiannual Programme

The Multiannual Programme contains construction measures to reduce the risk of floods, primarily the construction of regulation, protection and land reclamation water facilities. The construction measures covered are subject to processing and elaboration at the level of preparation of technical documentation of a higher degree of details (analysis carried out in the framework of feasibility studies, conceptual or main project, and the requirements and conditions set out in the process of obtaining location and building permits, i.e. in the process of determining the acceptability of environmental impacts of the project).

1.1.1 Protection against adverse effects of water

The Multiannual Programme covers all areas where there are or are likely to be potentially significant flood risks according to flood hazard maps and flood risk maps contained in the Flood Risk Management Plan, which is an integral part of the Water Management Plan 2016-2021. In addition to new projects, the remaining 210 unrealized projects from the existing Program were included on the

list of the Multiannual Programme, some of which were novelized if there was a change of the situation on the ground or conditions for the application of different technical solutions.

The Multiannual Programme contains a total of 504 water protection projects, of which 325 projects relate to the Danube River Basin District and 179 projects to the Adriatic basin District.

Table 1.1-1. Total number of projects for protection against adverse effects of water

	Existing Program					Program	
	Planned	Rejected	Finished	In construction	The rest for implementation	New projects	Total for realisation
North Adriatic Basins	33	5	3	1	24	9	33
South Adriatic Basins	84	19	16	6	43	103	146
Adriatic basin district - total	117	24	19	7	67	112	179
Danube and Drava Rivers sub - basins	124	25	20	10	69	76	145
Sava River sub-basins	132	15	18	25	74	106	180
Danube river basin District - total	256	40	38	35	143	182	325
Grand total:	373	64	57	42	210	294	504

The realization of projects from the list of the updated Multiannual Programme is expected in the following dynamics:

- Starting with the construction or completing a total of 251 projects until 2023, when the new update of the Multiannual Programme is planned in order to harmonise it with the River Basin Management Plan 2022 - 2027
- Leaving the implementation of the remaining 253 projects for the period after 2023

1.1.2 Irrigation

Public irrigation is the activity of abstracting groundwater and surface waters and their delivery for irrigation of agricultural land using irrigation facilities owned by units of regional self-government or combined land reclamation facilities owned by the Republic of Croatia. The right to use water for irrigation is realised in accordance with the Water Act for the purpose of achieving the objectives of the National Project of Irrigation and Agricultural Soil and Water Management in the Republic of Croatia and irrigation plans and programmes of regional self-government units, and for meeting the needs for irrigation of various users for various purposes.

The basis for the development of the updated Multiannual Programme is the National Project of Irrigation and Agricultural Soil and Water Management in the Republic of Croatia (July 2005) and county irrigation plans (developed in the period from 2003 to 2019).

The project proposal took into account the spatial limitations (protected areas, sanitary protection zones, etc.), which were noted during the development of county irrigation plans. As part of the updated Multiannual Programme, the projects were additionally checked with regard to vulnerable areas.

1.2 Multiannual Programme for the Construction of Regulation, Protection and Land Reclamation Water Facilities for the period until 2030 projects

The Multiannual Programme plans the construction of a number of water protection projects systematized into project units formed according to the corresponding flood defence systems, spatial location and area of influence (area of a small basin, municipality or city, etc.). The grouping was done in order to better understand the wider effects of the planned projects on increasing the level of flood protection and the formation of the corresponding project units with the aim of more efficiently applying for financing from EU funds.

The selection of relevant project units, that is, the spatial grouping of proposed projects, avoids partial observation of the effects of the implementation of each individual project and enables a more efficient assessment and monitoring of the achievement of set goals and benefits in a wider area. This approach makes it much easier to assess the impact of planned projects on the environment, because the assessment of the cumulative effects of the program on the environment is carried out at the level of project units, and not at the level of individual projects. In addition, during the selection of project units, possible cross-border impacts were taken into account, in order to single out projects that may require the implementation of appropriate procedures according to a special procedure.

Due to the complexity and comprehensiveness of the Multiannual Programme, only the framework activities necessary to achieve the set goals were defined for the mentioned projects, without prior analysis of possible variant solutions, investment and maintenance costs, socio-economic benefits, as well as other relevant criteria. All interdependent or functionally connected projects that need to be implemented in a certain area are grouped into project units that include wider parts of the area within which the proposed procedures improve the existing damaged condition and do not endanger the existing condition (biological and hydromorphological elements of quality). For each individual planned project from the list of the Multiannual Programme, it is possible to arrive at a better technical solution when creating more detailed project documentation or a feasibility study.

1.2.1 Water regulation and protection facilities

Projects for construction of the regulation and protection facilities				
ID	Name of the project unit	Project	Project name	Priority
	VMD for South Adriatic basin			
1	Flash flood protection project of in the area of Dubrovačko primorje, the Pelješac peninsula and the islands of Korčula, Mljet and Lastovo	172	Regulation of Rijeka Dubrovačka torrents	1
		178	Regulation of the torrential stream Blatina	1
		185	Reconstruction of the main outlet canal of the karst field Donje Blato - Lumbarda	1
		187	Regulation of the torrential stream Puka	1
		191	Regulation of Župa dubrovačka torrents	1
		6079	Reconstruction of the torrential stream Klek	1

		6080	Regulation of the torrential stream Duba	1
		6081	Regulation of the torrential stream Duba Pelješka	1
		6082	Regulation of the Konavle area torrents	2
		6083	Regulation of the Zaton area torrents	2
		6084	Regulation of the Orašac area torrents	2
		6085	Regulation of the Brsečine area torrents	2
		6086	Regulation of the Slano area torrents	2
		6087	Regulation of the Primorje area torrents	2
		6088	Regulation of the Ston area torrents	2
		6089	Regulation of the Ponikve area torrents	2
		6090	Regulation of the Putniković area torrents	2
		6091	Regulation of the Žuljane area torrents	2
		6092	Regulation of the Janjina area torrents	2
		6116	Reconstruction of the outlet canal Vino polje - Ubli	2
		6119	Reconstruction of the riverbed of the torrential stream Dubravica - Stanković	2
		6120	Regulation of the riverbed of the torrential stream Trstenik – estuary	1
		6121	Regulation of the bed of the torrential stream MaliTrstenik	2
		6122	Regulation of the bed of the torrential stream Skrivena Luka	2
2	Flood protection project in the Neretva river basin	161	Flood defence of the town Metković, the right Neretva bank – a dike in the municipality Čapljina (BiH)	1
		163	Stabilisation of the left Neretva bank upstream of the bridge in Metković	1
		164	Stabilisation of the Mala Neretva banks with backshore protection	1
		167	Regulation of the Mislina River and Lake Kuti, water improvement	2
		169	Stabilisation of the Neretva banks to improve the flood defence system	1
		170	Stabilisation of the right Neretva bank in Komin	1
		173	Improvement of the coast and promenade along the Crna Rijeka in Rogotin	2
		184	Flood protection of the settlement Komin	1
		190	Construction of a dike for flood defence of a part of the settlement Krvavac in the municipality Kula Norinska	1
		193	Construction of a syphon under the Mala Neretva	1
		226	Construction of dikes for the sub-system Mislina - Kuti	1
		6077	Reconstruction of the coastal dike "Diga"	2
		6078	Water improvement of the Upper Old Neretva course, banks improvement	1
		6117	Collecting canal Glibuša	1
		6118	Lake Birina, Crna Rijeka, section Rogotin - Ploče – sediment cleanup - -regulation	2
		6123	Reconstruction of the self-regulating sluice at the confluence of the Norin River	2
		6124	Reconstruction of a separating dike Hum	2
		6200	Protection from salinisation of soils, surface waters and ground water in the Neretva valley	1
3	Flood protection project in the Vrgorsko polje basin	6060	Flood protection in the basins of the karst fields Rastok and Vrgorsko polje	1
		6061	Regulation of Baćina Lakes	1

		6062	Rehabilitation and reconstruction of combined amelioration facilities in the karst field Rastok	1
		6063	Amelioration canals of Vrgorsko polje (construction of new canals and reconstruction and rehabilitation of existing canals)	2
4	Flood protection project in the Imotsko-bekijsko polje basin	208	Regulation of the torrential stream Lasića Vrilo	1
		209	Regulation of the torrential stream Vrilo	1
		215	Construction of five culverts at canal mouths into Imotsko polje	1
		6115	Regulation of the torrential stream Čečuk in Proložac	1
5	Protection from flash floods in the Makarska coastal region	180	Regulation of the torrential stream Žbanjica	1
		182	Regulation of the torrential stream Krvavica	1
		192	Regulation of the torrential stream Mlatinjska bujica	1
		6064	Regulation of the Municipality of Brela torrents	1
		6065	Regulation of the Municipality of Baška Voda torrents	1
		6066	Regulation of the City of Makarska area torrents	1
		6067	Regulation of the Municipality of Tučepi torrents	1
		6068	Regulation of the Municipality of Podgora torrents	1
		6069	Regulation of the Municipality of Podgora torrents	1
		6072	Regulation of the torrential stream Puharića potok in Makarska	1
		6074	Regulation of the torrential stream Stomarica in Brela	1
6	Protection from flash floods in the Middle Adriatic coastal region and the islands of Brač, Hvar, Vis, Šolta and Čiovo	162	Regulation of the Jadro River in Solin	1
		183	Regulation of the torrential stream Veliki potok	1
		189	Regulation of the left tributary of the torrential stream Soline	1
		205	Regulation of the torrential stream Samogor	1
		210	Regulation of the lower and middle course of the Žrnovnica River	1
		218	Regulation of the torrential stream Gajina - Podgaj	1
		228	Regulation of the torrential stream Kiseljevica	1
		371	Uređenje bujica grada Trogira	1
		6020	Regulation of the torrential stream Gata, section from km 0+815 upstream	1
		6021	Regulation of the torrential stream Ravna njiva potok – detailed design development	1
		6023	Regulation of the torrential stream Kutleša potok	1
		6027	Regulation of the torrential stream Suhi potok	1
		6030	Regulation of the II right tributary of the torrential stream Dugi Rat, section from km 0+088 to km 0+170	1
		6031	Regulation of the torrential stream Kovačića potok	1
		6038	Regulation of the torrential stream Vrilo	1
		6039	Regulation of the torrential stream Planiča and its left tributary	1
		6040	Regulation of the right tributary of the torrential stream Balancana in Trogir – Phase I	1
		6041	Regulation of the torrential stream Betanija in Trogir upstream of km 0+660	1
		6042	Regulation of the eastern tributary of the torrential stream Dragočevo in K. Sućurac, Phases I and II	1
		6043	Regulation of the torrential stream Ričevica mouth in Kaštel Novi (0+000 - 0+140)	1
		6044	Regulation of the torrential stream Mućka Jaruga in Muć (upstream of the road Drniš - Split)	1

		6045	Regulation of the torrential stream Ričevica upstream of the express road	1
		6046	Regulation of the torrential stream Dragočevo (above former Getro)	1
		6047	Regulation of the right tributary of the torrential stream Rupotinska bujica in Solin (along the house Gizdić)	1
		6048	Regulation of the torrential stream Korešnica along the street Ulica put Vrila	1
		6049	Regulation of the torrential stream Dol	1
		6050	Regulation of the torrential stream Grljevac	1
		6052	Regulation of the eastern tributary of the torrential stream Smoljevac	1
		6053	Regulation of the western tributary of the torrential stream Stražbenica	1
		6054	Regulation of the torrential stream Smokvica in Kaštel Kambelovac	1
		6055	Regulation of the Town of Kaštela torrents	1
		6056	Regulation of the Municipality of Podstrana torrents	1
		6057	Regulation of theTown of Solin torrents	1
		6058	Regulation of the City of Split torrents	1
		6059	Regulation of the Municipality of Muć torrents	1
		6106	Regulation of the torrential stream Žilića potok	1
		6107	Regulation of the downstream section of the torrential stream Jaruga	2
		6108	Rehabilitation of the covered cunette of the torrential stream Mala luka	2
		6111	Regulation of the torrential stream Dol in Postire	1
		6112	Regulation of the lower course of the torrential stream Sutivan	1
		6113	Regulation of the torrential stream Hvar	1
		6114	Regulation of the torrential stream Rusinjče potok – middle course	1
7	Flood protection project in the Cetina river basin	168	Regulation of the Cetina River in Hrvatačko polje	1
		188	Regulation of the torrential stream Drežnica	1
		6022	Regulation of the torrential stream Pavjak, section from km 2+081 upstream	1
		6024	Regulation of the torrential stream Župićev potok	1
		6025	Regulation of the torrential stream Miletin	1
		6026	Regulation of the torrential stream Stuparića potok	1
		6032	Construction of a culvert over the riverbed of the torrential stream Banovića potok in km 1+200	1
		6035	Regulation of the downstream section of the stream Kosinac in the length of about 170 m, from the confluence into the Cetina River to the bridge on the road Han - Otok	1
		6036	Regulation of the stream Ovrlja	1
		6105	Regulation of the downstream section of the torrential stream Vrlička jaruga	1
		6109	Rehabilitation of the eroded left bank of the Cetina River in Blato na Cetini	2
		6110	Rehabilitation of the water tank Bunarina in Velić	2
8	Flood protection project in the Krka river basin	239	Protection of the Krka River near the petrol station in Knin	1
		6016	Regulation of the torrential stream Rupska foša	2
		6017	Regulation of the torrential stream Rivina jaruga	2

9	Protection from flash floods in the Šibenik coastal region and on the Šibenik islands	6015	Regulation of the torrential stream Sovlje	2
10	Protection from flash floods in the Zadar coastal region and on the Zadar islands	223	Stabilisation of the Miljašić Jaruga banks (0+000 - 0+500)	1
		234	The stream Subica, Pašman, cunette from 0+000 - 0+540	2
		236	Regulation of the torrential stream Potok Barotul	1
		370	Regulation of the torrential stream Ričina in Zadar	1
		6002	Construction of a retention in the upper part of the Ričina basin	1
		6005	Construction of a retention on Miljašić jaruga upstream of the City of Nin	2
		6009	Regulation of the torrential stream Krušćica duboka	1
		6014	Regulation of the watercourse Mala Paklenica	1
		6101	Regulation of Sukošanski potok	1
11	Flood protection project in the Ravni Kotari basins	165	Rehabilitation of critical sections of the water transfer tunner Tinj	1
		202	Construction of the multipurpose reservoir Kotao	2
		224	Stabilisation of the watercourse Baščica banks (0+000 - 0+900)	1
		372	Construction of a sluice (sill) in the canal Prosika	1
		6001	Reconstruction of the dam Vlačina and pertaining facilities	1
		6003	Reconstruction of the left bank wall of the watercourse Karišnica	1
		6004	Reconstruction of the drainage system Kličevica - Nadin - Polača - Vrana – the sea and the main drainage canal of Nadinsko blato	1
		6006	Regulation of the watercourse Glavičine	1
		6007	Regulation of the stream Grubića draga	1
		6008	Regulation of the stream Oblog	1
		6010	Regulation of the streams Prestene and Polje in Lišane Ostrovičke	2
		6011	Rekonstrukcija of the canal Donje Bare in Prović	2
		6012	Regulation of the canal Banjevci	2
		6102	Reconstruction of the water transfer tunnel Bokanjac	2
		6103	Regulation of Novigradska jaruga	1
		6104	Reconstruction of the connecting canal Pristeg - Stankovci	2
12	Flood protection project in the basins of the Zrmanja river and the Lika plateau	222	Stabilisation of the Zrmanja banks (Ervenik, Mokro Polje, Palanka-Kusci, Čankovac, Gradina and downstream of the bridge Ćukovi (64+000 - 64+100)	1
		225	Stabilisation of the watercourse Otuča banks (1+120 - 1+265)	2
	WMD for North Adriatic Basin			
13	Flood protection project in the Lika and Gacka river basins	137	Brušanka - construction of a retention	2
		144	Gacka – regulation of the relief canal of the Gacka River	2
		154	Tisovac - construction of a retention	2
14	Protection from flash floods in the Kvarner coastal region and on the islands of Krk, Cres, and Lošinj	133	Bašćanska Ričina – regulation of a torrential stream	2
		138	Dubračina – regulaction of a part of the watercourse	2
		143	Cres – construction of the retention C3	1
		155	Slani Potok – regulation of the basin	2
		156	Lug - Kozica – construction of a water transfer tunnel	2

		363	Baška - a retention	2
		5012	Dobrinjski potok - construction of a canal	2
		5013	Gorica – construction of a canal	2
		5020	Torrential streams of Rab Island – regulation works	2
15	Flood protection project in the Mirna river basin	142	Benčići - construction of a retention	2
		148	Draga (Čiritež) - construction of a retention	2
		157	Račice – construction of a barrier	2
		158	Draguć - Podmerišće - construction of a barrier	2
		5006	Jukani – a retention (rehabilitation)	2
		5007	Pengari - construction of a retention	2
		5025	Restoration of the Mirna River	2
16	Flood protection project in the Raša river basin	140	Raša – reconstruction of the boundary canal No. 2	2
		149	Karbuna – watercourse regulation	2
		150	Tupaljski potok - construction of a retention	2
		151	Sepćići – a retention (rehabilitation)	2
		153	Pedrovica - construction of a retention	2
		5004	Krapanjske bujice - regulation (Kapelica I, Kapelica II, Kapelica III)	2
		5015	Vilete –construction of a canal	2
17	Protection from flash floods in the Western Istria coastal region	139	Ljubljanija - construction of a retention	2
		5002	Valbandon - construction of a canal	2
47	Flood protection project in the Rječina river	141	Grobnik - construction of a retention	2
55	Flood protection in the Pazinčica basin	146	Lipa - construction of a retention	2
56	Flood protection project in the Boljunčica basin	367	Boljunčica - regulation	2
		368	Letaj - rehabilitation of the reservoir	2
57	Flood protection project in the Lokvarka basin	145	Construction of the reservoir Križ potok	2
	WMD for Middle and lower Sava River			
18	Flood protection in the Upper Kupa River Basin	4020	Reconstruction the waterfall on the Kupa River in Orljakovo	1
		4021	Reconstruction of the waterfall on the Kupa River in Pribanjci	1
19	Flood protection project of the town of Ogulin	9	Construction of the retention Ogulin, a dam with pertaining facilities on the watercourse Ogulinska Dobra in the area of the settlement Turkovići near Ogulin for flood defence of Ogulin	1
		4016	Regulation of the stream Ratković in Ogulin	1
20	Flood protection project in the Kupa river basin – Karlovac and Sisak areas	7	Improvement of the left Kupa bank in Karlovac on the location Drežnik by the construction of a revetment from km 137+470 to km 138+200, in the total lenght of 730 m, for the purpose of bank stabilisation	2
		14	Construction of the node Brodarci with pertaining dikes on the Kupa and Dobra in two construction stages for the purpose of the water regime regulation in the Karlovac area	1
		18	Construction of the eastern dike of the retention Kupčina	1
		19	Construction of sluices for water distribution in the stretch from the canal Kupa - Kupa to the retention Kupčina	1

		20	Construction of the cutoff Korana - Kupa with inlet and outlet sluices	1
		27	Construction of the left Kupa dike, revetment and protective wall from the settlement Selce to Rečica on the Kupa section from rkm 123+552-rkm 135+415 in five construction phases for flood protection of the settlements Selce, Gradac, Mekušje and Husje	1
		38	Construction of the retention Burdelj, a dam with pertaining facilities on the watercourse Burdeljski potok in the area of the settlement Peščenica in the SMC for the purpose of flood defence	1
		42	Reconstruction of the left Korana dike between the wooden bridge and the pontoon bridge in Karlovac	2
		58	Construction of the left Kupa dike upstream of the railway bridge in Karlovac to Brodarac from km 137+450 to km 144+300, a continuation of the construction of the left Kupa dike from km 4+689,41 to km 6+772,50 in stage III of the construction	1
		67	Reconstruction of the left Kupa dike in the section Staro Pračno - Stara Drenčina (Phase 2 from km 2+400 to km 10+825) in the total length of 8.4 km (Measure 9/1-stage 2)	1
		95	Reconstruction of the canal Znanovit - Brebernica	1
		4007	Construction of a transversal dike from the relief canal Odra to the Sava dike – extension of the flood defence system of the City of Zagreba	1
		4008	Construction of the right Kupa dike from Brodarci to the brewery in the length of 5.7 km	1
		4010	Reconstruction of the drainage facilities of the left Kupa backshore from the settlement Selce to Rečica	1
		4011	Construction of dikes along the Korana left and right banks and the Mrežnica left bank, and the regulation of the stream Sajevac for protection of the settlements Mostanje and Turanjski Lug	1
		4012	Construction of a dike along the right Mrežnica bank and along the left and right Korana banks for the protection of the settlements Logorište, Mala Švarča and Turanjski Poloj	1
		4013	Reconstruction of a dike around the Crna Mlaka fish ponds in the retention Kupčina	1
		4018	Reconstruction of the dike on the canal Kupa-Kupa	1
		4019	Reconstruction of a stone wall on the right Kupa bank in Obala V. Mažuranića St. in Karlovac	1
		4023	Protection of the settlements from Šišljavić to Lijeva Pokupska from flooding of the Kupa River	1
		4036	Reconstruction of the stone wall and right Kupa bank in Gaza in Karlovac	1
		4037	Odransko polje – construction of the eastern dike of the retention Odransko polje Tišina Kaptolska - Suša in the length of about 14.5 km	1
		4038	Odransko polje – construction of a dike about 6.8 km long, boundary canal and pumping station for the protection of the settlements Greda - Sela - Stupno from flooding of the retention Odransko polje	1

		4039	Odransko polje - reconstruction and construction of a dike for the protection of the settlement Lekenik, left and right dike in the total length of about 10.8 km	1
		4040	Reconstruction and construction of the right Odra dike, Odra Sisačka - Žabno – Stupno, in the length of about 7.2 km	2
		4041	Reconstruction and construction of the left dike of the Odra River Sisak - Tišina Kaptolska from 2+990 to 4+250	1
		4042	Construction of protection and regulation water facilities on the left Kupa bank in the settlement Brkiševina about 2.0 km long	1
		4043	Construction of protection and regulation water facilities on the left Kupa bank, settlements Stari Brod - Letovanić - Žažina - Mala Gorica, in the length of about 11.0 km	2
		4045	Construction of protection and regulation water facilities on the left Kupa bank – settlements Brest Pokupski - Vurot - Stara Drenčina, length about 2.5 km	1
		4051	Construction of protection and regulation water facilities on the right Kupa bank Nova Drenčina - Moščenica in the length of about 3.0 km, a boundary channel and a pumping station	2
		4052	Construction of a revetment on the Kupa bank in Stari Brod from 48+550 - 48+700	2
		4301	Rehabilitation of the left Kupa bank in Stari Farkašić from rkm 49+100 to 49+700 by the construction of a revetment	1
		4308	Drainage of the canal 1.1 basin in Novi centar in Karlovac	2
		4312	Stabilisation of the left Kupa bank in Jaminička Kiselica upstream of the bridge	2
		4314	Reconstruction of the retarding dikes of the Petrinjčica River	2
		4315	Protection of the settlements on the right Kupa bank downstream of Kamnesko	1
		4316	Regulation of the stream Švarča in Karlovac	1
		4317	Regulation of the canal Mostanje in Karlovac	2
21	Flood protection project in the Korana river basin	4009	Construction of the reservoir Lučica on the Korana River	2
		4303	Flood protection of a part of the settlement Turanjski Goljaci in Karlovac	1
		4304	Flood protection of the settlement Vojnić (regulation of the Radonja and Vojišnica through Vojnić)	1
		4305	Protection of the settlement Belajske Poljice from the Korana floods	2
		4309	Rehabilitation of a retaining wall on the left Korana bank in Rastoke in Slunj	2
22	Flood protection in the Kupčina basin	47	Construction of the connecting canal Stojnica - Kupčina and regulation of the Stojnica from the sluice to the distribution facility on the Kupčina in Franetići	1
		51	Construction of a chute in the riverbed of the watercourse Kupčina at the railway bridge and the regulation of the Kupčina from km 0+530 to km 0+805 for the purpose of the riverbed regulation	1
		69	Regulation of the stream Črnac in Draganić from rkm 0+000 to rkm 2+900	1
		4017	Regulation of the stream Brebrovac in Čeglje	1

		4022	Construction of a box culvert on the stream Kupinec	1
		4024	Construction of a retention and a reservoir in the Kupčina basin	2
		4302	Regulation of the stream Reka in Vranov Dol	2
23	Protection from Una River floods	39	Protection of Hrvatska Kostajnica from the Una floods	1
		4034	Rehabilitation of the left Una dike – a wall from km 5+109,50 to km 5+965	1
24	Flood protection project in the Middle Sava River basin	6	Construction and reconstruction of the dike and protective wall on the right Sava bank upstream of Sisak, from km 32+400-km 34+705,42, in the Sava section Željezno Desno - Dubrovčak Desni, rkm 643+500-rkm 645+800	1
		10	Rehabilitation of the left Sava bank by the construction of a revetment in the section from rkm 498+961 to rkm 499+761 in the settlement Mlaka for the purpose of bank stabilisation	1
		35	Rehabilitation of the left Sava bank near the settlements Jasenovac and Drenov Bok by the construction of a revetment for the purpose of the riverbank stabilisation	2
		41	Reconstruction of the right Sava dike through the settlements Sisak - Bok Palanječki - Strelečko -Tišina Desna from km 5+370 to km 13+581	1
		43	Reconstruction of the left Sava dike through the settlements Palanjek - Setuš from km 110+800 - 117+600	2
		60	Reconstruction of the protection system of the settlements Donja Jelenska and Zapolic from flooding of the Sava and stream Vlahinićka by phased construction	1
		70	Reconstruction of the right Sava dike in the section from km 22+700 to km 24+370 between the settlements Martinska Ves (Desna) and Ljubljanica	1
		72	Reconstruction of the bridge above the outlet canal of the weir Palanjek and access ramps of the road Hrastelnica - Palanjek	1
		73	Construction of the right Ilova dike in the section of about 4200 m length from the Kutinica confluence upstream to the motorway	1
		75	Reconstruction of the left Sava dike through the settlement Preloščica from km 89+800-94+015	2
		76	Reconstruction of the left Sava dike through the settlement Gušće from km 78+725 -81+000 and from 82+000-83+200	2
		80	Works performance on the “Reconstruction of a dam in the Sunja riverbed in Četvrtkovac“	1
		84	Reconstruction of the right Sava dike through the settlement Ljubljanica from km 18+000 to 19+200	2
		85	Reconstruction of the left Sava dike through the settlement Lonja from km 63+214 - 63+512	2
		86	Reconstruction of the left Sava dike downstream of the sluice Trebež to the bridge on the watercourse Trebež from km 58+324 - 59+700	1
		87	Revitalisation of the old Sava riverbed in Crkveno and Ivanjski Bok, Čigoć and Mužilovčica	2

		90	Performance of rehabilitation works on the left Sava bank in Bok Palanječki by the construction of a revetment in rkm 609+500 in the length of 400 m	2
		96	Construction of a revetment on the left Sava bank in Galdovo	1
		4029	Reconstruction of the left Sava dike in Mlaka from km 0 to km 12,100	1
		4030	Reconstruction of the left Sava dike in the section Košutarica - Jasenovac from km 24.4 to 35.6 (11.2 km)	1
		4035	Rehabilitation of the right Sava bank in Uštica from km 0+350 to km 1+250	1
		4046	Construction of the PS Preloščica	2
		4047	Rehabilitation of the Sava left bank by the construction of a revetment in rkm 577 in Kratečko in the length of about 400 m	1
		4102	Construction of a revetment on the left Sava bank in Luka Lijeva	1
		4103	Protection of the settlement Kraljeva Velika	1
		4311	Reconstruction of the right Sava dike from km 0+000 to 10+050, from the settlement Selište sunjsko to Gradusa – Phase II	2
		4313	Reconstruction and construction of the right Sunja dike and retarding dikes of the stream Krivaj	2
29	Flood protection project in Česma and Glogovnica basins	31	Construction of the reservoir Martinac Trojstveni, a dam with pertaining facilities on the watercourse Dobrovita, a right Bjelovarska tributary, for the purpose of flood defence, improvement of small waterecourses downstream and irrigation	2
		57	Regulation of the Česma riverbed and construction of dikes on its both banks from rkm 38+850 to rkm 46+591, section Siščani - Narta	1
		78	Construction of sills in the Česma, Severinska and Lipova riverbeds for stabilisation of the riverbeds and regulation of low-water level regimes	1
		88	Construction of the left and right dikes of the lateral canal Koritna from rkm 2+020-rkm 3+000 in the area of the small basin Česma - Glogovnica	2
		89	Construction of dikes of the connecting canal Zelina - Lonja - Glogovnica from rkm 10+500 to rkm 11+000 near the settlement Stara Marča in the Kloštar Ivanić area	2
		92	Reconstruction of dikes on the streams Črnec and Glogovnica on the stretch south of the railroad Vrbovec - Križevci	2
		4031	Construction of the reservoir Samarica	1
		4053	Rehabilitation by geodetic works on the left and right banks - the revetment Glogovnica in Križevci from 26+200 to 26+280	1
		4054	Rehabilitation by perfroming geodetic works on the left and right bank – revetment Glogovnica in Majurec in 31+600	1
		4056	Construction of the reservoir Grbavac	2
		4057	Construction of the reservoir Kreševine	2
		4058	Construction of the reservoir Topolovica	2
		4059	Construction of the reservoir Bedenička	2
		4060	Construction of the reservoir Ravneš	2

		4061	Construction of the reservoir Lazarevac	2
		4062	Construction of the reservoir Severin	2
		4063	Construction of the reservoir Ciglena	2
		4064	Construction of the reservoir Tomaška	2
		4066	Construction of the reservoir Starčevljani	2
		4067	Construction of the reservoir Rovišće	2
		4068	Construction of the reservoir Mala Trnovitica	2
		4069	Construction of the reservoir Velika Trnovitica	2
		4070	Construction of the reservoir Krnjača	2
		4071	Construction of the reservoir Ruškovac	2
		4072	Construction of the reservoir Šimljana	2
		4073	Construction of the reservoir Krivaja	2
		4074	Construction of the reservoir Križic	2
		4075	Construction of the reservoir Laminac	2
		4076	Construction of the reservoir Martinac	2
		4077	Construction of the reservoir Miklouš I	2
30	Flood protection project in the Ilova and Pakra basins	37	Construction of the retention Miletinac, a dam with pertaining facilities on the Ilova River near the settlement Mali Miletinac for purposes of flood defence, improvement of small watercourses downstream and irrigation	1
		48	Regulation of the watercourse Bijela with the construction of a relief canal for floodwater and regulation of the existing riverbed from km 25+474 to km 28+411 in Sirač for the purpose of flood defence	1
		52	Construction of the left Ilova dike in the area of the settlements Međurić and Veliko Vukovje near Kutina	2
		4201	Regulation of the stream Toplica in Daruvar with dike construction	2
		4028	Protection of the town Pakrac from flash floods	1
		4032	Protection of the right bank in the town Pakrac from flash floods	1
		4033	Regulation of the Pakra River from km 45+982 to km 47+750 in the cadastral municipality Kusonje in the area of the town Pakrac	1
31	Flood protection project in the Šumetlica and Crnac basins	17	Construction of the reservoir Rešetarica, a dam with pertaining facilities on the watercourse Rešetarica for purposes of flood defence, improvement of small watercourses downstream and irrigation	1
		25	Construction of a weir facility in the riverbed of the watercourse Šumetlica, a bridge across the connecting canal Šumetlica - Rešetarica on the road Cernik - Šumetlica and finalisation of the excavation of the connecting canal in the length of about 150 m for the purpose of transporting a part of the Šumetlica water to the Rešetarica	1
		66	Regulation of the watercourse Rešetarica in Rešetari by the construction of a new cutoff from km 12+870 to km 13+505	1
		79	Regulation of the watercourse Rešetarica in the section from km 2+749,40 to km 2+800,90 with the construction of a bridge in km 2+749,00 on the road Baćin Dol - Cernik	1
32	Protection from the Sava River floods on the section	68	Rehabilitation of the left Sava bank in Županja from rkm 270+500 to rkm 271+311 by the construction of a revetment	1

	between Nova Gradiška and Račinovci	4105	Rehabilitation of a rockfall on the Sava left bank by the construction of a revetment from rkm 275+770 to rkm 276+277 in the village Štitar, Phase II	1
		4200	Modernisation of the left Sava dikes from Račinovci to Nova Gradiška	1
33	Flood protection project in the Orljava basin	16	Construction of the reservoir Kamensko, a dam with pertaining facilities on the watercourse Brzaja, a left tributary of the Orljava, for flood defence, improvement of small watercourses downstream, irrigation and water supply	1
		40	Regulation of the Orljava with the construction of dikes and a protective wall on its left bank in the Ciglenik and Bečica area, km 8+717 - 9+400	1
		55	Regulation of the Orljava River in the section Kuzmica - Vidovci from km 30+188-33+983 downstream of Požega	2
		4310	Improvement of the access road along the regulated riverbed of the torrential stream Kutjevačka Rika through Kutjevo	2
		4320	Protection of the town Požega against flash floods from Mt. Požeška gora	2
		4321	Retention Kaptolka	2
34	Flood protection project in Brodska posavina	8	Retention Glogovica	1
		64	Construction of a sluce and pumping station on the stream Glogova and reconstruction of the pertaining section of the Sava defensive dike in the zone of Luka Brod (Port)	1
		71	Construction of the reservoir Razliv, a dam with pertaining facilities on the watercourse Razliv near Sl. Brod for flood defence and irrigation	1
35	Flood protection project in the Bić and Bosut basins	46	Regulation of the watercourse Bić in the section from km 6+000 to km 26+295	2
		49	Construction of the reservoir Breznica, a dam with pertaining facilities on the watercourse Breznica in the basin of the Western Lateral Canal in Bić polje for purposes of flood defence, improvement of small watercourses downstream and irrigation	2
		50	Construction of the reservoir Preslatinci, a dam with pertaining facilities on the watercourse Kaznica, a tributary of the Western Lateral Canal, in Bić polje for purposes of flood defence, improvement of small watercourses downstream and irrigation	2
		61	Construction of the PS Teča on the Sava near Račinovci	1
		82	Regulation of the watercourse Boris – confluence of the watercourse Boris (in km 9+250) into the Bosut River (in km 55+035)	1
		4025	Regulation and stabilisation of the Bosut banks in Vinkovci	1
41	Flood protection project in the Bistra basin	4055	Regulation of the watercourse Jabučeta from 0+000 to 1+700 in the settlement Jabučeta	
50	Flood protection project in the Glina basin	4048	Construction of the retention Kalanjevac, a dam with pertaining facilities on the stream Kalanjevac in the area of the settlement Topusko for the purpose of flood defence	1
		4049	Construction of the retention Vranovina, a dam with pertaining facilities on the Glina River in the area of the municipality Topusko for the purpose of flood defence	2

		4104	Protection of the settlements Topusko and Velika Vranovina on the left and right Glina banks	1
51	Flood protection project in the Petrinjčica basin	4050	Construction of the retention Petrinjčica, a dam with pertaining facilities on the watercourse Petrinjčica in the area of the town Petrinja for the purpose of flood defence	2
53	Flood protection project in the Kutinica basin	23	Regulation of the watercourse Kutinica from rkm 10+374tdo rkm 13+511 in the area of the town Kutina	1
		28	Construction of the reservoir Polojac, a dam with pertaining facilities on the watercourse Polojac, left tributary of the Kutinica, for flood defence, improvement of small watercourses downstream, and irrigation	1
54	Flood protection project in the Lower Dobra river basin	4004	Stabilisation of the left Dobra bank in Grdun – of common interest with HEP	1
		4005	Reconstruction of the Sava dike in Dubrovčak Lijevi in the length of about 2.5 km	1
		4307	Protection of a part of the settlement Priselci from the Dobra floods	1
58	Flood protection project in the Mrežnica river basin	4306	Rehabilitation of the left Mrežnica bank in Zvečaj	2
	WMD for Upper Sava			
20	Flood protection project in the Kupa river basin – Karlovac and Sisak areas	3012	Construction of a transversal dike from the relief canal Odra to the Sava dike – extension of the flood defence system of the City of Zagreba	1
24	Flood protection project in the midlle Sava River basin	105	Sava – sills in the Sava riverbed, section Ivanja Reka - Jarun (6 sills)	1
		119	Construction of the left Sava dike in the Zaprešić area (from the Sutla River to the Krapina River)	1
		120	Sava (left bank) – reconstruction of the left-bank dike Hrušćica - Dubrovčak	1
		122	Sava (right bank) – reconstruction of the dike between the settlements Drnek - Suša, including the construction of four revetments	1
		124	Rakovica – reconstruction of the right retarding dike	1
		126	Sava - construction of a sill in the Sava riverbed at Novaki Šćitarjevski	1
		3006	Reconstruction of the left Sava bank on the stretch Jadranski most - Jarun (L=3000 m) from 704+000 to 707+000	1
		3007	Reconstruction of the right Sava bank on the stretch weir Jankomir - Jarun (L=1400 m) from 707+700 to 709+100	1
		3008	Reconstruction of the right Sava bank on the stretch Most slobode - Jadranski most (L=1400 m) from 700+500 to 701+900	1
		3010	Reconstruction of the weir Jankomir - extension of the flood defence system of the City of Zagreb	2
		3011	Construction of a sill in the Sava River downstream of the weir Jankomir - extension of the flood defence system of the City of Zagreb	2
25	Flood protection project in the Krapina basin	114	Construction of the retention Reka with pertaining facilities on the watercourse Reka in Donja Stubica area for flood protection of the downstream area and Stubičke Toplice	1

		116	Construction of the retention Slani Potok – flood protection of Donja Stubica and Stubičke Toplice downstream areas	2
26	Flood protection project in the Samobor basins	111	Construction of the retention Lipovečka Gradna – a fill barrier and a retention for flood protection of the Samobor area	1
		129	Stream Goštiraj - Sveta Nedjelja	1
		3004	Construction of a retention in the stream Bregana basin	1
		3005	Regulation of the watercourse Lipovecka Gradna from 0+000 to 9+000	2
27	Flood protection project in the Sjeverno Zagrebačko prisavlje basin	3001	Regulation of the stream Črnomerec	1
28	Flood protection project in the Zelina and Lonja basins	110	Construction of the reservoir Presečno with pertaining facilities on the Presečno tributary of the Lonja River, reconstruction of the county and local roads, flood defence, improvement of small watercourses	2
		121	Construction of the retention Vir on the watercourse Zlenin in the town of Vrbovec area	1
		3003	Regulacija and improvement of the canal Puhovec - PS Dugo Selo	1
		3020	Construction of the syphon Kosač in the conecting canal	1
		3021	Construction of the syphon Poljanski Lug	1
		3022	Lonja River, Negovec 9+750-10+170	2
		3023	Lonja River, Mlaka 12+079-12+504	2
48	Flood protection project in the Sutla basin	115	Regulation of the Sutla riverbed in a 900 m long section near Hum na Sutli, with the removal of the old bridge and the construction of a new one for flood protection of the settlement centre	1
	WMD for the Mura and Upper Drava			
36	Flood protection project of the Drava River from the Slovenian border to Pitomača	244	Reconstruction of the dike Virje Otok - Brezje (along the old bed of the HPP Formin, 3.7 km)	1
		247	Reconstruction of the left bank dike Puščine (3.5 km)	1
		254	Revitalization of the Čambina (old Drava side channel)	2
		259	Construction of the dike Selnica - Dubovica (right bank dike along the old bed of the HPP Dubrava, 6.7 km)	2
		261	Reconstruction of the dike Gornji Hrašćan along the old bed of the HPP Varaždin (3.0 km)	1
		264	Construction of a dike between the bridges, left bank in Varaždin (0.2 km)	2
		266	Construction and reconstruction of the dike Šemovec (2.5 km)	2
		267	Reconstruction of the dike Zamlaka - Hrženica (0+000 - 6+500)	2
		279	Reconstruction of the dike Novo Virje - Crnec (7.2 km)	2
		303	Construction of the right bank dike Botovo - Libanovec	2
		1004	Reconstruction of the dike Repaš - Botovo (18 km)	2
		1005	Reconstruction of the dike Brodić - Zgruti	2
		1006	Construction of the right Drava dike in the area of the settlement Drnje	2
		1104	Revitalization of the side channel Ješkovo	2
38	Flood protection project of the Mura River	250	Reconstruction of retarding dikes along the Bistrec - Rakovnica (10.3 km)	2

		251	Reconstruction of retarding dikes along Kotoripski kanal (4.8 km)	2
		252	Reconstruction of the retarding dikes along the Trnava (6.4 km)	1
		1101	Reconstruction of the Mura dike from km 0 – 6.1	2
		1107	Rehabilitation of the dike Podturen seepage	2
39	Flood protection project in the Bednja basin	240	Cleaning of Lake Trakošćan	1
		258	Construction of the retention Korušćak	2
		262	Reconstruction of the retarding dike on the left and right banks of the Bednja River from 0+000 to 5+610	1
		287	Construction of a reservoir on the Bednja River near the settlement Bednja	2
		288	Construction of a retention on the watercourse Čret	2
		289	Construction of a retention on the watercourse Očura	2
		294	Construction of the retention Šaša I (flood defence) on the stream Šaša	2
		305	Construction of the retention Kamenica I on the watercourse Kamenica	2
		1001	Construction of a dike along the Bednja from Kapela Podravska to Ludbreg (11 km)	2
		1013	Regulation of the Bednja along the easter bypass road of Novi Marof (4.5 km)	1
		1014	Regulation of the watercourse Makoišće in the settlements Možđenec and Grana (0.5 km)	1
		1018	Regulation of Mlinski kanal in the business zone Veliki Bukovec (0.25 km)	1
		1022	Regulation of a stormwater canal of the settlements Novo Selo Podravsko and Županec (4.3 km)	1
		1023	Construction of a sotrmwater canal of the settlement Kapela Podravska (0.6 km)	2
		1024	Regulation of the watercourse Drenovec in the settlement Drenovec (2 km)	1
		1025	Regulation of the watercourse Koščevec in Varaždinske Toplice (1.3 km)	1
		1026	Regulation of the watercourse Vapnara in Strmec Remetinečki	1
40	Flood protection project in the Trnava basin	255	Construction of the retention Vugrišinec	2
		283	Regulation of the watercourse Hrebec from the retention Šenkovec to its confluence	2
		284	Regulation of the Trnava Murska downstream of the WWTP of the town Čakovec	2
		1016	Regulation of the Jalšovnica from Gornji Kraljevec to Novo Selo Rok (2.5 km)	1
		1102	Construction of a boundary canal of the settlement Pribislavec	1
		1103	A retarding dike along the watercourse Zelena	2
41	Flood protection project in the Bistra basin	253	Regulation of the watercourse Bistra Koprivnička from km 25+735 - 32+040	2
		268	Construction of the retention Javorovac on the stream Komarnica	2
		269	Construction of the retention Miholjanec on the stream Zdelja	2
		272	Construction of the retention Anski on the stream Anski	2
		273	Construction of the retention Kozarevac on the stream Kozarevac	2

		274	Construction of the retention Prugovac on the stream Suha Katalena	2
		280	Regulation of the watercourse Komarnica from km 5+820 to 7+300	1
		282	Regulation of the watercourse Zdelja from km 5+400 – 10+500	2
		304	Regulation of the watercourse Gliboki in the settlement Rasinja (29+420-32+000)	1
		1105	Construction of the retention Žlebic on the Bistra Koprivnička	2
49	Flood protection project in the Plitvica basin	260	Reconstruction of the dike on the relief channel of the Plitvica River from 0+000 - 3+500	2
		263	Reconstruction of the retarding dike on the left and right Plitvica banks from 0+000 do 3+030	1
		301	Construction of the retention Grabušnica on the Plitvica River	2
		1002	Construction of a relief canal of the Plitvica and the retention Jalkovec	2
		1007	Regulation of the Plitvica from Varaždin to Gojanec (5 km)	1
		1008	Regulation of the Plitvica from Zbelava to Varaždin	2
		1010	Regulation of the Plitvica in the settlement Dubovica (1.95 km)	2
		1011	Regulation of the Plitvica from rkm 12+800 - 22+000 (7.2 km)	2
		1012	Regulation of the Mozdernjak in the settlement Varaždin Breg from rkm 2+800 - 4+500	2
		1015	Regulation of torrential streams in the area of the municipality Martijanec	1
		1019	Construction of the western boundary canal of the settlement Trnovec Bartolovečki (2.5 km)	1
		1020	Construction of a lateral stormwater canal of the settlements Biljevec, Bikovec and Jurketinec (1.3 km)	1
		1021	Construction a lateral stormwater canal of the settlement Greda (0.6 km)	1
		1106	Construction of the retention Tužno	2
	WMD for Danube and Lower Drava			
37	Flood protection project of the Drava River from Pitomača to the Danube estuary	314	Dike Terezino polje - Vrbovka, dike Noskovci - Sopje and retarding dike along the Županijski kanal, dike reconstruction	2
		315	Dike Zabara - Hoboď, dike Donji Miholjac - Sveti Đurađ and dike Belišće - Nard, dike reconstruction	2
		345	Drava – rehabilitation and maintenance of the right bank (km 38-Nehaj), revitalisation	2
		351	Boroš Drava – ecological revitalisation of the Boroš Drava area, sluice	2
		352	Boroš jezero – a bridge - ecological revitalisation of the Boroš Drava	2
		353	Boroš Drava - ecological revitalisation of the Boroš Drava area, mud removal	2
		2006	Construction of a flood protection dike for the settlement Karašica	2
		2011	Reconstruction and extension of the dike and revetment - Zoo vrt	2

		2013	The sluice Stara Drava in Josipovac with a plateau for a mobile pump	2
		2031	Improvement and revitalisation of Otok ljubavi in Osijeku, left Drava bank rkm 22	2
		2033	Rehabilitation of a waste disposal site on the left Drava bank near the corridor VC - rkm 32	2
		2034	Reconstruction of defensive dikes in the defended area B.34 - the Lower Drava and Danube	2
		2041	Construction of a revetment on the right Drava bank from rkm 66+000 - settlement Gat	2
		2042	Construction of a revetment on the right Drava bank in Bistrinci from rkm 57+000 - 58+000	2
		2105	Regulation of the Drava River in Osijek – construction ongoing, completion in 2024	1
		2107	Dike Terezino polje - Vrbovka, dike Noskovci - Sopje and retarding dike along the Županijski kanal, dike reconstruction	2
		2109	Dike Zabara - Hoboď, dike Donji Miholjac - Sveti Đurađ and dike Belišće - Nard, dike reconstruction	2
		2201	Drava – rehabilitation and maintenance of the right bank (km 38-Nehaj), revitalisation	1
		2203	Boroš Drava – ecological revitalisation of the Boroš Drava area, sluice	2
42	Flood protection project in Županijski kanal basin	342	Dabrovica – construction of a reservoir – dam on the stream Dabrovica – multipurpose economic facilitiy (flood defence, irrigation, recreation) near Suhopolje	2
		344	Regulation of the water regime in the Čađavica - sluices, sills, reconstruction of existing retentions	2
		348	Regulation of the streams Čađavica and Slanac (box culverts)	2
		2010	Regulation of the water regime in the Oďenica basin for flood defence and other uses in the town Virovitica area	1
		2021	Regulation of the water regime in the Brežnica Orešačka basin for flood defence and multipurpose use	2
		2022	Improvement of water facilities in the watercourse Županijski kanal	2
		2023	Improvement of water facilities in the watercourse Lendava	2
		2024	Regulation of the water regime in the watercourse Županijski kanal for flood defence and multipurpose use	2
		2026	Regulation of the water regime in the watercourse Lendava for flood defence and multipurpose use	2
		2027	Regulation of the water regime in the watercourse Brana for flood defence and multipurpose use	2
		2028	Dabrovica – construction of a relief channel	2
43	Flood protection project in the Karašica and Vučica basins	316	Regulation of the Vučica River, basin improvement	2
		334	Breznica – construction of a multipurpose reservoir (irrigation, recreation, fisheries, technological uses) near Našice	1
		337	Darna - construction of a multipurpose reservoir (flood defence, irrigation, recreation) near Našice	2
		343	Krajna – construction of a reservoir (flood defence, irrigation, recreation), Čačinci	2
		349	Lapovac 1 – construction of a multipurpose reservoir near Našice	2

		350	Seona - construction of a multipurpose reservoir (flood defence, recreation, irrigation, etc.) near Donja Motičina	2
		354	Marjanac - construction of a reservoir (flood defence, irrigation, recreation) for protection of Orahovica from mountain flash floods	2
		2007	Reservoir / retention Stublovac	2
		2008	Improvement of the flood protection system of the settlements Bokšić Lug and Bokšić	2
		2020	Reservoir / retention Šašika	2
		2106	Reservoir Gornja Motičina	2
44	Flood protection project in the Vuka basin	319	Kanal Petruš – basin regulation, canal, sluice, pumping station	2
		323	Construction of the multipurpose reservoir Dola (flood protection for settlements upstream of Vukovar, recreation, fisheries)	2
		356	Poganovačko - Kravički kanal, basin regulation	2
		359	Revitalisationb of Antinski prokop	2
		360	Regulation of the water regime in the Vuka by the construction of sluices	2
		2014	Construction of a flood protection system for the settlement Punitovci	2
		2015	Execution of a new Vuka riverbed in the area of the cadastral municipality Bučje	2
		2103	Regulation of the Vuka River in Vukovar from 0+000 to 3+640	I
		2108	Reconstruction of the bottom outlet gate of the dam Borovik	2
45	Flood protection project of the Danube River	331	Danube River – stabilization of its right bank from Vukovar to Vučedol (rkm 1328-1333)	1
		332	Batina - construction of a revetment, the Karašica confluence with the Danube	2
		339	Danube River – improvement of is right bank in Sotin, downstream of Vukovar - MSTI (the former agency conducts public procurement for works in 2020 – funding from the OPCC fund)	1
		355	Kopački rit – water regime regulation – revitalisation of habitats	2
		2004	Reconstruction of the Danube dikes Gomboš and Batina	2
		2032	Retarding dike along the Karašica in Batina – confluence with the Danube	2
		2035	Improvement and protection of Zeleni otok in the Danube – rehabilitation of the parallel facility in the Danube from rkm 1423+250 to 1424+200 and revitalisation of a Danube side channel from rkm 1421+500 to 1423+370	2
		2036	Regulation of the Danube in Dalj from rkm 1352+500-1355+000 (protection against adverse effects of water, defence against ice, revitalisation)	2
		2037	Improvement of the Danube right bank in Aljmaš from rkm 1379+800 - 1380+400 (protection against adverse effects of water)	2
		2038	Construction of the connecting defensive dike Zmajevac - Goboš (Batina)	2
		2039	Construction of a defensive dike along the Danube in Ilok	2

		2040	Improvement of the Danube bank in Šarengrad rkm 1306+500 - 1307+000 - continued construction of the revetment in the upstream part (protection against adverse effects of water)	2
		2043	Improvement of the right Danube bank downstream of the settlement Aljmaš rkm 1375+000 - 1378+000 (Staklara)	2
		2202	Restoration of the old Danube course - Zmajevački Dunavac - continuation of the INTERREG IPA project "Wetland / Restore"	2
46	Flood protection project in the Baranja area	327	PS Bakanka - reconstruction, protection of the settlements Darda and Bilje	2
		340	Baranjska planina – construction of a multipurpose reservoir (flood defence, irrigation, recreation), Kneževi Vinogradi, Zmajevac	2
		357	Revitalisation of Topoljski Dunavac, municipality Draž	2
		361	Regulation of the water regime of the Karašica in Baranja by the construction of sluices	2
		2005	Reconstruction of water facilities Gaj	1
		2017	Reservoirs Divlja dolina	2
		2018	Improvement of the retention area of the torrential stream Zmajevac	2
		2019	Sluice Stara Drava in Bilje	2
		2029	Sub-centre for flood defence in the Danube region	2
52	Flood protection project in the Danube river basins downstream of Vukovar	325	Opatovac – reconstruction of the outlet channel of the reservoir	2
		335	Drljan - construction of a reservoir in Ilok (Drljanski potok), flood defence, irrigation, recreation	2
		336	Drljan 1 - construction of a reservoir in Ilok (flood defence, irrigation, recreation)	2
		341	Lovas and Tompojevci - regulation of the water regime and use of rits	2
		2016	Retetion Mala Kanjiža	2
		2030	Water management improvement and revitalisation of reservoir area of rit Grabovo near the Ovčara Memorial	2

PRIORITIES	
I	PROJECT IN CONSTRUCTION
Z	PROJECT COMPLETED
1	1ST PRIORITY
2	2ND PRIORITY

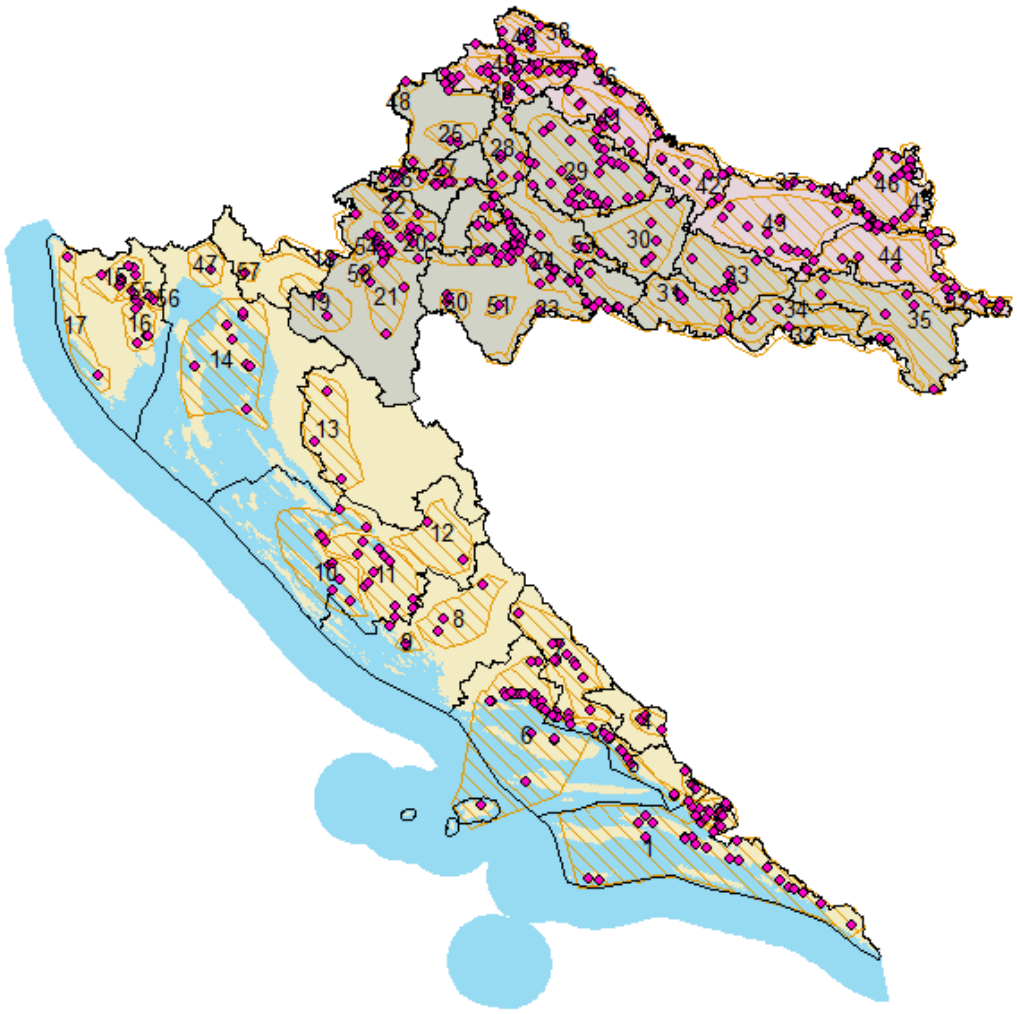

Figure 1.2-1 Spatial arrangement of identified projects for protection against the adverse effects of water with associated project units and the associated area of a small basin (Taken from: Multiannual Programme for the Construction of Regulation, Protection and Land Reclamation Water Facilities for the period until 2030)

1.2.2 Identified irrigation projects

Project ID	Construction of irrigation project County	Project Area	Short description of the project
WMD Mura and Upper Drava Rivers			
51	Koprivnica-Križevci County	Koljak	Water intake for the future reservoir Sirova Katalena (planned within the project), pumping station, pressure distribution network to land plots.
57	Međimurje County	Belica	Divided into 2 phases of development – Phase 1 - 337 ha, Phase 2 - 382 ha. Water intake from ground water (5 wells connected with connecting pipeline and control station), pressure distribution network to land plots
53	Međimurje County	Prelog - Donji Kraljevec – Sub-system Prelog	Water intake from existing reservoir of the HPP Dubrava, supply pipeline, pumping station, pressure distribution network to land plots.

54	Međimurje County	Prelog - Donji Kraljevec – Sub-system Donji Kraljevec	Intake from the reservoir, HPP Dubrava, IS Donji Kraljevac
55	Međimurje County	Prelog - Donji Kraljevec – Sub-system Goričan	Intake from the reservoir, HPP Dubrava, IS Donji Kraljevac
129	Varaždin County	Varaždin Istok	Intake from the Drava, Varaždin lake, IS Varaždin Istok
128	Varaždin County	Varaždin zapad	Intake from the Drava, Ormoško jezero, IS Varaždin Zapad
127	Varaždin County	Ludbreg	Intake from the Drava, Akumulacija Dubrava, IS Ludbreg
WMD Danube and lower Drava			
63	Osijek-Baranja County	Gat – Phase 2	Extension of existing irrigation system Gat (water intake from the Drava)
69	Osijek-Baranja County	Dravski rit	Water intake from the Drava River, pumping station, combined distribution system (open canals and pressure distribution network)
61	Osijek-Baranja County	Budimci-Krndija	Water intake from the Vuka River (there are tow reservoirs upstream of the intake - Borovik 6 million m3 and Koritnjak 6 million m3), pumping stations, pressure distribution network to land plots.
68	Osijek-Baranja County	Karašica – Subsystem Miholjački Poreč	Water intake from the Karašica River, pumping stations, pressure distribution network.
66	Osijek-Baranja County	Karašica - Subsystem Kapelna	Revitalisation of the Karašica River (pumping station Krnjak, sluices on the Karašica) and IS Karašica – Sub-system Kapelna (water intake from the Karašica River, pumping station, pressure distribution network to land plots).
67	Osijek-Baranja County	Karašica - Subsystem Miholjac-Viljevo	Water intake from the Karašica River, pumping station, pressure distribution network to land plots.
79	Osijek-Baranja County	Puškaš	Water intake from the lake Topoljski Dunavac and future PS Draž, open canal network; ground water (30 ha)
64	Osijek-Baranja County	Dalj Phase 1	Water intake from the Danube, pumping stations, pressure distribution network in the floodplain area, pumping stations, settling tanks outside floodplain area, pressure distribution network.
74	Osijek-Baranja County	Mala šuma-veliki vrt	Water intake from the Vuka River, pumping station, pressure distribution network.
75	Osijek-Baranja County	PI Osijek	Intake form three underground wells, pumping station, pressure distribution network.
76	Osijek – Baranja County	Marjanci	Intake from ground water.
131	Virovitica-Podravina County	Kapinci - Vaška	Extension of the irrigation IS Kapinci Vaška (300 l/sec.) , pressure distribution network.
135	Virovitica-Podravina County	Đolta Phase 2	Intake from ground water, IS Đolta
132	Virovitica-Podravina County	Lukač Phase 1	Water intake from the Drava (max.1000 l/sec.), pumping stations, pressure distribution network, IS Lukač
133	Virovitica-Podravina County	Lukač – 2 faza	

137	Virovitica-Podravina County	Novi Gradac-Detkovec	Works transfer (works started during the previous Multiannual Programme) – water intake from the Drava (max. 600l/sec), pumping stations, pressure distribution network.
136	Virovitica-Podravina County	Čađavica Phase 1	Water intake from the Drava, IS Čađavica
184	Virovitica-Podravina County	Čačinci-Crnac	
185	Virovitica-Podravina County	Zdenci	
144	Bjelovar – Bilogora County	Grabovo Phase 2	Intake from existing reservoir Grabovo, which will be supplemented with additional water quantities from the Danube over the planned pumping station Sokolovac and supply pipeline, pumping stations, pressure distribution network
162	Vukovar-Srijem County	Čeretinci - Markušica	Water intake from the ground, IS Čeretinci-Markušica
WMD for Upper Sava			
180	Zagreb County	Rugvica-Oborovo-Topolje	Intake from the Sava River near Rugvica
182	Zagreb County	Lupoglav	Intake from the Sava River near Rugvica,ISN Lupoglav
181	Zagreb County	Lonjica	Intake from the Lonja River – PS Negovec, IS Lonjica
186	Zagreb County	Pisarovina	Pisarovina
WMD for Middle and Lower Sava			
183	Zagreb County	Dubrava	Intake from the watercourse Cerina (fill dam, option 2),IS Dubrava
104	Sisak-Moslavina County	Velika Ludina	Water intake from the reservoir on the watercourse (planned within the project), pumping station, pressure distribution network to land plots with an intermediate PS.
1	Bjelovar-Bilogora County	Kapelica-Kaniška Iva	Water intake from the reservoir on the watercourse Bršljanica (planned within the project), supply pipeline and pumping station, pressure distribution network to land plots
7	Brod-Posavina County		IS Bid
2	Brod-Posavina County	Bid-Bosut polje BPŽ	Bid-Bosut polje on the area of the County
3	Brod-Posavina County	Orubica	Water intake from the Sava River, supply pipeline, low pressure pumping station, connecting pipeline, high pressure pumping station, pressure distribution network to land plot, IS Orubica
161	Brod-Posavina County		Bid-Bosutsko polje
80	Požega-Slavonija County	Orljava-Londža	Divided into 2 sub-systems - Sub-system Orljava (923 ha) and Sub-system Londža (874 ha). Water from existing reservoir Londža is released in the controlled manner into the Londža riverbed towards existing lateral canal for land along the Londža (sluices and mobile pumps on plateaus for one part, and supply pipeline, pumping station and pressure distribution network for the other part) and into the planned concrete canal for the land along the Orljava (sluices

			and syphons, mobile pumps on plateaus and pressure distribution network).
145	Vukovar-Srijem County	Tovarnik	Intake from the planned reservoir Berak through planned reconstruction of the canal Boris, pumping station, pressure distribution network
150	Vukovar-Srijem County	Lipovac	Water intake from the watercourse Spačva, IS Lipovac
151	Vukovar-Srijem County	Penave	Water intake from the watercourse Bosut, pumping stations, pressure distribution network, IS Penave
139	Vukovar-Srijem County	Ervenica	Water intake from the Bosut River, pumping stations, pressure distribution network
161	Vukovar-Srijem County		Bić-Bosutsko polje VSŽ
148	Vukovar-Srijem County	Dam Trbušanci	Construction of a control and regulation node at the site of the existing war dam, Dam Trbušanci
147	Vukovar-Srijem County	Weir Bazjaš	Elevation of existing weir
149	Vukovar-Srijem County	Sluice on the supply land reclamation canal of Bić – bosutsko polje (DMKBBP)	Construction of a sluice at the end of the supply land reclamation canal for irrigation of Bić – bosutsko polje (DMKBBP)
146	Vukovar-Srijem County	Dam Lipovac Phase 2	Elevation of existing dam Lipovac
138	Vukovar-Srijem County	Blata Cerna	Water intake from watercourse Bić
152	Vukovar-Srijem County	Sopot	Water intake from watercourse Bosut
WMD for North Adriatic Basin			
32	Istria County	Červar Porat-Bašarinka	Červar Porat-Bašarinka Pilot project
33	Istria County	Petrovija Phase 1	Water intake from public water supply that abstracts water from the source Gradole, IS 1 phase
36	Istria County	Čepić polje	Water intake from the planned reservoir, pumping station, pressure distribution network.
39	Istria County	Vodnjan	Water intake from reservoir, from water supply in winter, IS Vodnjan-Dignano
40	Istria County	Donja Raša	Water intake from reservoir, from water supply in winter, IS Donja Raša
41	Istria County	Brtonigla	Water intake from the reservoir, from water supply in winter, IS Brtonigla
37	Istria County	Boljunčica	Water intake from reservoir Letaj, SN Boljunčica
38	Istria County	Tar-Vabriga	Water intake from public water supply, source Gradole, Tar - Vabriga
42	Istria County	Buzeština	Water intake from river Mirna, Buzeština
43	Istria County	Butoniga	Water intake from lake Butoniga, Butoniga
44	Istria County	Mugeba-Funtana-Vrsar	Water intake from public water supply, source Gradole, Mugeba - Funtana - Vrsar
94	Primorje - Gorski Kotar County	Lič	Water intake from the spillway of the HPP Ličanka, pressure distribution network.
92	Primorje - Gorski Kotar County	Bašćanska dolina	Water intake from existing abandoned wells, ultimately the Žamac reservoir, pumping stations, pressure distribution network, IS Bašćanska dolina

99	Primorje - Gorski Kotar County	Pavlomir	Water intake from the existing reservoir, IS Pavlomir
93	Primorje - Gorski Kotar County	Brusan	Water intake from reservoir, pumping stations, pressure distribution network, IS Brusan
98	Primorje - Gorski Kotar County	Mrkoplaj - Sunger	Water intake from micro-reservoirs on local watercourses, pumping stations, pressure distribution network,IS Mrkopalj-Sunger
100	Primorje - Gorski Kotar County	Vrbničko polje	Water intake from reservoir Paprata (planned reservoir), pumping stations, pressure distribution network, IS Vrbničko polje
102	Primorje - Gorski Kotar County	Dunat	Water intake from water supply and reservoir. Water intake from the reservoir and from water supply in winter, SN Dunat
103	Primorje - Gorski Kotar County	Malinska Dubašnica	Water intake from the reservoir and from water supply in winter, IS Malinska Dubašnica
101	Primorje - Gorski Kotar County	Kimpi	Water intake from the reservoir and from water supply in winter, IS Kimpi
WMD for South Adriatic Basin			
19	Dubrovnik-Neretva County	NPPN Donja Neretva – Sub-system Koševo - Vrbovci	Water intake from the main irrigation canal until the construction of the barrier on the Neretva River, after this – supply gravity pipeline, pumping station and pressure distribution network to land plots.
22	Dubrovnik-Neretva County	NPPN Donja Neretva-Sub-system Glog	NPPN Donja Neretva-Subsystem Glog
25	Dubrovnik-Neretva County	Župa Dubrovačka	Water intake from the water chamber "Plat" HPP Dubrovnik, IS Župa Dubrovačka
14	Dubrovnik-Neretva County	Konavosko polje	Water intake from the water chamber "Plat" HPP Dubrovnik, IS Konavosko polje
13	Dubrovnik-Neretva County	Vela Luka (Bradat, Potoračje i Vrbovica-Kruševo)	Includes the systems Bradat, Vrbovica - Kruševo and Potoračje. Water intake from public water supply and ground water.
24	Dubrovnik-Neretva County	Stonsko polje	Water intake from public water supply and ground water, IS Stonsko polje
11	Dubrovnik-Neretva County	Lumbarda - Donje blato	Water intake from public water supply and ground water, IS Lumbarda -Donje Blato
9	Dubrovnik-Neretva County	Čara	Water intake from public water supply and ground water, IS Čara
12	Dubrovnik-Neretva County	Smokvica	Water intake from public water supply and ground water, IS Smokvica
110	Split-Dalmacija County	Sinjsko polje - Trnovača	Intake form the Cetina River, pumping stations, pressure distribution network
106	Split-Dalmacija County	Bunina	Pumping stations, pressure distribution network
114	Split-Dalmacija County	Imotsko-bekijsko polje	Wtare intake from reservoir Ričica, Imotsko - bekijsko polje
124	Šibenik-Knin County	Petrovo polje Phase 1	Intake from ground water, IS Petrovo polje
123	Šibenik-Knin County	Donje polje-Jadrtovac	Water intake from the future reservoir, IS Donje Polje-Jadrtovac
166	Zadar County	Baštica (reservoir Grabovac)	Water inatke from resevoir, pressure stations, pressure distribution network, IS Donja Baštica-Grabovac

169	Zadar County	Škabrnja (reservoir, well)	Water intake from ground water, microreservoir, pressure stations, pressure distribution network, IS Škabrnja
178	Zadar County	Povljana	Water intake from public water supply and ground water, pumping stations, pressure distribution network, IS Povljana
175	Zadar County	Kolan	Water intake from public water supply and ground water, pumping stations, pressure distribution network, IS Kolan
167	Zadar County	Bokanjac-Rašinovac	Water intake from future reservoir Bokanjac (part of the water from basin and part from ground, 1.0 mil. m^3, pumping stations, pressure distribution network, IS Bokanjac and Rašinovac
171	Zadar County	Vransko polje Phase 1 – Sub-system Malo Blato	Intake from surface waters in the basin (Sub-system Malo blato)
172	Zadar County	Vransko polje Phase 1 – Sub-system Gorčine	Intake from surface waters in the basin, Sub-system Gorčine

The spatial layout of the planned projects is given in the following figure.

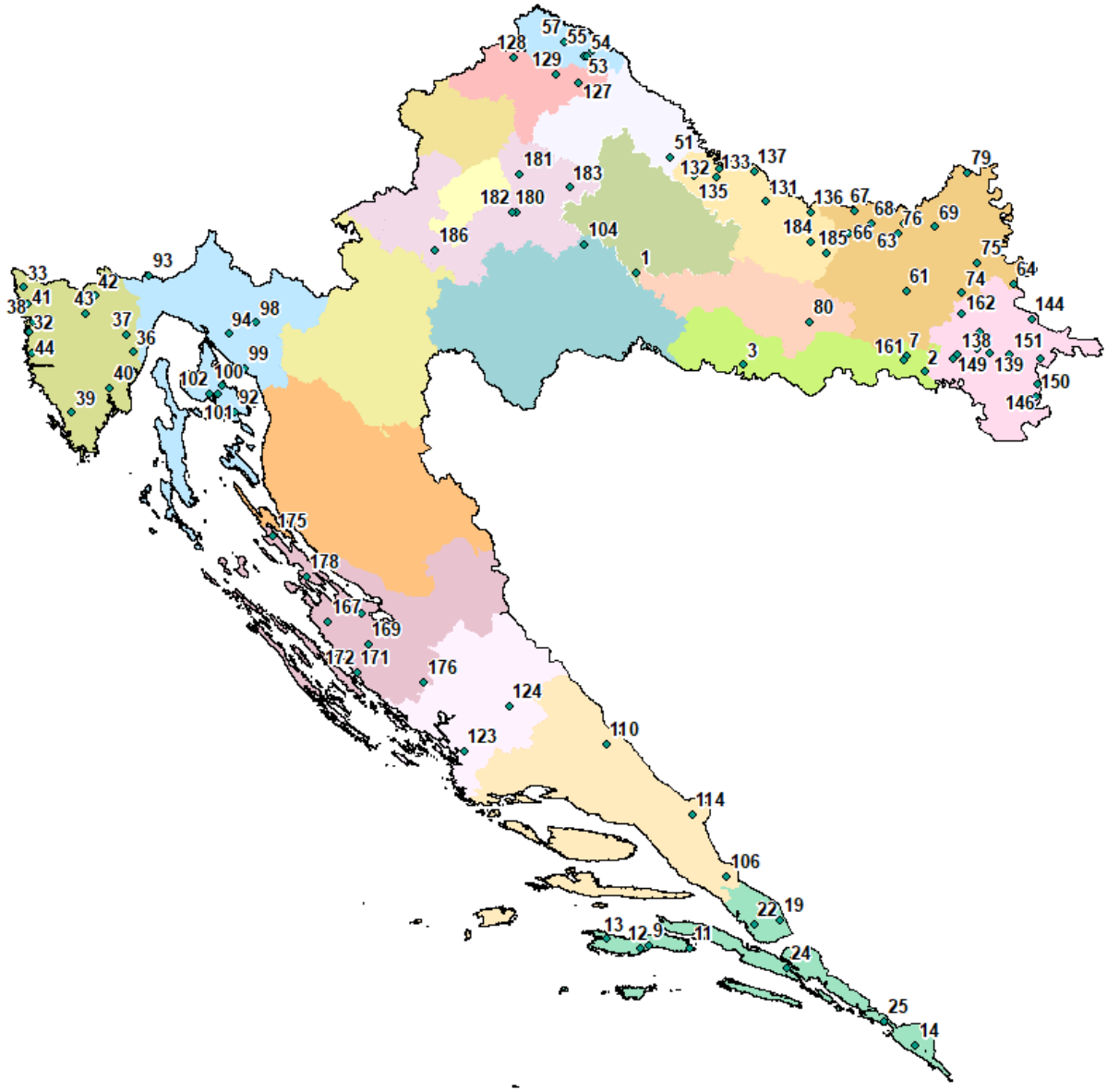

Figure 1.2-2. Spatial distribution of irrigation projects (Taken from: Multiannual Programme for the Construction of Regulation, Protection and Land Reclamation Facilities for the period until 2030)

2 Existing condition and possible impacts on the environment

2.1 Soil and agriculture

Based on geographical and geological diversity, the main feature of soils in the Republic of Croatia is their diversity. Natural and anthropogenic pressures are the causes of degradation, which is evident in the form of erosion, landslide formation, alkalinization, salinization, pollution, and loss of soil as a valuable natural resource. Furthermore, the agricultural potential of Croatia is insufficiently exploited despite its abundance and value. The largest problems are abandoned agricultural land, lack of strategic approach to development of agricultural sector and underdevelopment of the irrigation system. The importance of sustainable management of water resources in food production is gaining more importance recently. Climate change and natural hazards such as droughts and floods have high impact on the availability of water resources and food production. Implementation of hydrotechnical projects in agriculture (drainage and irrigation) secures the adequate production through a more efficient use of water resources. The development of protective measures against detrimental effects of water and adequate use of agrochemicals are basic preconditions for the achievement of sustainable and environmentally acceptable agriculture.

During the assessment of Strategy's potential influence on soil and agriculture and determination of measures, only activities that could have significant positive and/or negative effect were considered.

Based on existing conditions and environmental problems, as well as available data, projects that will have an effect on agriculture and/or soil were determined. The construction of reservoirs will have a negative effect on soil, especially if they are planned on particularly valuable (P1) and valuable cultivated (P2) agricultural land. At the same time, reservoirs that will be used for irrigation, as well as land reclamation facilities, will have a positive impact on agriculture because they will enable irrigation and will increase the resistance of agricultural sector to climate changes. Projects of the regulation of torrents in the Adriatic basin will have a positive influence on soil, especially in areas with a high risk of water erosion because they will reduced this risk. Also, a positive impact on agriculture is expected if regulation of torrent is carried out in areas with considerable agricultural production. Construction and reconstruction of embankments in the area of Danube River Basin will have a positive impact on agriculture if agricultural land is located near rivers and/or is prone to flooding. Negative impacts can occur when locations from which soil material will be excavated for dikes construction are located on particularly valuable (P1) and valuable cultivated (P2) agricultural land. Reconstruction of existing facilities will not have significant long term impacts.

2.2 Geology

With regard to the geological structure on the territory of Croatia, two areas can be singled out: the Pannonian one, which includes the northern part, and the Dinaric one that extends from west to south along the Adriatic Sea. In the structure of the Pannonian area, mainly igneous, metamorphic and clastical sedimentary rocks appear, while the Dinaric area is characterized mainly by carbonate rocks.

Structurally tectonic relations on the territory of the Republic of Croatia are complex, and four main tectonic units can be singled out: Pannonian basin, Inland Dinarides, Outer Dinarides and Adriatic.

The Pannonian basin is extending through Croatia and the surrounding countries, and is surrounded by the Alpine-Carpathian-Dinarides orogenic system. The Croatian part of the Pannonian Basin is spread over 26,000 km^2 and is divided into four main sub-pools: Sava and Drava basin, Northwestern Croatia and Slavonia. In this area there are the oldest rocks of Paleozoic age that build fundamental mountains, represented by igneous and metamorphic and less often sedimentary rocks with granites, gnaeuses, shale and metamorphic rocks of different lower degree of metamorphosis on them lie deposits of mesozoic-Paleozoic and neogene-quaternary age.

The Dinarides are a wide northwest-south-eastern belt stretching from southwestern Slovenia to Montenegro and runs along the Croatian part of the Adriatic coast and inland. The inner Dinarides represent the young, concatenated mountains formed by alpine orogenesis within the framework of the creation of the Tethys Ocean due to the collision and underscore of the African craton under the European part of the Eurasian Plate. They cover the area from Žumberak, Karlovac, Duga Resa, Banovina and Kordun and continue to neighbouring Bosnia and Herzegovina. All types of rocks are present, and structures extend in the direction of NW-SE.

The outer Dinarides were formed on the Adriatic-Dinaric carbonate platform. The most prominent structures of the Dinarides are the northwest-southeastern reverse faults that directly border the southwestern border of the Pannonian Basin. They stretch from Karlovac and Ozalj, through Istria all the way to Dubrovnik and include all the islands of the Adriatic. In the structure, limestones and dolomites predominate mainly with the frequent appearance of carbonate clastics. The sequence of carbonate deposits is very thick, interspersed with more than 8000 m, stratigraphic range from Carbon to Eocene.

Geotectonic unit Adriatic is located on the carbonate base of Mesozoic age. Carbonates and clastics of Paleogene age are present, and of the Oligocene, clasts with terigene influence predominate. The islands have carbonate builds except Apple, Brusnik and Svetac (gabro). Tuffs are present inside the Neogenic clastics.

2.3 Hidrogeology

The territory of the Croatian territory, given the hydrogeological characteristics, can be divided into two areas: the Pannonian area and the karst.

The Pannonian region is dominated by alluvial aquifers of inter-grain porosity formed within large sedimentation basins of the Drava and Sava rivers. Between them stretch mountainous and hilly areas also mainly built from deposits of inter-grain porosity, and carbonate aquifer rocks of crack porosity are found only in the highest parts of the mountainous regions. Alluvial aquifers in the Drava and Sava basins are rich in water and represent the main water supply resource of the northern part of Croatia.

The fundamental features of karst basins are spacious water collection zones in mountainous areas very rich in precipitation and very complex conditions of emerging on the contacts of karstified water-permeable carbonate aquifers and waterproof clastic rocks, or under the slow action of the sea. Karstification and underground flows are deeper than today's sea level, thanks to much lower sea levels in the quaternary period. Groundwater flows are tied to cavernous-fissure systems, they are relatively high speeds of underground flows (up to 30 cm/s), and the amplitudes of leakage at karst springs vary up to 200 m^3/s.

The natural vulnerability of the aquifer was separately assessed for the Pannonian and karst parts of the water area. In the Pannonian area, a very high natural vulnerability is the Drava aquifer and the area of the Sava River basin from the Slovenian border to Sisak. Significant areas of very large vulnerabilities of karst aquifers are separated in the groundwater units central Istria, Rijeka Bay, Lika-Gacka and Cetina and on the islands of Krk and Cres.

2.4 Seismic activity

The locations of seismic activities correlate with the locations of regional faults or fault zones, especially along their intersections and along the edges of larger tectonic units. According to the global distribution of earthquakes depending on their strength, the area of the intervention belongs to the Mediterranean-Asian seismic zone.

In accordance with the map of earthquake areas for the return period of 95 years, on the territory of the Republic of Croatia horizontal peak acceleration of the soil starts in the value of 0.04 - 0.20 g. According to the map of the earthquake areas for the return period of 475 years, the horizontal peak acceleration of the soil starts in the value of 0.06 - 0.38 g. The most pronounced in the area of Dalmatia, Primorje and the wider Zagreb area.

2.5 Forest and foresting

All forests and forest land in the Republic of Croatia are united into one forest management area forming a functional unit to ensure unique, permanent, and sustainable management. Total forest management area, determined by the Forest management plan for the Republic of the Croatia (General FMAP) for the period from 2016 to 2025, amounts to 2.759.039 ha, which is 49,3 % of the land territory of Croatia. The share of vegetated area amounts 90 %. Considering the ownership structure, 76 % of forests and forest land are owned by the Republic of Croatia, of which 97 % are managed by the Croatian Forests Ltd, and 3 % by the state administration bodies or legal entities founded by the Republic of Croatia. The remaining 24 % of the forests and forest land are owned by the private forest owners. Forests are managed according to the principles of sustainable management, which means that an effort is made to achieve a permanent balance between the total production of wood biomass and the general forest benefits that refers to all those services, impacts, and values that forest provides to man, community, the environment, and the overall nature.

One of the fundamental problems of forestry in water management department (WMD) for the Mura and upper Drava and the Danube and lower Drava, related to the management of water resources are numerous large hydrotechnical interventions built in the past (hydroelectric power plants, construction of large canals, revetments, etc.), which resulted in the deepening of the riverbed and lowering of the groundwater level and, consequently, in drying of floodplain forests. Due to the hilly characteristics, problems of the forests in the WMD for the upper Sava are primarily related to the occurrence of torrential flows that cause erosion and soil washing. Also, forest management is difficult due to the reduced forest road infrastructure. Because of the proximity to urban areas, almost every infrastructural intervention represents a certain encroachment on forest habitats. The problem of forests in the WMD for middle and lower Sava is mainly related to the conversion of forests and forest land in the past for the needs of building the existing infrastructure and energy network, which led to the fragmentation of forest ecosystems. In lowland floodplain forests, sudden changes in the water regime caused by land reclamation, hydrotechnical and other interventions on larger areas represent

a significant pressure. In the entire distribution area, ash stands (*Fraxinus angustifolia* and *F. excelsior*) are particularly threatened due to the complex interplay of abiotic and biotic factors.

Also, a particular threat to the floodplain forests is the false indigo-bush (*Amorpha fruticosa*), whose aggressive spread is favoured by the floods. The WMD for the basins of the northern Adriatic is partly characterized by the forests of the Istrian area that are endangered due to frequent erosive and torrential processes in the flysch area, which cause ecological and economic damage due to the loss of soil and vegetation. On the other hand, in the forests in Gorski Kotar, the biggest problems are windbreaks, windthrows, icebreaks and snowbreaks caused by the increasingly frequent and pronounced climatic oscillations. Forests in the WMD for the Southern Adriatic basins are mainly of a protective character and have low economic value. The reason for this is degradation of a forests because of systematic exploitation in the past (cutting, grazing, conversion of land). There are very few high forests that have remained preserved due to the difficult accessibility of these areas. The main problem in this area is forest fires caused by climatic extremes or human activities and carelessness, as well as soil erosion caused by frequent torrents, which is especially pronounced on burned forest areas due to the lack of vegetation.

Given that this Program plans interventions that concern water management and that can potentially change the water regime, emphasis is placed on those WMD-s and project units that should be paid attention to when planning and implementing interventions. The greatest impact can be expected in the case of encroachment on lowland floodplain forests, i.e., in forests communities where pedunculate oak (*Quercus robur*), field ash (*Fraxinus angustifolia*) and black alder (*Alnus glutinosa*) are present or in alluvial willow (*Salix* sp.) and poplar (*Populus* sp.) forests. For the WMD for Mura and upper Drava this refers to project units 36, 38, 40 and 41, for the WMD for the Danube and lower Drava to project units 37, 43, 44, 45 and 46, for the WMD for the upper Sava to project units 24 and 28 and for the WMD for middle and lower Sava to project units 20, 24,3 2, 35 and part of project units 29 and 30. As for interventions in the WMDs for northern and southern Adriatic, the impacts are mainly concentrated on landslides and erosion due to torrential flows and loss of vegetation due to the fire or land conversion.

Analysing the possible impacts of the projects planned in the Multiannual Programme, it was observed that the construction of certain projects can result in the loss of forest areas and their exclusion from regular management, first by establishment of reservoirs on forest land. Possible negative impacts on forests can also occur through the construction of retention basins in case of surface water stagnation, especially in those forest communities that are not adapted to flood conditions. The construction of embankments can disrupt the flooding regime of forest communities dependent on floods. In cases where construction may lead to the absence of flooding in otherwise flooded areas, this will lead to succession towards drier forest communities. Furthermore, hydrotechnical interventions such as the construction of channels and dams can have both negative and positive impact, depending on the water regime trends. For example, if the water level has already been lowered, then technical measures can be used to ensure groundwater recharge in open aquifers. On the other hand, the construction of deep channels can affect the lowering of groundwater level, which leads to the changes in habitat conditions and physiological weakening of trees. In any case, before any major hydrotechnical intervention, which is estimated to have an impact on the surrounding alluvial and floodplain forests, it is necessary to establish monitoring of the surface (floodwater) and groundwater regime, as well as the forest health status to regulate the depth of channels and the height of the dams.

Positive impact on forests will be achieved by carrying out works on the restoration of torrential flows, as further landslides, soil erosion and degradation will be prevented. The important role of forest vegetation as a key element in soil rehabilitation should be emphasized.

No negative impacts of the construction of land reclamation facilities are expected, but it should be ensured that pumping water for irrigation does not endanger the water regime of the nearby forest communities that depends on it.

2.6 Climate and climate changes

The climate of some area may change over a longer period. Climate change should be distinguished from variations within a certain climatic period. Variations refer to differences in the values of the meteorological element within short periods, for example from one year to the next. It is an experiential knowledge that two consecutive winters are not equal - one winter can be noticeably colder (or warmer) than the other. Climatic variation does not indicate that climate change has occurred. It is possible that in a shorter period the climate variation even works against the long-term climate change. But if there is a significant and permanent change in the statistical distribution of meteorological (climatic) elements or weather phenomena, usually over a period of several decades to millions of years, then we are talking about climate change.

State of the climate for the period 1971-2000 (reference period) and climate changes for future time periods 2011-2040 and 2041-2070 were analysed for the area of Croatia based on the results of numerical integrations with the regional climate model (RCM) RegCM. The spatial domain integration covered the wider area of Europe (Euro-CORDEX domain) using boundary conditions from four global climate models (GCMs), Cm5, EC-Earth, MPI-ESM and HadGEM2, at a horizontal resolution of 50 km. Climate changes in the future are modelled according to the RCP4.5 scenario of the IPCC, according to which a moderate increase in greenhouse gases is expected until the end of the 21st century.

In the future, the **average air temperature** is expected to rise in all seasons throughout Croatia. In the period 2011-2040 this increase could be from 0.7 to 1.4 °C; the largest in winter and summer, and slightly smaller in spring. The biggest increase in temperature is expected in the coastal parts of Croatia. By 2070, the largest increase in mean air temperature, up to 2.2 °C, is expected in the coastal area in summer and autumn, and a slightly smaller increase is expected in continental regions in winter and spring. Like the average daily temperature, an increase in the **average maximum and average minimum temperature** is expected. By 2040, the maximum increase would be up to 1.5 °C for the maximum temperature, and up to 1.4 °C for the minimum temperature; by 2070, the projected increase in the maximum temperature would be 2.2 °C, and the minimum temperature up to 2.4 °C. Expected future changes in the **total amount of precipitation** are not unambiguous as for temperature. In the period 2011-2040 a smaller increase in precipitation is expected in winter and in most of Croatia in spring, while a decrease in precipitation would prevail in summer and autumn. These changes in the future climate would be between 5 and 10% (compared to the reference period), so they would not have a significant impact on the annual averages of total precipitation. By 2070, a further decrease in the total amount of precipitation is expected in all seasons except winter, and the largest decrease would be up to 15%. The biggest change, a decrease of almost 50%, is expected for the **snow cover** in the mountain areas. Evapotranspiration would increase by about 15% by 2070, and surface runoff would decrease by up to 10% in mountainous regions. The expected change in **solar radiation** is 2-5%,

but it is of opposite signs: a decrease in winter and spring, and an increase in summer and autumn. The **maximum wind speed** would not change significantly, except in the southern Adriatic in winter, with expected decrease of 5-10%.

Mitigation of climate change

The construction of water protective and regulatory facilities and amelioration facilities will not have a significant impact on climate change as themselves, given that these are facilities that do not emit greenhouse gases during their use. Greenhouse gas emissions will occur during their construction as a result of the operation of machinery and vehicles that use fossil fuels. However, viewed at this strategic level, these are temporary emissions that can be further reduced by regular maintenance and the use of more modern machines with reduced emissions. Considering the significant number of facilities that are planned to be built by 2030, it should be noted that their construction indirectly leads to greenhouse gas emissions due to the use of construction materials, primarily concrete, i.e. cement, the production of which is a significant source of greenhouse gas emissions. By using natural materials where possible and technically justified, these emissions can be partly avoided. Some of the planned operations may also lead to the occupation of forest areas, which represents an unfavourable impact on climate change, considering the importance of forests as sinks for greenhouse gases. However, by avoiding and reducing the occupation of forest areas, this impact can be considered acceptable. Likewise, some of the revitalization projects of old riverbeds and backwaters will have a favourable effect on the swamp forests that depend on the flooding regime. Also, a large number of projects will ultimately not be realized, either for financial or technical reasons.

Adaptation to climate changes

According to the Climate Change Adaptation Strategy in the Republic of Croatia for the period up to 2040 with a view to 2070 (Official Gazette 46/20), the main expected impacts that can lead to a high degree of vulnerability of water resources are: reduction of water quantities in watercourses and at sources; reduction of underground water supplies and lowering of groundwater levels; reduction of the water level in lakes and other dammed natural or constructed systems; sea level rise, salinization of coastal aquifers and aquatic systems; an increase in water temperatures accompanied by a decrease in the reception capacity of aquatic receivers; increase in the frequency and intensity of floods in threatened areas; increase in the frequency and intensity of torrents; increase in the frequency and intensity of rainwater floods in urban areas; increase in sea level, and thus the probability of flooding at the estuary of watercourses; reducing the effectiveness of coastal infrastructure and intensifying the salinization of river estuaries and coastal aquifers.

The projects planned by the Multiannual Programme represent an adaptation to expected climate changes, such as an increase in the frequency of floods and erosion caused by short-term heavy rains and storms, which protect settlements, but also the economy. Revitalization projects represent an adaptation to climate change because they increase biodiversity, for example, in areas of swamp forests that depend on the flooding regime of watercourses, in addition to flood protection. However, when building reservoirs, it is necessary to ensure an ecologically acceptable minimum downstream of the reservoir in order not to endanger the biodiversity of watercourses downstream of the reservoir. The construction of irrigation facilities increases the resistance of agricultural production to the extension of dry periods and the increase in temperatures that are expected in the future. At the same time, it is important that, at the project level, water intakes are dimensioned in such a way that they do not endanger the amount of water for other purposes, primarily for human consumption.

2.7 Game and Hunting

According to the Law on Hunting (Official Gazette 99/18, 32/19, 32/20), game is of interest of the Republic of Croatia and has its special protection. Hunting is an activity that includes breeding, protection, hunting and use of game. In a wider sense, hunting is an economic, scientific, educational, touristic, sports and recreational component of several activities.

The territory of the Republic of Croatia, in accordance with the Law on Hunting, is divided into hunting grounds that are managed by the hunting licensees according to the valid contract on the lease of hunting rights and in accordance with valid hunting management plans.

The problem of hunting is mostly reduced to illegal hunting, especially in parts of Croatia where the emigration of the population is pronounced. The same reason is the decrease in the number of hunters in such rural areas and the impossibility of implementing the planned shooting, which is why game damage occurs.

Regarding the impacts that may arise from the implementation of the Multiannual Programme, they are mainly manifested in the occupation of the area, i.e., the loss of hunting productive areas, the removal of forest cover that provides shelter and safety for game, habitat fragmentation and changes in the established migration corridors.

In case if Multiannual Programme is not implemented, the impact will be neither negative nor positive because the state will remain unchanged.

2.8 Water

The territory of the Republic of Croatia hydrographically belongs to the Adriatic Sea basin and the Black Sea basin and is divided into two water areas: the Danube River Water Area (62 % of the territory) and the Adriatic Water Area (38 % of the territory). The waterworks that represents the boundary between the two basins passes through the highest mountain peaks of Croatia.

The condition of surface water bodies, according to the Regulation on water quality standards (OG 96/19), is determined by its ecological and chemical condition, and depending on this, the final assessment cannot be higher than the worst observation item.

The assessment of the ecological condition of water bodies integrates biological and accompanying physico-chemical, chemical and hydromorphological elements. On the territory of the Republic of Croatia, 42 % of river water bodies are in very good and good, 19 % in moderate and 39 % in poor and very poor ecological condition. Measured in length, 66 % of river water bodies are in moderate, poor and very poor ecological condition. The ecological condition of the lake water bodies is as follows: 46 % very good and good, 14 % moderate and 40 % bad and very bad condition.

The assessment of the chemical condition of rivers is based on the results of monitoring of priority substances in rivers in the water column. About 8 % of river water bodies do not meet the prescribed environmental quality standards. Measured in length, this is just over 9 % of the length of all rivers greater than 10 km^2. Most often, it is pollution with metals and their compounds. No lake has been subject to exceed the permitted concentrations of priority substances, according to which all lakes are in good chemical condition.

In the transitional waters of the Adriatic water area, 25 water bodies have been designated. The transitional waters of the Neretva, Cetina, Krka and Zrmanja have the largest number of water bodies and the greatest diversity of types, and therefore related ecosystems. The overall condition of water bodies in the area of transitional waters was rated as good in 28 % of cases, in 64 % of cases as moderate and in 4 % of cases as poor, or very poor, which would be 33.3 % as good in terms of area, 46.7 % as moderate, 16.7 % as poor and 3.3 % as very poor.

Coastal water typology is the main criteria when determining water bodies. Based on typology, 26 water bodies of coastal waters were determined. Water bodies in coastal waters are located in a relatively large range of areas from 0.63 km^2 to 4,238.76 km^2. Expert analysis of hydromorphological loads and impacts has shown that four coastal water bodies are possible candidates for significantly altered water bodies. The overall situation in the coastal water area was slightly better, i.e. in 5.,9 % of cases as well, in 42.3 % of cases as moderate and in 3.9 % of cases as very bad, which in terms of area would be 81.6 % as good, 18.3 % as moderate and 0.04 % as very poor.

In the Water Area of the Danube River, 20 grouped groundwater bodies (GWBs) were separated, while in the Adriatic water area 12 were separated. The chemical condition of almost all groundwater bodies is rated as good. The poor chemical condition is experienced by GWB Varaždin, then in the grouped body of groundwater Zagreb - its basic body HR204, GWB South Istria and GWB Bokanjac-Poličnik. The quantitative condition of all groundwater bodies was rated as good. On the basis of the overall assessment of the situation, it is evident that only for the Bokanjac - Poličnik GWB (JKGN-09) the situation was rated as poor (due to the over-exhaustion of renewable groundwater reserves during the prolonged summer dry spells on Bokanjac water intake), while in all others it was rated as good.

In the Republic of Croatia, 16 protected areas of surface water and 320 protected areas of groundwater are designated from which it is affected or reserved for the abstraction of water intended for human consumption.

Protected areas for the life of freshwater fish are determined on 151 river bodies of water, with a total length of 2833 km and on a lake with area of 2745 km^2. Protected areas of water suitable for bivalve molluscs have been declared on parts of the Adriatic Sea by the Decision on the determination of waters suitable for the life and growth of bivalves (OG 78/11).

Protected areas of water for swimming and recreation are declared every year before the start of the bathing season. In 2012, decisions were made on 3 bathing areas (in 2014 an additional 3 were declared) on inland waters and 905 (in 2014 an additional 13) of sea beaches.

In the Adriatic water area, 54 isolated areas of estuary and coastal waters have been declared vulnerable, which are eutrophic or could become eutrophic due to poor water changes or the intake of a large amount of nutrients. The declared areas subject to eutrophication include an area of 1 732 km^2 , namely 72 km^2 of transitional waters, 813 km^2 of coastal waters and 847 km^2 of open sea outside the borders of the Adriatic water area. The basins of declared areas subject to eutrophication cover an area of 10 466 km^2, of which 651 km^2 are on the islands. Areas intended to capture water for human consumption (where it is difficult to extract groundwater from surface water) and surface water in protected areas of nature have also been declared vulnerable. The waterfront of the sensitive area has been declared a water area of the Danube River in its entirety, due to the eutrophic Danube Delta. The total area of sensitive areas of coastal waters is 813,80 km^2, and the transitional waters are 122,90 km^2.

The decision on the determination of vulnerable areas (nitrates) in the Republic of Croatia (OG 130/12), which entered into force in December 2012 and has not changed in the meantime, identified 6 vulnerable areas covering an area of 5 090 km^2 (9 % of the territory of the Republic of Croatia), that is, 75 municipalities in 7 counties and the City of Zagreb.

The total flooded area of treated historical floods, in the Republic of Croatia, is about 633 km^2, of which about two thirds relate to flood events recorded in the water area of the Danube River. Of the approximately 15 000 inhabitants at risk of flooding, just over 15 % are located in the Adriatic water area. Looking only at the recorded historical floods, it can be concluded that according to the number of vulnerable inhabitants from floods, the water area of the Danube River is at a somewhat disadvantage compared to the Adriatic water area.

The construction of regulatory and protective water structures is carried out for the purpose of protecting against the adverse effects of waters, thus achieving the goals of protecting people and their property from floods and other forms of water adverse effects.

However, the construction of these procedures will also have a negative impact on the condition of water bodies, primarily on hydromorphological elements depending on the type of procedure.

The construction of embankments and walls will lead to a change in the morphology of the coast and riverbeds. These facilities will affect the hydrological regime of the watercourse during high waters in terms of retaining large waters in the riverbed and increasing the speed and energy of the flow when conducting it into the downstream area. Due to the increase in flow energy, one can expect to increase the adverse effects of large waters in terms of disrupting the longitudinal continuity of the watercourse: deep erosion and stopping the drifts on the downstream parts of the stream, especially on parts of the trough where there are partitions, omissions, bridges or meanders. This would also occur in the natural state of the watercourse during large waters, however to a lesser extent. The construction of embankments on the other hand protects the population and property threatened by the spill of large waters from the riverbed, alleviates erosion and deposition of sediments in the floodplain. The construction of walls as a protective structure against large waters is chosen in cases where there is no possibility to apply other protective hydrotechnical structures. This solution is applied in areas where there is a lack of space along the riverbed, either because of the already built facilities along the river bank, or due to the morphology of the terrain. These facilities are therefore usually incorporated with protective embankments and if the design and construction of walls are carried out in accordance with professional practice, erosion around the contact of the wall with natural terrain can be avoided.

The impact of retention construction on some hydromorphological elements during high waters is lasting and positive. During high waters, there will be a change in the hydrological regime of the watercourse, since temporary inspection will be created in the area of retention, while the watercourse downstream from the retention will have reduced flows. Flow continuity will be interrupted. Upstream of the retention slowdown, the hydrological regime of the watercourse is not expected to be affected. During lower hydrological conditions than those on which the retention is dimensioned, there is no effect on the hydromorphological elements of the watercourse.

The construction of reservoirs, mainly downstream from the reservoir, will improve the impact on those hydromorphological elements that are important for flood protection, especially during high water levels – erosion and damage caused by floodwaters will be prevented. A permanent water source will be provided for various purposes as well as raising groundwater levels. However, the negative impact of the reservoir on the hydromorphological elements of the watercourse is direct and

lasting. The construction of the reservoir will change the hydrological regime of the observed area in terms of creating permanent low water levels. Upstream of the reservoir slowdown area, the hydrological regime will remain unchanged, while downstream from the dam the hydrological regime of the watercourse will be changed as the water from the reservoir will be released in a controlled manner. The construction of hydrotechnical facilities will also break the continuity of flow in the area of the reservoir.

In some areas (depending on the surrounding terrain of the reservoir and its slowdown) it is possible that there will be a change in the groundwater regime in terms of the recharge of the surrounding underground during lower underground water levels. The stated influence is local.

Also, the construction of reservoir leads to a change in sediment deposition regime. Dragged sediment is mainly deposited in the upstream part of the reservoir. Suspended sediment settles mainly in the lake itself. The above causes a reduced transfer of sediment to the river bed downstream from the dam of the reservoir. In addition to the already mentioned reduced discharge of water from the reservoir lake, the water level in the riverbed is consequently lowered and the groundwater level in the aquifer near the riverbed is lowered. Newly created hydrological - hydraulic conditions when large waters occur cause deepening of the watercourse bed downstream of the dam. This is the case with large hydrotechnical systems (hydroelectric power plants), where there are several consecutive hydrotechnical facilities on one watercourse. This kind of influence is not expected to such a pronounced extent in the case of reservoir lakes with other purposes (e.g. water supply, irrigation).

Basin partitions in the riverbed permanently affect the continuity of the flow of the watercourse. The continuity of the watercourse as it was in its natural state is interrupted. The hydrological regime of the watercourse changes during high waters, when the structure causes the backwater. The impact of partitions on groundwater is negligible.

The morphology of the terrain is changing in the area of the partition itself, but erosion is also possible by the action of backwater on the coast upstream of the partition.

The regulation of the watercourse will prevent further erosion of the watercourse and surrounding terrain and the depositing of sediments in the trough, which will allow water to flow continuously in the trough. The regulation of watercourses can have an impact on groundwater in terms of breaking the connection of groundwater with the surface flow. The morphology of the watercourse and surrounding terrain will be permanently altered. By arranging the riverbed the hydrological regime of the watercourse should not be changed.

Revitalization of a riverbed will have a positive impact on groundwater dynamics. The revitalization of the watercourse changes the hydrological regime of the watercourse, but in a positive way, allowing water dynamics as in the natural state.

If the amount of pumped water is not adequately dimensioned, water interventions may affect the hydrological regime of surface water as they may affect the groundwater regime around the operation. An unacceptable reduction in groundwater and surface water levels could be due to the pumping of large amounts of water during low water levels. Excessive pumping can cause a sharp decrease in surface or groundwater, which may result in the appearance of erosion and collapse of soil deposits in the area from which it is pumped.

2.9 Biodiversity and protected areas

The scope of the Multiannual Programme belongs zoogeographically to the European and Mediterranean sub-regions, and geobotanically to the Eurosiberia-North America, Alps, and Mediterranean regions. Along the banks of large watercourses predominate lowland floodplain forests and mixed oak-hornbeam forests, permanent watercourses, mosaics of cultivated areas and mesophilous meadows. According to the Ordinance on Strictly Protected Species (OG 144/13, 73/16), 388 strictly protected plant species were recorded in the area covered by the Multiannual Programme, of which 170 species belong to the higher endangerment categories, mostly related to forest, wetland and meadow habitats along large streams. In addition, a total of 489 strictly protected animal species have been recorded in the geographic scope of the Program, mostly associated with forest, aquatic and meadow habitats.

In total, 418 areas in various categories are protected in the Republic of Croatia. Protected areas account for 8.56% of the total area of the Republic of Croatia, i.e. 12.20% of the land area and 1.94% of the coastal sea. Nature parks (4.79% of the total area) have the largest share in the area of all protected areas. The scope of the Multiannual Programme includes 225 protected areas (Nature Protection Act OG 80/13, 15/18, 14/19, 127/19). Of these, most are monuments of park architecture (68), followed by significant landscapes (53). The largest area is occupied by the Velebit and Lonjsko polje Nature Parks and the Mura-Drava Regional Park.

The impact of the objectives of the Multiannual Programme, which refer to the improvement of the regulation and irrigation systems of watercourses and the regular implementation of technical maintenance works on watercourses, floods and hydraulic structures, will have a secondary positive impact on biodiversity and protected areas due to the reduction of the risk of possible pollution of the aquatic environment and riverbanks, as well as possible incidents. On the other hand, program actions that involve the construction of new and/or additional infrastructure may have potentially negative impacts in the form of habitat loss and fragmentation, pollution, harassment or direct harm to fauna, and changes in riverbed structure. To minimize negative impacts, it is necessary to strategically plan the locations of new hydrotechnical structures and later implement project-level protection measures. Negative impacts will be more intense outside of urban areas and so will their significance, therefore sensitive, rare, and endangered habitats should be avoided when planning new water regulation infrastructure. For some projects, such as riverbed regulation and stabilization of riverbanks, it is suggested that they be carried out outside protected areas whenever possible. When constructing infrastructure in the floodplains of the Sava, Drava and Danube rivers, cumulative impacts of settlement and habitat fragmentation are also possible and should be avoided at the planning stage for biodiversity protection reasons. The cumulative impact of habitat loss could also occur when the impacts of planned projects are added or when the new impacts are added to the already existing negative environmental impacts; e.g. stabilization of the banks of the Sava River (especially in the area of Turopolje and Lonjsko polje), Kupa River, the Neretva Delta, the upper and lower reaches of the Drava River and the Danube River.

The strategic study identified 23 projects for the construction of flood protection and regulation facilities and 7 irrigation projects that may have an impact on protected areas. Problems that may arise during the implementation of these projects include alteration and loss of terrestrial and aquatic habitats, disturbance of species due to noise, vibration, and emission of dust and exhaust fumes,

spread of invasive alien species, and possible incidents (e.g., release of large amounts of chemical substances into the environment).

2.10 Landscape

According to the *Landscape Regionalization of Croatia about natural features* (Bralić I., 1995), the territory of the Republic of Croatia is divided into three basic natural-geographical regions - Pannonian, Highland and Adriatic Croatia, i.e. 16 landscape units.

Furthermore, the Republic of Croatia is divided into 6 water management departments (WMD). **The water management department for the Mura and upper Drava** is the northernmost VMD, and it includes 3 landscape units: *Lowland areas of northern Croatia, North-western Croatia and the Bilogora-Moslavina area*. The north-eastern part of the Republic of Croatia belongs to the **Water management department for the Danube and Lower Drava**. The greater part of the VMD covers the *lowland areas of northern Croatia*, while a smaller part falls on the *Bilogora-Moslavina region* and the *Pannonian Mountains*. The central part of the Republic of Croatia is under the **Water management department for Upper Sava**. Much of the area is within *Northwestern Croatia*, and the rest covers *Žumberak and the Samobor Mountains*, the lowland areas of northern Croatia and the *Bilogora-Moslavina area*. The **Water management department for the middle and lower Sava** covers a diverse area. The top northern part belongs to *Northwestern Croatia*, followed by the *Bilogora-Moslavina area* and the *Pannonian Mountains* surrounded by the *Lowlands of northern Croatia*. In the west of the WMD are several landscape units: *Žumberak and Samoborsko gorje, Kordunska zaravan, Gorski kotar and Lika*. The western part of the Republic of Croatia is under the **Water Management Department for the basins of the northern Adriatic**, which covers the area of *Istria, the Kvarner-Velebit area, the Gorski Kotar, Lika and the Peak Velebit belt*. Southern Croatia belongs to the **Water Management Department for the basins of the southern Adriatic**. The northern part includes parts of the *Kvarner-Velebit area, the Velebit peak and Lika.* In the direction of the south*, the North Dalmatian Plain, the Zadar-Šibenik Archipelago, the Dalmatian Zagora, the Coastal Area of Central and Southern Dalmatia* and the *Lower Neretva* follow.

The implementation of the Multiannual Programme would potentially lead to the degradation of valuable landscape structures. During the implementation of the planned projects, changes in the surface cover and morphology of the terrain are possible, which can directly affect the change in the landscape character and its visual quality. On the other hand, without the implementation of the Multiannual Programme, which foresees the construction of regulation and protection water facilities and land reclamation facilities, the current situation would be maintained. This alone would not have potential negative impacts on the physical structure, as well as on the visual qualities of the landscape. However, the Multiannual Programme also foresees rehabilitation, reconstruction, revitalization, etc. interventions, the implementation of which, in compliance with the prescribed measures, will make it possible to improve the existing situation in terms of residential quality and in terms of visual experience.

The significance of individual impacts depends on the characteristics of individual projects, that is, the activities they encompass. Likewise, the significance depends on the character and values of the area, among other things, the visual - experiential values of the landscape areas where the activities are planned, and the visual exposure of the planned activities. For the planned measures and activities of

the Multiannual Programme, at the strategic level, it was established that projects will not cause undesirable impacts on the landscape that could not be mitigated by the application of protection measures at the project level. Therefore, the planned projects can be considered acceptable from the landscape aspect. The cumulative impact on landscape features is only possible in certain projects at the area of the WMD for the Mura and the upper Drava, the WMD for the Danube and lower Drava, and the northern part of the WMD for the middle and lower Sava. In these areas, there are many projects that have a negative impact on the landscape (construction of reservoirs, retentions, canals, regulation of watercourses, etc.) within the same basin or in a narrow area. Therefore, if all the planned projects are realized, they will potentially change the character of the landscape, which can then probably cause significant impacts on the landscape.

2.11 Cultural and historical heritage

The territory of the Republic of Croatia is extremely rich in cultural and historical heritage. Thanks to its favourable geographical position and climatic characteristics, the settlement of this area began in the earliest historical periods and can be traced continuously until today. A good communication base is conditioned by the presence of branched river corridors - rivers on the territory of the Croatian inland and near islands in the coastal area of the Republic of Croatia, where communication with the cultural sign took place in the past, which led to the establishment of numerous settlements of temporary or permanent character, many of which are still present today.

Cultural heritage is classified as immovable individual cultural property, cultural-historical entity, cultural landscape, archaeology, and intangible cultural property of the Republic of Croatia and is entered in the Register of Cultural Property of the Republic of Croatia. It should be noted that the number of cultural properties in the Register of Cultural Properties of the Republic of Croatia is not constant and is updated depending on the activities of specialized services in the field.

The official data of the Ministry of Culture and Media for the territory of the Republic of Croatia as of February 24, 2022 indicate a number of 5,473 permanently or preventively protected immovable cultural properties. In total, there were 5,236 permanently protected immovable cultural properties. Preventively protected immovable properties (i.e. protected for a period of three or six years) totalled 147. Most cultural and historical values are recorded in the spatial planning documentation.

The Strategic Study on the Environmental Impact of the Multiannual Program for the Construction of Regulation, Protection and Land Reclamation Facilities in the Republic of Croatia, planned for a period until 2030, envisages numerous projects involving the construction of new infrastructure, improvement of existing ones and other interventions aimed at the development and protection of the planned area. These projects represent interventions in the space, so it can be assumed that their implementation will have an impact on protected cultural assets and recorded cultural and historical values. In accordance with the typology of projects, the study identifies potential impacts that we can categorize based on their character, some of which may threaten or affect the physical condition of certain cultural properties and violate their spatial and visual integrity. In addition, it should be noted that possible archaeological sites and finds whose existence is not yet known are particularly at risk during the execution of this work, unless they are covered by lists of protected or recorded cultural properties. A particularly sensitive category is represented by the material remains of the past in

riverbeds, the existence of which is foreseeable due to previous chance finds or extremely rare archaeological investigations of riverbeds.

Since the locations and extent of each infrastructure project are not specified, a more detailed analysis and evaluation of the impacts of each project will be possible during the implementation of environmental impact assessment procedures, when appropriate protection measures will also be imposed. Consultation measures will be listed to avoid and/or mitigate impacts, and in a situation where protective documentation is required, protective measures for the procedures concerned will also be specified. In addition, monitoring measures to be applied by the relevant institutions are indicated if the works contain previously unknown cultural-historical sites or finds.

In addition to the possible (negative) impacts in the implementation of the Multiannual Program for the Construction of Regulation, Protection and Land Reclamation Facilities on the territory of the Republic of Croatia, especially the parts related to cultural heritage, positive aspects related to the cultural heritage segment can also be highlighted. This part primarily refers to the prevention, protection and preservation of cultural heritage from the possible negative effects of floods and other natural disasters. Therefore, in the long term and cumulatively, one can expect a positive impact of the Multiannual Program for the Construction of Regulation, Protection and Land Reclamation Facilities on the territory of the Republic of Croatia on the cultural heritage of the Republic of Croatia.

2.12 Infrastructure

2.12.1 Transportation Infrastructure

Transportation Infrastructure

Transportation infrastructure is one of the most important components of the economy, which depends on the development of the local or regional system.

Motorways by sectors:

- ***Sector A*** – A4 (G. P. Goričan (border of the Republic of Croatia) Hungary) - Varaždin - Zagreb (junction Ivanja Reka, A3))
- ***Sector B*** – A5 (G. P. Branjin Vrh (border of the Republic of Hungary) - Beli Manastir - Osijek - Đakovo - Sredanci junction (A3) - G. P. Svilaj (border of Bosnia and Herzegovina))
- ***Sector C*** – A1 (Zagreb (junction Lučko, A3) - Karlovac - Bosiljevo - Split - Ploče - Opuzen - border of Bosnia and Herzegovina) and the border of Bosnia and Herzegovina - Dubrovnik), A2 (G. P. Macelj (border of the Republic of Croatia) Slovenia) - Trakošćan - Krapina - Zagreb (junction Jankomir, A3), A3 (G. P. Bregana (border of the Rep. Slovenia) - Zagreb - Fig. Brod - G. P. Bajakovo (border Rep. Serbia)), A4 (G. P. Goričan (border of the Republic of Serbia) Hungary) - Varaždin - Zagreb (junction Ivanja Reka, A3)) and A11 (Zagreb (junction Jakuševec, A3) - Velika Gorica - Sisak).
- ***Sector D*** – A1 (Zagreb (junction Lučko, A3) - Karlovac - Bosiljevo - Split - Ploče - Opuzen - border of Bosnia and Herzegovina) and the border of Bosnia and Herzegovina - Dubrovnik), A3 (G. P. Bregana (border Rep. Slovenia) - Zagreb - Fig. Brod - G. P. Bajakovo (border Rep. Serbia)), A5 (G. P. Branjin Vrh (border Rep. Hungary) - Beli Manastir - Osijek - Đakovo - junction Sredanci (A3) - G. P. Svilaj (border Rep. Bosnia and Herzegovina)), A11 (Zagreb (junction Jakuševec, A3) - Velika Gorica - Sisak)

- ***Sector E*** – A1 ((Zagreb (junction Lučko, A3) - Karlovac - Bosiljevo - Split - Ploče - Opuzen - border of Bosnia and Herzegovina) and border of Bosnia and Herzegovina - Dubrovnik), A6 (junction Bosiljevo 2 (A1) - Delnice - Rijeka (junction Orehovica, A7)), A7 (G. P. Rupa (border Rep. Slovenia) - Matulji - Orehovica - Sv. Kuzam - Hreljin - Šmrika (D8)), A8 (junction Kanfanar (A9) - Pazin - Lupoglav - junction Matulji (A7)), A9 (junction Umag (D510) - Kanfanar - junction Pula (D66))
- ***Sector F*** – A1 (Zagreb (junction Lučko, A3) - Karlovac - Bosiljevo - Split - Ploče - Opuzen - border of Bosnia and Herzegovina) and the border of Bosnia and Herzegovina - Dubrovnik)

Major state roads by sectors according to the Decision on Classification of Public Roads (OG 17/20):

- ***Sector A*** – DC2, DC3, DC41, DC24, DC35, DC227, DC209, DC20
- ***Sector B*** – DC 2, DC 7, DC 53, DC 518
- ***Sector C*** – DC 1, DC 3, DC 31, DC 206, DC 3, DC 24
- ***Sector D*** – DC 46, DC 7, DC 51, DC 53, DC 5, DC 47, DC 45, DC 26, DC 43, DC 6, DC 23, DC 42
- ***Sector E*** – DC 50, DC 1, DC 8, DC 100, DC 66, DC 44, DC 48, DC 64, DC 75, DC 50, DC 25, DC 218
- ***Sector F*** – DC 27, DC 8, DC 33, DC 109, DC 110, DC 1, DC 56, DC 60, DC 220, DC 70, DC 62, DC 113, DC 116, DC 118, DC 414, DC 120, DC 516

In the vicinity of the project in question there are also county and municipal roads, as well as unclassified roads, a high percentage of which run around the settlement.

Railway lines on the territory of the Republic of Croatia are classified in the following categories: railway lines for international traffic (code: M), railway lines of importance for regional traffic (code: R), railway lines of importance for local traffic (code: L) (Decision on Classification of Railway Lines (OG 72/17)):

Railway lines on the territory of the sector:

- ***Sector A*** – M501 DG - Čakovec - Kotoriba - DG, L201 Varaždin - Golubovec, L101 Čakovec - M. Središće - DG, R202 Varaždin - Dalj
- ***Sector B*** – R202 Varaždin - Dalj, L205 Nova Kapela - Nasice, M302 Osijek - Strizivojna-Vrpolje, L208 Vinkovci - Osijek, R104 Vukovar-B.n. - Erdut - DG
- ***Sector C*** – M101 DG - S. Marof - Zagreb Gk, M401 Sesvete - Sava, M201 DG - Botovo - Dugo Selo, M202 Zagreb Gk - Rijeka
- ***Sector D*** – M103 Dugo Selo - Novska - M502 Zagreb Gk - Sisak - Novska, L204 Banova Jaruga - Beetic L205 Nova Kapela - Nasice, M302 Osijek - Strizivojna-Vrpolje, R105 Vinkovci - Drenovci - DG, L103 Karlovac - Kamanje - DG
- ***Sector E*** – M602 Škrljevo - Bakar, M203 Rijeka - Šapjane - DG, R101 DG - Buzet - Pula,
- ***Sector F*** – L213 Lupoglav - Rasa, M604 Oštrije - Knin - Split, R103 DG - L. D. Polje - Knin, M606 Perković - Sibenik, M607 Perković - Sibenik, M304 DG - Metković - Ploče

Inland waterways are usually divided into navigable and non-navigable waterways. Inland waterways of the Republic of Croatia are located on five Croatian rivers with a total length of 1,016.80 km and four river ports: Vukovar, Osijek, Slavonski Brod and Sisak.

Inland waterways by sectors:

- ***Sector B*** – includes navigable waterways along the rivers: Drava and Danube

- ***Sector D*** – includes navigable waterways along the rivers: Sava, Kupa and Una

2.13 Waste management

The Law on Waste Management (Official Gazette 84/21) and the Waste Management Plan of the Republic of Croatia for the period 2017-2021 (Official Gazette 3/17) and the Amendments to the Waste Management Plan of the Republic of Croatia for the period 2017-2022 establish measures for prevention or reduction of the adverse effects of waste on human health and the environment, primarily through the reduction of the created waste during production and waste management without the use of risky procedures for human health and the environment, while using the valuable properties of waste.

According to the priority order of waste management, prevention of waste generation has priority over other procedures, followed by preparation for reuse, then recycling and other recovery procedures, while the waste disposal procedure, which includes landfilling, is the least desirable waste management procedure.

According to the data on the state of waste management specified in the Plan, in the territory of the Republic of Croatia in 2014, the total recorded amount of produced waste (municipal and industrial) were about 3.7 million tons, which is 10.5% more than in 2012. In the total amount of waste, 97% is non-hazardous waste, while the remaining 3% is hazardous waste.

In addition to certain types of municipal waste (e.g. mixed municipal waste), in the total amount of waste produced, the most represented types are waste metals (13%), soil (9%), mineral construction waste (9%), animal faeces, urine and fertilizer (7 %) and waste paper (6%).

The total amount of construction waste generated in 2020 was estimated at 1,399,192.7 t, which is an increase of 2.5% compared to 2019. The largest share of construction waste is soil, stones and dredging waste (37.7 %) and mixed construction waste and waste from the demolition of buildings (17.7%). This is followed by concrete, bricks, tiles and ceramics (17.4%), metals and their alloys (15.9%), bitumen mixtures, i.e. old asphalt (9.2%) and other types of waste represented by around 2%.

Mineral (non-hazardous) construction waste (not including excavations WN 17 05 04), which has great potential for reuse and recycling, accounts for 44.5% of the total construction waste.

In contrast to the generated waste, the data on processing construction waste are not based on estimates, but exclusively on reports from the companies. According to data reported to the Register of Environmental Pollution (Croatian: Registar onečišćavanja okoliša - ROO), the total amount of processed waste in 2020 was 1,144,214.2 t of construction waste (6.3% more than in 2019).

In 2020, there is a decrease in the amount of produced municipal waste compared to the amount from the previous year. One of the reasons that influenced the reduction of the total amount of generated waste is the COVID-19 pandemic, which led to a significant reduction in work in the service sector. The recorded decrease in the generated amount is in line with the goal from the national Waste Management Program of the Republic of Croatia, according to which by 2022 it is necessary to reduce the total amount of produced (generated) municipal waste by 5% compared to 2015 (the target value is 1,571,300 t).

As for construction waste, the comparison of data on reported construction waste with economic and other indicators for the construction sector continuously indicates insufficient data quality and,

consequently, insufficient knowledge of the flows of this special category of waste and the need to strengthen supervision.

The Multiannual Programme, i.e. the goals of construction of regulation and protection water facilities and facilities for melioration in order to reduce the risk of floods and establish the functionality of areas intended for the reception of large waters are not directly related to the issue of waste management. However, during the construction of certain buildings, different types of waste will be generated, which must be handled in accordance with existing regulations with a special emphasis on reducing the generation, separate collection by individual types so that the waste can be further used, but also in a way that will prevent soil and water pollution. Additionally, the prevention of flooding of populated areas will affect the reduction of the generation of waste that would otherwise occur as a result of water penetrating into the basements of the houses and buildings of the residents of the flooded area.

2.14 Population and human health

According to the last census 2021, Republic of Croatia has a population of 3,888,529, of which 1,874,566 are men and 2,013,963 are women. In relation to the estimation in the 2019, the population decreased by 176,724 inhabitants by 4.35%. One of the main demographic problems of the Republic of Croatia is the aging of the population. The main indicator of this is the share of the young population (0 - 19 years), which for 2021 is only 19.1%. The Primorje-Gorski Kotar County has the smallest share of the young population, 16.5%, and Međimurje the largest at 21.4%. Observing only the recorded historical floods, it can be concluded that according to the number of inhabitants threatened by floods, the water area of the Danube River is in a slightly less favourable position in relation to the Adriatic water area.

The most significant expected impact of the construction of Regulationa and prtoection water facilities on the population is positive, because the adverse effects of water will be prevented, primarily due to the prevention of floods that can result in the loss of human life, material property, endangerment of economic activities and infrastructure, impact on the environment, etc. Settlements which were threatened by flash floods until now will be protected from further material and non-material damage (such as Pelješac peninsula, the area of Kaštelan Bay near Split, the island of Krk, the area of the Virovitica-Podravina County along the Karašica River, the area of Osijek-Baranja County along Drava and Danube rivers as well as the area of Sisak-Moslavina County and Vukovar-Srijem County along the Sava River.

Projects of the construction of land reclamtion facilities will also have a positive impact on the development of the economy, primarily agriculture in areas where it was limited due to lack of water. At the same time, care should be taken not to endanger water supplies for other purposes.

2.14.1 The Air Quality

Almost all economic and social activities are a source of emissions of pollutants into the air. As stated in the Report on Air Quality Monitoring in the Republic of Croatia for 2020, MINGOR, October 2021, a large number of pollutants in the air have been proven or suspected to have negative effects on human health and the environment. Elevated concentrations of pollutants in the air and/or long-term exposure to them can lead to serious health symptoms and conditions in humans. This primarily refers

to the respiratory system and inflammatory processes in the body, but it can also cause more serious conditions such as heart disease and cancer.

According to air pollution levels, the territory of the Republic of Croatia is classified into five zones and four agglomerations in accordance with the Air Protection Act (Official Gazette 127/19) and the Regulation on determining zones and agglomerations according to air pollution levels on the territory of the Republic of Croatia (Official Gazette 01/14).

In addition to measurements at permanent measuring points at stations of the state network and local networks for permanent monitoring of air quality, the assessment of the level of air pollution in the areas of zones and agglomerations of the Republic of Croatia is also carried out using the method of objective assessment. In the Report on Air Quality Monitoring in the Republic of Croatia for 2020, MINGOR, October 2021, a summary assessment of the pollution (non-compliance) of zones and agglomerations by pollutants was given.

The problem of air pollution by particulate matter (PM) is still pronounced in the populated areas of the continental part of Croatia in the winter months, i.e. in the agglomerations of Zagreb and Osijek and the Industrial Zone (Kutina, Sisak and Slavonski Brod), in the colder part of the year, while ground pollution ozone (O3) is more pronounced in the coastal areas of Croatia and in the summer months.

Unlike primary pollutants, which are emitted directly into the air, ground-level (tropospheric) ozone (O3) is not released directly into the atmosphere, but is formed by complex chemical reactions and is affected by emissions of its precursors, such as nitrogen oxides (known as NOx including NO and NO2) and non-methane volatile organic compounds (NMVOCs). These reactions are stimulated by solar radiation. The target values for ground ozone in 2020 were exceeded at Hum and Pula Fižela monitoring stations.

According to the latest Information Report on the Inventory of Air Pollutant Emissions in the Republic of Croatia 2019 (1990 - 2019), MINGOR, March 2021, pollutant emissions show a general trend of reduction in the period from 1990 to 2019. The reasons are multiple: stricter regulations on permitted concentrations of pollutants in the air and limit values of emissions from stationary sources, banning the sale of gasoline containing lead, the use of catalysts in vehicles, the introduction of stricter standards for emissions from road traffic, gasification and connection to the heating network, the use of low-sulphur coal and, to a lesser extent, the development of public transport, reduction in the use of fertilizers in agriculture, decline in industrial production and reduction in energy production due to the economic crisis, etc.

The implementation of the Multi-Year Program has no impact on air quality. These are buildings that do not emit pollutants into the air during their use. Emissions may occur during their construction, but these are only temporary and short-term impacts that are not considered significant at a strategic level.

2.14.2 Noise

Noise is any unwanted sound caused by human activity and is one of the main causes of reducing the quality of life, especially in urban areas where it is constantly present and affects many aspects of everyday life. In urban areas, traffic noise plays a significant role in polluting the human environment and is a serious environmental problem, and its occurrence is related to technical progress, urbanization and increased traffic volume.

The adverse impact of noise has an accumulative character, which means that it is noticed only after a long time. There are two types of adverse effects of noise, namely aural and extraaural. Aural leading to hearing loss or acute hearing loss. The term " extraaural effect of noise" refers to all human reactions to noise outside the auditory system. Extraaural action is characterized by the fact that the human body reacts to every sound stimulus in different areas, such as neural, vegetative, hormonal or psychological. Such a adverse impact of noise manifests itself as bad mood, irritability, fatigue, insomnia, headache and loss of concentration, interference with communication, interference during rest, all of which results in reduced work ability.

The Law on Noise Protection (Official Gazette 30/09, 55/13, 153/13, 41/16, 114/18, 14/21) establishes measures aimed at avoiding, preventing or reducing adverse effects on human health caused by noise in the environment.

Noise emissions are an inevitable side effect related to economic development, i.e. to the development of transport infrastructure, industry and communal economy. In doing so, we can distinguish two basic groups of noise sources: mobile and stationary. Mobile noise sources are primarily related to the traffic infrastructure that takes place within the city area. The emission levels of this noise directly depend on the condition of the roads and the traffic load, as well as on the condition of the vehicles that use them, including the river traffic in question. Stationary sources of noise are related to industrial and economic facilities, the operation of hydropower plants, and areas of temporary storage, processing and final disposal of waste. The noise emission levels of these facilities and areas directly depend on the applied technology, including the machinery and vehicle fleet used.

Amelioration facilities and water regulation and protection facilities, by their characteristics, do not affect the noise level, except during construction-related works and possibly from maintenance machinery, so no changes in noise levels in the environment are expected.

2.15 Possible cumulative impacts

Potential cumulative impacts at the strategic level for individual projects were reviewed and analysed in the light of existing projects.

Contribution to cumulative impacts on biodiversity, protected areas and strictly protected species, and endangered and rare habitat types is possible for the following projects:

- In the Neretva River basin, the construction of the planned bank stabilization structures, flood protection, renewal, or construction of irrigation objects, hydrotechnical tunnel, regulation of small or temporary watercourses and revitalization (Projects No. 2 and 3) will have impacts on overall biodiversity and protected areas. Since the proposed projects along the Neretva River include river sections that are already under significant anthropogenic pressure, the contribution to cumulative impacts is not significant. Individual sub-projects that may have a major or significant impact on their own, and thus contribute to cumulative impacts, are the construction of a self-regulating dam near Norin and the construction of a movable dam to protect the soil along the Neretva River from progressive salinization. In order to reduce the impact of the above sub-projects, the technical design must in any case provide for a functional fish passage to avoid the fragmentation of aquatic habitats in the mainstream of the Neretva River, which certain

fish species use for their upstream and downstream migrations. Among the other projects, the construction of several levees (dikes) to protect settlements along the Neretva River from flooding stands out.

- Along the Neretva River through the construction of linear hydrotechnical structures in the floodplain of the river (Project No. 2). In addition to existing pressures (channelization of streams, dikes, changes in hydrological regime due to intensive agriculture and irrigation), additional impacts are possible in the form of more severe hydromorphological changes such as sediment transport, changes in habitat conditions for strictly protected and endangered species (e.g., disruption of migration routes of fish species). By adhering to the proposed protective measures, the contribution to the aforementioned adverse cumulative impacts can be reduced to an acceptable level.
- Cumulative impacts are possible along the Zrmanja River (Project No. 12), which is located in the protected area of the Velebit Nature Park, as the total length of individual proposed bank stabilization is approximately 1% of the river's course. The contribution to cumulative impacts could be reduced as much as possible at the project level by planning bioengineering solutions for bank stabilization wherever possible, and stabilizing banks only where there is no other solution, and it is necessary to ensure flood protection.
- Along the tributaries of Lake Butoniga, cumulative impacts to species of ichthyofauna, astacofauna, and herpetofauna are possible due to the construction of a barrier in the riverbed (Project No. 15). In addition to existing pressures (significant pollution from intensive agriculture and irrigation, reservoir, and deposition of large amounts of alluvial sediments), additional impacts are possible in the form of greater hydromorphological changes such as sediment transport, alteration of habitat conditions for strictly protected and endangered species (e.g., disruption of migratory routes of fish species). By applying the proposed protection measures, the contribution to the aforementioned negative cumulative impacts can be reduced to an acceptable level.
- The construction of pumping stations in Bosut and in the central Posavlje region (Projects No. 24 and 35), in addition to existing human activities, has impacts on the components of biodiversity: surface and groundwater pollution, anthropogenic changes in hydrological conditions, channelization and construction of watercourses. The above cumulative impacts can be mitigated through the application of the proposed project-level conservation measures. Reconstruction measures, at the strategic level, are acceptable, provided they do not include moving the levee closer to the riverbed or lengthening the levee.
- Dikes, riverbank stabilization, flood protection, renovation of irrigation structures, construction of a hydrotechnical tunnel, reservoirs, detention basins, etc. on the Sava River (Project No. 20) have an impact on overall biodiversity and protected areas. To mitigate this impact, projects must be planned in such a way as to prevent the degradation of riverbanks and allow natural processes, including natural erosion and sediment deposition. All future projects (not yet constructed and/or approved) must be designed to seek alternative engineering solutions wherever possible, for example by implementing (burying) a stone landfill in the immediate vicinity of the river, i.e., by implementing other suitable, less "aggressive" designs in the riverbed and outside the riverbank habitats. Primarily, riverbank stabilization should be conducted exceptionally on the shortest stretches of bank and only where necessary. To reduce the cumulative impact, it is proposed to plan for the revitalization of natural riverbank habitats along the Sava River,

in which the possibilities of restoring natural habitats and river processes would be analysed from a hydrotechnical and an ecological point of view.

- Linear hydrotechnical structures in the riverbed and floodplain of Kupa, Una, Mrežnica and middle Posavlje (Projects No. 20, 23, 24 and 58) might have cumulative effects on the components of biodiversity with regard to the existing threat from human activities: pollution of surface and underground water, anthropogenic changes in hydrological conditions, watercourse canalization and water flow diversion. The cumulative impact can be mitigated by applying the proposed nature protection measures at the project level. The cumulative impacts can be mitigated by applying the proposed conservation measures at the project level. Reconstruction of existing hydrotechnical features at the strategic level is acceptable, provided that the levee is not relocated or extended closer to the riverbed.
- Barriers in the riverbed of Kupa (Projects No. 18, 20) and the Česma river basin (Project No. 29) might have cumulative effects on ichthyofauna, astacophauna and herpetofauna. In addition to the existing pressures (significant pollution due to intensive agriculture and irrigation, accumulation and deposition of large quantities of torrential sediments) an additional impact is possible in the form of more pronounced hydromorphological changes such as changes in the downstream transfer of sediments, the change in habitat conditions for strictly protected and endangered species (e.g. disrupting the migratory paths of fish species). By applying the proposed protection measures, the contribution to the mentioned negative cumulative impacts can be reduced to an acceptable level.
- The construction of hydrotechnical objects in the area of central Posavlje (Project No. 24) and flood protection projects in the part of Sava basin around Samobor (Project No. 26) on the overall biodiversity and protected areas in addition of the existing threats to the area by human activity: pollution of surface and underground water, anthropogenic changes in hydrological conditions, watercourse canalization and water flow diversion. The cumulative impact can be mitigated by applying the proposed nature protection measures at the project level. Reconstructions of existing hydrotechnical objects, at the strategic level, are acceptable, provided that they do not include moving the levee closer to the riverbed or lengthening it. Also, interventions along the Sava river must be planned in the future in such a way as to prevent the degradation of natural riverbank habitats and allow natural processes, including erosion and sediment deposition.
- The construction of hydrotechnical objects in the Krapina river basin (Project No. 25) in the protected area of the Medvednica Nature Park may have a cumulative impact if it will include barriers, i.e. if the interventions lead to the fragmentation of aquatic habitats. The before mentioned impact can be mitigated by the proposed measure to design detentions basins without physical barriers to aquatic fauna, such as weirs, that is, to apply technical solutions that ensure the upstream movement of aquatic animals in the watercourse and that the downstream regulation of the banks and riverbed is carried out only to the necessary extent.
- Linear hydrotechnical objects, such as construction of levees in the of Mura and Drava river basin (Projects No. 36, 38, 39 and 40), can contribute to cumulative effects, having in mind the existing threat to the upper course of the Drava by human activity: pollution of surface and underground waters, anthropogenic changes in hydrological conditions, canalization and changing direction of watercourses. The cumulative impact can be mitigated by applying the proposed nature protection measures at the project level. Sub-

projects need to be planned in such a way as to preserve the diversity of natural habitats along the riverbanks and in the riverbed as well as natural hydromorphological processes.

- Cumulative effects may arise from stabilization of riverbanks, various flood protection objects, reconstruction of irrigation hydrotechnical objects, construction of hydrotechnical tunnel, reservoir and detention basin, revitalization, watercourse regulations and linear hydrotechnical objects in the riverbed of the Drava and Danube rivers (Projects No. 37, 42, 45, 46). In addition to existing pressures (channelization of streams, levees and revetments, changes in the hydrological regime due to intensive agriculture and irrigation), an additional impact is possible in the form of more pronounced hydromorphological changes such as sediment transport, changes in habitat conditions for strictly protected and endangered species (e.g. disruption of migration routes of fish species). By complying with the proposed nature protection measures, the contribution to the mentioned negative cumulative impacts can be reduced to an acceptable level.
- Construction of irrigation hydrotechnical objects in the Drava River riverbed (Project No. 63) may have cumulative impacts on biodiversity in general and protected areas. In addition to existing pressures (channelization of streams, levees and revetments, changes in the hydrological regime due to intensive agriculture and irrigation), an additional impact is possible in the form of more pronounced hydromorphological changes such as changes in sediment transport, changes in habitat conditions for strictly protected and endangered species (e.g. disruption of migration routes of fish species). By complying with the proposed nature protection measures, the contribution to the mentioned negative cumulative impacts can be reduced to an acceptable level.
- Construction of irrigation hydrotechnical objects along Neretva and Cetina rivers (Projects No. 110, 9) and extraction of groundwater (Project No. 123) will impact biodiversity. In addition to existing pressures (channelization of streams, levees and revetments, changes in the hydrological regime due to intensive agriculture and irrigation), an additional impact is possible in the form of more pronounced hydromorphological changes such as changes in sediment transport, changes in habitat conditions for strictly protected and endangered species (e.g. disruption of migration routes of fish species, especially those that seasonally migrate into underground streams). By complying with the proposed nature protection measures, the contribution to the mentioned negative cumulative impacts can be reduced to an acceptable level.
- Construction of irrigation hydrotechnical objects in the Bosut riverbed (Projects No. 61, 146, 147) may have impact on biodiversity. In addition to existing pressures (channelization of streams, levees and revetments, changes in the hydrological regime due to intensive agriculture and irrigation), an additional impact is possible in the form of more pronounced hydromorphological changes such as changes in sediment transport, changes in habitat conditions for strictly protected and endangered species (e.g. disruption of migration routes of fish species). By implementing the proposed nature protection measures, the contribution to the mentioned negative cumulative impacts can be reduced to an acceptable level.
- Construction of irrigation hydrotechnical objects in the Bosut riverbed (Project 139) on can have impact on biodiversity. In addition to existing pressures (channelization of streams, levees and revetments, changes in the hydrological regime due to intensive agriculture and irrigation), an additional impact is possible in the form of more pronounced hydromorphological changes such as changes in sediment transport, changes in habitat conditions for strictly protected and endangered species (e.g. disruption of migration

routes of fish species). By implementing the proposed protection measures, the contribution to the mentioned negative cumulative impacts can be reduced to an acceptable level.

- Construction of irrigation hydrotechnical objects in the Bosut riverbed (Projects No. 61, 146, 147) on biodiversity. In addition to existing pressures (channelization of streams, levees and revetments, changes in the hydrological regime due to intensive agriculture and irrigation), an additional impact is possible in the form of more pronounced hydromorphological changes such as changes in sediment transport, changes in habitat conditions for strictly protected and endangered species (e.g. disruption of migration routes of fish species). By implementing to the proposed nature protection measures, the contribution to the mentioned negative cumulative impacts can be reduced to an acceptable level.
- Construction of irrigation hydrotechnical objects may have additional cumulative effects for biodiversity in the Sava riverbed (Projects No. 180, 182). In addition to existing pressures (channelization of streams, levees and revetments, changes in the hydrological regime due to intensive agriculture and irrigation), an additional impact is possible in the form of more pronounced hydromorphological changes such as changes sediment transport, changes in habitat conditions for strictly protected and endangered species (e.g. disruption of migration routes of fish species). By implementing the proposed nature protection measures, the contribution to the mentioned negative cumulative impacts can be reduced to an acceptable level.
- Construction of irrigation hydrotechnical objects may have additional cumulative effects for biodiversity in in Drava river (Projects No. 129, 128, 127). In addition to existing pressures (channelization of streams, levees and revetments, changes in the hydrological regime due to intensive agriculture and irrigation), an additional impact is possible in the form of more pronounced hydromorphological changes such as changes sediment transport, changes in habitat conditions for strictly protected and endangered species (e.g. disruption of migration routes of fish species). Cumulative impact may also arise from construction of several hydrotechnical objects in the same basin. By implementing the proposed nature protection measures, the contribution to the mentioned negative cumulative impacts can be reduced to an acceptable level.
- Construction of irrigation hydrotechnical objects (Projects No. 18, 64, 69, 132, 136) may have cumulative effects on biodiversity. In addition to existing pressures (channelization of streams, levees and revetments, changes in the hydrological regime due to intensive agriculture and irrigation), an additional impact is possible in the form of more pronounced hydromorphological changes such as changes sediment transport, changes in habitat conditions for strictly protected and endangered species (e.g. disruption of migration routes of fish species). By implementing the proposed nature protection measures, the contribution to the mentioned negative cumulative impacts can be reduced to an acceptable level.

Cumulative impact on game and hunting in the area of WMD for the Danube and lower Drava and WMD for Mura and upper Drava is possible due to the large number of projects that mostly result in the loss of productive hunting areas.

A cumulative impact is also possible on the landscape features in the area of the WMD for the Mura and upper Drava, the WMD for the Danube and the lower Drava and the northern part of the WMD for the middle and lower Sava. In these areas, there are large number of projects that have a negative

impact on the landscape (construction of reservoirs, retention, canals, Regulation of watercourses, etc.) within the same basin or in a narrow area. Therefore, if all the planned projects are realized, there will potentially be a change in the character of the landscape, which can cause probably significant impacts on the landscape.

Cumulative impact on forests and forestry is possible in WMD for the middle and lower Sava and the WMD for the Danube and lower Drava, where larger interventions are planned, such as the construction of embankments that may affect the flooding regime of floodplain and alluvial forests, as well as a larger number of reservoirs, which, if they are realized, can lead to a reduction of areas under forests. By following the suggested protection measures, the cumulative impact can be reduced to an acceptable level.

2.16 Cross-border Impacts

A large part of Croatian waters has a border and cross-border character. Almost all major rivers in the territory of the Republic of Croatia are border or cross-border watercourses and have international significance.

The Danube River Basin borders four countries: Slovenia, Hungary, Serbia and Bosnia and Herzegovina. The Adriatic water area has a border, i.e. it shares surface waters with: Slovenia, Bosnia and Herzegovina, Montenegro and Italy.

62 water bodies border Bosnia and Herzegovina, 48 with Slovenia, 21 with Serbia and 31 in total with Hungary (Source: Strategic study on the environmental impact of the Water Area Management Plan 2016-2021, Oikon d.o.o., 2016).

As stated in the Water Area Management Plan 2016 – 2021, most of the GWB - groundwater bodies in the Pannonian part of the Danube River Basin have transboundary character, i.e. they extend into neighbouring countries: Slovenia, Hungary, Serbia and Bosnia and Herzegovina.

Out of a total of 20 grouped ground water bodies, 15 of them have a transboundary character. In the karst part of the Danube River Basin, out of 5 GWBs, three extend into neighbouring countries, i.e. they have a cross-border character.

It is important to point out that the majority of GWBs in the Adriatic sea Basin set aside in Croatia extend into the neighbouring countries of Slovenia and Bosnia and Herzegovina. This refers to the GWB in the Istrian (Northern Istria) and Rijeka area, which are partly in Slovenia, and the GWB Krka, Cetina and Neretva, which are partly in Bosnia and Herzegovina. Towards the south, the share of the cross-border part of the GWB increases, so in the Dubrovnik area practically only the source zones of the Neretva GWB are located in Croatia, and its largest part is in Bosnia and Herzegovina. Below are presented the possible impacts of the Multiannual Programme viewed through the possible impacts of grouped projects of construction of regulation and protection water structures, i.e. structures for melioration along border watercourses separately for each neighbouring state.

2.16.1 Republic of Hungary

Protection and regulation facilities

Table 2.16-1 *Presentation of the possible impacts of the construction of protection nd regulation facilities on the territory of the Republic of Hungary*

No	Name	Theme	Possible impacts
WMD for the Mura and upper Drava			
36	Flood protection project of the Drava River from the Slovenian border to Pitomača	Water	The construction and reconstruction of dikes in the territory of the Republic of Croatia will have a positive impact on the territory of the Republic of Hungary in terms of reducing the adverse effects of large waters that can cause phenomena that could disrupt the continuity of water flows. The embankments will change the morphology of the coast in the area of the catchment itself, while there is no influence on the morphology of the watercourse upstream of the catchment. The construction of the embankment will not disturb the hydrological regime of the watercourse, nor the continuity of the flow upstream of the impoundment area, nor in the area of the impoundment itself. The impact of the embankment on the groundwater is not expected either, as the embankments do not represent an obstacle to the flow of underground water. However, it is necessary to harmonize the input hydrological data between the two countries so that the dimensioning of the embankment is optimal.
		Biodiversity	During the planned works on the levees along the Drava River, due to the construction works, there may be a temporary change in habitat conditions, temporary pollution of watercourses downstream of the project due to siltation, i.e., a temporary change in habitat conditions and, consequently, a temporary disturbance of the existing individuals of animal species whose populations may be present on both sides of the Drava River bank. Designing new levees that preserve existing forest, grassland, aquatic, and wetland habitats in the area of natural inundation (flooding) will avoid permanent impacts to hydrologic conditions and habitat fragmentation. Revitalization of the old branch of the Drava River may have short-term negative impacts in the form of loss of existing suitable habitat for populations of wildlife species living on both sides of the Drava River, but in the long term there will be positive impacts on the conservation of aquatic, wetland, and floodplain habitats if revitalization is planned in accordance with biological and ecological objectives and its long-term sustainability (with minimal future interventions) is ensured. Transboundary impacts are minor and acceptable.
		Protected areas	During the planned works on the levees (dikes) along the Drava River, due to the construction works, there may be a temporary change in habitat conditions, temporary pollution of watercourses downstream of the project due to silting, i.e. a temporary change in habitat conditions and consequently a temporary disturbance of the existing individuals of strictly protected and endangered species of the Republic of Hungary, whose populations may occur on both sides of the Drava River bank.

			The revitalization of the old branch of the river Drava (Čambina) may have short-term negative impacts in the form of loss of existing suitable habitats for some strictly protected populations of aquatic species of fauna and flora of the Republic of Hungary living on both sides of the Drava, the revitalization is planned in accordance with biological and ecological objectives and ensures its long-term sustainability (with minimal interventions in the future). By applying measures that prevent the introduction and spread of invasive alien plant species and their immediate eradication in case of occurrence during construction and maintenance works, the risk of negative impacts of invasive alien species on natural habitats will be reduced. Transboundary impacts are minor and acceptable.
		Landscape	The revitalization of Čambana (an old branch of the Drava River) will potentially change the image of the landscape, due to the change in surface cover and terrain morphology. However, there can also be a positive impact from the aspect of improving the existing condition in a visual-experiential sense. Given that a part of that backwater belongs to the Republic of Hungary, it is possible that this will affect its territory as well.
		Forests	The revitalization of the backwater will have a long-term positive impact on the improvement of water relations, ecological conditions, and the diversity of alluvial forests.
38	Flood protection project of the Mura River	Water	The reconstruction of the embankment will possibly have a short-term and local impact on the hydromorphological elements of the watercourse and upstream of the intervention area in the form of water turbidity during the implementation of the project.
		Biodiversity	During the proposed work on the existing flood control embankments (dikes) along the Mura River, there may be temporary changes in habitat conditions and, consequently, temporary disturbance to existing individuals of wildlife species whose populations may be present on both sides of the Mura River bank. These are local and short-term impacts. Transboundary impacts are minor and acceptable.
		Protected areas	During the proposed work on the existing flood control levees (dikes) along the Mura River, temporary changes in habitat conditions, and consequently temporary disturbance, may occur to animal species whose populations may be present on both sides of the Mura River bank. These are local and short-term impacts that are minor and acceptable. The application of measures to prevent the introduction and spread of invasive alien plant species and their immediate eradication if they occur during construction and regular maintenance will reduce the risk of adverse impacts of invasive alien species on protected areas. Transboundary impacts are minor and acceptable.
WMD for Danube and Lower Drava			
37	Flood protection project of the Drava River from Pitomača	Water	The revitalization of the watercourse changes the hydrological regime of the watercourse, but in a positive sense, enabling the dynamics of the water as in its natural state. Revitalization of the riverbed will have a positive impact

	to the mouth of the Danube		on the dynamics of groundwater. Because of the above, a change in the hydrological regime and dynamics of the watercourse is possible. The continuity of the flow will not be disturbed by the construction of these structures, it will be improved, i.e. the impact on the watercourse is positive. The morphology of the watercourse and the surrounding terrain will be permanently changed in the catchment area and the surrounding area. The reconstruction of the dikes will possibly have a short-term and local impact on the hydromorphological elements of the watercourse and upstream of the project area in the form of water turbidity during the implementation of the project.
		Biodiversity	During the planned works on the levees (dikes) along the Drava River, due to the construction works, there may be a temporary change in the quality of the habitat, temporary pollution of the watercourse downstream of the project, i.e. a temporary change in the habitat conditions and, consequently, a temporary disturbance of the existing individuals of animal species. Revitalization of the old branch of Drava River (Boroš) may have short-term negative impacts in the form of loss of existing suitable habitat for populations of animal species living on both sides of the Drava River, but long-term positive impacts on the conservation of aquatic, wetland, and floodplain habitats if planned with clear biological and ecological objectives to ensure their sustainability (with minimal future interventions). Transboundary impacts are minor and acceptable
		Protected areas	During the planned works on the levees (dikes) along the Drava River, there may be a temporary change in the quality of the habitat due to the construction works and consequently a temporary disturbance of the existing individuals of strictly protected and endangered species. Revitalization of the old branch of Drava River (Boroš) may have short-term negative impacts in the form of loss of existing suitable habitats for strictly protected populations of aquatic species of fauna and flora of the Republic of Hungary living on both sides of the Drava, but long-term positive impacts if planned with clear biological and ecological objectives to ensure their sustainability (with minimal interventions in the future). The application of measures to prevent the introduction and spread of invasive alien plant species, their eradication in case of the occurrence during regular maintenance will reduce the risk of negative impacts of invasive alien species on the natural habitats of the protected areas of the Republic of Hungary. The transboundary impacts are low and acceptable.
		Landscape	The ecological revitalization of the Boroš Drava will potentially affect the change in the image of the landscape, due to the change in surface cover and terrain morphology. However, there can also be a positive impact from the aspect of improving the existing condition in a visual-experiential sense. Given that a part of that backwater belongs to the Republic of Hungary, it is possible that this will affect its territory as well.

		Forests	The revitalization of the backwater will have a long-term positive impact on the improvement of water relations, ecological conditions, and the diversity of alluvial forests.
46	Flood protection project in the area of Baranja	Water	The reconstruction of water facilities will possibly have a short-term and local impact on the hydromorphological elements of the watercourse and larger project area in the form of water turbidity during the project.
		Biodiversity	During the planned works for the reconstruction of hydrotechnical infrastructure along the Drava River, there may be a temporary change in habitat conditions and consequently a temporary disturbance of the existing individuals of animal species whose populations may be present on both sides of the Drava River bank. Revitalization of Topoljski Dunavac will have short-term negative impacts in the form of loss of existing suitable habitats for strictly protected populations of aquatic animal and plant species, but long-term positive impacts on the conservation of natural aquatic, wetland and floodplain habitats. Transboundary impacts are minor and acceptable.
		Protected areas	During the planned works for the reconstruction of hydrotechnical infrastructure along the Drava River, there may be a temporary change in habitat conditions and consequently a temporary disturbance of the existing individuals of strictly protected plant and animal species of the Republic of Hungary, whose populations may occur on both sides of the Drava River bank. The revitalization of Topoljski Dunavac has negative short-term effects in the form of loss of existing suitable habitats for strictly protected populations of aquatic animal and plant species, but in the long term it has positive effects on the conservation of natural habitats of water bodies, wetlands and floodplains. The application of appropriate measures to prevent the introduction and spread of invasive alien plant species, their eradication in case of occurrence during regular maintenance will reduce the risk of negative impacts of invasive alien species on natural habitats. Transboundary impacts are minor and acceptable.

Land reclamtion projects

Table 2.16-2 *Presentation of the possible impacts of the construction of land reclamation facilities on the territory of the Republic of Hungary*

No	Name	Component	Possible impacts
53	Water intake from the existing reservoir of HPP Dubrava, Irrigation system Prelog	Water	Water intake will not have a cross-border impact on hydromorphological elements.
		Biodiversity	Transboundary impacts on the biodiversity have not been identified.
		Protected areas	Transboundary impacts on protected areas have not been identified.
54	Water intake from the existing reservoir of HPP Dubrava, Irrigation	Biodiversity	Transboundary impacts on the biodiversity have not been identified.
		Protected areas	Transboundary impacts on protected areas have not been identified.

	system Donji Kraljevac		
132	Intake of water from Drava River (max.1000 l/sec), pumping stations, pressure distribution network, Irrigation system Lukač	Biodiversity	There is a potential impact on hydrological conditions downstream and on strictly protected species that are directly or indirectly dependent on the water regime of the Drava River. Therefore, an adequate water regime, i.e., ecologically acceptable flow, must be ensured. The construction works themselves will have temporary impacts on strictly protected animal species occurring on both sides of the Drava River, e.g. due to noise or disturbance.
		Protected areas	There is a potential impact on hydrological conditions downstream and on strictly protected species that are directly or indirectly dependent on the water regime of the Drava River. Therefore, an adequate water regime, i.e., ecologically acceptable flow, must be ensured. The construction works themselves will have temporary impacts on strictly protected animal species occurring on both sides of the Drava, e.g. due to noise or disturbance. The application of appropriate measures to prevent the introduction and spread of invasive alien plant species and their eradication if they occur during regular maintenance will reduce the risk of negative impacts of invasive alien species on natural habitats in protected areas.
137	Intake of water from Drava River (max. 600 l/sec), pumping stations, pressure distribution network, Irrigation system Novi Gradac-Detkovac	Biodiversity	There is a potential impact on hydrological conditions downstream and on strictly protected species that are directly or indirectly dependent on the water regime of the Drava River. Therefore, an adequate water regime, i.e., ecologically acceptable flow, must be ensured. The construction works themselves will have temporary impacts on strictly protected animal species occurring on both sides of the Drava, e.g. due to noise or disturbance.
		Protected areas	There is a potential impact on hydrological conditions downstream and on strictly protected species that are directly or indirectly dependent on the water regime of the Drava River. Therefore, an adequate water regime, i.e., ecologically acceptable flow, must be ensured. The construction works themselves will have temporary impacts on strictly protected animal species occurring on both sides of the Drava, e.g. due to noise or disturbance. The application of appropriate measures to prevent the introduction and spread of invasive alien plant species and their eradication if they occur during regular maintenance will reduce the risk of negative impacts of invasive alien species on natural habitats in protected areas.
136	Intake of water from Drava River, Irrigation system Čađavica	Biodiversity	Considering relatively small irrigation system area (only around 500 ha), water extraction from Drava River will not have significant impact on the water regime, therefore it does not pose the risk on biodiversity, i.e., species and habitats dependent on the water regime. Construction itself will result in temporary impacts on animal species present on both sides of Drava River, such as noise or disturbance.
		Protected areas	Considering relatively small irrigation system area (only around 500 ha), water extraction from Drava River will not have significant impact on the water regime, therefore it

			does not pose the risk on biodiversity, i.e., species and habitats dependent on the water regime. The application of appropriate measures to prevent the introduction and spread of invasive alien plant species and their eradication in case of their occurrence during regular maintenance will reduce the risk of negative impacts of invasive alien species on natural habitats in protected areas.
67	Intake of water from Karašica River, pumping stations, pressure distribution network, Irrigation system Miholjac-Viljevo	Biodiversity	Transboundary impacts on the biodiversity have not been identified.
		Protected areas	Transboundary impacts on protected areas have not been identified.
79	Intake of water from Lake Topoljski Dunavac, which will be replenished with water from the Danube via the canal and the future pumping station (PS) Draž, an open canal network. Irrigation system Puškaš	Biodiversity	The impact on hydrological conditions downstream and on species directly or indirectly dependent on the water regime of the Drava River is possible. Therefore, it is necessary to ensure an adequate water regime, i.e., ecologically acceptable flow.
		Protected areas	The impact on hydrological conditions downstream and on species directly or indirectly dependent on the water regime of the Drava River is possible. Therefore, it is necessary to ensure an adequate water regime, i.e., ecologically acceptable flow. The application of appropriate measures to prevent the introduction and spread of invasive alien plant species and their eradication in case of their occurrence during regular maintenance will reduce the risk of negative impacts of invasive alien species on natural habitats in protected areas.

2.16.2 Bosnia and Herzegovina

The border with Bosnia and Herzegovina in a significant part of its course is formed by the rivers Una and Sava. Below are presented the possible impacts of individual projects within the area of water management department for **the upper and lower Sava** and water management departement **for the South Adriatic**, as well as the description and nature of the mentioned impacts.

Protection and regulation facilities

Table 2.16-3 *Presentation of the possible impacts of the construction of protection nd regulation facilities on the territory of the Bosnia and Herzegovina*

No	Name	Component	Possible impacts
WMD for Southern Adriatic			
2	Flood protection project in the Neretva river basin	Water	The measure to protect the town of Metković from flooding includes a dike in the Municipality of Čapljina (BiH). The dikes will not disrupt the hydrological regime of the watercourse, nor the continuity of the flow upstream of the catchment area, nor in the area of the catchment itself, only improvement is possible in terms of reducing the damaging effects of large waters that can cause phenomena that could disrupt the continuity of the watercourse. The impact of the dike on the groundwater is not expected because the dikes do not represent an obstacle to the flow of underground water.

			The dikes will change the morphology of the coast in the area of the catchment itself, there is no influence on the morphology of the watercourse upstream of the catchment. It is necessary to harmonize the input hydrological data between the two countries so that the dimensioning of the dike is optimal. Stabilization of the coast will not affect the hydrological regime and the continuity of the flow, as well as the groundwater regime. The morphology of the coast will be permanently changed, which will have a positive effect on the stability of the coast-erosion. The impact of the collection channel on the hydromorphological elements of the watercourse across the border will be positive, as it will manifest itself in an increase in flow, which will also prevent the degradation of the terrain upstream.
		Biodiversity	Transboundary impacts on the biodiversity have not been identified.
		Protected areas	Transboundary impacts on protected areas have not been identified.
		Landscape	The measure to protect the town of Metković from flooding includes an embankment in the municipality of Čapljina (BiH), which can have a negative impact on that area in the form of a change in terrain morphology and surface cover.
4	Flood protection project in the Imotsko-Bekijsko polje basin	Landcsape	The culvert construction project at the canal mouths will potentially have a negative impact on the landscape image due to the change in surface cover. Given that the planned interventions are located in the area of Imotski polje, which extends into the neighbouring country, it is possible that this will be reflected in the territory of BiH as well.
		Biodiversity	Transboundary impacts on the biodiversity have not been identified.
		Protected areas	Transboundary impacts on protected areas have not been identified.
WMD for the Middle and Upper Sava			
23	Protection from Una River floods	Water	There is a possible cross-border impact on the hydrological regime of watercourses in terms of flooding of the right bank of the Una, which is at lower altitudes or is not protected from flood waters. This can impact the terrain morphology of the right bank of the Una. Transboundary impact on flow continuity and groundwater regime is not expected.
		Biodiversity	During the proposed work on the existing levees along the Una River, construction activities may result in temporary habitat alteration, temporary pollution of watercourses downstream of the sub-project, i.e., temporary alteration of habitat conditions and, consequently, temporary disturbance of existing individuals of wildlife species whose populations may be present on both sides of the bank of the Una River.
		Protected areas	During the planned works on the existing levees along the Una River, due to the construction works, there may be a temporary change in the habitat, temporary pollution of the watercourses downstream of the sub-project, i.e., temporary change in the habitat conditions and consequently a temporary disturbance of the existing individuals of the

			populations of strictly protected bird and fish species and the components of the protected landscape area of the Una River in Bosnia and Herzegovina. The application of measures that prevent the introduction and spread of invasive alien plant species and their immediate removal in case of occurrence during regular maintenance will reduce the risk of negative impacts of invasive species on natural habitats in strictly protected areas in Bosnia and Herzegovina.
		Landscape	The construction of a protective wall and revetments and the rehabilitation of the embankment on the Una River will potentially affect the landscape picture and considering the location of the intervention on the border itself, it is possible that this will also affect the territory of Bosnia and Herzegovina. The impact can be negative in the form of changes in terrain morphology and surface cover, but it can also be positive from the aspect of improving the existing condition in a visual and experiential sense during the rehabilitation of existing operations.
24	Flood protection project in the area of Middle Sava river basin	Water	The reconstruction of the dike will possibly have a short-term and local impact on the hydromorphological elements of the watercourse and upstream of the project area in the form of water turbidity during the implementation of the project. The construction of the protective wall and revetment will not have a cross-border impact on the hydromorphological elements.
		Biodiversity	During the planned reconstruction works on the existing dikes along the Sava River, due to the construction works, there may be a temporary change in the habitat, temporary pollution of the watercourses downstream of the subproject, i.e. a temporary change in the habitat conditions and, consequently, a temporary disturbance of the existing individuals of animal species whose populations may be present on both sides of the Sava River bank. Reconstruction and construction of revetments to stabilize the Sava riverbank will result in permanent alteration and loss of natural habitats on the riverbank and in the riverbed, which may negatively affect populations of bird and fish species that are tied to these habitats and live on both sides of the Sava riverbank.
		Protected areas	During the planned reconstruction works on the existing dikes along the Sava River, due to the construction works, there may be a temporary change in the habitat, temporary pollution of the watercourses downstream of the sub-project, i.e. a temporary change in the habitat conditions and, consequently, a temporary disturbance of the existing individuals of strictly protected animal and plant species in Bosnia and Herzegovina, whose populations may occur on both sides of the Sava River bank. Reconstruction and construction of revetments to stabilize the Sava riverbank will result in permanent alteration and loss of natural habitats on the riverbank and in the riverbed, which may negatively affect populations of strictly protected bird and fish species in Bosnia and Herzegovina that are tied to these habitats and live on both sides of the Sava riverbank. Application of measures to prevent invasion and spread of invasive alien plant species and their immediate removal in

			case of their occurrence during regular maintenance will reduce the risk of negative impact of invasive alien species on natural habitats in protected areas in Bosnia and Herzegovina.
		Landscape	The rehabilitation of the coast with the construction of a revetments and the reconstruction of the embankment on the Sava River will potentially affect the landscape image, and considering the location of the project on the border itself, it is possible that this will also affect the territory of Bosnia and Herzegovina. The impact can be negative in the form of a change in terrain morphology and surface cover, but it can also be positive in terms of improving the existing condition in a visual-experiential sense.
32	Flood protection project of the Sava River on the section from Nova Gradiška to Račinovac	Water	The reconstruction of the dike will possibly have a short-term and local impact on the hydromorphological elements of the watercourse and upstream of the project area in the form of water turbidity during the iproject construction. The construction of the revetments will not have a cross-border impact on the hydromorphological elements.
		Biodiversity	Reconstruction and construction of new riverbank revetments in order to stabilize the banks of the Sava River will result in permanent changes and loss of riparian habitats and riverbed habitats, which may negatively affect populations of bird and fish species that are tied to such habitats and live on both sides of the Sava River bank. In addition, during the construction works, there may be a temporary change in the habitat due to the construction works and temporary pollution of the watercourses downstream of the project area, i.e. a temporary change in the habitat conditions and, consequently, a temporary disturbance of the existing individuals of animal species whose populations may occur on both sides of the banks of the Sava River. Therefore, it is necessary to limit the works to the smallest possible area so that the impact itself is as small as possible. Stabilization of riverbanks changes their structure and leads to permanent loss of habitat types that develop on the banks of watercourses (habitats with flat muddy and sandy banks, alluvial forest habitats). Stabilization of riverbanks changes their structure and morphology and affects the natural fluvial processes of erosion, transport, and deposition of materials, and indirectly, the availability of river habitats. Both planned sub-projects will result in a total change of about 1.3 km of the river bank, and a contribution to the cumulative impact on BiH biodiversity components is possible.
		Protected areas	Reconstruction and construction of new riverbank revetments in order to stabilize the banks of the Sava River will result in permanent changes and loss of riparian habitats and habitats in the riverbed, which may negatively affect populations of strictly protected bird and fish species that are tied to such habitats and live on both sides of the Sava River bank. In addition, during the construction works, there may be a temporary change in the habitat due to the construction works, temporary pollution of watercourses downstream of the project, i.e. a temporary change in habitat conditions and, consequently, a temporary disturbance of the existing individuals of strictly protected species, whose populations may occur on both sides of the banks of the Sava River.

			Therefore, it is necessary to limit the works to the smallest possible area so that the impact itself is as small as possible. Stabilization of riverbanks changes their structure and leads to permanent loss of habitat types that develop on the banks of watercourses (habitats with flat muddy and sandy banks, alluvial forest habitats). Stabilization of riverbanks changes their structure and morphology and affects the natural fluvial processes of erosion, transport, and deposition of materials, and indirectly, the availability of river habitats. The two planned sub-projects will result in a total change of about 1.3 km of the river bank, and a contribution to the cumulative impact on BiH biodiversity components is possible. The application of measures that prevent the introduction and spread of invasive alien plant species and their immediate removal in case of occurrence during regular maintenance will reduce the risk of negative impacts of invasive species on natural habitats in strictly protected areas of BiH.
		Landscape	The rehabilitation of the coast with the construction of a revetments and the reconstruction of the dikes on the Sava River will potentially affect the image of the landscape, and considering the location of the project on the border itself, it is possible that this will also affect the territory of Bosnia and Herzegovina. The impact can be negative in the form of a change in terrain morphology and surface cover, but it can also be positive in terms of improving the existing condition in a visual-experiential sense.
34	Flood protection project in the Brodska Posavina	Water	The reconstruction of the dike will possibly have a short-term and local impact on the hydromorphological elements of the watercourse and upstream of the project area in the form of water turbidity during the project construction.
		Biodiversity	The reconstruction of the levees (dikes) along the Sava River will have short-term and local impacts on the hydro morphological elements of the watercourse upstream of the intervention area and possibly in the form of higher water turbidity during the construction of the intervention, therefore there are possible impacts on plant and animal species that may live on both sides of the Sava River. Transboundary impacts due to disturbance of individuals and populations of animal species during the works carried out are also possible.
		Protected areas	Reconstruction of the levees (dikes) along the Sava River will have a short-term and local impact on the hydro morphological elements of the watercourse upstream of the intervention area and possibly in the form of higher water turbidity during the construction of the intervention, therefore there is a possible impact on strictly protected plant and animal species that may live on both sides of the Sava River. There is also a possible transboundary impact of disturbance of strictly protected individuals and populations of animal species during the performed works. The application of measures to prevent the introduction and spread of invasive alien plant species and their immediate removal in case of occurrence during regular maintenance works will reduce the risk of negative impact of invasive alien species on natural habitats in protected areas of BiH.

		Landscape	The construction of an embankment on the Glogova stream can affect the landscape picture, and considering the location of the project on the border itself, it is possible that this will also affect the territory of Bosnia and Herzegovina. The impact can be negative in the form of a change in terrain morphology and surface cover, but it can also be positive in terms of improving the existing condition in a visual-experiential sense.
35	Flood protection project in the Bić and Bosut basins	Water	Transboundary impact of pumping station on hydromorphological elements are not expected.
		Biodiversity	Transboundary impacts on the biodiversity have not been identified.
		Protected areas	Transboundary impacts on protected areas have not been identified.

Land reclamation projects

Table 2.16-4 *Presentation of the possible impacts of the construction of land reclamation facilities on the territory of the Bosnia and Herzegovina*

No	Name	Component	Possible impacts
114	Water intake from the Ričica reservoir, Imotsko - Bekijsko polje	Water	Water intake will not have a cross-border impact on hydromorphological elements.
		Biodiversity	Transboundary impacts on the biodiversity have not been identified.
		Protected areas	Transboundary impacts on protected areas have not been identified.

2.16.3 Republic of Serbia

The border with the Republic of Serbia is mostly represented by the Danube River.

Table 2.16-5.*Presentation of the possible impacts of the construction of regulation and protection facilities on the territory of the Republic of Serbia*

No	Name	Component	Possible impacts
WMD for Dunav and lower Drava			
45	Flood protection project of the Danube River	Water	The construction of the revetment will not have a cross-border impact on the hydromorphological elements. The revitalization of the watercourse changes the hydrological regime of the watercourse, but in a positive sense, enabling the dynamics of the water as in its natural state. Revitalization of the riverbed will have a positive impact on the dynamics of groundwater. Because of the above, a change in the hydrological regime and the dynamics of watercourses is possible. The continuity of the flow will not be disturbed by the construction of these structures, it will be improved, the impact on the water flow is positive. The morphology of the watercourse and the surrounding terrain will be permanently changed in the affected area and the surrounding area. The reconstruction of the dike will possibly have a short-term and local impact on the hydromorphological elements of the watercourse and upstream of the project area in the form of water turbidity during the project construction.

		Biodiversity	During the planned works on the existing levees (dikes) along the Danube River, there may be a temporary change in habitat due to the construction works, temporary pollution of watercourses downstream of the project, i.e., a temporary change in habitat conditions and, consequently, a temporary disturbance of animal species whose populations may be present on both sides of the Danube riverbanks. In addition, the construction of new dikes may result in a change in hydrological conditions along the river. Therefore, it is necessary to ensure an adequate water regime for the existing flora and fauna. Revitalization projects along the Danube may have short-term impacts in the form of losses of existing habitats and changes in habitat conditions. At the same time, they have a positive long-term impact on biodiversity components if they are planned with clear biological and ecological objectives to ensure their long-term sustainability (with minimal future interventions). Projects to stabilize the banks of the Danube with revetments result in permanent changes and loss of riparian habitats and riverbed habitats, which can negatively impact populations of bird and fish species that are tied to such habitats and live on both sides of the Danube. Bank stabilization also has long-term negative effects on natural hydromorphological processes. Since the AA within this SEA Study proposes to exclude interventions with potentially significant effects, no significant effects on biodiversity in general are expected either if all proposals from the AA are implemented.
		Protected areas	During the proposed work on the existing levees along the Danube River, there may be a temporary change in habitat due to construction, temporary pollution of watercourses downstream of the project, i.e., a temporary change in habitat conditions, and consequently, temporary disturbance of existing individuals of strictly protected species whose populations may be present on both sides of the Danube riverbank. In addition, the construction of new dikes may result in a change in hydrological conditions along the river. Therefore, an adequate water regime for strictly protected plant and animal species must be ensured. Revitalization projects along the Danube may have short-term impacts in the form of losses of existing habitats and changes in habitat conditions. At the same time, they have long-term positive impacts on strictly protected environmental components (species, habitats, and protected areas) if they are planned with clear biological and ecological objectives to ensure their long-term sustainability (with minimal future interventions). Bank stabilization projects on the Danube River with revetments lead to permanent changes and loss of riparian habitats and habitats in the riverbed, which can negatively affect the strictly protected populations of bird and fish species that are tied to such habitats and live on both sides of the Danube riverbank. Bank stabilization also has long-term negative impacts on natural hydromorphological processes, but since the AA proposes the exclusion of

			interventions with potentially significant impacts as part of this SEA study, no significant impacts on the river banks are expected if all of the AA proposals are implemented. With the application of measures that prevent the introduction and spread of invasive alien plant species, and their immediate eradication in case of occurrence during regular maintenance, the risk of negative impacts of invasive alien species on natural habitats in protected areas of the Republic of Serbia will be reduced.
		Landscape	The activities of improving the coast, construction of revetments, and the construction and reconstruction of embankments on the Danube River will potentially affect the landscape picture, and considering the location of the activities on the border itself, it is possible that this will be reflected in the territory of the Republic of Serbia. The impact can be negative in the form of changes in terrain morphology and surface cover, but it can also be positive from the aspect of improving the existing condition in a visual and experiential sense during rehabilitation, reconstruction and revitalization interventions.
52	Flood protection project in the Danube river basins downstream of Vukovar	Biodiversity	Transboundary impacts on the biodiversity have not been identified.
		Protected areas	Transboundary impacts on protected areas have not been identified.

Land reclamtion facilities

Table 2.16-6 *Presentation of the possible impacts of the construction of land reclamation facilities on the territory of the Republic of Serbia*

No.	Name	Component	Possible impacts
64	Water intake from the Danube, pumping stations, pressure distribution network in the floodplain area, pumping stations, settling tanks outside floodplain area, pressure distribution network, Irrigation system Dalj	Water	Water intake will not have a cross-border impact on hydromorphological elements.
		Biodiversity	Transboundary impacts on the biodiversity have not been identified.
		Protected areas	Transboundary impacts on protected areas have not been identified.
144	Intake from existing reservoir Grabovo, which will be supplemented with additional water quantities from the Danube over the planned pumping station Sokolovac and supply pipeline, pumping stations,	Biodiversity	Transboundary impacts on the biodiversity have not been identified.
		Protected areas	Transboundary impacts on protected areas have not been identified.

	pressure distribution network, Irrigation System Grabovo		
150	Increasing the water level in the Bosut watercourse downstream from Vinkovci in order to ensure the necessary amount of water for IS Lipovac, Lipovac Dam	Biodiversity	Transboundary impacts on the biodiversity have not been identified.
		Protected areas	Transboundary impacts on protected areas have not been identified.

2.16.4 Republic of Slovenia

Protection and regulation facilities

Table 2.16-7 *Presentation of the possible impacts of the construction of protection and regulation facilities on the territory of the Republic of Slovenia*

No	Name	Component	Possible Impact
WMD for Upper Sava			
48	Flood protection project in the Sutla basin	Water	The Regulation of the riverbed and the construction of the bridge will increase the flow rate of the riverbed, which will reduce the negative impact on the hydromorphological elements of the morphology of the riverbed and the continuity of the flow.
		Biodiversity	The regulation of the Sutla riverbed may have significant impacts on fish species and other aquatic species that occur on both sides of the Sutla's banks in the form of occupation of in-stream habitat (bed and banks), disturbance of individuals, pollution of the watercourse, potential accidents, and risk of introduction and spread of invasive alien species, particularly aquatic invertebrates and fish. It is also possible that habitat conditions downstream from the location of the proposed impact could change due to temporary siltation or pollution. The effects of permanent loss of suitable habitat would be more pronounced for fish species that are tied to the upper sections of the river with faster flow and gravelly bottoms. Detailed engineering data on the sub-project are not known, but if the design includes construction of sills or water stairs, habitat fragmentation is possible if upstream migrations of fish are prevented.
		Protected areas	The regulation of the Sutla riverbed may have significant impacts on strictly protected fish species and other aquatic animals, as well as on the protected areas of the Sutla River in the Republic of Slovenia, in the form of occupation of in-stream habitats (bed and banks), disturbance of individuals, pollution of the watercourse, possible accidents, and the risk of introduction and spread of invasive alien species, especially aquatic invertebrates and fish. It is also possible that habitat conditions could change downstream from the site of the proposed intervention due to temporary siltation or pollution. Impacts from permanent loss of suitable habitat would be more pronounced for strictly protected fish species associated with the upper sections of the river with faster flow and gravelly bottoms. Detailed engineering

			data on the sub-project are not known, but if the design includes construction of sills or water stairs, habitat fragmentation is possible if upstream fish migration is prevented. The application of measures that prevent the introduction and spread of invasive plant species, as well as their removal in case of the occurrence during regular maintenance will reduce the risk of negative impacts of invasive species on natural habitats in protected areas of the Republic of Slovenia.
		Landscape	The Regulation of the Sutla riverbed will potentially affect the landscape, and given the location of the project on the border itself, it is possible that this will also affect the territory of the Republic of Slovenia. The impact can be negative in the form of a change in terrain morphology and surface cover, but it can also be positive in terms of improving the existing condition in a visual-experiential sense.
WMD for the Middle and Lower Sava			
18	Flood protection project in the Gornja Kupa basin	Biodiversity	During the execution of the planned projects for the reconstruction of the existing barriers (sills), there will be works in the riverbed and along the banks, and temporary disturbance of aquatic species (invertebrates, fish) due to noise is expected. Also, during the works, rise in turbidity of water is possible. There is a possibility of a minor permanent loss of favourable habitats for animal species whose populations can live on both sides of the Kupa River, as well as habitat types, especially along the riverbanks and in the riverbed, but the mentioned impact is not considered potentially significant because it is related to existing hydrotechnical structures. The aforementioned impacts can be significantly reduced by planning the execution of works outside the period of reproduction and higher activity of endangered species of fish and invertebrates, and by planning the scope of the project within the dimensions of existing structures. Since the mentioned hydrotechnical objects are existing, they already represent a certain (larger or smaller, depending on the individual species) disturbance for the upstream-downstream movement of animals. If there will be no elevation of the barriers due to their reconstruction, and if they are constructed in their downstream part in a cascade, with a gentle slope and lined with natural material (stone), the impact during use will not significantly change compared to the existing state, i.e., there will be no additional fragmentation of the water flow for rheophilic and migratory endangered species of fish and other aquatic species. If there is an increase in the height of the existing barriers, this will cause the fragmentation of water habitats, a change in hydrology upstream and downstream, and a significant impact due to the change in hydrology as a consequence of the possible elevation of the barriers through reconstruction.

		Protected areas	During the execution of the planned projects for the reconstruction of the existing barriers (sills), there will be works in the riverbed and along the banks, and temporary disturbance of aquatic species (invertebrates, fish) due to noise is expected. Also, during the works, rise in turbidity of water is possible. There is a possibility of a minor permanent loss of favourable habitats for strictly protected animal species whose populations can live on both sides of the Kupa River, as well as endangered habitat types, especially along the riverbanks and in the riverbed, but the mentioned impact is not considered potentially significant because it is related to existing hydrotechnical structures. The aforementioned impacts can be significantly reduced by planning the execution of works outside the period of reproduction and higher activity of endangered and strictly protected species of fish and invertebrates, and by planning the scope of the project within the dimensions of existing structures. Since the mentioned hydrotechnical objects are existing, they already represent a certain (larger or smaller, depending on the individual species) disturbance for the upstream-downstream movement of animals. If there will be no elevation of the barriers due to their reconstruction, and if they are constructed in their downstream part in a cascade, with a gentle slope and lined with natural material (stone), the impact during use will not significantly change compared to the existing state, i.e., there will be no additional fragmentation of the water flow for rheophilic and migratory endangered species of fish and other aquatic species. If there is an increase in the height of the existing barriers, this will cause the fragmentation of water habitats, a change in hydrology upstream and downstream, and a significant impact due to the change in hydrology as a consequence of the possible elevation of the barriers through reconstruction. With the application of measures that prevent the introduction and spread of invasive alien plant species and their immediate removal in case of the occurrence during regular maintenance, the risk of negative effects of invasive alien species on natural habitats in protected areas of the Republic of Slovenia is reduced.
		Landscape	The operations of the reconstruction of the waterfall on the Kupa river will potentially have a positive impact in terms of improving the existing condition in a visual-experiential sense. However, during the works, there may be a negative impact primarily due to the removal of the surface cover in order to access the bed. Given that the intervention is located on the border itself, it is possible that it will also affect the territory of the Republic of Slovenia.
WMD for the Mura and Upper Drava			
36	Flood protection project of the Drava River from the Slovenian border to Pitomača	Water	The reconstruction of the dike will possibly have a short-term and local impact on the hydromorphological elements of the watercourse and upstream of the project area in the form of water turbidity during the project construction.
		Biodiversity	Reconstruction of the existing levees could cause temporary and localized impacts to the hydromorphological elements of the watercourse in the vicinity of the intervention site, as

			well as temporarily increased turbidity during construction. This could cause temporary and minor impacts to flora and fauna on both sides of the river.
		Protected areas	Reconstruction of the existing levees could cause temporary and localized impacts to the hydromorphological elements of the watercourse in the vicinity of the intervention site, as well as temporarily increased turbidity during construction. This could cause temporary and minor impacts to flora and fauna on both sides of the river. With the application of measures that prevent the introduction and spread of invasive alien plant species and their immediate removal in case of the occurrence during regular maintenance, the risk of negative effects of invasive alien species on natural habitats in protected areas of the Republic of Slovenia is reduced.
40	Flood protection project in the Trnava basin	Biodiversity	During the planned works for the construction of the retention levees (dikes) on the Zelena watercourse, which flows into the Drava River, there may be a temporary change in habitat due to the construction works, minor permanent loss of natural habitats and temporary change in habitat conditions, and thus temporary disturbance of the existing individuals of animal species whose populations can live with both sides of the Drava River. Because this is a tributary of the Drava River whose levees serve to regulate floodwaters primarily from the Zelena River, no major impacts in the form of habitat fragmentation and significant permanent loss of natural habitats or changes in hydrologic conditions in the Drava River floodplain are identified.
		Protected areas	During the planned works for the construction of the retention levees (dikes) on the Zelena watercourse, which flows into the Drava River, there may be a temporary change in habitat due to the construction works, minor permanent loss of natural habitats and temporary change in habitat conditions, and thus temporary disturbance of the existing individuals of strictly protected animal species whose populations can live with both sides of the Drava River. Because this is a tributary of the Drava River whose levees serve to regulate floodwaters primarily from the Zelena River, no major impacts in the form of habitat fragmentation and significant permanent loss of natural habitats or changes in hydrologic conditions in the Drava River floodplain are identified. With the application of measures that prevent the introduction and spread of invasive alien plant species and their immediate removal in case of the occurrence during regular maintenance, the risk of negative effects of invasive alien species on natural habitats in protected areas of the Republic of Slovenia is reduced.
		Landscape	The construction of a dike along the Trnava watercourse will potentially affect the image of the landscape in the form of a change in the morphology of the terrain and surface cover, and considering the location of the project on the border itself, it is possible that this will also affect the territory of the Republic of Slovenia.

Land reclamation facilities

Table 2.16-8 *Presentation of the possible impacts of the construction of land reclamation facilities on the territory of the Republic of Slovenia*

No	Name	Component	Possible Impacts
128	Intake of water from the Drava, Ormoško lake, IS Varaždin west	Water	Water intake will not have a cross-border impact on hydromorphological elements.
		Biodiversity	Negative effects are possible on hydrological condition of Drava River downstream from the planned projects. Therefore it is necessary to ensure ecologically acceptable flow.
		Protected areas	Negative effects are possible on hydrological condition of Drava River downstream from the planned interventions. Therefore it is necessary to ensure ecologically acceptable flow. The application of measures to prevent the introduction and spread of invasive alien plant species and their immediate eradication in case of occurrence during construction and maintenance works will reduce the risk of negative impacts of invasive alien species on natural habitats.
		Landscape	The intake of water from the Drava will potentially affect the landscape in the form of changes in terrain morphology and surface cover, and given the location of the intake on the border itself, it is possible that this will also affect the territory of the Republic of Slovenia.

3 Appropriate Assessment

The geographical scope of the Multiannual Programme covers the ecological network Natura 2000 on the territory of the Republic of Croatia (Regulation on the ecological network and responsibilities of public bodies for the management of the ecological network areas, NN 80/19). Based on the Nature Protection Act (Official Gazette 80/13, 15/18, 14/19, 127/19), the procedure for assessing the acceptability of a strategy, programme or plan for the ecological network evaluates the impact of the programme alone or in combination with other plans, programmes and strategies on the target species and habitats, as well as the integrity of the ecological network area. The appropriate assessment is conducted for the programme or parts of the programme that, alone or in combination with other strategic and planning documents, may have a significant impact on the conservation objectives and integrity of the ecological network. As part of the SEA procedure for the Multiannual Programme, which began with the Decision on the Implementation of the Strategic Environmental Assessment Procedure (CLASS: 325-09/17-01/01, UR NO: 517- 07-1-3-1-18-8 dated September 6, 2018), the procedure of appropriate assessment of the Multi-Year Program for the Ecological Network is carried out (based on the opinion of the Ministry of Environmental Protection and Energy, CLASS: UP /I 612-07/17- 60/147, URBROJ: 517-05-2-18-6 dated July 26, 2018).

The objective of the appropriate assessment is to evaluate the degree of significance of the impacts of the programme in question on the conservation objectives and integrity of the ecological network. In doing so, it is necessary to examine the nature (intensity, duration, significance) of the independent and cumulative, direct and indirect impacts of the Multiannual Programme on the target species and habitats, i.e., the integrity of the ecological network area, and to propose measures to mitigate the significant adverse impacts if such impacts are identified during the Appropriate assessment process.

The biodiversity of aquatic ecosystems in the world, including in Croatia, is under serious threat. The reasons for threats to freshwater ecosystems are numerous: regulation and channelization of watercourses, disruption of watercourse continuity, drainage of wetlands, irrigation and land conversion, removal of sediments from rivers (gravel and sand), wastewater and pollution of surface and groundwater, excessive use of artificial fertilisers, and changes in native communities (due to altered habitat conditions, introduction of invasive alien species, etc.).

The impact of the Multiannual Programme on target species and habitats, as well as on the integrity of the ecological network, is seen at the strategic level, as it is a state-level programme that entails a very large number of planned interventions (works) through its programme measures, most of which are geographically defined (although often not precise enough, especially in terms of their scope). The analysis and presentation of the potential impact of the Programme was carried out at the level of projects related to the regulation of streams and rivers (a project or project unit is a set of proposed sub-projects, i.e. interventions that, within the project unit, ensure the solution of problems related to flood protection, as well as the achievement of the programme objective of protection from the adverse effects of flooding, and at the level of projects related to irrigation.

The flood protection project units, as well as the construction projects of irrigation structures are grouped geographically by water management sectors and, moreover, by larger basins, hydrologically, but also in terms of the characteristics of the ecological network (target species, target habitat types, ecological conditions that must be maintained for their preservation). For the evaluation of the

construction of flood protection and relief subprojects, impacts were assessed at the project unit level, while for the evaluation of irrigation projects and cumulative impacts, impacts were spatially assessed at the level of larger catchment areas (Sava, Drava and Danube, Northern Adriatic, Southern Adriatic).

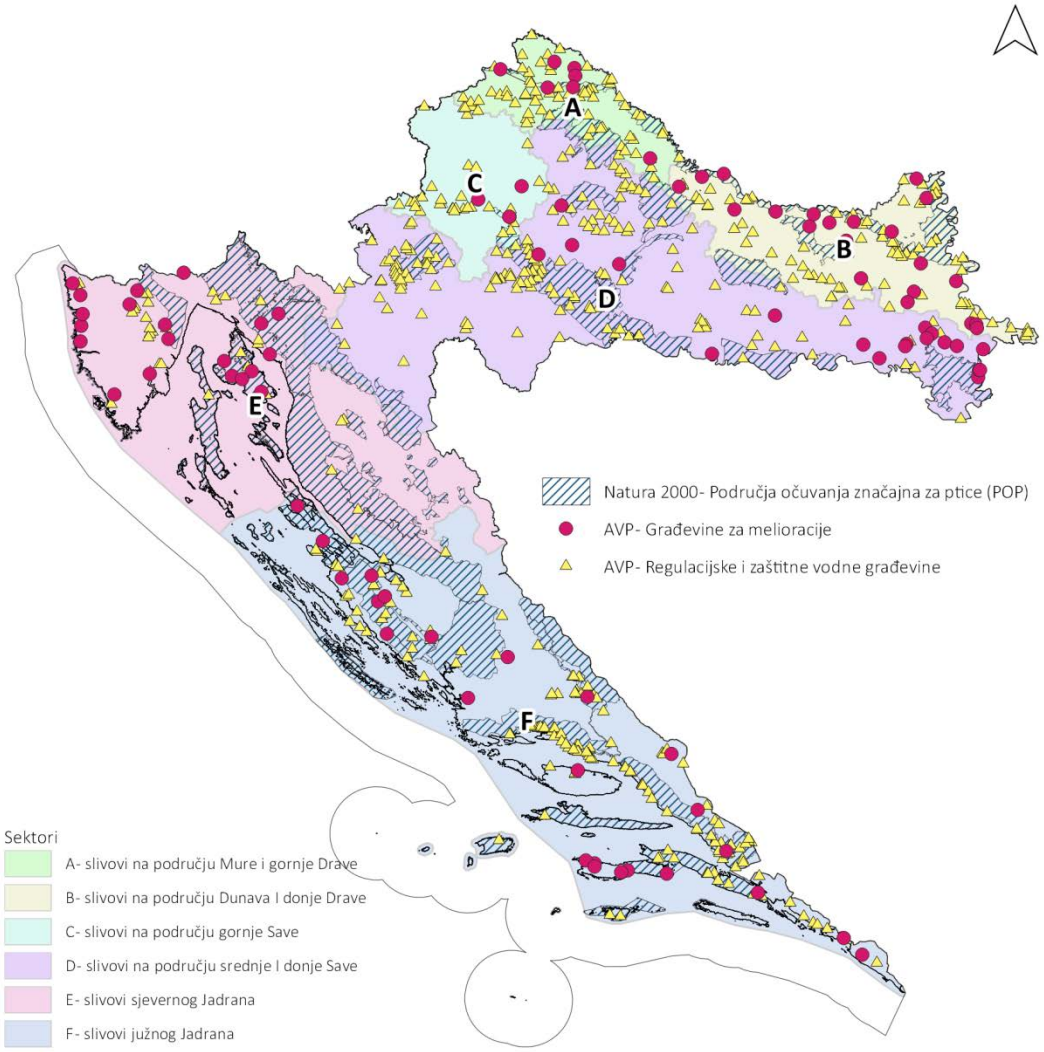

Figure 3-1 Flood protection and regulation sub-projects and land reclamation projects planned by the Multiannual Program according to water management sectors in relation to Special Protection Areas (SPAs, in Croatian: POP)

The implementation of the activities planned under the Multiannual Programme, which include the implementation of various interventions in the area, may have adverse impacts on the ecological network during construction and use in relation to the conservation of target species, their suitable habitats, and target habitat types associated with aquatic ecosystems and surrounding terrestrial ecosystems in the area of construction of certain interventions (e.g., temporary disturbance of wildlife species; long-term and/or temporary habitat loss, habitat degradation and fragmentation). The aforementioned negative impacts, if present, can be mitigated or avoided during the design and planning stages of an individual intervention, i.e., through the identification of mitigation measures as part of the assessment of the acceptability of an intervention for the ecological network. In addition,

in order to avoid potential negative impacts and/or to make an even better contribution to achieving a water status suitable for the target species and habitats, it is necessary to consult appropriate experts in the field of nature conservation and responsible authorities for nature conservation at the early stages of the development of plans/projects at the state level. Indeed, the level of detail of data on the scope of an individual project, i.e., subproject and encroachment, is often insufficient to assess with certainty the impacts on a particular target species or target habitat type. In cases where this was not possible or existing data were insufficient, it is suggested that a preliminary survey of target species and/or target habitats in the ecological network should be conducted during the preparation of the technical documentation or prior to the start of technical design. The goal is to obtain current and accurate data on the status and distribution of target species and target habitat types that would serve as input data for planning, and to be able to accurately limit the scope of the project or find appropriate technical solutions in cooperation with planners that reduce or avoid impacts on the ecological network as much as possible.

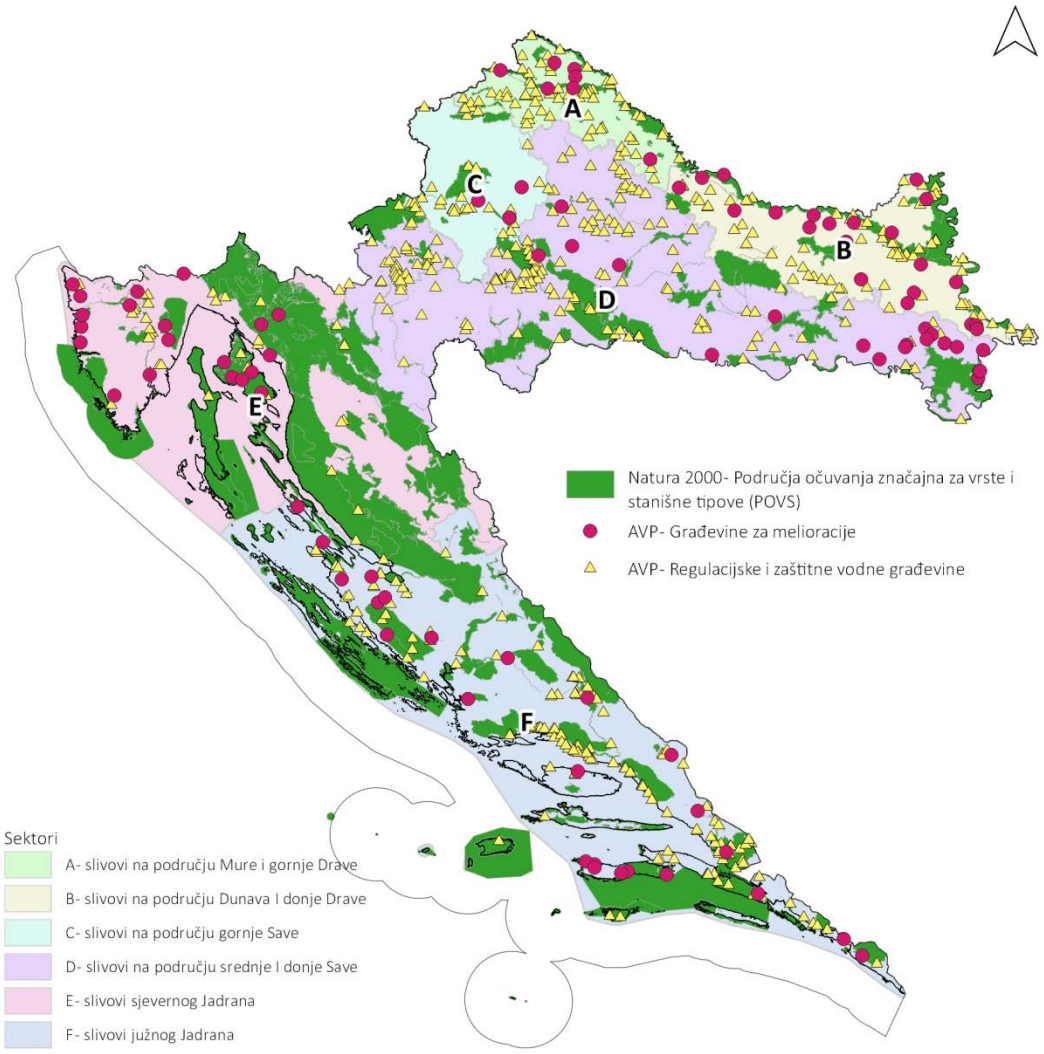

Figure 3-2 Flood protection and regulation sub-projects and land reclamation projects planned by the Multiannual Programme according to water management sectors in relation to Sites of Community Interest (SCIs, in Croatian: POVS)

As a result, certain types of hydrotechnical interventions have a pronounced cumulative character. This is particularly true of projects with purpose of stream or river beds regulation and river banks stabilization. For such projects, mitigation measures proposed in the appropriate assessment to reduce independent and concurrent cumulative impacts are primarily aimed at reducing the scale of the intervention to the lowest possible level and applying bioengineering solutions or less aggressive structural solutions (depending on the watercourse, as appropriate) that would avoid a direct and permanent impact on natural riverbanks. In addition, it is proposed to use engineered and landscape solutions to increase habitat diversity at such hydrotechnical objects. In this way, the cumulative contribution to existing impacts can be reduced.

Actions that may result in greater permanent loss of natural habitats in the ecological network are reservoirs planned in the ecological network. The appropriate assessment suggests that such interventions should be planned at a scale that does not significantly affect the status of target habitats or favourable habitats for target species, i.e., planning detention basins instead of reservoirs when appropriate and compatible with conservation objectives and when no other technical solution is available. For detention basins, reservoirs, and other types of interventions that involve barriers or dams, it is necessary to maintain continuity of water flow, i.e., to prevent fragmentation of aquatic habitats through engineering measures and to allow upstream-downstream migrations of aquatic fauna.

The Multiannual Programme includes a larger number of revitalization sub-projects. These sub-projects can have significant positive impacts if implemented in a manner that ensures their long-term sustainability with minimal future intervention and achievement of hydrologic, hydromorphologic, and biological ecological objectives by restoring floodplain dynamics, structure, and morphology to their natural state while maintaining important forest, wetland, and aquatic habitats. Revitalization projects in the ecological network should be designed to be consistent with the conservation goals of the ecological network area, i.e., to contribute to the long-term maintenance or improvement of the status of populations of target species and/or the status of target habitat types.

Potential impacts resulting from implementation of irrigation projects include habitat loss and fragmentation in the vicinity of water withdrawals and water supply (distribution) network. Indirect impacts include changes in habitat conditions along riverbanks, either hydrologically or due to potential soil and groundwater contamination from increased uptake of agrochemicals. Significant changes in hydrologic conditions in the stream downstream of the water intake and in the immediate vicinity can only be avoided through good design of irrigation projects in accordance with the capacity of the stream and other water sources. Therefore, for outdated irrigation plans, it is necessary to review water use options based on the most recent hydrologic data.

The following is a brief summary of the implications for larger catchment areas.

1) Northern Adriatic Basin

Within the framework of 9 projects (project units) of flood protection and relief, sub-projects for the construction of hydrotechnical objects in the catchment area of the Northern Adriatic were analysed. By analysing the spatial relationship of the sub-projects and projects to the ecological network sites and according to the characteristics of each project and the characteristics of the ecological network sites, 5 ecological network sites were identified as been potentially affected by significant negative impacts, and it was mandatory to propose appropriate compensatory measures:

Natura 2000 Site	Project	Significance of impact of the project without mitigation measures implemented	Significance of impact of the project with mitigation measures implemented	Sub-projects with potentially significant adverse impact
HR5000022 Park prirode Velebit	13	-2	-1	Construction of 2 retention ponds (Brušanka, Tisovac)
HR2001012 Ličko polje		-2	-1	
HR2000619 Mirna i šire područje Butonige	15	-2	-1	Construction of retention and barriers on the Mirna watercourse and its tributaries
HR5000019 Gorski kotar i sjeverna Lika	57	-2	-1?	Reservoir Križ potok
HR2001353 Lokve-Sunger-Fužine		-2	-1?	

Most of the sub-projects identified as having a potentially significant adverse effect on the conservation objectives and integrity of the ecological network involve the construction of detention basins, the construction of which generally has localised impacts in the area of the detention dam (barrier) and on shorter stream segments upstream and downstream of the dam if engineering measures are taken to ensure continuity of stream flow (construction of detention basin without barriers to aquatic fauna, such as. e.g., target fish species, crayfish). Since several detention basins are planned along the Mirna River and in the area SCI HR2000619 Mirna i šire područje Butonige, as well as the construction of a barrier on one of the watercourses, the potential cumulative impacts of these interventions were also identified for the mentioned ecological network site. In particular, the planned reservoir at Križ potok may result in significant and permanent loss of target habitats and favourable habitats for target species within SCI HR5000019 Gorski Kotar i Sjeverna Lika and SCI HR2001353 Lokve-Sunger-Fužine. The most obvious potential impact is on crayfish, for which the Križ potok is a suitable habitat according to available data. Flooding of a portion of the stream and its impoundment would result in a significant loss of suitable habitat and habitat fragmentation. Mitigation measures have been proposed for the Križ potok reservoir, and a site survey will also need to be conducted and the importance for conservation of target species and target habitat types determined. It is assumed that if the mitigation measures are applied, the impacts of the entire project unit can be mitigated to an acceptable level by developing a different technical solution (e.g., by constructing a detention basin instead of the reservoir with the dam). However, if the impacts cannot be reduced to an acceptable level with the above measures, the need for construction of a reservoir should be reviewed and the sub-project for construction of the Križ Potok reservoir should be excluded from the Multiannual

Programmeme if the site is considered to be of high importance for the conservation of the target species and habitat types of the ecological network.

Fifteen proposed irrigation projects have been identified that could have negative impacts on ecological network sites. These are irrigation activities that use water from existing and proposed reservoirs, water supplies, or watercourses. In order to avoid possible cumulative impacts, especially on watercourses (Mirna, Boljunčica, Raša) and their downstream water regimes, which may be a consequence of water use, it is proposed to review the possibilities of water use on a larger spatial scale (e.g. individual counties) in accordance with the latest hydrological data. Given the larger number of reservoirs and micro-dams that will need to be planned for implementation of these projects, it is important to plan the scale of reservoirs and irrigation networks so that there is not a major permanent loss of target habitats and beneficial habitats for target species in ecological network areas. This is especially true for the scope of Project No. 36 (which involves the withdrawal of water from the Boljunčica or Raša River, Ćepić polje irrigation system), which should be planned outside the SCI HR2001486 Istra - Čepićko polje and the island of Krk (SPA HR1000033 Kvarnerski otoci, SCI HR2001357 Otok Krk).

2) Southern Adriatic Basin

In the area of responsibility of the Water Management Department for the southern Adriatic basin, sub-projects for the construction of hydrotechnical objects were analysed within the framework of 12 projects (project units) of flood protection and relief. By analysing the spatial relationships between the projects and the sub-projects and the ecological network sites, and based on the characteristics of the individual projects and the characteristics of the ecological network sites, 24 ecological network sites were identified as sites with potentially significant adverse impacts for which it was essential to propose appropriate mitigation measures:

Natura 2000 Site	**Project**	**Significance of impact of the project without mitigation measures implemented**	**Significance of impact of the project with mitigation measures implemented**	**Sub-projects with potentially significant adverse impact**
HR2000946 Snježnica i Konavosko polje	1	-2	**-2?**	Regulation of torrents of Konavsko polje
HR2001007 Orašac – kanjon	1	-2	-1	Regulation of watercourses (torrents) Orašac
HR5000031 Delta Neretve	2	-2	-1	More projects: stabilization of the Neretva banks; self-regulating weir Norin, protection against salinization of the soil and waters of the lower Neretva (movable partition in the riverbed), Black river – sediment cleaning;
HR1000031 Delta Neretve	2	-2	-1	
HR5000031 Delta Neretve	3	-2	-1	Flood protection in the Rastoke and Vrgorsko polje basins (excess water drainage system)
HR2001046 Matica – Vrgoračko polje	3	-2	-1	
HR2001315 Rastočko polje	3	-2	-1	

Natura 2000 Site	Project	Significance of impact of the project without mitigation measures implemented	Significance of impact of the project with mitigation measures implemented	Sub-projects with potentially significant adverse impact
HR2000951 Krotuša	3	-2	-1	
HR1000031 Delta Neretve	3	-2	-1?	Regulation of the Baćina Lakes
HR5000031 Delta Neretve	3	-2	**-2?**	
HR2001313 Srednji tok Cetine s Hrvatačkim i Sinjskim poljem	7	-2	-1	Regulation of the river Cetina in Hrvatačko polje
HR2001325 Ninski stanovi – livade	10	-2	-1	Construction of retention in the Miljašić ravine upstream from the town of Nin
HR2001361 Ravni kotari	11	-2	-1	Reconstruction of the drainage system Kličevica – Nadin – Polača – Vrana – sea and the GOK of Nadinsko mud
HR2001366 Bokanjačko blato	11	-2	-1	Reconstruction of the hydrotechnical tunnel Bokanjac
HR2000641 Zrmanja	12	-2	-1	Stabilization of the banks of Zrmanja
HR5000022 Park prirode Velebit	12	-2	-1	
HR1000022 Velebit	12	-2	-1	
HR1000026 Krka i okolni plato	12	-2	-1	
HR2001268 Otuča	12	-2	-1	Stabilization of the banks of the Otuča watercourse
HR2000919 Čikola	mg_124	-2	**-2?**	Access from underground, IS Petrovo polje
HR2001266 Vrba	mg_124	-2	**-2?**	
HR2001236 Kanjon Badnjevica	mg_114	-2	-1	Intake of water from the existing Ričica reservoir, Imotsko - Bekijo polje
HR2001229 Bočni kanal uz Vrljiku	mg_114	-2	-1	
HR2000933 Vrljika	mg_114	-2	-1	
HR2000932 Prološko blato	mg_114	-2	-1	
HR2001313 Srednji tok Cetine s Hrvatačkim i Sinjskim poljem	mg_110	-2	-1	Water intake from the Cetina River and the irrigation system (pumping stations, pressure distribution network)
HR3000376 Stračinčica	mg_13	-2	-1	Extraction of water from the public water supply and underground, SN Bradat, Vrbovica-Kruševo Potoračje
HR1000024 Ravni kotari	mg_167	-2	**-2?**	Intake of water from the future Bokanjac reservoir (part of the accumulated water from the basin, and part of it replenished from the underground, 1.0 million M3, pumping stations, pressure distribution network, IS Bokanjac and Rašinovac
HR2001366 Bokanjačko blato	mg_167	-2	**-2?**	

A large proportion of the sub-projects relate to stabilization and protection of riverbanks, particularly the Neretva, Cetina and Zrmanja rivers, most of which are designed as bank revetments. These sub-

projects have a pronounced cumulative effect, as they lead directly and in the long term to changes and loss of natural riverbanks and consequently to loss of favourable habitats for the target species associated with them (e.g., target bird species, target habitats, target fish species). For such sub-projects, measures should be taken to reduce the extent of bank stabilization to what is necessary, and engineering biological solutions or less aggressive structural solutions should be applied that would avoid direct and permanent impacts to natural riverbanks. In addition, engineering and landscape solutions should increase habitat diversity at such structures. Among the projects studied are two planned structural interventions at the confluence of the Norin and Neretva rivers and a movable barrier on the Neretva River, which may lead to fragmentation of aquatic habitats and disruption of water flow continuity. Due to insufficient data, the proposed sub-project at Baćina Lakes, the importance of Baćina Lakes as habitat for certain target species, and the consequent inability to determine adequate mitigation measures to avoid significant impacts with certainty, the above sub-project should be excluded from the Multiannual Programmeme.

Of the proposed irrigation projects, 18 projects were identified as having the potential to adversely impact the ecological network. In order to prevent potential cumulative impacts to the water regime of surface waters downstream of the water withdrawal and in the floodplain that may be a result of water use, water use capacities should be reviewed at a larger spatial scale (e.g., individual counties) consistent with the most recent hydrologic data. A potentially significant impact has been identified for the Petrovo polje irrigation project, as it is not possible to assess the significance of project impacts with certainty at the level of a strategic assessment. The proposed reservoir on the Čikola River has already been assessed as a significant and unacceptable adverse impact at the project level (appropriate assessment, environmental impact assessment), and it is not clear from the Multiannual Programme whether the reservoir is still planned as part of the Petrovo polje irrigation system. If the reservoir is still planned and the Petrovo polje irrigation system will not be functional without the Čikola reservoir (the Petrovo polje irrigation system without the Čikola reservoir would represent a substantial change to the project), then the entire project should be excluded from the Multiannual Programme. The construction of the Bokanjac reservoir would result in a significant loss of favorable habitat for populations of the target species SPA HR1000024 Ravni kotari due to its location (according to available data from spatial planning documents) and the size of the reservoir. In particular, this refers to the significant and permanent loss of favorable habitat for nesting of the European roller (*Coracias garrulus*). In addition, implementation of the proposed irrigation project would result in potentially significant alteration of favorable habitat for the target species SCI HR2001366 Bokanjačko blato, through construction of the reservoir, but also during use of the project through land use change and potential intensification of agriculture.

3) River Sava Basin

The Sava River basin falls under the jurisdiction of two water management departments: the Upper Sava Water Management Department and the Middle and Lower Sava Water Management Departments. In the Sava River basin, 24 projects (project units) for flood protection were analysed. By analysing the spatial relationship of the subprojects and projects to the ecological network sites, and based on the characteristics of the individual projects and the characteristics of the ecological network sites, a total of 21 ecological network sites were identified where significant negative impacts are possible, and it was imperative to propose appropriate mitigation measures:

Natura 2000 Site	Project	Significance of impact of the project without mitigation measures implemented	Significance of impact of the project with mitigation measures implemented	Sub-projects with potentially significant adverse impact
HR2000592 Ogulinsko-plaščansko područje	19	-2	-1	Regulation of the Ratković stream
HR2001505 Korana nizvodno od Slunja	21	-2	**-2?**	Reservoir Lučica on Korana River
HR2000450 Ribnjaci Draganići	22	-2	-1	Construction of the connecting canal Stojnica - Kupčina and regulation of Stojnica from the foundation to the distribution facility at Kupčina in Franetići
HR2000586 Žumberak – Samoborsko gorje	22	-2	-1	Planned retentions (Lipovečka Gradna, retentions on the Bregana stream basin)
HR2000234 Draganička šuma – Ješevica 1	22	-2	-1	Construction of the connecting canal Stojnica - Kupčina and regulation of Stojnica from the foundation to the distribution facility at Kupčina in Franetici
HR2000583 Medvednica	25	-2	-1	Planned retentions (Reka, Slani potok)
HR2000586 Žumberak – Samoborsko gorje	26	-2	-1	Construction of retentions and reservoirs in the Kupčina basin
HR2001506 Sava uzvodno od Zagreba	26	-2	-1	Retention in the Bregana stream basin, regulation of the Lipovečka Gradna stream
HR1000004 Donja Posavina	24	-2	-1	Several sub-projects for the stabilization of the Sava banks (construction of reventments)
HR1000003 Turopolje	24	-2	-1	Several sub-projects for the stabilization of the Sava banks (construction of reventments)
HR2001311 Sava nizvodno od Hrušćice	24	-2	-1	Several sub-projects for the stabilization of the Sava banks (construction of reventments)
HR2001208 Bilogora	29	-2	-1	Construction of the Topolovica reservoir
HR1000008 Bilogora i Kalničko gorje	29	-2	-1	Several sub-projects for the construction of reservoirs (Kreševine, Rovišće, Toplovica, Bedenička)
HR2001220 Livade uz potok Injaticu	29	-2	**-2?**	Construction of Kreševina reservoirs
HR2001216 Ilova	30	-2	-1	Construction of Miletinac retention
HR2001293 Livade kod Grubišnog polja	30	-2	-1	Construction of Miletinac retention
HR2001330 Pakra i Bijela	30	-2	-1	Regulation of the Bijela watercourse with the construction of a discharge channel for large water and regulation of the existing riverbed from km 25+474 to km 28+411 in Sirač
HR2001286 Orljavac	33	-2	**-2?**	Construction of the Kamensko reservoir, a dam with accompanying structures on the left tributary of the Orljava, the Brzaja watercourse
HR2001329 Potoci oko Papuka	33	-2	**-2?**	
HR2001328 Londža, Glogovica, Breznica	35	-2	**-2?**	Construction of the reservoir Breznica

Natura 2000 Site	Project	Significance of impact of the project without mitigation measures implemented	Significance of impact of the project with mitigation measures implemented	Sub-projects with potentially significant adverse impact
HR2000459 Petrinjčica	51	-2	-1	Construction of Petrinjčica retention
HR2001070 Sutla	48	-2	-1	Regulation of the Sutla riverbed on a section of 900 m near Hum na Sutli

Projects with potentially significant impacts on ecological network sites include sub-projects for riverbed regulation (Sutla River), bank protection and stabilisation (along the Sava and Kupa Rivers), rehabilitation and construction of levees along the Sava River, and hydrotechnical objects in the riverbed (riverbed sills). These sub-projects have a pronounced cumulative effect, as they lead to immediate and long-term changes and loss of natural riverbanks and consequently loss of favourable habitats for the target species associated with them (e.g., the target bird species kingfisher and sand martin, the target habitats and target fish species). Several detention basins are planned (Medvednica, Žumberak - Samoborsko gorje). Reconstruction of existing levees for flood control purposes will result in minor local impacts if planned along the route of existing levees. Several sub-projects involve the construction of new levees, and negative impacts can be reduced in such projects by providing adequate floodplain width and avoiding fragmentation of valuable forest and grassland habitats in natural floodplains and aquatic and wetland habitats along watercourses. There are several stream regulation sub-projects that may adversely affect the ecological network. Since not all of the technical aspects of these projects are known at the strategic impact assessment level, the appropriate assessment identified that further technical documentation should be prepared to reduce the scale (magnitude) of the intervention where possible and apply less aggressive engineering or bioengineering solutions where appropriate, while maintaining the natural structure and morphology of the watercourse (streambed and banks). If data on target species and target habitat types are insufficient, or if it is necessary to determine the exact status and distribution of target species and habitat types for planning a single hydrotechnical intervention, preliminary biological surveys should be conducted in the area of impact. Riparian stabilisation projects along the Sava River are among the individual sub-projects that pose a potentially high risk to the conservation of ecological network target species because they will result in permanent loss of natural riparian habitat along the riverbanks and will have potentially significant cumulative impacts.

Among the planned irrigation projects, there are several large irrigation projects that may have a (likely non-significant) impact on the ecological network, particularly at SCI HR2001311 Sava nizvodno od Hrušćice. These are planned irrigation schemes using surface water from the Sava River. In order to avoid possible cumulative impacts, especially on the Sava River and its downstream water regime, as well as on the Kupa River, which may be a consequence of surface water use, water use capacity should be reviewed at a larger spatial scale (e.g. individual districts) in accordance with the latest hydrological data.

In addition, there are several proposed reservoir interventions that may result in significant and permanent loss of ecological network habitat and/or fragmentation of aquatic habitats and disruption of water flow continuity, as well as significant changes in water regime and physicochemical conditions for target species. The construction of the planned reservoirs as part of the flood protection project in

the Česma and Glogovnica river basins is considered to pose a very high risk to the conservation of target species and target habitat types, in particular HR2001281 Bilogora, HR1000008 Bilogora i Kalničko gorje (cumulative impacts) and HR2001220 Livade uz potok Injaticu. The above sub-projects need to be significantly modified and further designed as detention basins rather than reservoirs. Considering the small area of SCI HR2001220 Livade uz potok Injaticu, it is not even possible to determine with certainty whether the detention basin would have an acceptable impact on this site without a precise scale of intervention. If it is not possible to reduce the impact of the overall project to an acceptable level through compensatory measures, the construction of the Kreševina detention basin should be excluded from the implementation of the Multiannual Programmeme. The proposed Breznica Reservoir and the Brzaja Reservoir may also have potentially significant impacts. In order for Project Units 33 and 35 to be acceptable to the ecological network, the above sub-projects must be substantially modified or excluded from implementation of the Multiannual Programmeme. As the Lučica reservoir on the Korana River has already been excluded from the spatial plan due to the identified significant impacts on SCI HR2001505 Korana nizvodno od Slunja, the construction of this reservoir should be excluded from the implementation of the Multiannual Programmeme due to the lack of appropriate measures to mitigate the significant impacts at the project level or (as indicated in the mitigation measures) to substantially change the technical solution (location, extent of intervention) of the subproject to make it acceptable for the ecological network, i.e. i.e., define a different technical solution to achieve the flood control objectives while minimising negative impacts on the ecological network.

4) River Danube and Drava Basin

The Drava and Danube River Basin also fall under the jurisdiction of the Water Management Department for the Mura and Upper Drava and the Water Management Department for the Danube and Lower Drava. In this area, sub-projects for the construction of flood protection and stream regulation hydrotechnical objects were analysed as part of 13 projects (project units) of flood protection. By analysing the spatial relationship of the sub-projects and projects with the areas of the ecological network and based on the characteristics of each project and the characteristics of the ecological network, a total of 6 ecological network sites were identified where potential significant impacts is expected and it was imperative to propose appropriate mitigation measures:

Natura 2000 Site	**Project**	**Significance of impact of the project without mitigation measures implemented**	**Significance of impact of the project with mitigation measures implemented**	**Sub-projects with potentially significant adverse impact**
HR2001408 Livade uz Bednju I	39	-2	**-2?**	Construction of reservoir on Bednja river
HR1000016 Podunavlje i donje Podravlje	37	-2	**-2?**	Construction of VHS Osijek
HR1000016 Podunavlje i donje Podravlje	37	-2	**-2?**	Drava - rehabilitation and maintenance of the right bank (km 38-Nehaj)
HR2001308 Donji tok Drave	37	-2	**-2?**	Construction of the multipurpose hydrotechnical system Osijek
HR2001006 Županijski kanal (Gornje Bazje – Zidina)	42	-2	-1	Regulation of the water regime of the Županijki kanal for the purposes of flood defence and multi-purpose use

Natura 2000 Site	Project	Significance of impact of the project without mitigation measures implemented	Significance of impact of the project with mitigation measures implemented	Sub-projects with potentially significant adverse impact
HR2001329 Potoci oko Papuka	43	-2	-1	Reservoir /retention Šašika
HR2000372 Dunav – Vukovar	45	-2	**-2?**	Danube river - stabilization of the right bank from Vukovar to Vučedol (rkm 1328 - 1333)
HR1000016 Podunavlje i donje Podravlje	45	-2	**-2?**	Regulation of the right bank of the Danube River downstream from the Aljmaš settlement rkm 1375+000 - 1378+000 (Staklara)

Most of the sub-projects identified as having the potential to affect the conservation objectives and integrity of the ecological network area are reconstructions of existing levees for flood control purposes, the construction of which will result in minor, localized impacts if the interventions are planned along the route of existing levees. A smaller portion of the sub-projects relate to the construction of new levees, where adverse impacts for such projects can be reduced by designing the levees alignments to maximize the width of the natural floodplain and prevent the fragmentation of valuable forest and grassland habitats in the floodplain, as well as aquatic, and wetland habitats along the watercourses. There are several stream management sub-projects that may impact ecological network. Since not all technical aspects of these sub-projects are known at the level of strategic impact assessment, for them the scope in the ecological network should be reduced during the preparation of further technical documents, and the least aggressive technical solutions or biotechnical solutions should be applied, maintaining the naturalness of the structure and morphology of the watercourse.

In the Drava River basin, several detention basins and a larger number of reservoirs are also planned, which may have an impact on the ecological network. Of the projects mentioned, the planned reservoir on the Bednja River near the Bednja settlement is noteworthy and may result in a potentially significant permanent loss of target habitats and favorable habitats for target species within the SCI HR2001408 Livade uz Bednju I. Appropriate mitigation measures for the subproject do not exist, however, as part of the mitigating the impact of the whole project unit, it is necessary to review the need for construction of a reservoir on Bednja River for flood control purposes and exclude this sub-project from the implementation if it is not necessary, or give preference to construction of detention basin, or substantially modify the subproject in terms of location or scope. Project Unit 39 was given a final score of "-2?" because the final score depends on which mitigation measures are applied (abandonment of the Bednja reservoir sub-project or substantial changes to the sub-project's technical solution).

Of the planned irrigation projects in the Mura and Upper Drava River basins, 6 planned projects were identified that may have impacts on the ecological network sites. These are irrigation projects that use water from the Drava River, i.e., Drava reservoirs. To prevent possible cumulative impacts, especially on the Drava River and its downstream water regime, which may be a consequence of surface water use, it is necessary to review the possibilities (capacities) of water use on a larger spatial scale (e.g., individual counties) in accordance with the latest hydrological data.

A large part of the sub-projects is related to the stabilization and protection of the Danube and Drava riverbanks, which is foreseen mainly through the construction of bank revetments. These sub-projects have a pronounced cumulative effect, as they lead directly and in the long term to changes and loss of natural riverbanks and consequently to loss of favorable habitats for the target species associated with them (e.g., bird target species, e.g., kingfisher and sand martin, target fish species). For such sub-projects, measures must be taken to reduce the extent of the bank stabilization to what is necessary, as well as bioengineering solutions or less aggressive structural solution along the riverbank, which would avoid a direct and permanent impact on natural stream banks. In addition, engineering and landscaping solutions should increase habitat diversity at such structures. For the two sub-projects on stabilization of the Danube riverbanks, it was concluded that they should be excluded from the implementation of the Multiannual Programmeme or another technical solution should be developed under the overall project that would not have a significant impact on the conservation objectives and integrity of the ecological network.

Among the sub-projects assessed, the proposed construction of the Osijek Hydrotechnical Multipurpose System (VHS Osijek) on Drava river should also be highlighted, as it may result in a significant permanent loss of target habitats and favorable habitats for target species within SPA HR1000016 Dunav i donje Podravlje and SCI HR2001308 Donja Drava. The appropriate assessment concluded that the implementation of the mentioned sub-project under the Multiannual Programmeme should be abandoned and that another technical solution should be developed under this project unit, which would achieve all the objectives of the Osijek VHS and especially the objective of protection from adverse effects of water, which is the subject of the Multiannual Programmeme. In fact, there are no suitable mitigation measures for this sub-project, and the sub-project can only be rated "-2" (potentially significant adverse impact). Project Unit 37, on the other hand, was given a final score of "-2" because it depends on the implementation of measures within the project unit by developer of the Multiannual Programmeme: the exclusion of the sub-project, i.e., the development of a different technical solution for the multipurpose use of the waters of the Drava River, which, due to the obvious significant negative impacts, does not include impoundment in this area, as it is now planned according to the spatial planning documents.

Among the planned irrigation systems in the area of the Drava and Danube basins, 14 projects have been identified that may have an impact on the ecological network sites. These are the projects that mainly use surface water from the Drava, Danube and Karašica rivers. In order to prevent possible cumulative impacts, especially on the Drava, Danube and Karašica rivers and their downstream water regimes, which may be a consequence of water use, the possibility of water use on a larger spatial scale (e.g. individual counties, or whole watercourses) should be reviewed in accordance with the latest hydrological data.

Final Evaluation of the Programme

The appropriate assessment identified sub-projects for the construction of hydrotechnical objects for flood control and relief, and for the construction of hydrotechnical objects for irrigation, which were rated "-2" (= potentially significant impact) due to possible significant adverse independent and/or cumulative impacts on the conservation objectives of the ecological network (see the following table). For these sub-projects and projects, given the assumed size (scale) and intensity of their impacts at the strategic level of impact assessment, it was not possible to propose appropriate mitigation measures

that would reduce the impacts on the conservation objectives and integrity of the ecological network below a significant negative level with sufficient certainty, and it is necessary to exclude their implementation under the Multiannual Programme. In order to achieve the Programme's objectives of protection from the adverse effects of water and the need for water use for irrigation purposes, it is necessary to apply various technical solutions to the highlighted interventions that do not result in a significant negative impact on the target species and habitat types and the integrity of the ecological network. If this is not possible even after the procedure prescribed by law is implemented, the planned sub-project or the project of the cannot be implemented.

Project	**Sub-project**	**Natura 2000 Site identified as the site of potentially significant adverse impact**
Flood protection and relief projects		
Water Management Department for North Adriatic Basin		
1 Flash flood protection project in the areas of Dubrovačko primorje, the Pelješac peninsula and the islands of Korčula, Mljet and Lastovo	6082 Regulation of Konavle area torrents	POVS HR2000946 Snježnica i Konavosko polje
3 Flood protection project in the Vrgorsko polje basin	6061 Regulation of the Baćina Lakes	POVS HR5000031 Delta Neretve
Water Management Department for the Middle and Lower Sava River		
21 Flood protection project in the Korana river basin	4009 Construction of the reservoir Lučica on Korana river	POVS HR2001505 Korana nizvodno od Slunja
29 Flood protection project in the Česma and Glogovnica basins	4057 Construction of the reservoir Kreševine	POVS HR2001220 Livade uz potok Injaticu
33 Flood protection project in the Orljava river basin	16 Construction of the reservoir Kamensko, a dam with pertaining facilities on the watercourse Brzaja, a left tributary of the Orljava, for flood defence, improvement of small watercourses downstream, irrigation and water supply	POVS HR2001286 Orljavac HR2001329 Potoci oko Papuka
35 Flood protection project in the Bić and Bosut basins	49 Construction of the reservoir Breznica	POVS HR2001328 Londža, Glogovica, Breznica
Water Management Department for Mura and Upper Drava River		
39 Flood protection project in the Bednja basin	287 Construction of a reservoir on the Bednja river near the Bednja settlement	POVS HR2001408 Livade uz Bednju I
Water Management Department for Danube and Lower Drava River		
37 Flood protection project of the Drava River from Pitomača to the mouth of the Danube	2109 Construction of multipurpose hydrotechnical system Osijek	POP HR1000015 Srednji tok Drave POVS HR5000015 Srednji tok Drave POP HR1000016 Podunavlje i donje Podravlje POVS HR2001308 Donji tok Drave
	345 Drava - rehabilitation and maintenance of the right bank (km 38-Nehaj)	POP HR1000016 Podunavlje i donje Podravlj POVS HR2001308 Donji tok Drave
45 Danube river flood protection project	331 Danube River – stabilization of its right bank	POVS HR2000372 Dunav-Vukovar

Project	Sub-project	Natura 2000 Site identified as the site of potentially significant adverse impact
	from Vukovar to Vučedol (rkm 1328-1333)	
	2043 Improvement of the right Danube bank downstream of the settlement Aljmaš rkm 1375+000 - 1378+000 (Staklara)	
Land reclamation projects		
167 Intake of water from the future Bokanjac reservoir		POVS HR2001366 Bokanjačko blato HR1000024 Ravni kotari
124 Irrigation system Petrovo polje (Čikola reservoir)		POVS HR2000919 Čikola HR2001266 Vrba

At the level of strategic impact assessment, in accordance with the analysis of potential negative impacts carried out, including cumulative impacts on the target species and habitat types of the Natura 2000 ecological network, the implementation of the Multiannual Programme, assuming the implementation of all proposed mitigation measures (including the modification of planned technical solutions for interventions with potentially significant negative impacts or the exclusion of such interventions from the Multiannual Programme), is acceptable for the ecological network, nor will it have significant negative impacts on the conservation objectives and integrity of the ecological network.

3.1 Proposal of measures to mitigate the adverse impacts on the ecological network

3.1.1 Mitigation measures for planned flood protection and stream regulation hydrotechnical objects

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
1	**Flash flood protection project in the areas of Dubrovačko primorje, the Pelješac peninsula and the islands of Korčula, Mljet and Lastovo**	HR1000036 Srednjedalmatinski otoci i Pelješac	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Carry out the works on the channel regulation of torrents and other watercourses during the dry period (if applicable, during period of dry streambed). Minimize the construction works area in ecological network and avoid the permanent loss of target habitat types and favorable habitats for target species, especially grasslands, garrigue, maquis and small water bodies (ponds). Preserve the natural structure and morphology of the streambed and streambanks. Preserve riparian vegetation and restore it after construction works if it is damaged. The sub-projects within this project unit should planned in such a way as to ensure the permeability of the streambed and the connection of the surface flow with the underground; design the banks of the torrential streams with a slight (gentle) slope and with the use of natural materials so that smaller animals can get out of the streambed. Minimize the scope of regulation and stabilization of the streambed of torrential and other streams and locate construction works on already anthropogenically modified stream sections, or where floods directly threaten settlements or important infrastructure. **Sub-project No. 172, 6079, 6080:** On the project level, the dynamics, and the manner of performing the construction works of each intervention should be planned in such a way as to minimize the disturbance of target bat species of SCI HR2001010 Paleombla – Ombla during important periods of their life cycles. Minimize the degradation of natural habitats, especially dry grasslands, garrigues, and maquis. **Sub-project No. 6016, 6122:** Dynamics and the manner of performing the construction works should be planned in such a way as to minimize the disturbance of target species of SCI HR5000038 Park prirode Lastovsko otočje during important periods of their life cycles. Minimize the degradation or permanent loss of natural habitats, especially dry grassland, garrigues, maquis. During construction works for the sub-project no. 6116, the structure and favourable condition of the ponds in Vino polje must be preserved.
		HR2001364 JI dio Pelješca	-1	
		HR2001367 I dio Korčule	-1	
		HR10000031 Delta Neretve	-1	
		HR50000031 Delta Neretve	-1	
		HR4000015 Malostonski zaljev	0	
		HR10000038 Lastovsko otočje	-1	
		HR5000038 Park prirode Lastovsko otočje	-1	
		HR2001010 Paleombla – Ombla	-1	
		HR3000163 Stonski kanal	0	
		HR2000946 Snježnica i Konavosko polje	-2?	
		HR2001007 Orašac – kanjon	0	
		HR3000165 Uvala Slano	0	
		HR2001337 Područje oko Rafove (Zatonske) špilje	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				Sub-project No. 6084: The scope of the sub-project should be planned outside of SCI HR2001007 Orašac – kanjon. **Sub-project No. 6083:** Dynamics of the construction works should be planned in such a way as to minimize or avoid the disturbance of target bat species of SCI HR2001337 Područje oko Rafove (Zatonske) špilje. Minimize the scope of the construction works and avoid the loss and degradation of natural habitats, especially habitats favourable for bats. **Sub-project No. 185:** At the project level, the dynamics and manner of performing construction works should be planned in such a way as to reduce the disturbance of target species (reptiles, bats) of SCI HR2001367 I dio Korčule during significant periods of their life cycles and to avoid the loss or degradation of natural habitats, especially grasslands, garrigues, maquis. The favourable condition and the morphology of ponds in Donje blato must be preserved. When reconstructing the main drainage channel, the natural marine coastal habitats must be preserved; changes in morphology and disposal of construction material is not allowed on natural coastal habitats. **Sub-project No. 6082:** Due to the significant existing cumulative impact, it cannot be concluded that adequate mitigation measures can be proposed to reduce the impact of this sub-project, therefore other technical solution for the sub-project must be designed, i.e., the current design must be significantly changed. If this is not possible even after the implementation of the procedure prescribed by law, the planned sub-project must be excluded from the Multiannual Programme.
2	**Flood protection project in the Neretva river basin**	HR1000031 Delta Neretve	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Minimize the construction works area in ecological network and avoid the permanent loss of target habitat types and favourable habitats for target species, especially alluvial forests, grasslands (hay meadows), wetlands and surface water bodies. **Reconstructions of the existing levees (dikes)** should be planned and constructed using the same alignment as the existing levees, except where the change is necessary to ensure the flood protection. **The new levees alignments** must be planned in such a way as to ensure the protection of valuable target habitat types and aquatic and wetland habitats important for target species within the natural floodplain (inundation area) and to ensure the favorable hydrological regime and natural flooding dynamics. Ensure favourable hydrological
		HR5000031 Delta Neretve	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				regime downstream and in ecologically dependent surrounding area. **Bank stabilization and construction of revetments** should be planned only exceptionally on the shortest possible sections and along already anthropogenically modified banks, where the bank stabilization is necessary to ensure flood protection of settlements and the infrastructure. The scope (length, height) of revetments must be minimized. Revetments are allowed to be constructed only where there is no other technical solution to ensure flood protection. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment. By adequate technical design of revitalization sub-projects ensure minimal future hydrotechnical interventions within the scope of the revitalization (i.e., ensure long-term self-sustainability of the revitalized area), natural hydrological regime and natural flooding dynamics, as well as the enhancement of hydromorphological features of Neretva River. **Sub-project No. 6077:** Preserve target habitat types along the coast. Natural marine coastal habitats must be preserved; changes in morphology and structure of natural habitats and disposing construction materials in coastal zone is not allowed. **Sub-project No. 6123 and 6200:** Preseve the water flow continuity on the dams and barriers for target fish species, i.e., prevent the fragmentation of aquatic habitats and allow for downstream and upstream fish migrations (if necessary, construct functional fish passage). **Sub-project No. 6118:** Plan the sub-project in several phases so that the impact is not present on the whole river section at the same time. Plan construction works dynamics in accordance with the ecological requirements of target fish species (avoid spawning and migration period) to minimize the disturbance. Preserve the riverbanks and natural riparian vegetation.
3	**Flood protection project in the Vrgorsko polje basin**	HR2001046 Matica – Vrgoračko polje	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Minimize the construction works area in ecological network and avoid the permanent loss, changes in morphology and structure of target habitat types and favourable habitats for target species, especially riparian, aquatic and wetland habitats (alluvial forest habitats, wetlands with emergent vegetation, such as reed and cattail). Construction works dynamics should be planned in accordance with the ecological requirements of
		HR2001315 Rastočko polje	-1	
		HR2000951 Krotuša	-1	
		HR5000031 Delta Neretve	-2?	
		HR1000031 Delta Neretve	-1?	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				target species of the ecological network site where the sub-project is carried out. **Sub-project No. 6061:** Preserve hydrological regime of Baćinska Lakes. Riparian habitats must be preserved, as well as their structure and morphology. Due to insufficient data about the proposed sub-project at Baćina Lakes, adequate mitigation measures cannot be determined to avoid significant impacts with certainty. technical solution must be designed in such a way as to avoid the significant adverse impact. If that is not possible even after the procedure prescribed by the law has been carried out, the above sub-project cannot be implemented. **Sub-project No. 6062:** Preserve surface water quality, physical and chemical conditions favourable for target species and hydrological regime within SCI HR2001046 Matica – Vrgorsko polje. Preserve natural morphology and structure of the riverbed. Preserve riparian vegetation and restore it if it has been damaged after construction works. Carry out the construction works on artificial channels during the dry period. **Sub-project No. 6060:** Preserve favourable hydrological state of the underground water bodies between Vrgoračko polje and Neretva River, between Rastočko polje and Vrgoračko polje, and between Vrgoračko polje and the sea (preserve hydrological regime of the natural sink zones of Vrgoračko polje and Rastočko polje, sources and connectivity of karst sinks, sources, and surface water bodies). Design the drainage system of Vrgoračko polje in such a way as to ensure the favourable hydrological regime (amount of water, water retention time) in Krotuša sink zone (habitat type 3180* Turloughs in SCI HR2000951 Krotuša.
4	**Flood protection project in the Imotsko-bekijsko polje basin**	HR2000933 Vrljika	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. The sub-projects of the regulation of torrential streams (no. 208, 209, 6115) within this project unit should planned in such a way as to ensure the permeability of the streambed and the connection of the surface flow with the underground; design the banks of the torrent with a slight (gentle) slope and with the use of natural materials so that smaller animals can get out of the streambed. Preserve as much as possible natural banks, natural structure and morphology of the streambed, and riparian vegetation. Preserve in their natural state sources and their connection with surface flows. Technical features of all regulations of torrential streams and channels should be planned in a way that construction works, permanent occupation, and changes of natural habitats in watercourses
		HR2001507 Izvor Krčevac	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				(streambed, streambanks, and riparian zone) are minimized to the least necessary extent. Plan to carry out works on torrents and channels in the dry period when the streambed is dry and (if possible) outside the spawning period of the target fish species of SCI HR2000933 Vrljika to avoid their disturbance.
5	**Protection from flash floods in the Makarska coastal region**	HR2001350 Podbiokovlje	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Plan all sub-projects within this project unit in such a way as to ensure the permeability of the torrent streambed and the connection of the surface flow with the underground; design the banks of the torrent with a slight (gentle) slope and with the use of natural materials so that smaller animals can get out of the streambed. Preserve as much as possible natural streambanks, natural morphology and structure of the streambed, and riparian vegetation. **Sub-project No. 6067 and 6068** should be designed in such a way that permanent loss and changes of natural habitats, in particular forest, scrub, and habitats of temporary streams in SCI HR2001350 Podbiokovlje are reduced to the least necessary extent. Plan the dynamics and manner of performing construction works in such a way as to reduce disturbance of the target species of amphibians during significant periods of their life cycle.
6	**Protection from flash floods in the Middle Adriatic coastal region and the islands of Brač, Hvar, Vis, Šolta and Čiovo**	HR1000039 Pučinski otoci	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Plan the dynamics and manner of performing construction works in such a way as to reduce disturbance of the target species (birds, fish, and amphibians) during significant periods of their life cycle. Plan the construction works on torrents and channels during the dry period when the bed is dry or during low water levels of permanent watercourses (Jadro, Žrnovnica). Design sub-projects within this project unit to ensure permeability of the riverbed and hydrological connection with the underground; design banks with a slight (gentle) slope and use natural materials to allow smaller animals to leave the riverbed. Minimize the construction works area in ecological network and avoid the permanent loss of target habitat types and favourable habitats for target species, especially grasslands, garrigue, maquis,
		HR2000942 Otok Vis	-1	
		HR1000036 Srednjedalmatinski otoci i Pelješac	-1	
		HR2001244 Bunar kod Franjevačkog samostana u Hvaru	-1	
		HR2001245 Bunar na Hvaru	-1	
		HR2000931 Jadro	-1	
		HR3000126 Ušće Cetine	-1	
		HR1000027 Mosor, Kozjak i Trogirska zavala	-1	
		HR2001352 Mosor	-1	
		HR2001363 Zaleđe Trogira	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				small water bodies (ponds), marine coastal habitats. Preserve as much as possible the natural streambank, the natural structure and morphology of the streambed, and the riparian vegetation. Stabilization of streambed during the regulation of torrents and permanent watercourses (Jadro, Žrnovnica) should be reduced to the smallest possible extent and carried out exclusively on already anthropogenically modified sections. Use bioengineering technical solutions wherever possible. On permanent watercourses (Jadro, Žrnovnica), preserve aquatic vegetation where it is present, riparian vegetation where it is present in a minimum zone of 2 m from the banks of the watercourse, and the composition of the substrate at the bottom (sand or gravel bottom). Preserve the continuity of the water course and allow the upstream migration of fish species.
7	**Flood protection project in the Cetina river basin**	HR1000029 Cetina	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Plan all sub-projects within this project unit in such a way as to ensure the permeability of the torrential and other streams' bed and the connection of the surface flow with the underground; design the streambanks with a slight (gentle) slope and with the use of natural materials so that smaller animals can get out of the streambed. Preserve as much as possible natural streambanks, natural morphology and structure of the streambed and riparian vegetation. Plan the dynamics and the manner of performing construction works of a particular intervention in the ecological network in such a way as to reduce the disturbance of the target species (fish, birds, reptiles) during significant periods of the life cycle. Carry out the works on the channel regulation of torrential and other streams during the dry period, which is during dry streambed or low water levels ((Cetina, Kosinac). Minimize the construction works area in ecological network and avoid the permanent loss of target habitat types and favourable habitats for target species, especially grasslands, scrub vegetation, small water bodies (ponds). Preserve as much as possible natural riverbanks, natural structure and morphology of the streambed, and riparian vegetation. Minimize the extent of regulation and stabilization of the streambed of torrential and permanent watercourses. Locate construction works on already anthropogenically modified stream sections. Use
		HR2000929 Rijeka Cetina – kanjonski dio	-1	
		HR2001314 Izvorišni dio Cetine s Paškim i Vrličkim poljem	-1	
		HR2000936 Ruda	-1	
		HR2001313 Srednji tok Cetine s Hrvatačkim i Sinjskim poljem	-1	
		HR1000028 Dinara	0	
		HR5000028 Dinara	0	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				bioengineering technical solutions wherever possible. Along the permanent watercourses preserve aquatic vegetation where it is present (riparian vegetation where it is present in a minimum width of 2 m from the banks of the watercourse) and the composition of the substrate at the bottom (natural, muddy, sandy or gravel bottoms). Preserve the continuity of the water flow and allow upstream migrations of fish and invertebrates along the watercourse.
8	**Flood protection project in the Krka river basin**	HR1000026 Krka i okolni plato	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 6016, 6017:** Minimize the construction works area in ecological network and avoid the permanent loss, changes in morphology and structure of target habitat types and favorable habitats for target species, especially riparian, aquatic, and wetland habitats (alluvial forest habitats, wetlands with emergent vegetation, such as reed and cattail). Preserve the natural morphology and structure of the streambed (bottom and slopes) of the watercourse. Preserve riparian vegetation and restore it after construction if it is damaged. Carry out the works on the channel regulation of torrential and other periodic flows during the dry period, that is during dry streambed or low water levels (preferably during dry streambed). Plan all sub-projects within this project unit in such a way as to ensure the permeability of the torrential and other streams' bed and the connection of the surface flow with the underground; design the streambanks with a slight (gentle) slope and with the use of natural materials so that smaller animals can get out of the streambed. Minimize the scope of regulation and stabilization of the streambed of torrential and permanent watercourses and locate construction works on already anthropogenically modified stream sections, or where floods directly threaten settlements or important infrastructure. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out, especially species dependent of aquatic, wetland, and riparian habitats.
		HR2000918 Šire područje NP Krka	-1	
		HR3000171 Ušće Krke	-1	
9	**Protection from flash floods in the Šibenik coastal region and on the Šibenik islands**	NONE	0	Mitigation measures are not proposed for Project No. 9 on strategic impact assessment level.

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
10	**Protection from flash floods in the Zadar coastal region and on the Zadar islands**	HR1000023 SZ Dalmacija i Pag	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Plan all sub-projects within this project unit in such a way as to ensure the permeability of the torrential and other streams' bed and the connection of the surface flow with the underground and design the streambanks with a slight slope and with the use of natural materials so that smaller animals can get out of the streambed. Preserve riparian vegetation and natural streambanks, as well as natural morphology and structure of the streambed. Minimize the scope of regulation and stabilization of the streambed of torrential and permanent watercourses and locate construction works on already anthropogenically modified stream sections, or where floods directly threaten settlements or important infrastructure. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out (SPA HR1000023 SZ Dalmacija i Pag, SPA HR1000024 Ravni kotari, SPA HR1000022 Velebit). Within the **sub-project No. 223**, natural sand and muddy coastal habitats in the ecological network must be preserved, i.e., they must not be damaged, their morphology must be preseved and construction material must not be disposed on such habitats. **Sub-project No. 6005** should be planned in such a way as to minimize the construction works to the least extent possible to avoid permanent loss and permanent changes of natural habitats (especially) grassland in SCI HR2001325 Ninski stanovi – livade. The extent of the detention basin should be planned in the extent of natural flooding area. Ensure a favourable year-round hydrological regime, as well as sediment and deadwood transport downstream of the detention basin. Preserve as much as possible natural streambank, natural structure and morphology of the streambed, and riparian and aquatic vegetation. Ensure favorable hydrological conditions for target species *Chouardia lithardierei* and for habitat type 6540 Sub Mediterranean grasslands of the alliance *Molinio-Hordeion secalini* within SCI HR2001325 Ninski stanovi – livade Within SPA HR1000024 Ravni kotari preserve riparian vegetation, especially old, developed poplar trees along the banks of watercourses and artificial channels as potential nesting sites for European roller.
		HR4000005 Privlaka – Ninski zaljev – Ljubački zaljev	-1	
		HR3000421 Solana Nin	0	
		HR3000176 Ninski zaljev	-1	
		HR1000024 Ravni kotari	-1	
		HR2001325 Ninski stanovi – livade	-1	
		HR1000022 Velebit	-1	
		HR5000022 Park prirode Velebit	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
11	**Flood protection project in the Ravni Kotari basins**	HR10000025 Vransko jezero i Jasen	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Minimize the construction works in ecological network to the least extent possible and avoid the permanent loss of natural habitats, especially riparian and grassland habitats. Within SPA HR1000024 Ravni kotari preserve riparian vegetation, especially old, developed poplar trees along the banks of watercourses and artificial channels as potential nesting sites for European roller. Plan construction works on temporary streams (torrents) during dry season, i.e., when the streambed is dry. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out. Plan all sub-projects within this project unit in such a way as to ensure the permeability of the torrential and other streams' bed and the connection of the surface flow with the underground and design the streambanks with a slight slope and with the use of natural materials so that smaller animals can get out of the streambed. Preserve riparian vegetation and natural streambanks, as well as natural morphology and structure of the streambed. Minimize the scope of regulation and stabilization of the streambed of torrential and permanent watercourses and locate construction works on already anthropogenically modified stream sections, or where floods directly threaten settlements or important infrastructure. Construction works in the ecological network within the sub-project No. 6003 should be planned outside natural sand and muddy coastal habitats. Morphology of such habitats must be preserved, nor should be construction materials disposed in the coastal zone. Reconstruction of the embankment on Karišnica River must be retained in the extent of the existing embankment. **Sub-project No. 6004** (reconstruction of the drainage system Kličevica – Nadin – Polača — Vrana – sea and main drainage channel of Nadinsko blato): Plan the reconstruction of the drainage system without barriers (sills) in the streambed, Preserve natural streambanks, riparian vegetation, streambed structure and substrate composition. Carry out the works carefully, i.e., the dynamics of the construction works should be planned in successive manner, so that longer sections of the watercourses are not simultaneously affected and the potential impact (increased turbidity, change in
		HR5000025 Park prirode Vransko jezero	-1	
		HR1000024 Ravni kotari	-1	
		HR2001361 Ravni kotari	-1	
		HR2001366 Bokanjačko blato	-1	
		HR2001325 Ninski stanovi – livade	-1	
		HR1000023 SZ Dalmacija i Pag	-1	
		HR4000030 Novigradsko i Karinsko more	-1	
		HR2001316 Karišnica i Bijela	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				physical and chemical conditions, water amount) on the population of the white-clawed crayfish is minimized. **Sub-project No. 6102** (reconstruction of the hydrotechnical tunnel Bokanjac): Technical solution of the reconstruction of the tunnel must be planned in such a way as to ensure future availability of the tunnel as a favourable habitat for maternity colony of target bat species *Rhinolophus ferrumequinum.* Dynamics of the construction works should be planned in accordance with the target bat species to avoid the disturbance of the population. Sub-project must be planned and designed with consultation with the bat expert.
12	**Flood protection project in the basins of the Zrmanja river and the Lika plateau**	HR1000022 Velebit	--1	**Sub-project No. 222, 225** Minimize the scope of riverbanks' stabilization (length, height) and locate construction works on already anthropogenically modified streambank sections, or where floods directly threaten human settlements or important infrastructure. Use only natural material while keeping the permeability od the riverbed and banks. Preserve favourable hydrological conditions for natural habitats in the floodplain. If weirs (sills) are planned, they should be designed in such a way as to preserve the continuity of the flow and to allow the upstream migrations of the aquatic animals, especially fish (e.g., they should be designed in the cascade manner, with slight downstream slope and with the use of natural materials, such as cobbles of different sizes). Apply bioengineering technical solutions wherever it is possible (along the whole regulated section or along the part of the section). Apply landscape and other technical solutions to diversify habitats in the riverbed and on bank slopes. Minimize the extent of construction works to avoid the permanent loss and changes of natural habitats, especially aquatic and riparian habitats. Preserve as much as possible natural riparian vegetation and restore it if it has been damaged during the construction works. Preserve aquatic vegetation of the habitat type 3260 Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion. Carry out construction works while preserving the target habitat type 32A0 Tufa cascades of karstic rivers of the Dinaric Alps (Zrmanja River, sub-project 222). Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out. For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
		HR1000026 Krka i okolni plato	-1	
		HR1000021 Lička krška polja	-1	
		HR2000641 Zrmanja	-1	
		HR2001268 Otuča	-1	
		HR5000022 Park prirode Velebit	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
13	**Flood protection project in the Lika and Gacka river basins**	HR1000022 Velebit	-1	**Sub-project No. 137, 154:** The technical aspects of the detention basins, accompanying facilities and weirs (sills) must be planned in such a way as to prevent the fragmentation of habitats for the white-clawed crayfish, i.e., to enable the species' upstream-downstream migrations. Design detention basins without barriers that would interrupt the upstream migration of aquatic fauna. The extent (scope) of the detention basin should be planned in the extent of natural flooding area. Ensure a favorable year-round hydrological regime, as well as sediment and deadwood transport downstream of the detention basin. Minimize the extent of construction works to avoid the permanent loss and changes of natural habitats, especially forest, hygrophilous grassland, riparian, and aquatic habitats. Preserve as much as possible natural streambank, natural structure and morphology of the streambed, aquatic, and riparian vegetation, especially the vegetation of hygrophilous tall herb fringe communities along the streams in the scope of the sub-project. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out: SPA HR1000022 Velebit and SCI HR5000022 Park prirode Velebit (sub-projects no. 137, 154), and SPA HR100021 Lička krška polja and SCI HR2001012 Ličko polje (sub-project no. 137). For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
		HR5000022 Park prirode Velebit	-1	
		HR1000021 Lička krška polja	-1	
		HR2001012 Ličko polje	-1	
		HR2000635 Gacko polje	-1	
14	**Protection from flash floods in the Kvarner coastal region and on the islands of Krk, Cres, and Lošinj**	HR1000033 Kvarnerski otoci	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. The extent of the detention basins should be planned in the extent of natural flooding (**sub-projects No. 143, 363)**. For all planned sub-projects construction works area, permanent occupation, and permanent changes of natural habitats in the ecological network must be minimized to the least extent possible. Preserve small water bodies (ponds, puddles, and similar habitats), especially the ponds with the vegetation characteristic for habitat type 3170 Mediterranean temporary ponds. Preserve as much as possible natural riverbanks, natural structure and morphology of the riverbed, and riparian vegetation. Along the sections where the stream regulation is necessary, the permeability of the streambed must be preserved
		HR2001357 Otok Krk	-1	
		HR2001359 Otok Rab	-1	
		HR2001358 Otok Cres	-1	
		HR2001275 Vrbnik	-1	
		HR4000029 Zaljev Soline -otok Krk	0	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				and the banks must be designed with the slight (gentle) slope to avoid the "trap effect" for small animals, especially for the target reptile species. For all the planned sub-projects of stream regulation, the permeability of the streambed and banks must be maintained and the hydrological connection of the surface flow with the underground must be preserved. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out (target species of birds, bats, and reptiles). Preserve natural marine coastal habitats.
15	**Flood protection project in the Mirna river basin**	HR2000619 Mirna i šire područje Butonige	-1	All sub-projects within the project (project unit): For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Sub-project No. 142, 148, 157, 158, 5006, 5007: The technical aspects of the detention basins, accompanying facilities and weirs (sills) must be planned in such a way as to prevent the fragmentation of habitats for the white-clawed crayfish and the target species of fish, i.e., to enable their upstream-downstream migrations. Design detention basins without barriers that would interrupt the upstream migration of these species. The extent (scope) of the detention basin should be planned in the extent of natural flooding area. Ensure a favorable year-round hydrological regime, as well as sediment and deadwood transport downstream of the detention basin. Minimize the extent of construction works to avoid the permanent loss and changes of natural habitats, especially forest, grassland, riparian, and aquatic habitats. Preserve as much as possible natural streambank, natural structure and morphology of the streambed, and riparian vegetation. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site SCI HR2000619 Mirna i šire područje Butonige and SCI HR2001016 Kotli. Sub-project No. 5025 (Mirna River restoration): River Mirna restoration sub-project should be planned and designed in accordance with the conservation objectives of SCI HR2000619 Mirna i šire područje Butonige and SCI HR2000637 Motovunska šuma. By adequate technical design of revitalization ensure minimal future hydrotechnical interventions within the scope of the revitalization (i.e., ensure long-term self-sustainability of the revitalized area), natural hydrological regime and natural flooding dynamics, as well as the
		HR2001016 Kotli	-1	
		HR2000637 Motovunska šuma	-1 / +1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				enhancement of hydromorphological features of Mirna River.
16	**Flood protection project in the Raša river basin**	HR2001365 Pazinština	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 150, 153** The technical aspects of the detention basins and accompanying facilities must be planned in such a way as to prevent the fragmentation of habitats for aquatic fauna, i.e., to enable upstream-downstream migrations of animal species. Design detention basins without barriers that would interrupt the upstream migration of aquatic species. The extent (scope) of the detention basin should be planned in the extent of natural flooding area. Ensure a favorable year-round hydrological regime, as well as sediment and deadwood transport downstream of the detention basin. Minimize the extent of construction works to avoid the permanent loss and changes of natural habitats, especially forest and aquatic habitats. Preserve small water bodies (ponds, puddles, and similar habitats) within the detention basin. Preserve as much as possible natural streambank, natural structure and morphology of the streambed, and riparian vegetation. Along the sections where stream regulation is necessary, ensure the streambed permeability and design the banks with slight (gentle) slope. Construction works dynamics should be planned in accordance with the ecological requirements of target amphibian species to avoid disturbance.
		HR3000432 Ušće Raše	-1	
17	**Protection from flash floods in the Western Istria coastal region**	NONE	0	Mitigation measures are not proposed for Project No. 17 on strategic impact assessment level.
18	**Flood protection in the Upper Kupa River Basin**	HR2000642 Kupa	-1	**Sub-project No. 4021, 4020:** Minimize the construction works in the riverbed and along the riverbanks of Kupa River to the least possible extent. Sub-projects of weir reconstruction must be planned within the current extent. Maintain the current height or lower the height of weir crest. Weir reconstruction must be planned in such a way as to ensure water flow continuity and to ensure downstream and upstream migration of fish and invertebrates (e.g., they should be designed in the cascade manner, with slight downstream slope and with the use of natural materials). Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out (SCI HR2000642
		HR2001372 Područje oko špilje Vrlovka	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				Kupa), especially target fish species (avoid spawning periods). Preserve natural riparian vegetation. For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
19	**Flood protection project of the town of Ogulin**	HR2000592 Ogulinsko-plaščansko područje	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 4016:** Minimize the construction works area in ecological network and avoid the permanent loss of target habitat types and favourable habitats for target species. Preserve the continuity of the flow and allow upstream and downstream migrations for present target species of aquatic fauna. Preserve as much as possible the natural morphology and structure of the streambed and streambank. Preserve the riparian vegetation and restore it in case of being damaged during construction works. Preserve the hydrological connection of the surface flow with the underground by keeping the permeability of the streambed. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out (SCI HR2000592 Ogulinsko-plaščansko područje).
20	**Flood protection project in the Kupa river basin – Karlovac and Sisak areas**	HR1000001 Pokupski bazen	-1	Mitigation measures on the strategic impact assessment level are not proposed for this project unit, since the procedures of EIA and Appropriate Assessment have already been carried out for the project unit, except for the sub-project No. 14 (**Izgradnja čvora Brodarci s popratnim nasipima na Kupi i Dobri u dvije etape izgradnje u cilju regulacije vodnog režima na području Karlovca**): Preserve the continuity of the flow on weirs and barriers for target fish species of SCI HR2000642 Kupa and SCI HR2001505 Korana nizvodno od Slunja, i.e., avoid the fragmentation of the aquatic habitats and allow downstream and upstream migrations of the fish (i.e., by constructing the functional fish passage).
		HR2001335 Jastrebarski lugovi	-1	
		HR2000642 Kupa	-1	
		HR2001505 Korana nizvodno od Slunja	-1	
		HR2000593 Mrežnica – Tounjčica	-1	
		HR1000003 Turopolje	-1	
		HR2000415 Odransko polje	-1	
		HR2001311 Sava nizvodno od Hrušćice	-1	
21	**Flood protection project in the Korana river basin**	HR2001505 Korana nizvodno od Slunja	-2?	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
		HR2000596 Slunjčica	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				Minimize the construction works area in ecological network and avoid the permanent loss of target habitat types and favourable habitats for target species. Preserve as much as possible natural riverbanks, natural structure and morphology of the riverbed and riparian vegetation. Construction works dynamics should be planned in accordance with the ecological requirements of target fish species of the ecological network site SCI HR2001505 Korana nizvodno od Slunja. **Sub-project No. 4303, 4309:** The new embankments alignments must be planned on the appropriate distance from the riverbanks the ensure wide inundation area, while keeping the natural flooding dynamics of the alluvial forest and wetland habitats. Minimize the scope of regulation and streambank stabilization and locate construction works on already anthropogenically modified stream sections, or where floods directly threaten settlements or important infrastructure. Apply bioengineering technical solutions wherever possible. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment. **Sub-project No. 4009 (reservoir Lučica on Korana River)**: The sub-project cannot be implemented within the Multiannual Programmeme in the extent as it has been planned. If this sub-project is necessary to ensure the flood protection within this project unit, alternative technical solution must be designed with the same effects regarding the achievement of the flood protection as the Programme objective, or the sub-project must be significantly changed to ensure the watercourse continuity, reduce the impact area upstream and downstream from the dam below significant, especially the physical and chemical conditions of the watercourse and hydrological regime, i.e., to reduce the impact on the target species and the integrity of the ecological network. **Sub-project No. 4309**: Design technical solution in such a way as to keep the existing hydrotechnical object (protective wall along the bank) in the current extent.
22	**Flood protection in the Kupčina basin**	HR1000001 Pokupski bazen	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Minimize the construction works area in ecological network and avoid the permanent loss of target habitat types and favourable habitats for target species. Plan all sub-projects within this project unit in such a way as to ensure the permeability of the streambed and the connection of the surface flow
		HR2001335 Jastrebarski lugovi	-1	
		HR2000450 Ribnjaci Draganići	-1	
		HR2000234 Draganićka šuma – Ješevica 1	-1	
		HR2000586 Žumberak – Samoborsko gorje	-1	

PROJECT (PROJECT UNIT)	NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
			with the underground; design the banks with a slight slope and with the use of natural materials so that smaller animals can get out of the streambed. Preserve riparian vegetation and natural streambanks, as well as natural morphology and structure of the streambed. Minimize the scope of regulation and stabilization of the streambanks in ecological network and locate construction works on already anthropogenically modified stream sections, or where floods directly threaten settlements or important infrastructure. Apply bioengineering technical solutions for bank stabilization wherever possible. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the individual sub-project is carried out: SCI HR2000586 Žumberak – Samoborsko gorje, SPA HR1000001 Pokupski bazen, SCI HR2000450 Ribnjaci Draganići, SCI HR2001335 Jastrebarski lugovi. **Sub-project No.4024** Plan detention basins instead of reservoirs on watercourses in the ecological network. Preserve the flow continuity of watercourses in SCI HR2000586 Žumberak – Samoborsko gorje. Design planned detention basins and accompanying facilities in such a way as to avoid the fragmentation of habitats for aquatic species, i.e., to allow for their upstream and downstream migrations. Design the dam on the detention basin and stream regulation work without the barrier which would prevent the upstream migration of aquatica fauna. Design fish passages on the dams of reservoirs. The extent (scope) of the detention basin and reservoirs should be planned in the extent of natural flooding area. Ensure a favourable year-round hydrological regime, as well as sediment and deadwood transport downstream of the detention basin or reservoir, and favourable physical and chemical conditions for aquatic species. Minimize the extent of construction works to avoid the permanent loss and changes of natural habitats, especially forest, grassland, riparian, and aquatic habitats. Preserve as much as possible natural streambank, natural structure and morphology of the streambed, and riparian vegetation, especially the vegetation of hydrophilous tall herb fringe communities along the streams in the scope of the sub-project. **Sub-project No.47**

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				Adjust technical design of the sub-project to ensure favourable hydrological regime and sufficient flow during construction works and afterwards for conservation of favourable habitats for target species and target habitat types of SCI HR2000450 Ribnjaci Draganići and SCI HR2000234 Draganička šuma – Ješevica 1.
23	**Protection from Una River floods**	HR1000004 Donja Posavina	-1	Mitigation measures are not proposed for Project No. 23 on strategic impact assessment level.
		HR2000463 Dolina Une	-1	
		HR2001370 Područje oko Hrvatske Kostajnice	-1	
24	**Flood protection project in the Middle Sava River basin**	HR1000004 Donja Posavina	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Reconstructions of the existing levees (dikes) should be planned and constructed using the same alignment as the existing levees, except where the change is necessary to ensure the flood protection. The new levees alignments must be planned in such a way as to ensure the protection of valuable target habitat types and habitats important for target species (alluvial forests, grasslands, aquatic, wetlands habitats) within the natural floodplain (inundation area) and to ensure the favourable hydrological regime and natural flooding dynamics. Ensure favourable hydrological regime downstream and in ecologically dependent surrounding area. Minimize the construction works to the least extent possible to avoid the permanent loss of alluvial forests, grasslands (hay meadows), aquatic (especially along natural riverbanks), and wetland habitats. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out. Bank stabilization with revetments along the banks of Sava River should be planned only exceptionally on the shortest possible sections, and only where there is no other technical solution to ensure flood protection. The scope (length, height) of revetments must be minimized. When designing revetments, apply alternative less aggressive or bioengineering technical solutions wherever possible, and landscape and other technical solutions to diversify habitats in the riverbed and on slopes along revetment. **Sub-project No. 80:** Ensure flow continuity for target fish species across the weir on Sunja River (Četvrtkovec). Design the technical solution of the
		HR1000003 Turopolje	-1	
		HR2001311 Sava nizvodno od Hrušćice	-1	
		HR2000416 Lonjsko polje	-1	
		HR2000420 Sunjsko polje	-1	
		HR2000415 Odransko polje	-1	
		HR2001506 Sava uzvodno od Zagreba	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				sub-project in such a way as to avoid the habitat fragmentation and to enable the upstream and downstream migrations of the fish species. **Sub-project No. 4046:** Design the pumping station Preloščica in such a way as to avoid the injury and mortality of the fish. **Sub-project No. 87:** By adequate technical design of revitalization sub-projects ensure minimal future hydrotechnical interventions within the scope of the revitalization (i.e., ensure long-term self-sustainability of the revitalized area), natural hydrological regime and natural flooding dynamics, as well as the enhancement of hydromorphological features of Sava River. **Sub-project No. 3010:** Design the technical solution for the reconstruction of the Jankomir spillway in such a way as to ensure the favourable hydrological conditions and regime for target species and target habitat types of the ecological network sites downstream from Zagreb (HR1000003 Turopolje, HR1000004 Donja Posavina, HR2000415 Odransko polje, HR2000416 Lonjsko polje, HR2000420 Sunjsko polje). **Sub-project No. 3011:** Ensure the watercourse continuity for target fish species of SCI HR2001311 Sava nizvodno od Hrušćice and SCI HR2001506 Sava uzvodno od Zagreba. Design the technical solution in such a way as to avoid the habitat fragmentation and to enable upstream and downstream migrations of the fish species. To mitigate the cumulative effects of bank stabilization interventions along the Sava River, develop the **Plan for revitalization of the riverbanks and riparian habitats along the Sava River**. The Plan must cover the hydrotechnical aspects (identification of technical solutions for restoring the natural processes of erosion and deposition, ensuring at the same time the flood protection of settlements and important infrastructure), and ecological aspects (respecting the conservation objectives of the ecological network), and define the monitoring programme.
25	**Flood protection project in the Krapina basin**	HR2000583 Medvednica	-1	**Sub-project No. 114, 116** Design planned detention basins and related facilities in such a way as to avoid the fragmentation of habitats for stone crayfish and Danube barbel, i.e., to allow for their upstream and downstream migrations. Design the dam of the detention basin without the barrier which would prevent the upstream migration of these species. The extent (scope) of the detention basin should be planned in the extent of natural flooding area. Ensure a favourable year-round hydrological regime, as well as sediment and deadwood transport downstream of the detention basin.

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				Minimize the extent of construction works to avoid the permanent loss and changes of natural habitats, especially forest and aquatic habitats. Preserve as much as possible natural streambank, natural structure and morphology of the streambed, and riparian vegetation, especially the vegetation of hydrophilous tall herb fringe communities along the streams in the scope of the sub-project. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site SCI HR2000583 Medvednica. For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
26	**Flood protection project in the Samobor basins**	HR2000586 Žumberak – Samoborsko gorje	-1	**Sub-project No. 111, 3004, 3005:** Design planned detention basins and accompanying facilities, and stream regulation in such a way as to avoid the fragmentation of habitats for stone crayfish and Danube barbel, i.e., to allow for their upstream and downstream migrations. Design the dam of the detention basin and stream regulation work without the barrier which would prevent the upstream migration of aquatic fauna. The extent (scope) of the detention basin should be planned in the extent of natural flooding area. Ensure a favourable year-round hydrological regime, as well as sediment and deadwood transport downstream of the detention basin. Minimize the extent of construction works to avoid the permanent loss and changes of natural habitats, especially forest, grassland, riparian, and aquatic habitats. Preserve as much as possible natural streambank, natural structure and morphology of the streambed, and riparian vegetation, especially the vegetation of hydrophilous tall herb fringe communities along the streams in the scope of the sub-project. Preserve woody vegetation in riparian zone and restore it if it has been damaged during the construction works. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site SCI HR2000586 Žumberak – Samoborsko gorje and SCI HR2001506 Sava uzvodno od Zagreba. For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
		HR2001506 Sava uzvodno od Zagreba	-1	
27	**Flood protection project in the Sjeverno**	HR2000583 Medvednica (?)	0	Mitigation measures are not proposed for Project No. 27 on strategic impact assessment level.

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
	Zagrebačko prisavlje basin			
28	**Flood protection project in the Zelina and Lonja basins**	HR2001415 Lonja	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 110** Plan the reservoir so that the continuity of the watercourse is not interrupted and upstream-downstream migrations, primarily fish, are allowed. Design fish passage if necessary. Provide a year-round favorable hydrological regime downstream from the reservoir, that is, ecologically acceptable flow.
29	**Flood protection project in Česma and Glogovnica basins**	HR1000009 Ribnjaci uz Česmu	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out to reduce the disturbance of target species in during critical periods of their life cycles. Minimize the construction works area in ecological network and avoid the permanent loss of forest, grassland, aquatic and wetland habitats. Ensure favourable hydrological conditions and regime downstream and upstream from the location of the intervention and in the surrounding ecologically dependent area. Downstream from the reservoirs a favourable year-round ecologically acceptable flow must be ensured, aa well as the favourable physical and chemical conditions in Česma River for the conservation of thick-shelled river mussel population and its host fish species. **Sub-projects for construction of reservoirs within SPA HR100008 Bilogora i Kalničko gorje and/or SCI HR2001281 Bilogora:** Plan detention basin instead of reservoir to avoid permanent loss of larger areas of favourable habitats for target species and significant areas of target habitat types within the ecological network. **Sub-project No. 57 (Česma River regulation)**: Preserve the continuity of the flow and allow for the present aquatica fauna the upstream and downstream migrations. preserve the natural flooding dynamics and favourable hydrological conditions for target species and target habitat types in the ecological network sites (SPA) HR1000009 Ribnjaci uz Česmu and (SCI) HR2000440 Ribnjaci Siščani i Blatinica. The new embankments alignments must be planned on the appropriate distance from the
		HR20011323 Česma – šume	-1	
		HR2000440 Ribnjaci Saščani i Blatnica	-1	
		HR2001243 Rijeka Česma	-1	
		HR2001208 Bilogora	-1	
		HR1000008 Bilogora i Kalničko gorje	-1	
		HR200120 Livade uz potok Injaticu	-2?	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				riverbanks the ensure wide inundation area, while keeping the natural flooding dynamics of the alluvial forest and wetland habitats. While carrying out the regulation of watercourses, preserve the natural morphology and structure of the riverbed and banks. Design the banks of the watercourse with slight (gentle) slopes and from natural materials. Preserve riparian vegetation and restore it after construction if it has been damaged. Preserve the hydrological connection between the surface flow and the underground by ensuring the permeability of the riverbed. Carry out the regulation and streambank stabilization only exceptionally, on shorter sections, and on already anthropogenically modified riverbanks, or where floods directly threaten settlements or important infrastructure. Apply bioengineering technical solutions wherever it is possible. **Sub-project No. 4057 (Kreševine reservoir)**: Because of potentially significant impact on SCI HR2001220 Livade uz potok Injaticu, the sub-project design must be significantly changed. The need for construction of reservoir must be reviewed. The priority must be given to the construction of detention basin instead of the reservoir to retain the water in the basin and to attenuate the stormwater runoff. The extent of the detention basin must be planned in such a way as to avoid the significant loss of target habitat type and favourable habitats for target butterfly species, i.e., to avoid the permanent changes of hydrological conditions for their conservation. If that is not possible even after the procedure prescribed by the law has been carried out, the sub-project should not be implemented.
30	**Flood protection project in the Ilova and Pakra basins**	HR2001216 Ilova	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out to reduce the disturbance of target species during the critical periods of their life cycles. Minimize the construction works area in ecological network to the least extent possible and avoid the permanent loss of forest, grassland, aquatic, and wetland habitats. Ensure the favourable hydrological conditions and hydrological regime upstream and downstream from the interventions, and in the surrounding ecologically dependent area. **Sub-project No. 37 (Miletinac detention basin)**: Downstream from the detention basin a favourable
		HR2001293 Livade kod Grubišnog polja	-1	
		HR1000010 Poilovlje s ribnjacima	-1	
		HR2001330 Pakra i Bijela	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				year-round ecologically acceptable flow must be ensured for target species of SCI HR2001216 Ilova. Preserve the hydrological conditions required for conservation of target habitat type of SCI HR2001293 Livade oko Grubišnog polja. The dam of the detention basin must be planned without the barrier to enable upstream migrations of fish species. **Sub-project No. 48 (Bijela River regulation):** Maintain the flow continuity and enable the fish species upstream and downstream migrations. Preserve the natural morphology and structure of the riverbed and banks. Design the riverbanks with the slight (gentle) slopes and of natural materials. Preserve the riparian vegetation and restore it if it has been damaged by construction. Maintain the hydrological connection of the surface flow and the underground by keeping the permeability of the riverbed. Carry out the bank stabilization only exceptionally, on short sections, and on anthropogenically modified banks, or to ensure flood protection of settlements and important infrastructure. Apply bioengineering technical solutions wherever possible.
31	**Flood protection project in the Šumetlica and Crnac basins**	NONE	0	Mitigation measures are not proposed for Project No. 31 on strategic impact assessment level.
32	**Protection from the Sava River floods on the section between Nova Gradiška and Račinovci**	HR2001311 Sava nizvodno od Hrušćice	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 68:** Minimize the construction works area in ecological network to the least extent possible and avoid the permanent loss of alluvial forests, grasslands (hay meadows), aquatic habitats in the riverbed, and riparian habitats (especially the habitat type 3270 Rivers with muddy banks with Chenopodion rubri pp and Bidention pp vegetation. Bank stabilization by construction of revetments should be planned only exceptionally on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure. The scope (length, height) of revetments must be minimized. Bank stabilization should be carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure, and where there is no other technical solution. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment.
		HR2001288 Pričac – Lužani	-1	
		HR2001289 Davor – livade	-1	
		HR2001379 Vlakanac – Radinje	-1	
		HR2001326 Jelas polje s ribnjacima	-1	
		HR2000426 Dvorina	-1	
		HR2000427 Gajna	-1	
		HR2001414 Spačvanski bazen	-1	
		HR2001415 Spačva JZ	-1	
		HR1000005 Jelas polje	-1	
		HR1000006 Spačvanski bazen	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				The areas used for the construction material supply must be determined outside the riverbed and the floodplain (inundation area). Ensure favourable hydrological conditions and regime downstream from the intervention and in the ecologically dependent area. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out, especially target fish species.
33	**Flood protection project in the Orljava basin**	HR1000040 Papuk (granično)	0	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Minimize the construction works area in ecological network and avoid the permanent loss of natural habitats. Preserve as much as possible natural riverbanks, natural structure and morphology of the riverbed, and riparian vegetation. Preserve the watercourse continuity and enable the upstream migrations of fish and aquatic invertebrates. Ensure the favourable hydrological conditions and regime downstream from the intervention and in the surrounding ecologically dependent area. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out, especially target fish species. Stream regulation within the project unit should be designed in such a way as to ensure the permeability of the streambed and its' connection to the underground, with slight slope of the banks and with the use of natural materials. Minimize the scope of regulation and stabilization of the streambank sections and locate construction works on already anthropogenically modified stream sections, or where floods directly threaten settlements or important infrastructure. Apply bioengineering technical solutions wherever possible. **Sub-project No. 16** Location of the dam and the extent of the sub-project must be planned outside of the ecological network, i.e., the technical solution must be significantly changed. If that is not possible even after the procedure prescribed by the law has been carried out, the planned sub-project cannot be implemented. Ensure the watercourse continuity for aquatic species, especially for target species of SCI HR2001329 Potoci oko Papuka (Danube barbel, stone crayfish), and fish species which are the hosts for thick-shelled river mussel.
		HR2000580 Papuk (granično)	0	
		HR2001385 Orljava	-1	
		HR2001286 Orljavac	-2?	
		HR2001329 Potoci oko Papuka	-2?	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				Downstream from the reservoir the favourable year-round ecologically acceptable flow must be ensured, as well as the favourable physical and chemical conditions for target species and fish species which are hosts for thick-shelled river mussel. Downstream from the reservoir the favourable hydrological regime must be ensured for hydrophilous and wetland habitats of target butterfly species of SCI HR2001286 Orljavac. **Sub-project No. 4321** Design planned detention basins and related facilities in such a way as to avoid the fragmentation of habitats for fish species, i.e., to allow for their upstream and downstream migrations. Design the dam of the detention basin without the barrier which would prevent the upstream migration of these species. The extent (scope) of the detention basin should be planned in the extent of natural flooding area. Ensure a favourable year-round hydrological regime, as well as sediment and deadwood transport downstream of the detention basin. **Sub-project No. 4320** Minimize the extent of construction works to avoid the permanent loss and changes of natural habitats, especially forest and aquatic habitats. Preserve as much as possible natural streambank, natural structure and morphology of the streambed, and riparian vegetation. If it is possible, regulation works should be planned without the barrier (weir), i.e., without the interruption of the flow continuity. Otherwise, design the appropriate technical solution to allow the upstream migrations of the fish. During construction and maintenance implement measures to prevent the introduction and spread of the invasive alien plant and animal species.
34	**Flood protection project in Brodska posavina**	HR2001328 Londža, Glogovica, Breznica	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 8:** Design planned detention basins and related facilities in such a way as to avoid the fragmentation of habitats for aquatic fauna. Design the dam of the detention basin without the barrier which would prevent the upstream migration of aquatic animals, especially fish species. Ensure a favourable year-round hydrological regime, as well as sediment and deadwood transport downstream of the detention basin. Minimize the extent of construction works to avoid the permanent loss and changes of natural habitats. Where present, preserve natural streambanks, riparian and aquatic vegetation, and

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				natural structure and morphology of the streambed. Construction works dynamics should be planned in accordance with the ecological requirements of target species especially of SCI HR2001328 Londža, Glogovica, Breznica, and fish species which are host species for thick-shelled river mussel.
35	**Flood protection project in the Bid and Bosut basins**	HR2001311 Sava nizvodno od Hrušćice	-1	For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 49:** Location of the dam and the extent of the reservoir basin should be planned outside of SCI HR2001328 Londža, Glogovica, Breznica. If it is possible, and thick-shelled river mussel is distributed along the river section which will be inundated, similar ecological conditions important for the species survival must be established in the surrounding area. If otter uses this area, the movement along the watercourse must be enabled for the species. ensure the flow continuity for aquatic species, especially for fish species which are hosts for thick-shelled river mussel. Downstream from the reservoir a favourable year-round ecologically acceptable flow must be ensured, as well as favourable physical and chemical conditions for thick-shelled river mussel and fish species which are host species for the mussel, as well as favourable hydrological regime for the habitats in the natural floodplain. Maintain the habitat continuity and enable the upstream and downstream migrations (especially for fish species that are hosts for thick-shelled river mussel). To avoid the potentially significant individual and cumulative impact, the technical solution must be significantly changed, or alternatives must be designed. If that is not possible even after the procedure prescribed by the law has been carried out, the planned sub-project cannot be implemented within the Multiannual Programmeme. For the **sub-project No. 61** ensure technical measures on sub-project level to prevent injury and mortality of target fish species of SCI HR2001311 Sava nizvodno od Hrušćice at the pumping station inflow. Construction works area should be minimized to the least extent possible to avoid the permanent loss of natural habitats, especially forest habitats.
		HR2001328 Londža, Glogovica, Breznica	-2?	
36	**Flood protection project of the Drava River from**	HR5000014 Gornji tok Drave	-1/+1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to
		HR1000014 Gornji tok Drave	-1/+1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
	the Slovenian border to Pitomača	HR2001307 Dravske akumulacije	-1	prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 279, 303, 1004, 1005, 1006, 264, 267:** Reconstructions of the existing levees (dikes) should be planned and constructed using the same alignment as the existing levees, except where the change is necessary to ensure the flood protection. The new levees alignments must be planned in such a way as to ensure the protection of valuable target habitat types and aquatic and wetland habitats important for target species within the natural floodplain (inundation area) and to ensure the favourable hydrological regime and natural flooding dynamics. Minimize the construction works area in ecological network to the least extent possible and avoid the permanent loss of alluvial forests, grasslands (hay meadows9, aquatic, and wetland habitats, especially: 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae), 6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*), 3270 Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation, 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation, 91F0 Riparian mixed forests of *Quercus robur, Ulmus laevis* and *Ulmus minor, Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (Ulmenion minoris), 3130 Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoeto-Nanojuncetea. **Sub-project No. 254, 1104:** By adequate technical design of revitalization sub-projects ensure minimal future hydrotechnical interventions within the scope of the revitalization (i.e., ensure long-term self-sustainability of the revitalized area), natural hydrological regime and natural flooding dynamics, as well as the enhancement of hydromorphological features of Drava River.
		HR1000013 Dravske akumulacije	-1	
37	**Flood protection project of the Drava River from Pitomača to the Danube estuary**	HR1000015 Srednji tok Drave	-1	For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Minimize the construction works area in ecological network to the least extent possible and avoid the permanent loss of alluvial forests, grasslands (hay meadows), aquatic, and wetland habitats. Reconstructions of the existing levees (dikes) should be planned and constructed using the same alignment as the existing levees, except where the change is necessary to ensure the flood protection. The new levees alignments must be planned in such a way as to ensure the protection of valuable target
		HR5000015 Srednji tok Drave	-1	
		HR1000016 Podunavlje i donje Podravlje	-2?	
		HR2001308 Donji tok Drave	-2?	

PROJECT (PROJECT UNIT)	NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
			habitat types and habitats important for target species (alluvial forests, hydrophilous grasslands, aquatic, wetland habitats) within the natural floodplain (inundation area) and to ensure the favourable hydrological regime and natural flooding dynamics. Bank stabilization and construction of revetments should be planned only exceptionally on the shortest sections possible and along already anthropogenically modified banks, where the bank stabilization is necessary to ensure flood protection of settlements and the important infrastructure. Apply bioengineering technical solutions wherever possible. The scope (length, height) of revetments must be minimized. Revetments are allowed to be constructed only where there is no other technical solution to ensure flood protection. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment. By adequate technical design of revitalization sub-projects ensure minimal future hydrotechnical interventions within the scope of the revitalization (i.e., ensure long-term self-sustainability of the revitalized area), natural hydrological regime and natural flooding dynamics, as well as the enhancement of hydromorphological features of Drava River. Ensure favourable hydrological regime downstream and in ecologically dependent surrounding area. **Sub-project No. 345 (regulation of the right riverbank of Drava River on location Nehaj):** The technical solution must be significantly changed in such a way as to avoid the bank stabilization on locations favourable for nesting of the common kingfisher and the sand martin. if that is not possible even after the procedure prescribed by the law has been carried out, the planned sub-project cannot be implemented. If the objective of the sub-project is revitalization and the enhancement of the hydromorphological features of the river, technical solution must be designed in accordance with the conservation objectives of SPA HR1000016 Podunavlje i donje Podravlje and SCI HR2001308 Donji tok Drave. **Sub-project No. 2109 (the construction of multipurpose hydrotechnical system Osijek):** Due to the significant adverse impact of this sub-project on the conservation objectives and the integrity of the ecological network, if the sub-project in necessary for the achievement of the Multiannual Programmeme's objective of flood protection within the project unit No. 37, then other technical solution(s) must be designed with acceptable impacts on ecological network, and which would satisfy the requirements for the benefits of the

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				multipurpose hydrotechnical system. if that is not possible, even after the procedure prescribed by the law has been carried out, the sub-project cannot be implemented.
38	**Flood protection project of the Mura River**	POVS HR2000364 Mura	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 252, 1101, 1107:** Reconstructions of the existing levees (dikes) should be planned and constructed using the same alignment as the existing levees, except where the change is necessary to ensure the flood protection. If the change of the levee alignment is necessary, it must be planned in such a way as to ensure the protection of valuable target habitat types and habitats important for target species (alluvial forests, hydrophilous grasslands, aquatic, and wetland habitats) within the natural floodplain (inundation area) and to ensure the favourable hydrological regime and natural flooding dynamics. Minimize the construction works in ecological network to the least extent possible and avoid the permanent loss of alluvial forests, grasslands (hay meadows), aquatic, and wetland habitats.
		POVS HR5000014 Gornji tok Drave	-1	
		POP HR1000014 Gornji tok Drave	-1	
39	**Flood protection project in the Bednja basin**	HR2001408 Livade uz Bednju I	-2?	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 287:** Review the need for construction of reservoir. If it is not necessary for flood protection, the sub-project should not be implemented. Design other technical solutions to achieve the objective of protection from adverse effects of water (the construction of detention basin, change in the location of the reservoir (outside of ecological network), or the significant reduction in the extent of the reservoir. If this is not possible even after the procedure prescribed by law has been carried out, the planned project cannot be implemented. **Sub-project No. 289:** Minimize the construction works in ecological network to the least extent possible and avoid the permanent loss of alluvial forests, grasslands (hay meadows), and aquatic habitats. Technical aspects of the detention basin and the accompanying facilities on the Očura stream must be planned in such a way as to avoid the permanent loss of favourable forest, grassland, aquatic, and wetland habitats for target species of SCI HR2001115 Strahinjčica. The location and the extent (scope) of the detention basin should be planned in the extent of natural flooding area. Ensure a favourable year-
		HR1000008 Bilogora i Kalničko gorje	-1	
		HR1000014 Gornji tok Drave	-1	
		HR5000015 Gornji tok Drave	-1	
		HR2001410 Livade uz Bednju III	-1	
		HR200115 Strahinjčica (?)	0	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				round hydrological regime downstream of the detention basin Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out.
40	**Flood protection project in the Trnava basin**	POVS HR2001304 Mačkovec – ribnjak	0	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 283:** Plan the sub-project extent and the construction work area in such a way as to avoid the damage or permanent loss of amphibian hydrophytic habitats of the type 3130 Oligotrophic to mesotrophic standing waters with vegetation of the Isoeto-Nanojuncetea. Stream regulation works should not change the hydrological condition on the fishpond Mačkovec. **Sub-project No. 1103:** Minimize the construction works area in ecological network and avoid the permanent loss of alluvial forest habitats, grasslands (hay meadows), aquatic, and wetland habitats. **The new levees alignments** must be planned in such a way as to ensure the protection of valuable target habitat types and habitats important for target species (alluvial forests, wet grasslands, aquatic, and wetland habitats) within the natural floodplain (inundation area) and to ensure the favourable hydrological regime and natural flooding dynamics.
		POVS HR2001307 Dravske akumulacije	-1	
		POP HR1000013 Dravske akumulacije	-1	
41	**Flood protection project in the Bistra basin**	HR1000008 Bilogora i Kalničko gorje	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-projects No. 253, 268, 269, 273, 274, 304, 1105:** Minimize the construction works area in ecological network and avoid the permanent loss of favourable habitats for target bird species, especially forest, grassland, aquatic and wetland habitats. Preserve hydrological conditions that support aquatic and wetland habitats within the ecological network in the extent of the planned detention basins, and in the extent of stream regulation. Preserve as much as possible natural banks, natural structure and morphology of the riverbed, and riparian vegetation. Riparian vegetation and damaged natural habitats should be restored by planting native (autochthonous) tree species adapted to riparian habitats. The location and the extent (scope) of the detention basin should be planned in the extent of

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				natural flooding area. Ensure a favourable year-round hydrological regime downstream of the detention basin Construction works dynamics should be planned in accordance with the ecological requirements of target bird species of the ecological network site POP HR1000008 Bilogora i Kalničko gorje to avoid their disturbance in during nesting periods.
42	**Flood protection project in the Županijski kanal basin**	HR1000014 Gornji tok Drave	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Plan the dynamics and manner of performing construction works in accordance with the life cycles and ecological requirements of the target species to reduce disturbance of the target species (birds, fish, and amphibians) during significant periods of their life cycle. Minimize the construction works area in ecological network to the least extent possible and avoid the permanent loss of alluvial forest habitats, grasslands (hay meadows), aquatic, and wetland habitats. Maintain the hydrological connectivity of the surface flow and the underground by ensuring the permeability of the steambed. Preserve the flow continuity and enable the upsteam and downstream migrations of target species if present in the watercourse in the scope of the project. Within the stream regulation sub-projects preserve as much as possible the natural morphology and structure of the riverbed and banks. Design the riverbanks with slight (gentle) slopes and of natural materials. Preserve riparian vegetation and restore it if it has been damaged during construction works. Streambed stabilization should be carried out exclusively, on short sections on already anthropogenically modified banks, and where floods directly threaten to human settlements and important structure. Use bioengineering technical solutions wherever possible. preserve favourable hydrological regime downstream and upstream from the intervention and in ecologically dependent area. To retain water in the basin and to attenuate the stormwater runoff, give priority to the construction of detention basins instead of reservoir, i.e., reservoirs. (sub-projects No. 2022, 2026, 2027)
		HR5000014 Gornji tok Drave	-1	
		HR1000008 Bilogora i Kalničko gorje	-1	
		HR2001281 Bilogora	-1	
		HR1000015 Srednji tok Drave	-1	
		HR5000015 Srednji tok Drave	-1	
		HR2001006 Županijski kanal (Gornje Bazje – Zidina)	-1	
43	**Flood protection project in the Karašica and Vučica basins**	HR1000011 Ribnjaci Grudnjak i Našice	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Construction works dynamics should be planned in accordance with the ecological requirements of
		HR2001085 Ribnjak Grudnjak s okolnim šumskim kopleksom	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
		HR1000016 Podunavlje i donje Podravlje	-1	target species of the ecological network site where the construction works are planned. Minimize the construction works to the least extent possible to avoid the permanent loss of alluvial forests, grasslands (hay meadows), wetland, and aquatic habitats in the ecological network. **Sub-project No. 316:** Reconstructions of the existing levees (dikes) should be planned and constructed using the same alignment as the existing levees, except where the change is necessary to ensure the flood protection. The new levees alignments must be planned in such a way as to ensure the protection of valuable target habitat types and aquatic and wetland habitats important for target species (alluvial forests, hydrophilous grasslands, aquatic, and wetland habitats) within the natural floodplain (inundation area) and to ensure the favourable hydrological regime and natural flooding dynamics. Preserve the target habitat type and favorable hydrological conditions of SCI HR2000376 Petrijevci. To retain water in the basin and to attenuate the stormwater runoff, give priority to the construction of detention basins instead of reservoir, i.e., reservoirs. Sub-project should be designed without barriers if possible; if not, technical solution for enabling the upstream migrations of aquatic animals must be planned. Preserve as much as possible natural riverbanks and riparian vegetation. **Sub-project No. 2020:** Plan detention basin instead of reservoir. Ensure the flow continuity for aquatic species, especially for target species of the SCI HR2001329 Potoci oko Papuka (Danube barbel, stone crayfish), fish species that are host species for larva of thick-shelled river mussel. Ensure a favourable year-round hydrological regime downstream of the detention basin or reservoir, physical and chemical water conditions for the abovementioned species of SCI HR2001329 Potoci oko Papuka, as well as the sediment and deadwood transport.
		HR2001308 Donji tok Drave	-1	
		HR2000573 Petrijevci	-1	
		HR2001329 Potoci oko Papuka	-1	
44	**Flood protection project in the Vuka basin**	HR2000372 Dunav-Vukovar	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Minimize the construction works area in ecological network and avoid the permanent loss of favourable habitats for target bird species, especially forest, grassland, wetland, and aquatic habitats. **Potprojekti br. 360:** Construction works dynamics should be planned in accordance with the ecological requirements of target fish species of SCI HR2000372 Dunav – Vukovar. Design technical solution in such a way as to allow upstream and downstream migrations of fish species along the
		HR2001354 Područje oko jezera Borovik	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				regulated section of Vuka River. While carrying out the regulation and constructing the detention basins, preserve as much as possible natural riverbanks, natural structure and morphology of the riverbed, and riparian vegetation. Riparian vegetation and damaged natural habitats should be restored by planting native (autochthonous) tree species.
45	**Flood protection project of the Danube River**	HR1000016 Podunavlje i donje Podravlje	-2?	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Minimize the construction works to the least extent necessary and avoid the loss and degradation of natural habitats, especially forest, grassland, wetland, and aquatic habitats. **Reconstructions of the existing levees (dikes)** should be planned and constructed using the same alignment as the existing levees, except where the change is necessary to ensure the flood protection. **The new levees alignments** must be planned in such a way as to ensure the protection of valuable target habitat types and aquatic and wetland habitats important for target species within the natural floodplain (inundation area) and to ensure the favourable hydrological regime and natural flooding dynamics. **Bank stabilization and construction of revetments** should be planned only exceptionally on the shortest possible sections and along already anthropogenically modified banks, where the bank stabilization is necessary to ensure flood protection of settlements and the infrastructure. The scope (length, height) of revetments must be minimized. Revetments are allowed to be constructed only where there is no other technical solution to ensure flood protection. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment. By adequate technical design of revitalization sub-projects ensure minimal future hydrotechnical interventions within the scope of the revitalization (i.e., ensure long-term self-sustainability of the revitalized area), natural hydrological regime and natural flooding dynamics, as well as the enhancement of hydromorphological features of Danube River. Ensure favourable hydrological regime downstream and in ecologically dependent surrounding area. **Sub-project No. 331:** Technical solution must be significantly changed to avoid the significant adverse individual and cumulative impact. The sub-project that covers the section D (rkm 1330+785 do rkm 1328+355) of the Danube River must be
		HR2001309 Dunav S od Kopačkog rita	-1	
		HR2000372 Dunav-Vukovar	-2?	
		HR2000394 Kopački rit	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				excluded from the implementation of the Multiannual Programmeme in the extent how is now planned. Other technical solution(s) must be designed to achieve the objective of flood protection along this section of Danube River and within this project unit. If that is not possible, even after the procedure prescribed by the law has been carried out, then the planned sub-project cannot be implemented. **Sub-project No. 2043:** Technical solution must be significantly changed to avoid the significant adverse impact on the common kingfisher and the sand martin. The sub-project must be excluded from the implementation of the Multiannual Programmeme in the extent how is now planned. Other technical solution(s) must be designed to achieve the objective of flood protection along this section of Danube River and within this project unit. If that is not possible, even after the procedure prescribed by the law has been carried out, then the planned sub-project cannot be implemented.
46	**Flood protection project in the Baranja area**	HR1000016 Podunavlje i donje Podravlje	-1/+1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Reconstructions of the hydrotechnical objects should be planned in the extent of the existing unless the change is necessary for protection against the adverse effects of water. Minimize the construction works to the least extent necessary and avoid the loss and degradation of natural habitats, especially forest, grassland (hay meadows), wetland, and aquatic habitats. Construction works dynamics should be planned in accordance with the ecological requirements of target species. **Sub-project No. 340, 361, 357:** Preserve target habitat types (6240* Sub-Pannonic steppic grasslands (Festucion valesiacae) and 6250* Pannonic loess steppic grasslands) within SCI HR2001309 Dunav S od Kopačkog rita. **Sub-project No. 361**: Preserve the favourable hydrological conditions and hydrological regime downstream from the sub-project's scope, and in ecologically dependent area. Preserve the flow continuity (allow the upstream migration of aquatic animals, especially fish species). **Sub-project No. 327:** Plan the appropriate technical design for the pumping station Bakanka to prevent fish injury and mortality. **Sub-project No. 357:** Plan the revitalization sub-project in accordance with the conservation objectives of SPA HR1000016 Podunavlje i donje Podravlje and SCI HR2001309 Dunav S od Kopačkog rita. By adequate technical design of revitalization sub-projects ensure minimal future hydrotechnical
		HR2001309 Dunav S od Kopačkog rita	-1	
		HR2001308 Donji tok Drave	-1	
		HR2000394 Kopački rit	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				interventions within the scope of the revitalization (i.e., ensure long-term self-sustainability of the revitalized area), natural hydrological regime and natural flooding dynamics, as well as the enhancement of hydromorphological features of Danube River.
47	**Flood protection project in the Rječina basin**	NONE	0	Mitigation measures are not proposed for Project No. 47 on strategic impact assessment level.
48	**Flood protection project in the Sutla basin**	POVS HR2001070 Sutla	-1	**Sub-project No. 115:** Preserve natural morphology and structure of the riverbed and riverbanks. Revetments and bank stabilization must be minimized to the least extent possible. Bank stabilization should be carried out exclusively along the already anthropogenically modified banks, and where flooding directly threatens to human settlements and important infrastructure. Use natural materials keeping the permeability of the riverbed and banks. Use bioengineering technical solutions wherever possible, on part of the regulated section or along the whole regulated section. Apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes. Preserve the flow continuity and allow upstream and downstream migrations of aquatic fauna. Minimize the construction works to the least extent necessary and avoid the loss and degradation of natural habitats, especially riparian and aquatic habitats (natural riverbanks and natural riverbed). Riparian vegetation should be preserved and restored with native (autochthonous) species if it has been damaged or removed during construction works. Preserve as much as possible of aquatic vegetation if where present. For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site SCI HR2001070 Sutla (avoid spawning period of target fish species and host species for thick-shelled river mussel *Unio* crassus).
49	**Flood protection project in the Plitvica basin**	POVS HR2001307 Dravske akumulacije	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 260, 263** Reconstruction of the levees should be planned and carried out along the alignment of the existing levees unless their change is necessary for protection against the adverse effects of water. If
		POP HR1000013 Dravske akumulacije	-1	
		POVS HR5000014 Gornji tok Drave	-1	
		POP HR1000014 Gornji tok Drave	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				the change of the alignment is necessary, the new alignments of the levees must be planned in such a way that valuable target habitat types and habitats important for the conservation of target species (flooded and alluvial forests, wet grasslands, aquatic, and wetland habitats) are kept within the inundation area bounded by the levee and that a favorable water regime and natural flood dynamics are preserved. Minimize the construction works to the least extent necessary and avoid the loss and degradation of natural habitats, especially forest, grassland (hay meadows), wetland, and aquatic habitats.
50	**Flood protection project in the Glina basin**	NEMA	0	Mitigation measures are not proposed for Project No. 50 on strategic impact assessment level.
51	**Flood protection project in the Petrinjčica basin**	HR2000459 Petrinjčica	-1	**Sub-project No. 4050** Minimize the construction works to the least extent necessary and avoid the loss and degradation of natural habitats, especially forest and aquatic habitats. Technical design of the detention basin Petrinjčica and accompanying facilities must be planned in such a way as to avoid the habitat fragmentation for target fish species, i.e., allow upstream and downstream migrations of aquatic species, and minimize the permanent loss of favourable habitats for target species of SCI HR2000459 Petrinjčica and SCI HR2001356 Zrinska gora. The location of the dam and accompanying facilities should be planned in such a way as to avoid the permanent loss of priority habitat type 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*). The extent of the detention basin must be planned in the extent of the natural flooding. Ensure a favourable year-round hydrological regime, as well as sediment and deadwood transport downstream of the detention basin. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out. For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
		HR2001356 Zrinska gora	-1	
52	**Flood protection project in the Danube basins downstream of Vukovar**	HR2000372 Dunav – Vukovar	-1	**All sub-projects within the project (project unit):** For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Sub-project No. 325** During the works on reconstruction of drainage channel of the Opatovac reservoir, there must be no damage or permanent
		HR2001501 Stepska staništa kod Opatovca	0	
		HR2001088 Mala Dubrava – Vučedol	0	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				loss of the target habitat type 6240 Sub-Pannonic steppic grasslands (Festucion valesiacae). If it is necessary, consult with the expert (biologist – botanist) before the start of construction works. Within SCI HR2001501 Stepska staništa kod Opatovca construction works must be minimized exclusively to the channel and necessary construction zone. Carry out the works during low flow periods.
53	**Flood protection project in the Kutinica basin**	NONE	0	Mitigation measures are not proposed for Project No. 53 on strategic impact assessment level.
54	**Flood protection project in the Lower Dobra basin**	NONE	0	Mitigation measures are not proposed for Project No. 54 on strategic impact assessment level.
55	**Flood protection project in the Pazinčica basin**	HR2001017 Lipa (?)	0	**Sub-project No. 146** The extent (scope) od the dam, related facilities and regulation works in the streambed and on the banks must be planned outside of the ecological network site HR2001017 Lipa. The location and the extent (scope) of the detention basin should be planned in the extent of natural flooding area. Ensure a favourable year-round hydrological regime downstream of the detention basin. Minimize the extent of construction works and avoid the permanent loss and changes of natural habitats, especially forest, grassland, and aquatic habitats, as much as it is possible. For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
56	**Flood protection project in the Boljunčica basin**	HR2001215 Boljunsko polje	-1	**Sub-project No. 367, 368** Minimize the construction works area in ecological network and avoid the permanent loss of target habitat types and favourable habitats for target species (streambed, banks, with natural morphology and structure, ponds and other stagnant water bodies, and forests, forest edges, riparian, and the habitats in the floodplain. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out, especially target fish, amphibian and bird species (avoid nesting and spawning periods). For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. While designing the sub-project of stream regulation of Boljunčica (sub-project no. 367), preserve the flow continuity and allow upstream and downstream migrations of target species, preserve natural morphology, and structure of
		HR1000018 Učka i Ćićarija	-1	

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				streambed and the banks, hydrological connectivity of the surface flow with the underground (ensure permeability of the streambed)), and preserve the riparian vegetation (restore it if it has been damaged). During the development of the Letaj reservoir reconstruction, keep the existing extent of the reservoir, and if possible, by adequate technical solution enable the upstream and downstream migration of aquatic fauna.
57	**Flood protection project in the Lokvarka basin**	HR5000019 Gorski kotar i sjeverna Lika	-2?	For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. **Reduce the scope of the Križ reservoir** and maintain the continuity of the watercourse with technical solutions if, based on biological research, a potentially significant loss of target habitat types, favourable habitats for target animal species and habitat fragmentation for animal species (especially stone crayfish) is determined. Plan the reservoir in such a way that the continuity of the water flow is not interrupted, and the longitudinal migration of aquatic animals is allowed. Ensure a year-round favourable hydrological regime downstream of the reservoir, i.e., ecologically acceptable flow. Adjust the dynamics and method of carrying out the construction works to reduce the disturbance of target species, especially birds, amphibians, and bats. If the impact cannot be mitigated to an acceptable level with the above measures, review the need to build a reservoir to protect against the adverse effects of water and develop a variant or alternative solution (e.g., the possibility of designing a detention basin instead of a reservoir) that would achieve the flood protection objective.
		HR2001353 Lokve-Sunger-Fužine	-1	
		HR1000019 Gorski kotar i sjeverna Lika	-1	
58	**Flood protection project in the Mrežnica basin**	HR2000593 Mrežnica-Tounjčica	-1	**Sub-project No. 4306:** Bank stabilization by construction of revetments should be planned only exceptionally on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure. The scope (length, height) of revetments must be minimized and alternative solutions (instead of revetments) should be planned wherever possible. Use bioengineering solutions and natural materials, keeping the permeability of the riverbed and riverbanks, and preserve the favourable hydrological conditions for natural habitats in the floodplain. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment. Minimize the extent of construction works and avoid as much as it is possible the permanent loss and changes of natural habitats, especially aquatic

PROJECT (PROJECT UNIT)		NATURA 2000 SITE	IMPACT ASSESSMENT with mitigation measures implemented	MITIGATION MEASURES
				and riparian habitats. Preserve natural riparian vegetation and restore it with native species if it has been damaged or removed by construction works. Preserve the hydrophytic vegetation of target habitat type 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation. Construction works dynamics should be planned in accordance with the ecological requirements of target species of the ecological network site where the sub-project is carried out. For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.

3.1.2 Mitigation measures for planned land reclamation facilities

Drava and Danube basins

Mitigation measures for identified impacts – sector A

- Plan the technical aspects of hydrotechnical objects for water withdrawal and irrigation systems in the ecological network in such a way to avoid direct impacts of construction on target habitat types and habitats important for maintaining populations of target species.
- Preserve valuable natural habitats near agricultural areas.
- Implement measures during construction and maintenance for all proposed projects to prevent the introduction and spread of invasive alien plant and animal species.
- Plan the scope of projects to cumulatively provide a favorable water regime, i.e., ecologically acceptable flow, in the basin and downstream on the Drava River and in the old watercourse of the Drava River.
- Conduct water withdrawals in a manner that does not disrupt ecologically acceptable flow downstream of the withdrawal. All irrigation projects proposing to withdraw water from the same natural surface source (watercourses, lakes) should be developed (or planned) together so that there is no cumulative impact on ecologically acceptable flow of watercourses downstream or water levels in reservoirs on the Drava River. If developed sequentially, each new project must consider the previously implemented irrigation systems and their incorporation when calculating water availability.
- Review the availability of surface water for irrigation in accordance with the most recent hydrological data, conduct appropriate hydrological research and analysis and, if necessary, develop a study of the use of surface water from rivers for irrigation.
- By application of technical measures prevent the negative impact on fish and amphibians on the site of surface water withdrawal, i.e., reservoirs (Drava River, HPP Dubrava reservoir, Varaždinsko lake, Ormoško lake).
- Maintain the favorable hydrological regime and habitat conditions of aquatic, wetland, forest, and grassland habitats in the ecological network within the area of impact of planned irrigation systems.

Mitigation measures for identified impacts – sector B

- Plan the technical aspects of hydrotechnical objects for water withdrawal and irrigation systems in the ecological network in such a way to avoid direct impacts of construction on target habitat types and habitats important for maintaining populations of target species.
- Preserve valuable natural habitats near agricultural areas.
- Implement measures during construction and maintenance for all proposed projects to prevent the introduction and spread of invasive alien plant and animal species.
- By application of technical measures prevent the negative impact on fish and amphibians on the site of surface water withdrawal.
- Plan the scope of projects to cumulatively provide a favorable water regime, i.e., ecologically acceptable flow, in the basin and downstream along watercourses and floodplains of Drava, Karašica and Danube rivers. All irrigation projects proposing to withdraw water from the same natural surface source (watercourses, lakes) should be developed (or planned) together so that there is no cumulative impact on ecologically acceptable flow of downstream watercourses or water levels in reservoirs. If developed sequentially, each new project must consider the previously implemented irrigation systems and their incorporation when calculating water availability.
- Review the availability of surface water for irrigation in accordance with the most recent hydrological data, conduct appropriate hydrological research and analysis and, if necessary, develop a study of the use of surface water from Danube River for irrigation, and revise the study already available for Drava River.

Sava basins

Mitigation measures for identified impacts – sector C

- Plan the technical aspects of hydrotechnical objects for water withdrawal and irrigation systems in the ecological network in such a way to avoid direct impacts of construction on target habitat types and habitats important for maintaining populations of target species.
- Preserve valuable natural habitats near agricultural areas.
- Implement measures during construction and maintenance for all proposed projects to prevent the introduction and spread of invasive alien plant and animal species.
- By application of technical measures prevent the negative impact on fish and amphibians on the site of surface water withdrawal (Sava and Kupa rivers).
- Maintain the favorable hydrological regime and habitat conditions of aquatic, wetland, forest, and grassland habitats in the ecological network within the area of impact of planned irrigation systems.
- Plan the scope of projects to cumulatively provide a favorable water regime, i.e., ecologically acceptable flow, in the basin and downstream along watercourses and floodplains of Sava, and Kupa rivers, especially during dry season that coincide with the period of increased irrigation demand. All irrigation projects proposing to withdraw water from the same natural surface water body should be developed (or planned) together so that there is no cumulative impact on ecologically acceptable flow of downstream watercourses. If developed sequentially, each new project must consider the previously implemented irrigation systems and their incorporation when calculating water availability. For this purpose, it is proposed to conduct a study of the impact of water withdrawal of planned irrigation systems on the hydrological regime of Sava and Kupa rivers.

Mitigation measures for identified impacts – sector D

- Plan the technical aspects of hydrotechnical objects for water withdrawal and irrigation systems in the ecological network in such a way to avoid direct impacts of construction on target habitat types and habitats important for maintaining populations of target species.
- Preserve valuable natural habitats near agricultural areas.
- Implement measures during construction and maintenance for all proposed projects to prevent the introduction and spread of invasive alien plant and animal species.
- By application of technical measures prevent the negative impact on fish and amphibians on the site of surface water withdrawal (especially target species of SCI HR2001311 Sava nizvodno od Hrušćice).
- Downstream of the Londža reservoir (Project No 80, irrigation system Orljava-Londža), provide sufficient flow to ensure favorable hydrological conditions in the watercourse and in the floodplain for the target species thick shelled river mussel *Unio crassus* (SCI HR1001385 Orljava) and the target habitat type 6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) (SCI HR2001292 Livade kod Čaglina).
- Plan the scope of projects to cumulatively provide a favorable water regime, i.e., ecologically acceptable flow, in the project area and downstream along the Sava River and other watercourses within ecological network (Spačva basin), especially during dry periods that coincide with the period of increased irrigation demand. If irrigation projects are developed sequentially, each new project must consider the previously implemented irrigation systems and their incorporation when calculating water availability.
- Review the availability of surface water for irrigation in accordance with the most recent hydrological data. If necessary, conduct appropriate hydrological research and analysis. Develop a hydrological study of the availability of surface water from Sava River for all the existing and planned irrigation systems.

Northern Adriatic Basins

Mitigation measures for identified impacts - sector E

- Plan the technical aspects of hydrotechnical objects for water withdrawal and irrigation systems in the ecological network in such a way to avoid direct impacts of construction on target habitat types and habitats important for maintaining populations of target species.
- Preserve valuable natural habitats near agricultural areas.
- Implement measures during construction and maintenance for all proposed projects to prevent the introduction and spread of invasive alien plant and animal species.
- Especially within SPA HR1000033 Kvarnerski otoci and SCI HR2001357 Otok Krk, prevent the conversion and permanent occupation of natural grasslands (meadows, pastures), low bushes and maquis, forest edges and forest clearings as valuable habitats for target species of reptiles and birds.
- If micro-reservoirs are planned on natural watercourses, develop a technical solution for reservoir in such a way that favorable habitats for target species in the natural watercourses are preserved and that natural stream channels, water flow continuity and favorable hydrological conditions downstream are maintained (SCI HR5000019 Gorski Kotar i Sjeverna Lika).
- By application of technical measures prevent the negative impact on fish and amphibians on the site of surface water withdrawal (Raša, Mirna,and Boljunčica rivers, Letaj reservoir).
- Plan the scope of the project so that in the project impact area, in the watercourses (Mirna, Raša, Boljunčica, Ličanka and other local watercourses) and downstream from water withdrawal a favorable water regime, i.e., ecologically acceptable flow, is ensured, especially during dry periods that coincide with the period of increased irrigation demand.
- All irrigation projects planned for using water from the same surface water body (streams, lakes) should be developed (i.e., planned) together to avoid cumulative effects to ecologically acceptable flow of watercourses or water levels in lakes (reservoirs). If developed sequentially, each new project must consider previously implemented irrigation systems and their incorporation when calculating water availability.
- Review water use availability according to the most recent hydrological data. If necessary, conduct appropriate hydrologic and biological research and analysis.
- Scope of project No. 36 should be planned outside of the Natura 2000 ecological network site SCI HR2001486 Istra – Čepićko polje.
- When planning irrigation system projects No. 33, No. 38 and No. 44 ensure year-round ecologically acceptable flows downstream from Gradola water source.

Southern Adriatic basins

Mitigation measures for identified impacts - sector F

- Plan the technical aspects of hydrotechnical objects for water withdrawal and irrigation systems in the ecological network in such a way to avoid direct impacts of construction on target habitat types and habitats important for maintaining populations of target species.
- Preserve valuable natural habitats near agricultural areas.
- Implement measures during construction and maintenance for all proposed projects to prevent the introduction and spread of invasive alien plant and animal species.
- Especially within SPA HR1000024 Ravni kotari and SCI HR2001361 Ravni kotari prevent the conversion and permanent occupation of natural grasslands (meadows, pastures), and mosaic habitats with a high proportion of natural vegetation.
- By application of technical measures prevent the negative impact on fish and amphibians on the site of surface water withdrawal.
- Plan the scope of the projects in such a way as to ensure the favorable hydrological regime (i.e., ecologically acceptable flow) in the watercourse downstream of the water withdrawal and in the surrounding ecologically dependent area.
- All irrigation projects planned for using water from the same surface water body (streams, lakes) should be developed (i.e., planned) together to avoid cumulative effects to ecologically acceptable flow of watercourses or water levels in lakes (reservoirs). If developed sequentially, each new project must consider previously implemented irrigation systems and their incorporation when calculating water availability. Review water use availability according to the most recent hydrological data. If necessary, conduct appropriate hydrologic and biological research and analysis.

- Plan the scope of Project No. 114 (irrigation system for Imotsko-bekijsko polje) and the use of water in a way that does not change the underground hydrological regime in the catchment area of the Vrljika River, as well as the hydrological regime of surface water bodies (Suvaja, Prološko blato, Vrljika), especially in dry periods. Preserve natural aquatic habitats along the banks and in the bed of the Vrljika River. Avoid the direct impact of construction works on the side channel along Vrljika.
- Plan the scope of Project No. 124 (irrigation system for Petrovo polje) and water use in a manner that does not alter the underground hydrological regime of the Čikola River basin, as well as the hydrological regime of surface waters, especially during dry periods. Preserve natural aquatic habitats on the banks and in the riverbed of the Čikola River, as well as the upstream and downstream longitudinal connection of the river. For project No. 124 another technical solution must be planned that will ensure the necessary conditions for the preservation of the populations of the target fish species SCI HR2000919 Čikola. If this is not possible even after the procedure prescribed by law has been carried out, the planned project cannot be implemented.
- Due to the potentially significant impact on the target species of sites SPA HR1000024 Ravni kotari and SCI HR2001366 Bokanjačko blato, to reduce the impact of habitat loss, planned Project No. 167 (irrigation systems Bokanjac and Rašinovac) must be significantly modified, i.e., another technical solution must be designed so that it does not have a significant impact on the target species of the mentioned areas of the ecological network. If this is not possible even after the procedure prescribed by law has been carried out, the planned project cannot be implemented.
- Plan the scope of project No. 110 (irrigation system Sinjsko polje, Trnovača) and water use in a way that does not change the underground hydrological regime of the Cetina River basin, as well as the hydrological regime of surface water bodies (Cetina River), especially in dry periods. Preserve natural aquatic habitats on the banks and in the riverbed of the Cetina, as well as as wet grassland habitats in the Hrvatačko polje.
- Maintain the suitable underground hydrological conditions with the aim of preserving habitat type 8330 Submerged or partially submerged sea caves, associated with the SCI HR3000376 Stračinčica (Project No. 13, irrigation system Vela Luka).

4 Proposals of measures / guidelines for mitigating the impact on the environment

4.1 Measures for implementation through the Multiannual Programme

Construction of regulation and protection water facilities

PROJECT / COMPONENT	MEASURE
WMD for the South Adriatic Basins	
1 Flash flood protection project of in the area of Dubrovačko primorje, the Pelješac peninsula and the islands of Korčula, Mljet and Lastovo	
Soil and agriculture	• When planning and designing the projects, ensure that impact of construction on erosion is reduced to minimum.
Forests and forestry	• Coordinate and monitor the dynamics of work execution and tree felling. Operations should be carried out in such a way as to prevent the landslides and tree felling. • Protect the trees outside the working zone. • When planning, use the existing and planned forest road infrastructure. • Follow the forest fire protection measures.
Water	• During the preparatory work, the remains of mowed grass, wicker, shrubs and trees should be removed, but leave the stumps so that as little organic matter as possible remains in the area provided for sinking, and the possibility of erosion is reduced. All works must be carried out in such a way that the ecological and chemical state does not deteriorate, that is, with a minimal risk of any pollution. • The protection of waters and water bodies is planned and carried out throughout the scope, and stricter criteria in the area of sanitary protection zones (including potential ones) in accordance with the ordinance establishing the zones of sanitary protection of the spring and decisions on the zones of sanitary protection of the spring. • When planning the intervention in the area, include the impacts of climate change when assessing the risk of adverse effects of water (floods). • To the greatest extent possible preserve the functionality of the existing protection system against adverse effects of water and the existing hydrological regime. Ensure environmentally friendly flow downstream from the reservoir. • In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned in such a way as to meet the needs of the already built facilities upstream and downstream, so as not to jeopardise the existing hydrotechnical system on the watercourse.
Landscape	• Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials, especially within protected areas (*PP Lastovsko otočje* and *Significant Landscapes: Cetina Canyon, Dubrovačka River and Konavoski dvori*).
Biodiversity	• Carry out structural flood protection construction works within the least extent that is necessary, preserving suitable rare and endangered habitats (in accordance with regulations in the field of nature protection) for herpetofauna species. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with

PROJECT / COMPONENT	MEASURE
	regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites. Plan construction works for bank stabilization and embankments in the least possible scope (extent) with the minimal required length and height. • Minimize the construction work to the least possible extent and avoid the loss of natural habitats and favourable habitats for endangered and protected animal species. • Preserve natural morphology and structure od riverbed and riverbanks. Preserve riparian vegetation and restore it if it has been damaged by construction works. • Design sub-projects within this project unit to ensure permeability of the riverbed and hydrological connection with the underground; design banks with a slight (gentle) slope and use natural materials to allow smaller animals to leave the riverbed. • Minimize the scope of regulation and stabilization of the streambed of torrential and permanent streams and locate construction works on already anthropogenically modified stream sections, or where floods directly threaten settlements or important infrastructure.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Cultural heritage	• For all intended interventions in the space, including temporary use of the site for the purpose of construction of the accompanying infrastructure, special conditions in the field of protection and preservation of cultural property and confirmation of the project documentation of the intended intervention in the site in accordance with the special conditions or prior authorization for the planned works shall be obtained from the conservation department of the relevant ministry. • If an archaeological site is encountered during the execution of earthworks (on the surface or under the ground surface, in the water or in the sea), the works shall be stopped and the conservation department of the relevant ministry shall be involved. • When planning the stream management in the Rijeka Dubrovačka and Brsečina area, areas with protected cultural properties (summer residences) are to be avoided, as these works could affect their properties as cultural assets. • When reconstructing the stream protection systems, avoid areas with individually protected cultural properties, which could affect the properties of cultural properties. • During construction of water structures, provide for professional archaeological supervision (permanent or occasional) during the performance of all earthwork in the construction area. If necessary, stop the work, carry out protective archaeological surveys and conservation of finds in coordination with the conservation department of the relevant ministry.
2 Flood protection project in the Neretva river basin	
Soil and agriculture	• Avoid P1 and P2 agricultural land during selection of locations from which soil material will be excavated for levee construction. • While planning the projects ensure that the impact of construction on soil erosion is reduced to minimum.
Landscape	• Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials, especially within valuable cultivated areas.
Game and hunting	• To the greatest extent, preserve the coastal vegetation. • Perform works outside the nesting period. • To the greatest extent possible, avoid occupation and fragmentation of habitats.
Water	• The protection of waters and water bodies plan and carry out throughout the scope, and stricter criteria in the area of sanitary protection zones (including potential ones) in

PROJECT / COMPONENT	MEASURE
	accordance with the ordinance establishing the zones of sanitary protection of the spring and decisions on the zones of sanitary protection of the spring. • During project planning, include the impacts of climate change when assessing the risk of adverse effects of water (floods). • To plan the collection of wastewater and stormwater from infrastructure facilities as a closed drainage system with wastewater treatment before discharge. • Canal slopes should be carried out in such a way as to enable the drainage of groundwater from the hinterland of the building towards the watercourse (permeable geotextile, gravel layer). • In order to reduce the impact on flow continuity and morphology of the surrounding terrain, regularly maintain the area behind the partition in terms of cleaning the deposited sediment during low waters. • Decorating the watercourse trough is carried out in such a way as to allow groundwater to flow towards the surface watercourse using adequate materials to stabilize the trough. • In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned in such a way as to meet the needs of the already built facilities upstream and downstream, so as not to jeopardise the existing hydrotechnical system on the watercourse.
Biodiversity	• Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Carry out the structural works for the reconstruction of irrigation hydrotechnical objects in such a way as to enable the migration of freshwater fish species. • If it is not possible to remove the hydrotechnical object from the watercourse and carry out the restoration of the watercourse, the structural works of construction or reconstruction of transverse water structures should be carried in the least possible extent while preserving rare and endangered habitats (according to regulations in the field of nature protection) for rheophilic species. Implement flood protection measures while minimizing construction impacts by applying alternative restoration and/or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Minimize the construction works area and avoid the permanent loss of alluvial forests, grasslands (hay meadows), wetland and aquatic habitats. • Reconstruction of levees should be planned and carried out along the alignment of the existing levees unless its change is necessary for protection against adverse effects of water. • The new embankments alignments must be planned in such a way as to ensure the protection of valuable habitat types and aquatic and wetland habitats important for animal and plant species within the natural floodplain (inundation area) and to ensure the

PROJECT / COMPONENT	MEASURE
	favourable hydrological regime and natural flooding dynamics. Ensure favourable hydrological regime downstream and in ecologically dependent surrounding area. • Bank stabilization and construction of revetments should be planned only exceptionally on the shortest possible sections and along already anthropogenically modified banks, where the bank stabilization is necessary to ensure flood protection of settlements and the infrastructure. The scope (length, height) of revetments must be minimized. Revetments are allowed to be constructed only where there is no other technical solution to ensure flood protection. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment. • By adequate technical design of revitalization sub-projects ensure minimal future hydrotechnical interventions within the scope of the revitalization (i.e., ensure long-term self-sustainability of the revitalized area), natural hydrological regime and natural flooding dynamics, as well as the enhancement of hydromorphological features od Neretva River.
Protected areas	• Plan the organization of the construction site and the dynamics of the construction works in such a way as to minimize the damage the natural habitats and minimize the disturbance the species.
3 Flood protection project in the Vrgorsko polje basin	
Landscape	• Create a landscape study for the lake improvement project. • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Changes to the terrain morphology should be as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials.
Water	• The protection of waters and water bodies is planned and carried out throughout the scope, and stricter criteria in the area of sanitary protection zones (including potential ones) in accordance with the ordinance establishing the zones of sanitary protection of the spring and decisions on the zones of sanitary protection of the spring. • Include any impacts of climate change when planning the procedure • To plan the collection of wastewater and stormwater from infrastructure facilities as a closed drainage system with wastewater treatment before discharge. • Canal slopes should be carried out in such a way as to enable the drainage of groundwater from the hinterland of the banks towards the watercourse (permeable geotextile, gravel layer). • Regulation of the riverbed should be carried out in such a way as to allow groundwater to flow towards the surface watercourse using adequate materials for the stabilization. • In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned in such a way as to meet the needs of the already built facilities upstream and downstream, so as not to jeopardise the existing hydrotechnical system on the watercourse.
Biodiversity	• Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats. (according to regulations in the field of nature protection). • Carry out the structural works for the reconstruction of irrigation hydrotechnical objects in such a way as to enable the migration of freshwater fish species (e.g. *Knipowitschia croatica* for Projects 2, 3). • Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with

PROJECT / COMPONENT	MEASURE
	regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites. Plan construction works for bank stabilization and levees (dikes) in the least possible scope (extent) with the minimal required length and height. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Minimize the extent of the construction works and avoid the permanent loss and permanent change of the morphology and structure of natural habitats and favourable habitats for present fauna, riparian habitats along the streams and channels, wetlands with emergent vegetation (reed, cattail), alluvial habitats in the floodplains of streams and rivers. • Plan the dynamics of the construction works in accordance with the ecological requirements of the present fauna.
4 Flood protection project in the Imotsko-Bekijsko polje basin	
Soil and agriculture	• While planning the projects, ensure that the impact of construction on soil erosion is reduced to minimum.
Forests and forestry	• Coordinate and monitor the dynamics of work execution and tree felling. Operations should be carried out in such a way as to prevent the landslides and tree felling. • Protect the trees outside the working zone. • When planning, use the existing and planned forest road infrastructure. • Follow the forest fire protection measures.
Water	• During the preparatory work, the remains of cut grass, shrubs, bushes and trees should be removed, but the stumps should be left in order to leave as little organic matter as possible in the area intended for immersion, and to reduce the possibility of erosion. • Perform all procedures in such a way that the ecological and chemical condition does not deteriorate, that is, with a minimal risk of any pollution. • Protection of waters and water bodies should be planned and carried out throughout the entire area, with stricter criteria in the area of sanitary protection zones (including potential ones) in accordance with the rulebook establishing sanitary protection zones of sources and decisions on sanitary protection zones of sources. • When planning projects in the area and assessing the risk of adverse effects of water (flooding), include the effects of climate change. • Stabilization of the banks and slopes of the protection and regulation facilities should be carried out in such a way as to enable the drainage of groundwater behind the bank towards the watercourse (permeable geotextile, gravel layer).
Biodiversity	• Carry out structural flood protection construction works within the least extent that is necessary, preserving suitable rare and endangered habitats (in accordance with regulations in the field of nature protection) for herpetofauna species. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Sub-projects for the regulation of torrential streams (no. 208, 209, 6115) within this project unit should be planned in such a way as to ensure the permeability of the torrent bed and the connection of the surface flow with the underground, and the banks of the torrents should be designed with a gentle slope and with the use of natural materials so that smaller animals could get out of the streambed. • Preserve as much as possible the natural streambank, the natural structure and morphology of the streambed, and the riparian vegetation. Preserve springs and their natural connection with surface flows.

PROJECT / COMPONENT	MEASURE
	• Plan the technical features and construction works for all planned sub-projects of regulation of torrential streams and channels in such a way as to minimize the permanent loss and changes to natural aquatic and riparian habitats due to construction works. • Plan the construction works on torrents and channels during the dry period when the bed is dry and outside the spawning period of fish species in Vrljika to avoid their disturbance.
Landscape	• Changes to the terrain morphology should be as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials.
Mitigation of Climate changes	• Limit works and use the existing and planned forest infrastructure in order to minimize the occupation of forest areas.
5 Protection from flash floods in the Makarska coastal region	
Soil and agriculture	• When planning and designing the projects, ensure that the impact of construction on soil erosion is reduced to minimum.
Forest and forestry	• Coordinate and monitor the dynamics of work execution and tree felling. Operations should be carried out in such a way as to prevent the landslides and tree felling. • Protect the trees outside the working zone. • When planning, use the existing and planned forest road infrastructure. • Follow the forest fire protection measures.
Water	• During the carrying out of preparatory work, the remnants of mowed grass, wicker, shrubs and trees should be removed, but leave stumps so that as little organic matter as possible remains in the area provided for sinking, and the possibility of erosion is reduced.. • Perform all procedures in such a way that the ecological and chemical condition does not deteriorate, i.e. with a minimal risk of contamination in any way. • The protection of waters and water bodies is planned and carried out throughout the scope, and stricter criteria in the area of sanitary protection zones (including potential ones) in accordance with the ordinance establishing the zones of sanitary protection of the spring and decisions on the zones of sanitary protection of the spring. • During project planning, when assessing the risk of water damage (floods), include the impacts of climate change. • To the greatest extent possible preserve the functionality of the existing water adverse protection system and the existing hydrological regime. Stabilize the banks and slopes of these facilities by allowing the drainage of groundwater from the hinterland of the bank towards the watercourse (permeable geotextile, gravel layer).
Biodiversity	• Design sub-projects within this project unit to ensure permeability of the riverbed and hydrological connection with the underground; design banks with a slight (gentle) slope and use natural materials to allow smaller animals to leave the riverbed. • Preserve as much as possible the natural streambank, the natural structure and morphology of the streambed, and the riparian vegetation.
Landscape	• Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials.
Cultural heritage	• When planning the procedure in the premises, the conservation department of the relevant ministry should be consulted beforehand and further action should be determined according to the assessment of the situation.
Mitigation of climate changes	• Limit works and use the existing and planned forest infrastructure in order to minimize the occupation of forest areas.
6 Protection from flash floods in the Middle Adriatic coastal region and the islands of Brač, Hvar, Vis, Šolta and Čiovo	
Soil and agriculture	• When planning and designing the projects, ensure that the impact of construction on soil erosion is reduced to minimum.

PROJECT / COMPONENT	MEASURE
Forests and forestry	• Coordinate and monitor the dynamics of work execution and tree felling. Operations should be carried out in such a way as to prevent the landslides and tree felling. • Protect the trees outside the working zone. • When planning, use the existing and planned forest road infrastructure. • Follow the forest fire protection measures.
Water	• During the carrying out of preparatory work, the remnants of mowed grass, wicker, shrubs and trees should be removed, but leave stumps so that as little organic matter as possible remains in the area provided for sinking, and the possibility of erosion is reduced. • Perform all procedures in such a way that the ecological and chemical condition does not deteriorate, i.e. with a minimal risk of contamination in any way. • The protection of waters and water bodies is planned and carried out throughout the scope, and stricter criteria in the area of sanitary protection zones (including potential ones) in accordance with the ordinance establishing the zones of sanitary protection of the spring and decisions on the zones of sanitary protection of the spring. • When planning the project in the area, include the impacts of climate change when assessing the risk of adverse effects of water (floods). To the greatest extent possible preserve the functionality of the existing water adverse protection system and the existing hydrological regime. • Stabilize the banks and slopes in these buildings by allowing the drainage of groundwater from the hinterland of the bank towards the watercourse (permeable geotextile, gravel layer).
Biodiversity	• Carry out structural flood protection construction works within the least extent that is necessary, preserving suitable rare and endangered habitats (in accordance with regulations in the field of nature protection) for herpetofauna species. • If it is not possible to remove the hydrotechnical object from the watercourse and carry out the restoration of the watercourse, the structural works of construction or reconstruction of transverse water structures should be carried in the least possible extent while preserving rare and endangered habitats (according to regulations in the field of nature protection) for rheophilic species. • Carry out the works in such a way as to enable the migration of freshwater fish species. • Implement flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. • Dynamics and the manner of performing the construction works should be planned in such a way as to minimize the disturbance of animal species, especially fish, birds and amphibians, during important periods of their life cycles. • Plan the construction works on torrents and channels during the dry period when the bed is dry ili during low water levels of permanent watercourses (Jadro, Žrnovnica). • Design sub-projects within this project unit to ensure permeability of the riverbed and hydrological connection with the underground; design banks with a slight (gentle) slope and use natural materials to allow smaller animals to leave the riverbed. • Minimize the construction works area to the least possible extent and avoid the permanent loss of valuable habitats and favourable habitats for animal species, especially grasslands, garrigue, maquis, small water bodies (ponds), marine coastal habitats. • Preserve as much as possible the natural streambank, the natural structure and morphology of the streambed, and the riparian vegetation. • Stabilization of streambed during the regulation of torrents and permanent watercourses (Jadro, Žrnovnica) should be reduced to the smallest possible scope and carried out exclusively on already anthropogenically modified sections. Use bioengineering technical solutions wherever possible. On permanent watercourses (Jadro, Žrnovnica), preserve aquatic vegetation where it is present, riparian vegetation where it is present in a minimum

PROJECT / COMPONENT	MEASURE
	zone of 2 m from the banks of the watercourse, and the composition of the substrate at the bottom (sand or gravel bottom). Preserve the continuity of the water course and allow the upstream migration of fish species.
Landscape	• Create landscape studies for watercourse management projects. • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials (especially within the *Significant Landscape of Cetina Canyon*).
Cultural heritage	• For all intended projects, including temporary use of the site for the purpose of construction of the accompanying infrastructure, special conditions in the field of protection and preservation of cultural property and confirmation of the project documentation of the intended project in the site in accordance with the special conditions or prior authorization for the planned works shall be obtained from the Conservation department of the relevant Ministry. • If archaeological sites or finds are encountered during earthworks (on the surface or below the surface and in the riverbeds), the works shall be stopped and the competent conservation authority shall be informed about the findings. • Prior conditions of the responsible conservation authority must be obtained for all projects within protected cultural-historical units. • When constructing water structures, professional archaeological monitoring (permanent or occasional) shall be provided during the execution of all earthworks in the construction area. If necessary, discontinuation of work, implementation of protective measures, archaeological investigations and conservation of finds in consultation with the Conservation department of the relevant Ministry.
Mitigation of climate changes	• Limit works and use the existing and planned forest infrastructure in order to minimize the occupation of forest areas.
7 Flood protection project in the Cetina river basin	
Soil and agriculture	• During planning and designing the project location, exclude P1 and P2 agricultural land. If that is not possible, include the least possible area of P1 and P2 agricultural land. • During planning and designing projects ensure that the impact of construction on soil erosion is reduced to minimum.
Water	• During the carrying out of preparatory work, the remnants of mowed grass, wicker, shrubs and trees should be removed, but leave stumps so that as little organic matter as possible remains in the area provided for sinking, and the possibility of erosion is reduced. • Perform all procedures in such a way that the ecological and chemical condition does not deteriorate, i.e. with a minimal risk of contamination in any way. • The protection of waters and water bodies is planned and carried out throughout the scope, and stricter criteria in the area of sanitary protection zones (including potential ones) in accordance with the ordinance establishing the zones of sanitary protection of the spring and decisions on the zones of sanitary protection of the spring. • When planning the project in the area, include the impacts of climate change when assessing the risk of adverse effects of water (floods). To the greatest extent possible preserve the functionality of the existing water adverse protection system and the existing hydrological regime. • In order to reduce the impact on flow continuity and morphology of the surrounding terrain, regularly maintain the area behind the partition in terms of cleaning the deposited sediment during low waters. • Carry out the Regulation the watercourse in such a way as to allow groundwater to flow towards the surface watercourse using adequate materials to stabilize the trough. • Stabilization of banks and slopes in these buildings should be carried out to enable the drainage of groundwater from the hinterland of the building towards the watercourse (permeable geotextile, gravel layer)..

PROJECT / COMPONENT	MEASURE
	• In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned in such a way as to meet the needs of the already built facilities upstream and downstream, so as not to jeopardise the existing hydrotechnical system on the watercourse.
Biodiversity	• Carry out structural flood protection construction works on torrential streams within the least extent that is necessary, preserving suitable rare and endangered habitats (in accordance with regulations in the field of nature protection) for herpetofauna species. • If it is not possible to remove the hydrotechnical object from the watercourse and carry out the restoration of the watercourse, the structural works of construction or reconstruction of transverse water structures should be carried in the least possible extent while preserving rare and endangered habitats (according to regulations in the field of nature protection) for rheophilic species. Carry out the works in such a way as to enable the migration of freshwater fish species. • Implement flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Direct the improvement of the existing pumping station infrastructure towards a more environmentally friendly form by applying alternative measures at the sub-project level. • Design sub-projects within this project unit to ensure permeability of the riverbed and hydrological connection with the underground; design banks with a slight (gentle) slope and use natural materials to allow smaller animals to leave the riverbed. • Preserve as much as possible the natural streambanks, the natural structure and morphology of the streambed, and the riparian vegetation. • Dynamics and the manner of performing the construction works should be planned in such a way as to minimize the disturbance of animal species, especially fish, birds European pond turtle, during important periods of their life cycles. • Plan the construction works on torrents and other watercourses during the dry period when the streambed is dry during low water levels od permanent watercourses (Cetina, Kosinac). • Minimize the construction works area to the least possible extent and avoid the permanent loss of valuable habitats and favourable habitats for animal species, especially grasslands, garrigue, maquis, small water bodies (ponds), marine coastal habitats. • Stabilization of streambed during the regulation of torrents and permanent watercourses should be reduced to the smallest possible scope and carried out exclusively on already anthropogenically modified sections. Use bioengineering technical solutions wherever possible. On permanent watercourses preserve aquatic vegetation where it is present, riparian vegetation where it is present in a minimum zone of 2 m from the banks of the watercourse, and the composition of the substrate at the bottom (sand or gravel bottom). Preserve the continuity of the water course and allow the upstream migration of fish and invertebrate species.
Forests and forestry	• Coordinate and monitor the dynamics of work execution and tree felling. Operations should be carried out in a way to prevent the landslides and tree felling. • Protect the trees outside the working zone. • When planning, use the existing and planned forest road infrastructure. • Follow the forest fire protection measures.
Game and hunting	• To the greatest extent, avoid the removal of vegetation and reduction of the hunting production area. • Perform works outside the nesting period. • To the greatest extent possible, avoid occupation and fragmentation of habitats.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively

PROJECT / COMPONENT	MEASURE
	native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation
Landscape	• Create landscape studies for watercourse management projects. • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials (especially within the *Significant Landscape of Cetina Canyon*).
Cultural heritage	• For works on protected cultural property, the prior opinion of the competent conservation department shall be obtained and a conservation study shall be prepared, based on which the impact of the intervention on cultural property and heritage shall be assessed. • For all intended encroachments on the site, including temporary use of the site for construction of accompanying infrastructure, special conditions in the field of protection and preservation of cultural properties and confirmation of project documentation of the intended encroachment on the site in accordance with the special conditions or prior approval for the planned works shall be obtained from the Conservation department of the relevant Ministry. • During all earthworks, if an archaeological site is found during the execution of earthworks (on or under the ground surface, in the water or in the sea), the works shall be stopped and the competent conservation authority shall be informed about the findings with the aim of securing and protecting the archaeological site and the finds. • When building water structures, professional archaeological supervision (permanent or occasional) shall be provided during the execution of all earthworks in the construction area. If necessary, discontinue the work, conduct protective archaeological research and conservation of the findings in consultation with the Conservation department of the relevant Ministry.
Mitigation of climate changes	• Limit works and use the existing and planned forest infrastructure in order to minimize the occupation of forest areas.
8 Flood protection project in the Krka river basin	
Soil and agriculture	• During planning and designing projects ensure that the impact of construction on erosion is reduced to minimum.
Landscape	• Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials (especially within *NP Krka and the Significant Landscape of Krka - upper stream*).
Water	• During the carrying out of preparatory work, the remnants of mowed grass, wicker, shrubs and trees should be removed, but leave stumps so that as little organic matter as possible remains in the area provided for sinking, and the possibility of erosion is reduced.. • Perform all procedures in such a way that the ecological and chemical condition does not deteriorate, i.e. with a minimal risk of contamination in any way. • The protection of waters and water bodies is planned and carried out throughout the scope, and stricter criteria in the area of sanitary protection zones (including potential ones) in accordance with the ordinance establishing the zones of sanitary protection of the spring and decisions on the zones of sanitary protection of the spring. • During the project planning phase, when assessing the risk of water damage (floods), include the impacts of climate change.
Biodiversity	• Carry out structural flood protection construction works within the least extent that is necessary, preserving suitable rare and endangered habitats (in accordance with regulations in the field of nature protection) for herpetofauna species. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016).

PROJECT / COMPONENT	MEASURE
	• Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Carry out the structural works for the reconstruction of irrigation hydrotechnical objects in such a way as to enable the migration of freshwater fish species • For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats.
Cultural heritage	• When preparing project documentation for project situated directly adjacent to the protected cultural-historical unit, the opinion of the competent conservation authority shall be obtained. • For all intended interventions in the space, including temporary use of the site for the purpose of construction of the accompanying infrastructure, special conditions in the field of protection and preservation of cultural property and confirmation of the project documentation of the intended intervention in the site in accordance with the special conditions or prior approval for the planned works shall be obtained from the conservation department of the relevant ministry. • For all earthworks, if an archaeological site or finds are encountered during the execution of earthworks (on the surface or below the surface of the ground, in the water or in the sea), the works shall be stopped and the conservation department of the relevant ministry shall be informed of the finds. • When building water structures, professional archaeological supervision (permanent or occasional) shall be provided during the execution of all earthworks in the construction area. If necessary, the works shall be stopped and the archaeological protection surveys and conservation of the finds shall be carried out in consultation with the Conservation department of the relevant Ministry.
Mitigation of climate changes	• Limit works and use the existing and planned forest infrastructure in order to minimize the occupation of forest areas.
9 Protection from flash floods in the Šibenik coastal region and on the Šibenik islands	
Soil and agriculture	• During planning and designing projects ensure that the impact of construction on erosion is reduced to minimum.
Forest and forestry	• Coordinate and monitor the dynamics of work execution and tree felling. Operations should be carried out in a way to prevent the landslides and tree felling. • Protect the trees outside the working zone. • When planning, use the existing and planned forest road infrastructure. • Follow the forest fire protection measures.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs

PROJECT / COMPONENT	MEASURE
	• In project planning phase, include impact of climate changes when assessing the risk of adverse effects of water (flooding). Preserve functionality of existing protection systems against adverse effects of water and current hydrological regime.
Biodiversity	• Carry out structural flood protection construction works within the least extent that is necessary, preserving suitable rare and endangered habitats (in accordance with regulations in the field of nature protection) for herpetofauna species. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
Landscape	• Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials.
Mitigation of climate changes	• Limit works and use the existing and planned forest infrastructure in order to minimize the occupation of forest areas.
10 Protection from flash floods in the Zadar coastal region and on the Zadar islands	
Soil and agriculture	• During planning and designing projects ensure that the impact of construction on erosion is reduced to minimum.
Landscape	• Create landscape studies for watercourse management projects. • Create a Study that will connect the existing watercourses and stagnant water (blue system) into the green infrastructure network. • Changes to the terrain morphology should be as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials (especially within *PP Velebit*).
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assessing the risk of adverse effects of water (flooding). Preserve functionality of existing protection systems against adverse effects of water and current hydrological regime. • Carry out the Regulation of riverbed as to insure ground water flow from hinterland of the structure towards watercourse using adequate materials for its' stabilisation. • In order to reduce the impact on hydromorphology, apply the optimization of existing and new hydrotechnical structures (piers, revetments...). • Stabilization of the banks and slopes of the facilities should be carried as to enable the drainage of groundwater from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer). • Channel cuts should be made as to enable groundwater drainage from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned to meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.

PROJECT / COMPONENT	MEASURE
Biodiversity	• Carry out structural flood protection construction works within the least extent that is necessary, preserving suitable rare and endangered habitats (in accordance with regulations in the field of nature protection) for herpetofauna species. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites, especially detention basins. Plan construction works for bank stabilization and embankments in the least possible scope (extent) with the minimal required length and height. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. • Design sub-projects of regulation of torrential and other streams within this project unit to ensure permeability of the riverbed and hydrological connection with the underground; design banks with a slight (gentle) slope and use natural materials to allow smaller animals to leave the riverbed. Preserve natural morphology and structure od riverbed and riverbanks, as well as riparian vegetation • Minimize the scope of regulation and stabilization of the streambed of torrential and permanent streams and locate construction works on already anthropogenically modified stream sections, or where floods directly threaten settlements or important infrastructure. • Plan the dynamics of the construction works in accordance with the ecological requirements of the present fauna.
Cultural heritage	• When planning the procedure in the premises, the conservation department of the relevant ministry should be consulted beforehand and further action should be determined according to the assessment of the situation.
11 Flood protection project in the Ravni kotari basins	
Soil and agriculture	• During planning and designing the project location, exclude P1 and P2 agricultural land. If that is not possible, include the least possible area of P1 and P2 agricultural land. • During planning and designing the project, avoid areas cultivated with permanent crops.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). Ensure environmentally acceptable flow downstream of the reservoir. • Carry out the Regulation of riverbed as to insure ground water flow from hinterland of the structure towards watercourse using adequate materials for its' stabilisation.

PROJECT / COMPONENT	MEASURE
	• Channel slopes should be made as to enable groundwater drainage from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned to meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Carry out the structural works for the reconstruction of irrigation hydrotechnical objects in such a way as to enable the migration of freshwater fish species • Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites. Plan construction works for bank stabilization and levees (dikes) in the least possible scope (extent) with the minimal required length and height. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Plan the construction works in the least possible extent. Avoid permanent loss or damage of natural habitats, especially riparian vegetation, and grassland habitats. Preserve riparian vegetation, especially old and developed poplar trees along the banks of natural watercourses and artificial channels, as potential nesting sites for European roller. • Plan the construction works on torrents during the dry period when the streambed is dry. • Plan the dynamics of the construction works in accordance with the ecological requirements of the present fauna and flora. • Design sub-projects of regulation of torrential and other streams and channels within this project unit to ensure permeability of the riverbed and hydrological connection with the underground; design banks with a slight (gentle) slope and use natural materials to allow smaller animals to leave the riverbed. Preserve as much as possible the natural streambank, the natural structure and morphology of the streambed, and the riparian vegetation. • Minimize the scope of regulation and stabilization of the streambed of torrential and permanent streams and locate construction works on already anthropogenically modified stream sections, or where floods directly threaten settlements or important infrastructure.
Forests and forestry	• Coordinate and monitor the dynamics of work execution and tree felling. Operations should be carried out in such a way as to prevent the landslides and tree felling. • Protect the trees outside the working zone. • When planning, use the existing and planned forest road infrastructure. • Follow the forest fire protection measures.
Protected areas	• Plan the organization of the construction site in such a way as to minimize the damage to natural habitats.
Biodiversity	• While planning the locations and the extent of the reservoirs avoid rare and endangered habitat types (in accordance with the regulations in the field of nature protection).

PROJECT / COMPONENT	MEASURE
Landscape	• When developing solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Changes to the terrain morphology should be as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials (especially within *PP Vrana Lake*).
Mitigation of climate changes	• Plan and carry out activities in such a way as to avoid taking over forest areas.
12 Flood protection project in the basins of the Zrmanja river and the Lika plateau	
Water	• Plan and carry out the water protections at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). Ensure environmentally acceptable flow downstream of the reservoir. • Channel slopes should be made as to enable groundwater drainage from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer).
Biodiversity	• Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites. • Plan construction works for bank stabilization and levees (dikes) in the least possible scope (extent) with the minimal required length and height. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016).
Forests and forestry	• Coordinate and monitor the dynamics of work execution and tree felling. Operations should be carried out in such a way as to prevent the landslides and tree felling. • Protect the trees outside the working zone.
Landscape	• Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials (especially within *PP Velebit*).
WMD for North Adriatic Basin	
13 Flood protection project in the Lika and Gacka river basins	
Forests and forestry	• Plan and implement operations in such a way to avoid the occupation of forest area, especially protective and special purpose forests. • In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation.
Game and hunting	• Plan and carry our works in such a way as to preserve forest areas as much as possible. • Restrict the movement of machinery and people to prevent disturbance of the peace. • To the greatest extent, avoid the removal of vegetation and reduction of the hunting production area. • Perform works outside the nesting period.

PROJECT / COMPONENT	MEASURE
	• To the greatest extent possible, avoid occupation and fragmentation of habitats.
Water	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Channel slopes should be made as to enable groundwater drainage from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer). • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area that retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned to meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• Avoid rare and endangered habitat types when planning the detention basins.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Landscape	• Create a landscape study for the projects of the watercourse Regulation. • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials (especially in the vicinity of *PP Velebit*).
Cultural and historical heritage	• When preparing project documents for projects within a protected cultural-historical unit, the opinion of the responsible nature conservation authority must be obtained.
Mitigation of climate changes	• Plan and carry out projects in such a way as to avoid occupying forest areas, especially those of special purpose.
14 Protection from flash floods in the Kvarner coastal region and on the islands of Krk, Cres, and Lošinj	
Soil and agriculture	• During planning and designing the projects, ensure that impacts of construction on erosion is reduced on minimum.
Forests and forestry	• Coordinate and monitor the dynamics of work execution and tree felling. Operations should be carried out in such a way as to prevent the landslides and tree felling. • Protect the trees outside the working zone. • When planning, use the existing and planned forest road infrastructure. • Follow the forest fire protection measures.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution.

PROJECT / COMPONENT	MEASURE
	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). Ensure environmentally acceptable flow downstream of the reservoir. • Carry out the Regulation of riverbed as to insure ground water flow from hinterland of the structure towards watercourse using adequate materials for its' stabilisation. • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area that retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned to meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• In the case of finding a speleological object, all construction works around the object must be stopped until the central state administration body in charge of nature protection decides on further treatment of the object. Also, tunnel construction should be carried out during the day, when bats are not active, with a high level of caution, with minimal impact on the surrounding bedrock in accordance with nature protection regulations. • While planning locations and the extent of detention basins, avoid rare and endangered habitat types. • Structural works for regulation of watercourses must be planned in the minimal necessary extent (minimal length and height). Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Carry out the works in such a way that the longitudinal migration route of freshwater fish species is enabled, and that the pollution of watercourse is avoided. Minimize the impact of construction works by applying alternative restoration and/or enhancement works that must be consistent with the ecological requirements of the endangered and protected species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment.
Landscape	• Create landscape studies for watercourse management projects. • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Changes to the terrain morphology should be as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials.
Cultural heritage	• If during the construction of water structures there is reasonable suspicion of the presence of or interaction with an archaeological site or other cultural heritage or if interaction with them is made, professional archaeological monitoring shall be provided during the

PROJECT / COMPONENT	MEASURE
	performance of all earthwork in consultation with the appropriate historic preservation authority. Also, in case of encountering an archaeological site or findings, discontinue the works, and notify the conservation department of the competent ministry, which will continue to act in accordance with the legal powers.
15 Flood protection project in the Mirna river basin	
Forests and forestry	• Plan and implement operations in such a way to avoid the occupation of forest area, especially protective and special purpose forests. • In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation.
Game and hunting	• Plan and carry our works in such a way as to preserve forest areas as much as possible. • Restrict the movement of machinery and people to prevent disturbance of the peace. • To the greatest extent, avoid the removal of vegetation and reduction of the hunting production area. • Perform works outside the nesting period. • To the greatest extent possible, avoid occupation and fragmentation of habitats.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). Ensure environmentally acceptable flow downstream of the reservoir. • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area that retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • In order to reduce the impact on the continuity of the flow and the morphology of the surrounding terrain, regularly maintain the area behind the partitions in terms of cleaning the precipitated sediment during low water. • In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned to meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• The construction of weirs and other barriers should be carried out at the least possible extent while preserving suitable rare and endangered habitats for rheophilic species. Carry out the works in such a way as to enable the migration of freshwater fish species. • Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). To reduce the impact on biodiversity, if possible, construct several low weirs in cascade manner, instead of one high, to allow for upstream migrations of fish and invertebrates. • While planning locations and the extent of detention basins, avoid rare and endangered habitat types.

PROJECT / COMPONENT	MEASURE
	• For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
Landscape	• Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials.
Cultural heritage	• When planning the procedure in the site, the conservation department of the relevant ministry shall be consulted beforehand and further action shall be determined according to the assessment of the situation. • In the case of all earthworks, including temporary use of the site for the purpose of constructing the accompanying infrastructure, the competent conservation authority shall be informed in advance and checked whether an archaeological field inspection is required. After the review and depending on the results, further measures for the protection of cultural assets will be determined. • If there is reasonable suspicion of the presence of or interaction with an archaeological site or other remains of cultural property during the construction of water structures, expert archaeological supervision shall be provided during the performance of all earthwork in consultation with the appropriate historic preservation authority. Also, in case of encountering an archaeological site or findings, discontinue the works, and notify the appropriate authority – the conservation department of the relevant ministry, which will continue to act in accordance with the legal powers.
Mitigation of climate changes	• Plan and carry out projects in such a way as to avoid occupying forest areas. Prevent excessive retention of water in retentions.
16 Flood protection project in the Raša river basin	
Soil and agriculture	• During planning and designing the projects, ensure that impacts of construction on erosion is reduced on minimum.
Forests and forestry	• Plan and implement operations in such a way to avoid the occupation of forest area, especially protective and special purpose forests. • In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation. • When working on torrents and watercourses, coordinate and monitor the dynamics of work execution and tree felling. Operations should be carried out in such a way as to prevent the landslides and tree felling and to protect the trees outside the working zone.
Game and hunting	• Plan and carry our works in such a way as to preserve forest areas as much as possible. • Restrict the movement of machinery and people to prevent disturbance of the peace. • To the greatest extent, avoid the removal of vegetation and reduction of the hunting production area. • Perform works outside the nesting period. • To the greatest extent possible, avoid occupation and fragmentation of habitats.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Channel slopes should be constructed as to enable groundwater drainage from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer).

PROJECT / COMPONENT	MEASURE
	• Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area that retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned to meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• While planning locations and the extent of detention basins, avoid rare and endangered habitat types. • Avoid endangered and rare habitat types when planning infrastructure sites. Structural works for regulation of watercourses must be planned in the minimal necessary extent (minimal length and height). Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Carry out the works in such a way that the longitudinal migration route of freshwater fish species is enabled, and that the pollution of watercourse is avoided. Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Channel cuts should be made in such a way as to enable groundwater drainage from the rear of the hydrotechnical object (structure) towards the watercourse (permeable geotextile, gravel layer). • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area so that the retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to jeopardize the existing hydrotechnical system on the watercourse.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Landscape	• Create landscape studies for watercourse management projects. • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Changes to the terrain morphology should be as little as possible.

PROJECT / COMPONENT	MEASURE
	• Preserve developed vegetation and use natural materials (especially in and near the *Significant Landscape of Pićan*).
Cultural heritage	• When planning the procedure on the site, the conservation department of the relevant ministry shall be consulted beforehand and the further actions shall be determined according to the assessment of the situation. • For all intended interventions on the site, including the temporary use of the site for the construction of the accompanying infrastructure, special conditions in the field of protection and preservation of cultural property and confirmation of the project documentation of the intended intervention on the site in accordance with the special conditions or prior approval for the planned works shall be obtained from the conservation department of the relevant ministry. • When planning the laying of canals in Labin, it is necessary to avoid areas with individually protected cultural heritage that may affect monument properties. • If there is a reasonable suspicion of the presence of archaeological remains during the construction of water structures, or if there are interactions with them, professional archaeological supervision shall be provided during the execution of all earthworks in coordination with the competent conservation department. If it is necessary to interrupt the work, archaeological protection research and the conservation of any findings shall be carried out in consultation with the conservation department of the relevant ministry.
Mitigation of climate changes	• Plan and carry out projects in such a way as to avoid occupying forest areas. Prevent excessive retention of water in retentions.
17 Protection from flash floods in the Western Istria coastal region	
Forests and forestry	• Plan and implement operations in such a way to avoid the occupation of forest area, especially protective and special purpose forests. • In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation. • When working on torrents and watercourses, coordinate and monitor the dynamics of work execution and tree felling. Operations should be carried out in such a way as to prevent the landslides and tree felling and to protect the trees outside the working zone.
Game and hunting	• Plan and carry our works in such a way as to preserve forest areas as much as possible. • Restrict the movement of machinery and people to prevent disturbance of the peace. • To the greatest extent, avoid the removal of vegetation and reduction of the hunting production area. • Perform works outside the nesting period. • To the greatest extent possible, avoid occupation and fragmentation of habitats.
Landscape	• Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme

PROJECT / COMPONENT	MEASURE
	hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area that retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • Channel slopes should be constructed as to enable groundwater drainage from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned to meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• While planning locations and the extent of detention basins, avoid rare and endangered habitat types.
Cultural heritage	• When planning any intervention on the site, the Conservation department of the relevant ministry shall be consulted beforehand and the further procedure shall be determined according to the assessment of the situation. For all intended interventions on the site, including the temporary use of the site for the purpose of building the associated infrastructure, special conditions in the field of protection and preservation of cultural property shall be obtained from the Conservation department of the relevant Ministry.
Mitigation of climate changes	• Plan and carry out projects in such a way as to avoid occupying forest areas. Prevent excessive retention of water in retentions.
47 Flood protection project in the Rječina river	
Forests and forestry	• In case of retention basins constructions, ensure efficient drainage of water from the retention in order to prevent excessive water stagnation.
Landscape	• Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area that retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned to meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• While planning locations and the extent of detention basins, avoid rare and endangered habitat types. • For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.

PROJECT / COMPONENT	MEASURE
Mitigation of climate changes	• Plan and carry out projects in such a way as to avoid occupying forest areas. Prevent excessive retention of water in retentions.
55 Flood protection project in the Pazinčica basin	
Forests and forestry	• In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation.
Landscape	• Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials.
Game and hunting	• Plan and carry our works in such a way as to preserve forest areas as much as possible. • Restrict the movement of machinery and people to prevent disturbance of the peace. • To the greatest extent, avoid the removal of vegetation and reduction of the hunting production area. • Perform works outside the nesting period. • To the greatest extent possible, avoid occupation and fragmentation of habitats.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area that retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • In order to avoid the negative cumulative impact of the planned hydrotechnical structures, the planned facilities must be dimensioned to meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• While planning locations and the extent of detention basins, avoid rare and endangered habitat types. • For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
Mitigation of climate changes	• Plan and carry out projects in such a way as to avoid occupying forest areas. Prevent excessive retention of water in retentions.
56 Flood protection project in the Boljunčica basin	
Soil and agriculture	• During planning and designing the projects, ensure that impacts of construction on erosin is reduced on minimum.
Forests and forestry	• Coordinate and monitor the dynamics of work execution and tree felling. Operations should be carried out in such a way as to prevent the landslides and tree felling and to protect the trees outside the working zone.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water).

PROJECT / COMPONENT	MEASURE
	• Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Changes to the terrain morphology should be as little as possible. • Preserve developed vegetation and use natural materials.
Game and hunting	• Plan and carry our works in such a way as to preserve forest areas as much as possible. • Restrict the movement of machinery and people to prevent disturbance of the peace. • To the greatest extent, avoid the removal of vegetation and reduction of the hunting production area. • Perform works outside the nesting period. • To the greatest extent possible, avoid occupation and fragmentation of habitats.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs. • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Carry out the Regulation of riverbed as to insure ground water flow from hinterland of the structure towards watercourse using adequate materials for its' stabilisation.
Biodiversity	• When planning reservoir locations, avoid endangered and rare habitat types, with an emphasis on NKS A.1.3. Unvegetated and sparsely vegetated riverbanks. • Avoid endangered and rare habitat types when planning infrastructure sites. Structural works for regulation of watercourses must be planned in the minimal necessary extent (minimal length and height). Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Carry out construction works in such a way as not to prevent or interrupt the migration route for freshwater fish. • Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment.
Mitigation of climate changes	• Plan and carry out projects in such a way as to avoid occupying forest areas. Prevent excessive retention of water in retentions.
57 Flood protection project in the Lokvarka basin	

PROJECT / COMPONENT	MEASURE
Forests and forestry	• When planning the locations of the reservoir basins avoid occupying forest areas. Consider an alternative solution (construction of retention basin), which would achieve the goal of flood protection.
Game and hunting	• Plan and carry out works in a way to preserve forest areas as much as possible. • Restrict the movement of machinery and people to prevent disturbance of the peace. • To the greatest extent, avoid the removal of vegetation and reduction of the hunting production area. • Perform works outside the nesting period. • To the greatest extent possible, avoid occupation and fragmentation of habitats.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs. • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Ensure environmentally acceptable flow downstream of the reservoir.
Biodiversity	• When planning reservoir locations, avoid endangered and rare habitat types, with an emphasis on NKS A.1.3. Unvegetated and sparsely vegetated shores of the banks • Ensure a year-round favorable hydrological regime downstream of the reservoir, i.e., ecologically acceptable flow. • During construction and maintenance, implement measures to prevent the introduction and spread of invasive alien plant and animal species. • Reduce the scope of the Križ reservoir and maintain the continuity of the watercourse with technical solutions if, based on biological research, a potentially significant loss of habitat types, favourable habitats for animal species and habitat fragmentation for animal species is determined. Plan the reservoir in such a way that the continuity of the water flow is not interrupted, and the longitudinal migration of aquatic animals is allowed. Ensure a year-round favourable hydrological regime downstream of the reservoir, i.e., ecologically acceptable flow. Adjust the dynamics and method of carrying out the construction works to reduce the disturbance of species, especially birds, amphibians, and bats. • If the impact cannot be mitigated to an acceptable level with the above measures, review the need to build a reservoir to protect against the adverse effects of water and develop a variant or alternative solution (e.g., the possibility of designing a detention basin instead of a reservoir) that would achieve the flood protection objective.
Landscape	• Create a landscape study for the construction of the reservoir. • Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials.
Mitigation of climate changes	• Consider an alternative solution of building a retention instead of an reservoir if this would also achieve the goal of flood protection.
WMD for the Middle and Lower Sava	
18 Flood protection in the Upper Kupa River Basin	
Landscape	• Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials.

PROJECT / COMPONENT	MEASURE
Water	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs. • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Plan the collection of wastewater and rainwater from infrastructure facilities as a closed drainage system with wastewater treatment before discharge. • During the construction and modernization of flood protection facilities, to the greatest extent possible, preserve the functionality of the existing protection system against the adverse effects of water and the existing hydrological regime. • In order to reduce the impact on the continuity of the flow and the morphology of the surrounding terrain, regularly maintain the area behind the barrier in terms of cleaning the deposited sediment during low water.
Biodiversity	• For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species.
Cultural heritage	• When planning to proceed at the site, the conservation department of the relevant ministry shall be consulted beforehand and further action shall be determined in accordance with the assessment of the situation. • For all intended interventions at the site, including the temporary use of the site for the construction of the accompanying infrastructure, special conditions in the field of protection and preservation of cultural property and confirmation of the project documentation of the intended intervention at the site in accordance with the special conditions or prior approval for the planned work shall be obtained from the conservation department of the relevant ministry. • For all intended interventions on the site, including temporary use of site for the purpose of construction of related infrastructure, special conditions in the field of protection and preservation of cultural property shall be obtained from the conservation department of the relevant ministry. • If during the construction of water structures there is a reasonable suspicion of the presence of or interaction with archaeological remains, professional archaeological monitoring shall be provided during the execution of all earthworks in consultation with the relevant conservation departments. If necessary, stop work, conduct protective archaeological research, and conserve any finds found in consultation with the conservation department of the relevant ministry.
19 Flood protection project of the town of Ogulin	
Biodiversity	• While planning locations and the extent of detention basins, avoid rare and endangered habitat types. • Structural works for regulation of watercourses must be planned in the minimal necessary extent (minimal length and height). Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Carry out the works in such a way that the longitudinal migration route of freshwater fish species is enabled, and that the pollution of watercourse is avoided. • Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016).

PROJECT / COMPONENT	MEASURE
	• During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Ensure enough water (sufficient flow) for watercourses downstream from the detention basin Ogulin in order to enable unhindered performance and development of the economic activity of fish farming on the nearby tributary.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area that retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • Carry out the Regulation of riverbed as to insure ground water flow from hinterland of the structure towards watercourse using adequate materials for its' stabilisation.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a Study that will connect the existing watercourses and stagnant water (blue system) into the green infrastructure network. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials.
20 Flood protection project in the Kupa river basin - Karlovac and Sisak area	
Soil and agriculture	• During planning and designing the project location, exclude P1 and P2 agricultural land. If that is not possible, include the least possible area of P1 and P2 agricultural land. • Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs

PROJECT / COMPONENT	MEASURE
	• In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area that retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • In order to reduce impact on flow contininuity and morphology of wider area, regularly clean area behind barrier by cleaning sedimnets during low water. • Channel cuts should be made in such a way as to enable groundwater drainage from the rear of the hydrotechnical object (structure) towards the watercourse (permeable geotextile, gravel layer). • Carry out the Regulation of riverbed as to insure ground water flow from hinterland of the structure towards watercourse using adequate materials for its' stabilisation. • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to jeopardize the existing hydrotechnical system on the watercourse.
Biodiversity	• Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • While planning locations and the extent of detention basins, avoid rare and endangered habitat types. • Structural works on watercourses must be carried out in such a way as to enable migration of fish species and to avoid spawning and nesting periods. • The construction of weirs and other barriers should be carried out at the least possible extent while preserving suitable rare and endangered habitats for rheophilic species. • Construction works on linear hydrotechnical objects in the riverbed of the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). Stone revetments should be constructed roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Reconstruction of the levees should be planned and carried out along the alignment of the existing levees unless their change is necessary for protection against the adverse effects of water. • Plan the alignments of new levees in such a way that valuable habitats and habitats important for the conservation of animal species (flooded and alluvial forests, wet grasslands, aquatic, and wetland habitats) are kept within the inundation area bounded by the levee and that a favorable water regime and natural flood dynamics are preserved.

PROJECT / COMPONENT	MEASURE
	• Minimize the construction works area and avoid the permanent loss of alluvial forests, grasslands (hay meadows), wetland, riparian, and aquatic habitats. • Plan the dynamics of the construction works in accordance with the ecological requirements of the present fauna. • Bank stabilization and construction of revetments should be planned only exceptionally on the shortest possible sections and along already anthropogenically modified banks, where the bank stabilization is necessary to ensure flood protection of settlements and the infrastructure. The scope (length, height) of revetments must be minimized. Revetments are allowed to be constructed only where there is no other technical solution to ensure flood protection. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment. • Ensure favorable hydrological conditions and water regime downstream of the catchment and in the surrounding ecologically dependent area..
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Cultural heritage	• For all projects planned within or in the immediate vicinity of protected cultural and historical units, when drawing up the project documentation, request the opinion of the competent conservation department and prepare a conservation study that will prescribe appropriate protection measures. • For all the intended interventions in the space, including the temporary use of the premises for the purpose of the construction of the accompanying infrastructure, obtain from the Conservation Department of the competent Ministry special conditions in the field of protection and preservation of cultural goods and confirmation of the project documentation of the intended intervention in the premises made in accordance with special conditions or prior approval for the planned works. • If during the construction of water structures there is a reasonable suspicion for the existence of archaeological remains, or if interaction with them is made, in agreement with the competent conservation departments to provide professional archaeological supervision during the performance of all earthworks. If necessary, discontinue the works, carry out protective archaeological research and preservation of the found findings in agreement with the competent Conservation Department of the Ministry responsible for the protection of cultural goods.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials (especially in and near *the Significant Odransko polje landscape* and *near the Crna Mlaka Special Reserve*).
21 Flood protection project in the Korana river basin	
Landscape	• Create a landscape study for the reservoir. • Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion.

PROJECT / COMPONENT	MEASURE
	• Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Ensure environmentally acceptable flow downstream of reservoir. • Carry out the Regulation of river banks as to insure ground water flow from hinterland of the structure towards watercourse using adequate materials for riverbed stabilisation • Channel slopes should be made in such a way as to enable groundwater drainage from the rear of the hydrotechnical object (structure) towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to jeopardize the existing hydrotechnical system on the watercourse.
Biodiversity	• For the construction of the reservoir, plan the intervention in such a way as not to interrupt the continuity of the water flow (river integrity) and to preserve the ecologically acceptable flow downstream with the use of the technology that leads to the least water turbidity. When planning location, avoid endangered and rare habitat types (according to nature protection regulations) and limit the permanent loss of riparian vegetation to the smallest possible extent. Also, the continuity of the migration routes of freshwater fish should be ensured. • For all planned sub-projects implement during construction and maintenance measures to prevent the introduction and spread of invasive alien plant and animal species. • Minimize the extent of the construction works to avoid the permanent loss of natural habitats and habitats favorable for present fauna. Preserve as much as possible the natural streambanks, the natural structure and morphology of the streambed, and the riparian vegetation. • Plan the dynamics of the construction works in accordance with the ecological requirements of the fish fauna of Korana River.
Cultural heritage	• Before starting the works, ask for the opinion of the Conservation department of the competent Ministry and define further actions for the purpose of protecting the cultural and historical heritage.
22 Flood protection project in the Kupčina basin	
Biodiversity	• Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Structural works for regulation of watercourses must be planned in the minimal necessary extent (minimal length and height). Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation).

PROJECT / COMPONENT	MEASURE
	• The construction of weirs and other barriers should be carried out at the least possible extent while preserving suitable rare and endangered habitats for rheophilic species. • Structural works on watercourses must be carried out in such a way as to enable migration of fish species and to avoid spawning and nesting periods. • Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Sub-projects for the regulation of torrential streams and ither streams within this project unit should be planned in such a way as to ensure the permeability of the torrent bed and the connection of the surface flow with the underground, and the banks of the torrents should be designed with a slight (gentle) slope and with the use of natural materials so that smaller animals could get out of the streambed. • Preserve as much as possible the natural streambank, the natural structure and morphology of the streambed, and the riparian vegetation. • Bank stabilization and construction of revetments should be planned only exceptionally on the shortest possible sections and along already anthropogenically modified banks, where the bank stabilization is necessary to ensure flood protection of settlements and the infrastructure. Revetments are allowed to be constructed only where there is no other technical solution to ensure flood protection. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment. • Plan the dynamics of the construction works in accordance with the ecological requirements of the present fauna.
Water	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Plan the collection of wastewater and rainwater from infrastructure facilities as a closed drainage system with wastewater treatment before discharge. • Carry out the Regulation of riverbed as to insure ground water flow from hinterland of the structure towards watercourse using adequate materials for riverbed stabilisation • Channel slopes should be made in such a way as to enable groundwater drainage from the rear of the hydrotechnical object (structure) towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to jeopardize the existing hydrotechnical system on the watercourse.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure.

PROJECT / COMPONENT	MEASURE
	• Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials.
Cultural heritage	For projects within the Protected Landscape Area Žumberak - Samoborsko gorje - Plešivica prigorje, ask the relevant nature conservation department for advice and: • change the morphology of the terrain as little as possible. • preserve the existing landscape pattern (monitor the existing parcelling) within valuable cultivated areas. • to preserve the vegetation that has grown and to use natural materials.
23 Protection from Una River floods	
Soil and Agriculture	• Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Biodiversity	• Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). Stone revetments should be constructed roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites. Removal of riparian vegetation must be in the least extent possible. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. • Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016).
Water	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Carry out the Regulation of river banks as to insure ground water flow from hinterland of the structure towards watercourse using adequate materials for riverbed stabilisation • Channel slopes should be made in such a way as to enable groundwater drainage from the rear of the hydrotechnical object (structure) towards the watercourse (permeable geotextile, gravel layer).
Landscape	• Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials.
Cultural heritage	• Before starting the works, ask for the opinion of the Conservation department of the competent Ministry and define further actions for the purpose of protecting the cultural and historical heritage.
24 Flood protection project in the Middle Sava river basin	
Soil and agriculture	• Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Forests and forestry	• Plan the routes of new embankments in such a way as to avoid encroachment on forest areas and to ensure a favorable water regime and flooding dynamics for the forest

PROJECT / COMPONENT	MEASURE
	communities dependent on floods through technical measures. Reconstruction and rehabilitation of embankments, as far as possible, should be planned and carried out along the route of existing embankments. • During the planning of interventions that are expected to have impact on the water regime, establish a water monitoring program and based on the results, plan the measures that will ensure a favorable water regime for forest communities dependent on it. • Limit the movement of vehicles and heavy machinery to prevent damage of forest soil and vegetation outside the working zone.
Game and hunting	• Plan and carry our works in such a way as to preserve forest areas as much as possible. • Restrict the movement of machinery and people to prevent disturbance of the peace. • To the greatest extent, avoid the removal of vegetation and reduction of the hunting production area. • Perform works outside the nesting period. • To the greatest extent possible, avoid occupation and fragmentation of habitats.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • In order to reduce the impact on the continuity of the flow and the morphology of the surrounding terrain, regularly maintain the area behind the barrier in terms of cleaning the deposited sediment during low water. • Carry out the Regulation of river banks as to insure ground water flow from hinterland of the structure towards watercourse using adequate materials for riverbed stabilisation • Channel slopes should be made in such a way as to enable groundwater drainage from the rear of the hydrotechnical object (structure) towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to jeopardize the existing hydrotechnical system on the watercourse.
Biodiversity	• Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). Stone revetments should be constructed roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation. • The construction of weirs and other barriers should be carried out at the least possible extent while preserving suitable rare and endangered habitats for rheophilic species. • Structural works on watercourses must be carried out in such a way as to enable migration of fish species and to avoid spawning and nesting periods.

PROJECT / COMPONENT	MEASURE
	• During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Reconstruction of the levees should be planned and carried out along the alignment of the existing levees, unless their change is necessary for protection against the adverse effects of water. • Plan the alignments of new levees in such a way that valuable habitats and habitats important for the conservation of animal species (flooded and alluvial forests, wet grasslands, aquatic, and wetland habitats) are kept within the inundation area bounded by the levee and that a favorable water regime and natural flood dynamics are preserved. • Minimize the construction works area and avoid the permanent loss of alluvial forests, grasslands (hay meadows), wetland, riparian, and aquatic habitats. • Plan the dynamics of the construction works in accordance with the ecological requirements of the present fauna and flora. • Bank stabilization and construction of revetments should be planned only exceptionally on the shortest possible sections and along already anthropogenically modified banks, where the bank stabilization is necessary to ensure flood protection of settlements and the infrastructure. The scope (length, height) of revetments must be minimized. Revetments are allowed to be constructed only where there is no other technical solution to ensure flood protection. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials (especially within *PP Lonjsko polje* and *the Significant Landscape Sunjsko polje*).
Mitigation of climate changes	• To the greatest extent possible, use natural materials for the construction of embankments and revetments. When arranging the shore, enable the flow of underground water towards the surface watercourse by using adequate materials to stabilize the riverbed.
29 Flood protection project in the Česma and Glogovnica basins	
Soil and agriculture	• During planning and designing project location, exclude the areas of P1 and P2 land. If this is not possible, cover the smallest possible area of P1 and P2 land. • When planning and designing, consider the variant of building retention instead of reservoir on P1 and P2 lands. • Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Forests and forestry	• As far as possible, interventions should be planned in such a way to avoid occupying valuable forest areas. • Where possible, prefer the construction of retentions instead of reservoirs. In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation.

PROJECT / COMPONENT	MEASURE
	• Plan the routes of new embankments in such a way as to avoid encroachment on forest areas and to ensure a favorable water regime and flooding dynamics for the forest communities dependent on floods through technical measures. • During the planning of projects that are expected to have impact on the water regime, establish a water monitoring program and based on the results, plan the measures that will ensure a favorable water regime for forest communities dependent on it. • When carrying out construction works, use the existing or planned forest transport infrastructure, and limit the movement of vehicles and heavy machinery to prevent damage of forest soil and vegetation outside the working zone.
Game and hunting	• Where possible and applicable, embankments should be planned as far from the riverbed as possible to protect alluvial and valuable forest areas that represent suitable habitats for the most valuable game species. • Plan and carry our works in such a way as to preserve forest areas as much as possible. • Restrict the movement of machinery and people to prevent disturbance of the peace. • Perform works outside the nesting period. • To the greatest extent possible, avoid occupation and fragmentation of habitats.
Water	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • In order to reduce the impact on the continuity of the flow and the morphology of the surrounding terrain, regularly maintain the area behind the barrier in terms of cleaning the deposited sediment during low water. • Channel slopes should be made in such a way as to enable groundwater drainage from the hinterland of the hydrotechnical object (structure) towards the watercourse (permeable geotextile, gravel layer). • Carry out the Regulation of river banks as to insure ground water flow from hinterland of the structure towards watercourse using adequate materials for riverbed stabilisation
Biodiversity	• For the construction of the reservoir, plan the intervention in such a way as not to interrupt the continuity of the water flow (river integrity) and to preserve the ecologically acceptable flow downstream with the use of the technology that leads to the least water turbidity. When planning location, avoid endangered and rare habitat types (according to nature protection regulations) and limit the permanent loss of riparian vegetation to the smallest possible extent. Also, the continuity of the migration routes of freshwater fish should be ensured. • Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). Stone revetments should be constructed roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation. • The construction of weirs and other barriers should be carried out at the least possible extent while preserving suitable rare and endangered habitats for rheophilic species. • Structural works on watercourses must be carried out in such a way as to enable migration of fish species and to avoid spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with

PROJECT / COMPONENT	MEASURE
	regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Dynamics and the manner of performing the construction works should be planned in accordance with the life cycles and ecological requirements of present fauna to minimize the disturbance during critical periods of their life cycles. • Minimize the construction works to the least extent to avoid the permanent loss of forests, grasslands, wetland, and aquatic habitats. • Ensure favorable hydrological conditions and water regime downstream of the catchment and in the surrounding ecologically dependent area. Ensure a year-round favorable hydrological regime downstream of the reservoirs of Česma River catchment, i.e. ecologically acceptable flow, as well as favorable physical and chemical conditions for the conservation of thick-shelled river mussel, its host fish species, and for the unhindered performance and development of the economic activity of fish farming on ponds Siščani, Blatnica and other.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials (especially in the immediate vicinity of *the Moslavačka gora Regional Park*).
Mitigation of climate changes	• Reduce the occupation of forest areas to the smallest possible extent, while still achieving the goals of flood protection. Where possible, prefer the construction of retentions instead of reservoir
Adaptation to climate changes	• Ensure environmentally acceptable flow downstream of the reservoir.
30 Flood protection project in the Ilova and Pakra basins	
Soil and agriculture	• Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Forests and forestry	• During the embankments constructions avoid encroachment on forest areas and ensure a favorable water regime and flooding dynamics for the forest communities dependent on floods through technical measures. • In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation.
Game and hunting	• Plan and carry our works in such a way as to preserve forest areas as much as possible. • Restrict the movement of machinery and people to prevent disturbance of the peace. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the breeding season of big game and nesting season.
Water	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs

PROJECT / COMPONENT	MEASURE
	• In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Channel slopes should be made in such a way as to enable groundwater drainage from the rear of the hydrotechnical object (structure) towards the watercourse (permeable geotextile, gravel layer). • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area that retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to jeopardize the existing hydrotechnical system on the watercourse.
Biodiversity	• While planning locations and the extent of detention basins, avoid rare and endangered habitat types. • Carry out the structural works in torrential streams in the least possible extent and preserve rare and endangered habitat types. • Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites. Plan construction works for bank stabilization and levees (dikes) in the least possible scope (extent) with the minimal required length and height. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Ensure a year-round favorable hydrological regime downstream of the reservoir, i.e., ecologically acceptable flow. • Dynamics and the manner of performing the construction works should be planned in accordance with the life cycles and ecological requirements of present fauna to minimize the disturbance during critical periods of their life cycles. Minimize the construction works to the least necessary extent and avoid the loss of forest, grassland, aquatic and wetland habitats. • Ensure favorable hydrological conditions and water regime downstream of the catchment and in the surrounding ecologically dependent area.
Landscape	• When developing solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials.
Cultural heritage	• When defining the location of the construction of stream protection and regulation buildings for of the City of Pakrac, avoid the area within the protected cultural and historical area of the City of Pakrac

PROJECT / COMPONENT	MEASURE
Adaptation to climate changes	• Ensure environmentally acceptable flow downstream of the reservoir. • When planning the extraction of water from the reservoir, ensure water supplies for other purposes, primarily for human consumption.
31 Flood protection project in the Šumetlica and Crnac basins	
Biodiversity	• For the construction of the reservoir, plan the intervention in such a way as not to interrupt the continuity of the water flow (river integrity) and to preserve the ecologically acceptable flow downstream with the use of the technology that leads to the least water turbidity. When planning location, avoid endangered and rare habitat types (according to nature protection regulations) and limit the permanent loss of riparian vegetation to the smallest possible extent. Also, the continuity of the migration routes of freshwater fish should be ensured. • Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • The construction of weirs and other barriers should be carried out at the least possible extent while preserving suitable rare and endangered habitats for rheophilic species. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites. Plan construction works for bank stabilization and levees (dikes) in the least possible scope (extent) with the minimal required length and height. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016).
Water	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Ensure environmentally acceptable flow downstream of reservoir • In order to reduce the impact on the continuity of the flow and the morphology of the surrounding terrain, regularly maintain the area behind the barrier in terms of cleaning the deposited sediment during low water. • Channel slopes should be made in such a way as to enable groundwater drainage from the rear of the hydrotechnical object (structure) towards the watercourse (permeable geotextile, gravel layer).
Game and hunting	• Restrict the movement of machinery and people to prevent disturbance of the peace. • To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • Perform works outside the nesting period. • To the greatest extent possible, avoid occupation and fragmentation of habitats.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a Study that will connect the existing watercourses and stagnant water (blue system) into the green infrastructure network. • Change the terrain morphology as little as possible.

PROJECT / COMPONENT	MEASURE
	• Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials.
Adaptation to climate changes	• Ensure environmentally acceptable flow downstream of the reservoir. • When planning the extraction of water from the reservoir, ensure water supplies for other purposes, primarily for human consumption.
32 Protection from the Sava River floods on the section between Nova Gradiška and Račinovci	
Soil and agriculture	• Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Biodiversity	• Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). Stone revetments should be constructed roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites. Removal of the riparian vegetation must be avoided as much as possible. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. • Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016).
Water	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Regulation of the banks of watercourses should be carried out in such a way as to enable the flow of underground water towards the surface watercourse by using adequate materials to stabilize the bed. • In order to reduce the impact on hydromorphology, apply the optimization of existing and new hydrotechnical structures (piers, revetments...).e.
Game and hunting	• Restrict the movement of machinery and people to prevent disturbance of the peace. • To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • Perform works outside the nesting period. • To the greatest extent possible, avoid occupation and fragmentation of habitats.
Landscape	• Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials.
Cultural heritage	• When planning the procedure in the premises, the conservation department of the relevant ministry should be consulted beforehand and further action should be determined according to the assessment of the situation.
Adaptation to climate changes	• Ensure environmentally acceptable flow downstream of the reservoir. • When planning the extraction of water from the reservoir, ensure water supplies for other purposes, primarily for human consumption.
33 Flood protection project in the Orljava basin	

PROJECT / COMPONENT	MEASURE
Soil and agriculture	• Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Forests and forestry	• When planning the locations of the reservoir basins avoid occupying forest areas and consider an alternative solution (construction of retention basin). • During the embankments constructions and watercourses regulations avoid encroachment on forest areas and ensure a favorable water regime and flooding dynamics for the forest communities dependent on floods through technical measures.
Biodiversity	• For the construction of the reservoir, plan the intervention in such a way as not to interrupt the continuity of the water flow (river integrity) and to preserve the ecologically acceptable flow downstream with the use of the technology that leads to the least water turbidity. When planning location, avoid endangered and rare habitat types (according to nature protection regulations) and limit the permanent loss of riparian vegetation to the smallest possible extent. Also, the continuity of the migration routes of freshwater fish should be ensured. • Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • The construction of weirs and other barriers should be carried out at the least possible extent while preserving suitable rare and endangered habitats for rheophilic species. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites. Plan construction works for bank stabilization and levees (dikes) in the least possible scope (extent) with the minimal required length and height. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Minimize the extent of the construction works in such a way as to avoid the loss of natural habitats. • Preserve as much as possible the natural streambanks, the natural structure and morphology of the streambed, and the riparian vegetation. Ensure the continuity of the water flow and enable upstream migration for fish and aquatic invertebrates. • Ensure favorable hydrological conditions and water regime downstream of the catchment and in the surrounding ecologically dependent area. • Plan the dynamics of the construction works in accordance with the ecological requirements of the present fauna, especially fish species. • Design sub-projects within this project unit to ensure permeability of the riverbed and hydrological connection with the underground; design banks with a slight (gentle) slope and use natural materials to allow smaller animals to leave the riverbed. • Minimize the scope of regulation and stabilization of the streambed of torrential and permanent streams and locate construction works on already anthropogenically modified stream sections, or where floods directly threaten settlements or important infrastructure.
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Restrict the movement of machinery and people to prevent disturbance of the peace. • Perform works outside the nesting period.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion.

PROJECT / COMPONENT	MEASURE
	• Carry out construction work in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Ensure environmentally acceptable flow downstream of reservoir. • Channel slopes should be made in such a way as to enable groundwater drainage from the rear of the hydrotechnical object (structure) towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to jeopardize the existing hydrotechnical system on the watercourse.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials.
Adaptation to climate changes	• Ensure environmentally acceptable flow downstream of the reservoir. • When planning the extraction of water from the reservoir, ensure water supplies for other purposes, primarily for human consumption.
34 Flood protection project in Brodska posavina	
Soil and agriculture	• During planning and designing project location, exclude the areas of P1 and P2 land. If this is not possible, cover the smallest possible area of P1 and P2 land. • When planning and designing, consider the variant of building retention instead of reservoir on P1 and P2 lands.
Biodiversity	• While planning locations and the extent of detention basins, avoid rare and endangered habitat types (in accordance with the regulations from the field of nature protection). • Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites. Plan construction works for bank stabilization and levees (dikes) in the least possible scope (extent) with the minimal required length and height. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016).
Soil and agriculture	• When planning and designing, plan the project outside the area of P1 and P2 land. If this is not possible, cover the smallest possible area of P1 and P2 land.
Water	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding).

PROJECT / COMPONENT	MEASURE
	• Channel slopes should be made in such a way as to enable groundwater drainage from the hinterland of the hydrotechnical object (structure) towards the watercourse (permeable geotextile, gravel layer). • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area that retention has its full function, which indirectly reduces the negative impact on hydromorphological elements.
Cultural heritage	• When planning the procedure in the premises, the conservation department of the relevant ministry should be consulted beforehand and further action should be determined according to the assessment of the situation.
Forests and forestry	• When planning the locations of the reservoir basins avoid occupying forest areas and consider an alternative solution (construction of retention basin). • In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation.
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Landscape	• Create a landscape study for the construction of the reservoir. • Create a Study that will connect the existing watercourses and stagnant water (blue system) into the green infrastructure network. • Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials.
Adaptation to climate changes	• Ensure environmentally acceptable flow downstream of the reservoir. • When planning the extraction of water from the reservoir, ensure water supplies for other purposes, primarily for human consumption.
35 Flood protection project in the Bid and Bosut basins	
Soil and agriculture	• During planning and designing project location, exclude the areas of P1 and P2 land. If this is not possible, cover the smallest possible area of P1 and P2 land.
Water	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Channel slopes should be made in such a way as to enable groundwater drainage from the hinterland of the hydrotechnical object (structure) towards the watercourse (permeable geotextile, gravel layer). • Ensure environmentally acceptable flow downstream of reservoir. • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to jeopardize the existing hydrotechnical system on the watercourse.
Forests and forestry	• Plan and carry out interventions in such a way as to protect forest areas as much as possible and avoid any unnecessary deforestation.
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period.

PROJECT / COMPONENT	MEASURE
	• Restrict the movement of machinery and people to prevent disturbance of the peace.
Biodiversity	• For the construction of the reservoir, plan the intervention in such a way as not to interrupt the continuity of the water flow (river integrity) and to preserve the ecologically acceptable flow downstream with the use of the technology that leads to the least water turbidity. • When planning location, avoid endangered and rare habitat types (according to nature protection regulations) and limit the permanent loss of riparian vegetation to the smallest possible extent. Also, the continuity of the migration routes of freshwater fish should be ensured. • When planning the reconstruction of the pumping station, plan the design as more environmentally friendly form by applying alternative measures at the sub-project level. • Direct the construction of the pumping station towards a more environmentally friendly form by applying alternative measures at the project level. • Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • Avoid endangered and rare habitat types when planning infrastructure sites. Plan construction works for bank stabilization and levees (dikes) in the least possible scope (extent) with the minimal required length and height. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials.
Cultural heritage	• For all intended interventions in the space, including the temporary use of the site for the purpose of construction of the accompanying infrastructure, special conditions in the field of protection and preservation of cultural property and confirmation of the project documentation of the intended intervention in the site in accordance with the special conditions or prior authorization for the planned works shall be obtained from the conservation department of the competent ministry. • In the area of protected archaeological sites, an archaeological research is mandatory. • If necessary, stop the works, carry out protective archaeological research and conservation of the findings in coordination with the conservation department of the relevant ministry.
Adaptation to climate changes	• Ensure environmentally acceptable flow downstream of the reservoir. • When planning the extraction of water from the reservoir, ensure water supplies for other purposes, primarily for human consumption.
50 Flood protection project in the Glina basin	
Forests and forestry	• Avoid any unnecessary deforestation and limit the movement of vehicles and heavy machinery to prevent damage of forest soil and vegetation outside the working zone. • In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation.

PROJECT / COMPONENT	MEASURE
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). To largest possible extent preserve the functionality of existing protection system against the adverse effect of water and hydrological regime. • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area so that the retention has its full function, which indirectly reduces the negative impact on hydromorphological elements..
Biodiversity	• While planning locations and the extent of detention basins, avoid rare and endangered habitat types (in accordance with the regulations from the field of nature protection). • Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Structural works on watercourses must be carried out in such a way as to enable migration of fish species and to avoid spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment.
Landscape	• Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials.
Cultural heritage	• Plan the retention outside the protected cultural and historical area of Topusko
51 Flood protection project in the Petrinjčica basin	
Forests and forestry	• Avoid any unnecessary deforestation and limit the movement of vehicles and heavy machinery to prevent damage of forest soil and vegetation outside the working zone. • In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation.
Biodiversity	• While planning locations and the extent of detention basins, avoid rare and endangered habitat types.
Water	• During preparation works, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion.

PROJECT / COMPONENT	MEASURE
	• Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area so that the retention has its full function, which indirectly reduces the negative impact on hydromorphological elements..
Landscape	• Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials.
53 Flood protection project in the Kutinica basin	
Forests and forestry	• When planning the locations of the reservoir basins avoid occupying valuable forest areas. Consider an alternative solution (construction of retention basin), which would achieve the goal of flood protection. Ensure a favorable water regime downstream of the reservoir. • In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation. • Avoid any unnecessary deforestation and limit the movement of vehicles and heavy machinery to prevent damage of forest soil and vegetation outside the working zone.
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Water	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Ensure environmentally acceptable flow downstream of the reservoir. • In order to reduce the impact on hydromorphology, apply the optimization of existing and new hydrotechnical structures (piers, coastal fortifications...).
Biodiversity	• For the construction of the reservoir, plan the intervention in such a way as not to interrupt the continuity of the water flow (river integrity) and to preserve the ecologically acceptable flow downstream with the use of the technology that leads to the least water turbidity. • When planning location, avoid endangered and rare habitat types (according to nature protection regulations) and limit the permanent loss of riparian vegetation to the smallest possible extent. Also, the continuity of the migration routes of freshwater fish should be ensured.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible.

PROJECT / COMPONENT	MEASURE
	• Preserve developed vegetation and use natural materials.
Adaptation to climate changes	• Ensure environmentally acceptable flow downstream of the reservoir. • When planning the extraction of water from the reservoir, ensure water supplies for other purposes, primarily for human consumption.
54 Flood protection project in the lower Dobra river basin	
Biodiversity	• Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • The construction of weirs and other barriers should be carried out at the least possible extent while preserving suitable rare and endangered habitats for rheophilic species. • Avoid endangered and rare habitat types when planning infrastructure sites. Plan construction works for bank stabilization and levees (dikes) in the least possible scope (extent) with the minimal required length and height. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016).
Water	• Plan and carry out the water protection at whole project area with stricter criteria at the sanitary protection zone area (including potential zones) in accordance with ordinance that defines sanitary protection zones of springs and decisions on sanitary protection zones of water springs • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • Plan the collection of wastewater and rainwater from infrastructure facilities and parking lots as a closed drainage system with wastewater treatment before discharge into the public drainage system. • During the construction and modernization of flood protection facilities, to the greatest extent possible, preserve the integrity of the existing protection system against the adverse effects of water and the existing hydrological regime. • In the case of the need for landscaping of buildings, in order to reduce the impact on hydromorphology, apply the improvement of the granulometric composition of the bed for the purpose of its stabilization and maintenance of the hydrological regime. • In order to reduce the impact on the continuity of the flow and the morphology of the surrounding terrain, regularly maintain the area behind the barrier in terms of cleaning the deposited sediment during low water. • Channel slopes should be made in such a way as to enable groundwater drainage from the back of the building towards the watercourse (permeable geotextile, gravel layer).
58 Flood protection project in the Mrežnica basin	
Water	• Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. Also, all construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution. • In project planning phase, include impact of climate changes when assesing the risk of adverse effects of water (flooding). • The watercourse banks should be constructed in such a way as to enable groundwater drainage from the back of the building towards the watercourse using adequate materials for riverbed stabilisation.
WMD for Upper Sava	
24 Flood protection project in the Middle Sava river basin	

PROJECT / COMPONENT	MEASURE
Soil and agriculture	• Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Forests and forestry	• Plan the routes of new embankments in such a way as to avoid encroachment on forest areas and to ensure a favorable water regime and flooding dynamics for the forest communities dependent on floods through technical measures. • Reconstruction and rehabilitation of embankments, as far as possible, should be planned and carried out along the route of existing embankments. • During the planning of interventions that are expected to have impact on the water regime, establish a water monitoring program and based on the results, plan the measures that will ensure a favorable water regime for forest communities dependent on it. • Limit the movement of vehicles and heavy machinery to prevent damage of forest soil and vegetation outside the working zone.
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Water	• Carry out the projects in a way that hydromorphological condition of water bodies does not deteriorated, that is, the impact on hydromorphological condition should be minimal. • All construction work should be carried out without causing deterioration of chemical and ecological state of waterbodies, with minimum risk of pollution, especially on locations within or near sanitary protection zones. • In order to reduce the impact on hydromorphology, apply the optimization of existing and new hydrotechnical structures (piers, coastal fortifications...). • In order to reduce the impact on the continuity of the flow and the morphology of the surrounding terrain, regularly maintain the area behind the barrier in terms of cleaning the deposited sediment during low water. • Regulation of the watercourse bed should be carried out in such a way as to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the watercourse. • Channel cuts should be made in such a way as to enable groundwater drainage from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of the planned hydrotechnical structures on the watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). Stone revetments should be constructed roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation. • The construction of weirs and other barriers should be carried out at the least possible extent while preserving suitable rare and endangered habitats for rheophilic species. • Structural works on watercourses must be carried out in such a way as to enable migration of fish species and to avoid spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with

PROJECT / COMPONENT	MEASURE
	regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Reconstruction of the levees should be planned and carried out along the alignment of the existing levees unless their change is necessary for protection against the adverse effects of water. • Minimize the construction works area and avoid the permanent loss of alluvial forests, grasslands (hay meadows), wetland, riparian, and aquatic habitats. • Plan the dynamics of the construction works in accordance with the ecological requirements of the present fauna. • Bank stabilization on Sava River and construction of revetments should be planned only exceptionally on the shortest possible sections and only where there are is no other technical solution to ensure flood protection. The scope (length, height) of revetments must be minimized and alternative solutions (instead of revetments) should be planned wherever possible. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials *(*especially within *PP Lonjsko polje* and *Significant Landscapes Turopoljski lug and Sunjsko polje).*
Cultural heritage	• When planning the construction of the embankment, avoid the area of individually protected cultural property, as these works could affect their cultural properties. • If the procedure needs to be located within a protected cultural property, ask for guidance from the relevant conservation department.
Mitigation of climate changes	• Reduce the occupation of forest areas to the smallest possible extent.
25 Flood protection project in the Krapina basin	
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Water	• During project planning, when assessing the risk of adverse effects of water (flooding), include the impacts of climate change. • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area so that the retention has its full function, which indirectly reduces the negative impact on hydromorphological elements.

PROJECT / COMPONENT	MEASURE
	• In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to jeopardize the existing hydrotechnical system on the watercourse.
Mitigation of climate changes	• As far as possible, plan the locations of projects to avoid forest areas, especially special purpose forests.
26 Flood protection project in the Samobor basins	
Soil and agriculture	• During planning and designing of the projects, ensure that the impact of the construction on soil erosion is minimized.
Water	• When planning interventions in the area, when assessing the risk of harmful effects of water (flooding), include the effects of climate change. • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area so that the retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • Regulation of the watercourse bed should be carried out in such a way as to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the watercourse. • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to jeopardize the existing hydrotechnical system on the watercourse.
Forests and forestry	• As far as possible, locations of the interventions should be planned in such a way to avoid occupying valuable forest areas. • By organizing the construction site, prevent the tree felling along the edge of the stream and by careful handling of machinery prevent/minimize damage of marginal vegetation and forest soil outside the working zone. • Coordinate and monitor the dynamics of work execution and tree felling. • In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation.
Cultural heritage	For projects within the Protected Landscape Area Žumberak - Samoborsko gorje - Plešivica prigorje, ask the relevant nature conservation department for advice and: • change the morphology of the terrain as little as possible. • preserve the existing landscape pattern (monitor the existing parcelling) within valuable cultivated areas. • to preserve the vegetation that has grown and to use natural materials.
Mitigation of climate changes	• As far as possible, plan the locations of projects to avoid forest areas, especially special purpose forests.
27 Flood protection project in the Sjeverno Zagrebačko Prisavlje basin	
Biodiversity	• Regulation of watercourses, bank stabilization and construction of levees must be planned in the minimal necessary extent (minimal length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Carry out the works in such a way that the longitudinal migration route of freshwater fish species is enabled, and that the pollution of watercourse is avoided. • Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the

PROJECT / COMPONENT	MEASURE
	ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Ding construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment.
Water	• Protection of waters and water bodies should be planned and carried out in the entire area, with stricter criteria in the area of sanitary protection zones (including potential ones) in accordance with the ordinance establishing sanitary protection zones of water sources and decisions on sanitary protection zones of water sources. • During project planning, when assessing the risk of adverse effects of water (flooding), include the impacts of climate change. • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area so that the retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to jeopardize the existing hydrotechnical system on the watercourse.
Landscape	• Create a landscape study for the intervention of the watercourse Regulation. • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials.
28 Flood protection project in the Zelina and Lonja basins	
Soil and agriculture	• During planning and designing project location, exclude the areas of P1 and P2 land. If this is not possible, cover the smallest possible area of P1 and P2 land.
Biodiversity	• When planning the locations and the scope of reservoirs and detention basin, avoid occupation of rare and endangered habitat types (in accordance with the regulations in the field of nature protection). • Construction works for linear structures in the watercourse which are planned outside of the extent of the existing structures should be planned during low water flows, while avoiding nesting and spawning periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites. Plan construction works for bank stabilization and levees (dikes) in the least possible scope (extent) with the minimal required length and height. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. Minimize the impact of construction works by applying alternative restoration and/or improvement works that must be consistent with the ecological requirements of the species and habitats, following the expert guidelines on river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Ensure a year-round favorable hydrological regime downstream of the reservoir, i.e. ecologically acceptable flow.
Water	• During the preparatory work, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for immersion, and to reduce the possibility of erosion.

PROJECT / COMPONENT	MEASURE
	• Perform all works in such a way that the ecological and chemical condition does not deteriorate, that is, with a minimal risk of pollution. • Protection of waters and water bodies should be planned and carried out in the entire area, with stricter criteria in the area of sanitary protection zones (including potential ones) in accordance with the rulebook establishing sanitary protection zones of water sources and decisions on sanitary protection zones of water sources. • During project planning, when assessing the risk of adverse effects of water (flooding), include the effects of climate change. • Ensure environmentally acceptable flow downstream of the reservoir • Channel cuts should be made in such a way as to enable groundwater drainage from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of the planned hydrotechnical structures on the watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Forests and forestry	• When planning the locations of the reservoir basins avoid occupying forest areas. Consider an alternative solution (construction of retention basin), which would achieve the goal of flood protection. Ensure a favorable water regime downstream of the reservoir. In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation.
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Landscape	• When creating solutions for the Regulation of watercourses, take care to preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials.
48 Flood protection project in the Sutla basin	
Biodiversity	• Regulation of watercourses, bank stabilization and construction of levees must be planned in the minimal necessary extent (minimal length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Carry out the works in such a way that the longitudinal migration route of freshwater fish species is enabled, and that the pollution of watercourse is avoided. • Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment.
Water	• Protection of waters and water bodies should be planned and carried out in the entire area, with stricter criteria in the area of sanitary protection zones (including potential ones) in

PROJECT / COMPONENT	MEASURE
	accordance with the rulebook establishing sanitary protection zones of water sources and decisions on sanitary protection zones of water sources. • During project planning, when assessing the risk of adverse effects of water (flooding), include the effects of climate change. • To the greatest extent possible, preserve the functionality of the existing protection system against the adverse effects of water and the existing hydrological regime. • In order to reduce the impact on hydromorphology, apply the optimization of existing and new hydrotechnical structures (piers, coastal fortifications...).
WMD for the Mura and Upper Drava	
36 Flood protection project of the Drava River from the Slovenian border to Pitomača	
Soil and agriculture	• Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Forests and forestry	• As far as possible, interventions should be planned in such a way to avoid occupying forest areas, especially special purpose forests. • When planning the embankments (re)constructions technical measures should be implemented to ensure a favorable water regime and flooding dynamics for the forest communities dependent on floods.
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Water	• Perform all works in such a way that the ecological and chemical condition does not deteriorate, that is, with a minimal risk of contamination in any way, especially in locations that are in sanitary protection zones. • During project planning, when assessing the risk of adverse effects of water (flooding), include the effects of climate change. • Channel cuts should be made in such a way as to enable groundwater drainage from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer). • Carry out the Regulation of the watercourse bed as to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the watercourse. • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• Design levees (dikes) reconstruction at the sub-project level in such a way that the change or loss of natural riverbanks, riparian habitats and habitats in the floodplain is minimized, i.e., along previously anthropogenically modified riverbanks while avoiding endangered and rare habitat types (according to regulations in the field of nature protection). If the above is not possible, during the levee design, where possible, plan its position far enough from the watercourse to ensure natural flooding and thus prevent a negative impact on natural habitats in river's floodplain. To the greatest extent possible, avoid removing riparian vegetation and deepening the riverbed. • Carry out construction works in the watercourse during low flows or dry streambed, avoiding important periods for reproduction of the present animal species dependent of the aquatic habitats. • Plan reconstruction of the existing levees (dikes) in such a way as to enable future flooding of natural habitats in the floodplain unless that represents the flood protection risk for the settlements and important infrastructure. • Regulation of watercourses, bank stabilization and construction of levees must be planned in the minimal necessary extent (minimal length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be

PROJECT / COMPONENT	MEASURE
	left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Carry out the works in such a way that the longitudinal migration route of freshwater fish species is enabled, and that the pollution of watercourse is avoided. • Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Landscape	• Prepare landscape studies for revitalization of old backwaters. • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials (especially within *the Mura - Drava Regional Park*).
Mitigation of climate changes	• To build embankments, use natural materials as much as possible. As far as possible, plan the locations of projects to avoid forest areas, especially special purpose forests.
38 Flood protection project of the Mura River	
Soil and agriculture	• Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Forests and forestry	• When planning the embankments (re)constructions technical measures should be implemented to ensure a favorable water regime and flooding dynamics for the forest communities dependent on floods.
Water	• Perform all works in such a way that the ecological and chemical condition does not deteriorate, that is, with a minimal risk of contamination in any way, especially in locations that are in sanitary protection zones. • During project planning, when assessing the risk of adverse effects of water (flooding), include the effects of climate change. • Channel cuts should be made in such a way as to enable groundwater drainage from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• Design levees (dikes) reconstruction at the sub-project level in such a way that the change or loss of natural riverbanks, riparian habitats and habitats in the floodplain is minimized, i.e., along previously anthropogenically modified riverbanks while avoiding endangered and rare habitat types (according to regulations in the field of nature protection). If the above is not possible, during the levee design, where possible, plan its position far enough from the watercourse to ensure natural flooding and thus prevent a negative impact on

PROJECT / COMPONENT	MEASURE
	natural habitats in river's floodplain. To the greatest extent possible, avoid removing riparian vegetation and deepening the riverbed. • Carry out construction works in the watercourse during low flows or dry streambed, avoiding important periods for reproduction of the present animal species dependent of the aquatic habitats. • Plan reconstruction of the existing levees (dikes) in such a way as to enable future flooding of natural habitats in the floodplain unless that represents the flood protection risk for the settlements and important infrastructure.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Landscape	• Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials (especially within the *Important Landscape of the Mura* and *the Mura - Drava Regional Park*).
Mitigation of climate changes	• To build embankments, use natural materials as much as possible.
39 Flood protection project in the Bednja basin	
Soil and agriculture	• When planning and designing projects location, exclude the areas of P1 and P2 land. If this is not possible, cover the smallest possible area of P1 and P2 land. • Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Water	• During the preparatory work, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for immersion and to reduce the possibility of erosion. • Perform all work that the ecological and chemical condition does not deteriorate, that is, with a minimal risk of contamination in any way, especially in locations that are in sanitary protection zones. • During project planning, when assessing the risk of adverse effects of water (flooding), include the effects of climate change. • To the greatest extent possible, preserve the functionality of the existing protection system against the adverse effects of water and the existing hydrological regime. • Ensure environmentally acceptable flow downstream of the reservoir. • Carry out the Regulation of the watercourse bed as to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the watercourse. • Channel cuts should be made in such a way as to enable groundwater drainage from the rear of the building towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Forests and forestry	• As far as possible, interventions should be planned in such a way to avoid occupying forest areas • Where possible, prefer the construction of retentions instead of reservoirs. In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation. • When planning the embankments (re)constructions technical measures should be implemented to ensure a favorable water regime and flooding dynamics for the forest communities dependent on floods.

PROJECT / COMPONENT	MEASURE
	• When carrying out construction works, use the existing or planned forest transport infrastructure, and limit the movement of vehicles and heavy machinery to prevent damage of forest soil and vegetation outside the working zone.
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Biodiversity	• For the construction of the reservoir, plan the intervention in such a way as not to interrupt the continuity of the water flow (river integrity) and to preserve the ecologically acceptable flow downstream with the use of the technology that leads to the least water turbidity. When planning location, avoid endangered and rare habitat types (according to nature protection regulations) and limit the permanent loss of riparian vegetation to the smallest possible extent. Also, the continuity of the migration routes of freshwater fish should be ensured. • Design levees (dikes) reconstruction at the sub-project level in such a way that the change or loss of natural riverbanks, riparian habitats and habitats in the floodplain is minimized, i.e., along previously anthropogenically modified riverbanks while avoiding endangered and rare habitat types (according to regulations in the field of nature protection). If the above is not possible, during the levee design, where possible, plan its position far enough from the watercourse to ensure natural flooding and thus prevent a negative impact on natural habitats in river's floodplain. To the greatest extent possible, avoid removing riparian vegetation and deepening the riverbed. • Carry out construction works in the watercourse during low flows or dry streambed, avoiding important periods for reproduction of the present animal species dependent of the aquatic habitats. • Plan reconstruction of the existing levees (dikes) in such a way as to enable future flooding of natural habitats in the floodplain unless that represents the flood protection risk for the settlements and important infrastructure. • Regulation of watercourses, bank stabilization and construction of levees must be planned in the minimal necessary extent (minimal length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Carry out the works in such a way that the longitudinal migration route of freshwater fish species is enabled, and that the pollution of watercourse is avoided. • Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas.

PROJECT / COMPONENT	MEASURE
	• Preserve developed vegetation and use natural materials (especially within *Trakošćan Forest Park*).
Cultural heritage	• In the case of all earthworks on the protected cultural property (Trakošćan Castle), including temporary use of the site for the purpose of construction of the associated infrastructure, inform the competent conservation department beforehand and, if necessary, carry out an archaeological field inspection. After the inspection and depending on the results, further measures for the protection of cultural assets shall be determined. • If during the construction of water structures there is reasonable suspicion of archaeological remains or if contact is made with them, expert archaeological supervision is to be ensured during the execution of all earthworks in coordination with the conservation department of the responsible ministry. Also, if necessary, discontinue the works, carry out protective archaeological research and any findings are to be preserved in consultation with the conservation department of the responsible ministry.
Mitigation of climate changes	• Regulation of the riverbed should be carried out to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the riverbed. • If possible, instead of reservoir, build retention.
40 Flood protection project in the Trnava basin	
Soil and agriculture	• Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Landscape	• Create landscape studies for watercourse management projects. • Create a Study that will connect the existing watercourses and stagnant water (blue system) into the green infrastructure network. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials.
Water	• Perform all work so that the ecological and chemical condition does not deteriorate, that is, with a minimal risk of contamination in any way, especially in locations that are in sanitary protection zones. • During project planning, when assessing the risk of adverse effects of water (flooding), include the effects of climate change. • Channel cuts should be made in such a way as to enable groundwater drainage from the rear of the building towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• Design levees (dikes) reconstruction at the sub-project level in such a way that the change or loss of natural riverbanks, riparian habitats and habitats in the floodplain is minimized, i.e., along previously anthropogenically modified riverbanks while avoiding endangered and rare habitat types (according to regulations in the field of nature protection). If the above is not possible, during the levee design, where possible, plan its position far enough from the watercourse to ensure natural flooding and thus prevent a negative impact on natural habitats in river's floodplain. To the greatest extent possible, avoid removing riparian vegetation and deepening the riverbed. • Avoid performing the works that cause removal of riparian vegetation and deepening of the streambed. • Carry out construction works in the watercourse during low flows or dry streambed, avoiding important periods for reproduction of the present animal species dependent of the aquatic habitats. • Plan reconstruction of the existing levees (dikes) in such a way as to enable future flooding of natural habitats in the floodplain unless that represents the flood protection risk for the settlements and important infrastructure.

PROJECT / COMPONENT	MEASURE
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Forests and forestry	• As far as possible, interventions should be planned in such a way to avoid occupying forest areas. • In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation. • By organizing the construction site, prevent the tree felling along the edge of the stream and by careful handling of machinery prevent/minimize damage of marginal vegetation and forest soil outside the working zone. • Coordinate and monitor the dynamics of work execution and tree felling
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Mitigation of climate changes	• Regulation of the riverbed should be carried out to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the riverbed. • As far as possible, plan the locations of projects in such a way as to avoid the occupation of forest areas..
41 Flood protection project in the Bistra basin	
Soil and agriculture	• When planning and designing projects location, exclude the areas of P1 and P2 land. If this is not possible, cover the smallest possible area of P1 and P2 land.
Water	• During the preparatory work, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for immersion and to reduce the possibility of erosion. • Perform all work so that the ecological and chemical condition does not deteriorate, that is, with a minimal risk of contamination in any way, especially in locations that are in sanitary protection zones. • During project planning, when assessing the risk of adverse effects of water (flooding), include the effects of climate change. To the greatest extent possible, preserve the functionality of the existing protection system against the adverse effects of water and the existing hydrological regime. • Ensure environmentally acceptable flow downstream of the reservoir. • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area so that the retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • Carry out the Regulation of the watercourse bed as to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the watercourse. • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Forests and forestry	• As far as possible, interventions should be planned in such a way to avoid occupying valuable forest areas.

PROJECT / COMPONENT	MEASURE
	• In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation. • By organizing the construction site, prevent the tree felling along the edge of the stream and by careful handling of machinery prevent/minimize damage of marginal vegetation and forest soil outside the working zone. • Coordinate and monitor the dynamics of work execution and tree felling.
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Biodiversity	• For the construction of detention basins, plan the location of the intervention in natural flooding area of watercourses, while avoiding tha damage and loss of endangered and rare habitat types (according to regulations in the field of nature protection). • Regulation of watercourses, bank stabilization and construction of levees must be planned in the minimal necessary extent (minimal length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Carry out the works in such a way that the longitudinal migration route of freshwater fish species is enabled, and that the pollution of watercourse is avoided. • Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials.
Mitigation of climate changes	• Regulation of the riverbed should be carried out to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the riverbed. • As far as possible, plan the locations of projects in such a way as to avoid the occupation of forest areas.
49 Flood protection project in the Plitvice basin	
Soil and agriculture	• Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Forests and forestry	• As far as possible, interventions should be planned in such a way to avoid occupying valuable forest areas. • In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation.

PROJECT / COMPONENT	MEASURE
	• By organizing the construction site, prevent the tree felling along the edge of the stream and by careful handling of machinery prevent/minimize damage of marginal vegetation and forest soil outside the working zone. • Coordinate and monitor the dynamics of work execution and tree felling.
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Water	• During the preparatory work, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for immersion and to reduce the possibility of erosion. • Perform all work so that the ecological and chemical condition does not deteriorate, that is, with a minimal risk of contamination in any way, especially in locations that are in sanitary protection zones. • During project planning, when assessing the risk of adverse effects of water (flooding), include the effects of climate change. To the greatest extent possible, preserve the functionality of the existing protection system against the adverse effects of water and the existing hydrological regime. • Stabilization of the banks and slopes of the facilities should be carried out in such a way as to enable the drainage of groundwater from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer). • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area so that the retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • Regulation of the watercourse bed should be carried out in such a way as to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the watercourse. • Channel cuts should be made in such a way as to enable groundwater drainage from the hinterland of the structure towards the watercourse (permeable geotextile, gravel layer). • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• Regulation of torrential streams should be planned in the least possible extent, i.e., on the shortest possible stream sections, while preserving the rare and endangered habitat types. • For the construction of detention basins, plan the location of the intervention in natural flooding area of watercourses, while avoiding the damage and loss of endangered and rare habitat types (according to regulations in the field of nature protection). • Design levees (dikes) reconstruction at the sub-project level in such a way that the change or loss of natural riverbanks, riparian habitats and habitats in the floodplain is minimized, i.e., along previously anthropogenically modified riverbanks while avoiding endangered and rare habitat types (according to regulations in the field of nature protection). If the above is not possible, during the levee design, where possible, plan its position far enough from the watercourse to ensure natural flooding and thus prevent a negative impact on natural habitats in river's floodplain. To the greatest extent possible, avoid removing riparian vegetation and deepening the riverbed. • Carry out construction works in the watercourse during low flows or dry streambed, avoiding important periods for reproduction of the present animal species dependent of the aquatic habitats.

PROJECT / COMPONENT	MEASURE
	• Plan reconstruction of the existing levees (dikes) in such a way as to enable future flooding of natural habitats in the floodplain unless that represents the flood protection risk for the settlements and important infrastructure. • Plan the organization of the construction site in such a way as to minimize the damage and loss of natural habitats. • Regulation of watercourses, bank stabilization and construction of levees must be planned in the minimal necessary extent (minimal length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Carry out the works in such a way that the longitudinal migration route of freshwater fish species is enabled, and that the pollution of watercourse is avoided. • Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Landscape	• Create landscape studies for watercourse management projects. • Create a Study that will connect the existing watercourses and stagnant water (blue system) into the green infrastructure network. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials (especially within *the Mura - Drava Regional Park*).
Mitigation of climate changes	• Regulation of the riverbed should be carried out to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the riverbed. • As far as possible, plan the locations of projects in such a way as to avoid the occupation of forest areas.
WMD for the Danube and lower Drava	
37 Flood protection project of the Drava River from Pitomača to the Danube estuary	
Soil and agriculture	• Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Forests and forestry	• For the construction of the Osijek multi-purpose hydrotechnical system, establish cooperation with the experts from the relevant forestry services in the field of forest ecology, forestry, and hydrology to assess the impact and risks that could arise from the implementation of the project and determine protection measures at the project level based on the opinion of experts. • When planning the embankments (re)constructions technical measures should be implemented to ensure a favorable water regime and flooding dynamics for the forest communities dependent on floods. • Before carrying out the construction works, clear mine-suspected areas.

PROJECT / COMPONENT	MEASURE
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Establish cooperation with hunting authorities and consider alternative interventions and their locations • Preserve forest vegetation as much as possible. • Restrict the movement of machinery and people to prevent disturbance of the peace. • Perform works outside the nesting period. • Perform works outside the mating period, especially for big game.
Vode	• All works must be carried out in such a way that there is no deterioration of the ecological and chemical condition, that is, with a minimal risk of pollution in any way, especially in locations that are in sanitary protection zones or its peripheral areas. • During project planning, when assessing the risk of adverse effects of water (flooding), include the effects of climate change. • In order to reduce the impact on the continuity of the flow and the morphology of the surrounding terrain, the area behind the barrier should be regularly maintained in terms of cleaning the precipitated sediment during low water. • Regulation of the watercourse bed should be carried out in such a way as to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the watercourse. • Channel cuts should be made in such a way as to enable groundwater drainage from the rear of the building towards the watercourse (permeable geotextile, gravel layer). • Regulation of the banks of watercourses should be carried out in such a way as to enable the flow of underground water towards the surface watercourse by using adequate materials to stabilize the bed. • In order to reduce the impact on hydromorphology, apply the optimization of existing and new hydrotechnical structures (piers, coastal fortifications...).
Biodiversity	• Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • Structural works on watercourses must be carried out in such a way as to enable migration of fish species and to avoid spawning and nesting periods. • Regulation of watercourses, bank stabilization and construction of levees must be planned in the minimal necessary extent (minimal length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016).

PROJECT / COMPONENT	MEASURE
	• Minimize the extent of the construction works and avoid the permanent loss of alluvial forests, grassland (hay meadows), wetland, and aquatic habitats. • Reconstruction of the levees should be planned and carried out along the alignment of the existing levees unless their change is necessary for protection against the adverse effects of water. • Plan the alignments of new levees in such a way that valuable habitats and habitats important for the conservation of animal species (flooded and alluvial forests, wet grasslands, aquatic, and wetland habitats) are kept within the inundation area bounded by the levee and that a favorable water regime and natural flood dynamics are preserved. • Bank stabilization and construction of revetments should be planned only exceptionally on the shortest possible sections and along already anthropogenically modified banks, where the bank stabilization is necessary to ensure flood protection of settlements and the infrastructure. The scope (length, height) of revetments must be minimized. Revetments are allowed to be constructed only where there is no other technical solution to ensure flood protection. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment. • By adequate technical design of revitalization sub-projects ensure minimal future hydrotechnical interventions within the scope of the revitalization (i.e., ensure long-term self-sustainability od the revitalized area), natural hydrological regime and natural flooding dynamics, as well as the enhancement of hydromorphological features od Drava River. • Ensure favorable hydrological conditions and water regime downstream of the catchment and in the surrounding ecologically dependent area, and for the unhindered performance and development of the economic activity of fish farming.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Landscape	• Create landscape studies for watercourse management projects. • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials (especially within *the Mura - Drava Regional Park*).
Mitigation of climate changes	• As far as possible, plan the locations of projects in such a way as to avoid the occupation of forest areas.
42 Flood protection project in the Županijski kanal basin	
Soil and agriculture	• When planning and designing projects location, exclude the areas of P1 and P2 land. If this is not possible, cover the smallest possible area of P1 and P2 land.
Water	• Protection of waters and water bodies should be planned and carried out in the entire area, with stricter criteria in the area of sanitary protection zones (including potential ones) in accordance with the rulebook establishing sanitary protection zones of water sources and decisions on sanitary protection zones of water sources. • When planning interventions in the area, when assessing the risk of adverse effects of water (flooding), include the effects of climate change • Ensure environmentally acceptable flow downstream of the reservoir. • Regulation of the watercourse bed must be carried out in such a way as to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the bed. • • In order to reduce the impact on the continuity of the flow and the morphology of the surrounding terrain, regularly maintain the area behind the barrier in terms of cleaning the deposited sediment during low water.

PROJECT / COMPONENT	MEASURE
Biodiversity	• For the construction of the reservoir, plan the intervention in such a way as not to interrupt the continuity of the water flow (river integrity) and to preserve the ecologically acceptable flow downstream with the use of the technology that leads to the least water turbidity. When planning location, avoid endangered and rare habitat types (according to nature protection regulations) and limit the permanent loss of riparian vegetation to the smallest possible extent. Also, the continuity of the migration routes of freshwater fish should be ensured. • The construction of weirs and other barriers should be carried out at the least possible extent while preserving suitable rare and endangered habitats for rheophilic species. • Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • Regulation of watercourses, bank stabilization and construction of levees must be planned in the minimal necessary extent (minimal length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Structural works on watercourses must be carried out in such a way as to enable migration of fish species and to avoid spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Dynamics and the manner of performing the construction works should be planned in such a way as to minimize the disturbance of animal species, especially fish, birds, and amphibians, during important periods of their life cycles. • Minimize the extent of the construction works and avoid the permanent loss of alluvial forests, grasslands (hay meadows), wetland, and aquatic habitats. • Maintain the continuity of the watercourse and enable the upstream-downstream migration of the animal species present within the scope of the individual sub-project. • Preserve the natural morphology and structure of riverbed and riverbanks during watercourse regulation. Design the banks of watercourses with slight (gentle) slopes and from natural materials. Preserve riparian vegetation and restore it after construction if it is damaged. Preserve the hydrological connection of the surface flow and the underground in such a way as to ensure the permeability of the riverbed. • Regulation and stabilization of the streambed should be carried out only exceptionally, on shorter sections, on anthropogenically altered sections of the stream, and in settlements to protect people and important infrastructure from flooding. Use bioengineering solutions wherever possible. • Preserve favorable hydrological conditions and water regime downstream and upstream of the project and in the surrounding ecologically dependent area.

PROJECT / COMPONENT	MEASURE
	• To retain water in the in the basin and to attenuate the stormwater runoff, give priority to the construction of detention basins instead of reservoir, i.e., reservoirs (sub-projects 2022, 2023, 2026).
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Forests and forestry	• As far as possible, interventions should be planned in such a way to avoid occupying forest areas.
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Landscape	• When creating solutions for the Regulation of watercourses, take care to preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a Study that will connect the existing watercourses and stagnant water (blue system) into the green infrastructure network. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials (especially within *the Mura - Drava Regional Park*).
Mitigation of climate changes	• As far as possible, plan the locations of projects in such a way as to avoid the occupation of forest areas.
43 Flood protection project in the Karašica and Vučica basins	
Soil and agriculture	• When planning and designing projects location, exclude the areas of P1 and P2 land. If this is not possible, cover the smallest possible area of P1 and P2 land.
Water	• During the preparatory work, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Perform all work in such a way that there is no deterioration of the ecological and chemical condition, that is, with a minimal risk of pollution in any way, especially in the areas of the sanitary protection zones of the source. • During project planning when assessing the risk of adverse effects of water (flooding), include the effects of climate change. • Ensure environmentally acceptable flow downstream of the reservoir. • Regulation of the watercourse bed should be carried out in such a way as to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the watercourse. • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities must be dimensioned to meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• For the construction of the reservoir, plan the intervention in such a way as not to interrupt the continuity of the water flow (river integrity) and to preserve the ecologically acceptable flow downstream with the use of the technology that leads to the least water turbidity. When planning location, avoid endangered and rare habitat types (according to nature protection regulations) and limit the permanent loss of riparian vegetation to the smallest

PROJECT / COMPONENT	MEASURE
	possible extent. Also, the continuity of the migration routes of freshwater fish should be ensured. • Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Regulation of watercourses, bank stabilization and construction of levees must be planned in the minimal necessary extent (minimal length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Structural works on watercourses must be carried out in such a way as to enable migration of fish species and to avoid spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Ensure a year-round favorable hydrological regime downstream of the reservoir, i.e., ecologically acceptable flow. • Plan the dynamics of the construction works in accordance with the ecological requirements of the present fauna. • Minimize the extent of the construction works and avoid the permanent loss of alluvial forests, grasslands (hay meadows), wetland, and aquatic habitats.
Forests and forestry	• When planning the locations of the reservoir basins avoid occupying valuable forest areas and consider an alternative solution (construction of retention basin) where possible. In case of retention basins constructions, ensure efficient drainage of water from the retention to prevent excessive water stagnation. • Coordinate and monitor the dynamics of work execution and tree felling. •
Game and hunting	• To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Landscape	• When creating solutions for the Regulation of watercourses, take care to preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a Study that will connect the existing watercourses and stagnant water (blue system) into the green infrastructure network. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials.
Mitigation of climate changes	• As far as possible, plan the locations of interventions in such a way as to avoid the occupation of forest areas.
Adaptation to climate changes	• Ensure environmentally acceptable flow downstream of the reservoir.
44 Flood protection project in the Vuka basin	

PROJECT / COMPONENT	MEASURE
Soil and agriculture	• When planning and designing, take into account a possible project change - construction of retention instead of reservoir on P1 and P2 lands.
Biodiversity	• For the construction of the reservoir, plan the intervention in such a way as not to interrupt the continuity of the water flow (river integrity) and to preserve the ecologically acceptable flow downstream with the use of the technology that leads to the least water turbidity. When planning location, avoid endangered and rare habitat types (according to nature protection regulations) and limit the permanent loss of riparian vegetation to the smallest possible extent. Also, the continuity of the migration routes of freshwater fish should be ensured. • The construction of weirs and other barriers should be carried out at the least possible extent while preserving suitable rare and endangered habitats for rheophilic species. • Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Structural works on watercourses must be carried out in such a way as to enable migration of fish species and to avoid spawning and nesting periods. • Regulation of watercourses, bank stabilization and construction of levees must be planned in the minimal necessary extent (minimal length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016).
Water	• During the preparatory work, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Perform all operations in such a way that there is no deterioration of the ecological and chemical condition, that is, with a minimal risk of pollution in any way, especially in the areas of the sanitary protection zones of the source. • During project planning, when assessing the risk of adverse effects of water (flooding), include the effects of climate change • Regulation of the banks of watercourses should be carried out in such a way as to enable the flow of underground water towards the surface watercourse by using adequate materials to stabilize the bed. • In order to reduce the impact on the continuity of the flow and the morphology of the surrounding terrain, regularly maintain the area behind the barrier in terms of cleaning the precipitated sediment during low water. • Channel cuts should be made in such a way as to enable groundwater drainage from the rear of the building towards the watercourse (permeable geotextile, gravel layer). • Ensure environmentally acceptable flow downstream of the reservoir. • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs

PROJECT / COMPONENT	MEASURE
	of already built facilities upstream and downstream, so as not to jeopardize the existing hydrotechnical system on the watercourse.
Landscape	• When developing solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials.
Game and hunting	• Restrict the movement of machinery and people to prevent disturbance of the peace.
Cultural heritage	• For all intended interventions at the site, including the temporary use of the site for the purpose of construction of the accompanying infrastructure, special conditions in the field of protection and preservation of cultural heritage shall be obtained from the conservation department of the competent ministry and further measures for the protection of cultural property shall be determined in accordance with the results. • If there is a reasonable suspicion of the presence of or interaction with an archaeological site or other remains of cultural heritage during the construction of water structures, professional archaeological monitoring shall be provided during the execution of all earthworks in consultation with the relevant heritage department. If you come across an archaeological site or findings, discontinue the work and inform the competent authority - the conservation department of the relevant ministry, which will continue to act within its legal powers.
45 Flood protection project of the Danube River	
Soil and agriculture	• Avoid the selection of soil material sites for the construction of protective embankments on P1 and P2 lands.
Forests and forestry	• Plan interventions in such a way that, as far as possible, the occupation of alluvial forests is avoided. • When planning the embankments (re)constructions technical measures should be implemented to ensure a favorable water regime and flooding dynamics for the forest communities dependent on floods. • When carrying out construction works, use the existing or planned forest transport infrastructure, and limit the movement of vehicles and heavy machinery to prevent damage of forest soil and vegetation outside the working zone. • Before carrying out the construction works, clear mine-suspected areas.
Game and hunting	• Establish cooperation with hunting authorities and consider alternative interventions and their locations. • To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Carry out works outside the mating season, especially of big game, and nesting season. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Water	• All works must be carried out in such a way that there is no deterioration of the ecological and chemical condition, that is, with a minimal risk of pollution in any way, especially in locations that are in sanitary protection zones or its peripheral areas. • When planning interventions in the area, when assessing the risk of adverse effects of water (flooding), include the effects of climate change. • Regulation of the watercourse bed should be carried out in such a way as to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the watercourse.

PROJECT / COMPONENT	MEASURE
	• Channel cuts should be made in such a way as to enable groundwater drainage from the rear of the building towards the watercourse (permeable geotextile, gravel layer). • In order to reduce the impact on hydromorphology, apply the optimization of existing and new hydrotechnical structures (piers, coastal fortifications...).
Biodiversity	• Construction works on the same watercourse should be carried out separately in time (without overlapping in two or more areas on the same watercourse), at low water level, avoiding spawning and nesting periods. • Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). Stone revetments should be constructed roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Avoid endangered and rare habitat types when planning infrastructure sites. Plan construction works for bank stabilization and levees (dikes) in the least possible scope (extent) with the minimal required length and height. Perform the works in such a way that the migration of freshwater fish species is not prevented or interrupted. • Carry out flood protection measures while minimizing construction impacts by applying alternative restoration or enhancement measures that must be in accordance with the ecological needs of species and habitats, respecting the expert guidelines for river management (Stručne smjernice – Upravljanje rijekama, HAOP 2016). • Reconstruction of the levees should be planned and carried out along the alignment of the existing levees, unless their change is necessary for protection against the adverse effects of water. • Plan the alignments of new levees in such a way that valuable habitats and habitats important for the conservation of animal species (flooded and alluvial forests, wet grasslands, aquatic, and wetland habitats) are kept within the inundation area bounded by the levee and that a favorable water regime and natural flood dynamics are preserved. • Bank stabilization and construction of revetments should be planned only exceptionally on the shortest possible sections and along already anthropogenically modified banks, where the bank stabilization is necessary to ensure flood protection of settlements and the infrastructure. The scope (length, height) of revetments must be minimized. Revetments are allowed to be constructed only where there is no other technical solution to ensure flood protection. When designing revetments apply landscape and other technical solutions to diversify habitats in the riverbed and banks slopes along revetment. • By adequate technical design of revitalization sub-projects ensure minimal future hydrotechnical interventions within the scope of the revitalization (i.e., ensure long-term self-sustainability od the revitalized area), natural hydrological regime and natural flooding dynamics, as well as the enhancement of hydromorphological features od Danube River. • Ensure favorable hydrological conditions and water regime downstream of the catchment and in the surrounding ecologically dependent area and for the unhindered performance and development of the economic activity of fish farming in the ponds in Bilje Municipality.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction, or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.

PROJECT / COMPONENT	MEASURE
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a Study that will connect the existing watercourses and stagnant water (blue system) into the green infrastructure network. • Change the terrain morphology as little as possible. • Preserve developed vegetation and use natural materials (especially in the area of *PP Kopački rit*).
Mitigation of climate changes	• As far as possible, plan the locations of projects in such a way as to avoid the occupation of forest areas.
46 Flood protection project in the Baranja area	
Soil and agriculture	• When planning and designing, plan projects location outside the areas of P1 and P2 land. If this is not possible, cover the smallest possible area of P1 and P2 land. • When planning and designing, take into account a possible project change - construction of retention instead of reservoir on P1 and P2 lands.
Game and hunting	• Establish cooperation with hunting authorities and consider alternative interventions and their locations. • To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Carry out works outside the mating season, especially of big game, and nesting season. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Vode	• During the preparatory work, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out all work in such a way that there is no deterioration of the ecological and chemical condition, that is, with a minimal risk of pollution in any way, especially in areas. source sanitary protection zone. • During project planning, when assessing the risk of adverse effects of water (flooding), include the effects of climate change. • Ensure environmentally acceptable flow downstream of the reservoir. • In order to reduce the impact on the continuity of the flow and the morphology of the surrounding terrain, regularly maintain the area behind the barrier in terms of cleaning the deposited sediment during low water. • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area so that the retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • Regulation of the watercourse bed should be carried out in such a way as to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the watercourse. • In order to avoid the negative cumulative impact of the planned hydrotechnical structures on the watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• For the construction of the reservoir, plan the intervention in such a way as not to interrupt the continuity of the water flow (river integrity) and to preserve the ecologically acceptable flow downstream with the use of the technology that leads to the least water turbidity. When planning location, avoid endangered and rare habitat types (according to nature protection regulations) and limit the permanent loss of riparian vegetation to the smallest

PROJECT / COMPONENT	MEASURE
	possible extent. Also, the continuity of the migration routes of freshwater fish should be ensured. Ensure enough water in the watercourses from which water is taken for fish farming in order to enable the unhindered performance and development of the economic activity of fish farming. • When planning the reconstruction of the pumping station, avoid endangered and rare habitat types (according to regulations in the field of nature protection) and limit the additional removal of riparian vegetation to the least extent possible. Direct the reconstruction towards a more environmentally friendly form by applying alternative measures at the project level. • Structural works to stabilize the riverbanks and eroded surfaces along the riverbanks should be planned and carried out on previously anthropogenically modified sections, i.e., on sections where floods directly threaten settlements or important infrastructure in such a way as to minimize the impact on the natural riverbanks and rare and endangered riparian habitats of the floodplain (according to regulations in the field of nature protection). • Regulation of watercourses, bank stabilization and construction of levees must be planned in the minimal necessary extent (minimal length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old, developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation). • Structural works on watercourses must be carried out in such a way as to enable migration of fish species and to avoid spawning and nesting periods. • During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment. • Reconstructions of the existing hydrotechnical objects should be planned and carried out within the scope of the existing ones, unless the change is necessary for the flood protection.
Protected areas	• Organize the construction site in such a way as to minimize the damage to the natural habitats. • Minimize the probability of the introduction and spread of invasive alien plant and animal species during intervention planning, construction or maintenance, using exclusively native species during recultivation and timely removal of invasive alien species individuals in the construction site, until the establishment of native vegetation.
Landscape	• When creating solutions for the Regulation of watercourses, preserve the existing elements of green infrastructure (vegetation, linear green stretches, watercourses and stagnant water). • Create a landscape study that will connect existing watercourses and stagnant waters (blue system) into the network of green infrastructure. • Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials (especially in the area of *PP Kopački rit* and *RP Mura - Drava*). • Preserve developed vegetation and use natural materials.
Adaptation to climate changes	• Ensure sufficient quantities of water downstream from the reservoirs, especially for fish farming, in order to enable the unhindered performance and development of economic activities.
52 Flood protection project in the Danube river basin downstream of Vukovar	
Soil and agriculture	• When planning and designing, plan projects location outside the areas of P1 and P2 land. If this is not possible, cover the smallest possible area of P1 and P2 land.

PROJECT / COMPONENT	MEASURE
	• When planning and designing, take into account a possible project change - construction of retention instead of reservoir on P1 and P2 lands.
Forests and forestry	• When carrying out construction works, use the existing or planned forest transport infrastructure, and limit the movement of vehicles and heavy machinery to prevent damage of forest soil and vegetation outside the working zone. • When planning the locations of the reservoir basins avoid occupying valuable forest areas and consider an alternative solution (construction of retention basin) where possible.
Game and hunting	• Establish cooperation with hunting authorities and consider alternative interventions and their locations. • To the greatest extent, preserve the coastal vegetation and reduce the damage of surrounding vegetation, especially forests. • To the greatest extent possible, avoid occupation and fragmentation of habitats. • Carry out works outside the mating season, especially of big game, and nesting season. • Restrict the movement of machinery and people to prevent disturbance of the peace.
Water	• During the preparatory work, remove the remains of cut grass, shrubs, bushes and trees, but leave the stumps in order to leave as little organic matter as possible in the area intended for submersion and to reduce the possibility of erosion. • Carry out all work in such a way that there is no deterioration of the ecological and chemical condition, that is, with a minimal risk of pollution in any way, especially in areas. source sanitary protection zone. • During project planning, when assessing the risk of adverse effects of water (flooding), include the effects of climate change. • • Ensure environmentally acceptable flow downstream of the reservoir. • Channel cuts should be made in such a way as to enable groundwater drainage from the rear of the building towards the watercourse (permeable geotextile, gravel layer). • Properly dimension the evacuation retention structures in order to enable the continuity of the watercourse and the hydrological regime in the watercourse during non-extreme hydrological conditions, which would reduce the impact on the hydromorphological elements of the watercourse. • Regularly clean sediment from the retention area so that the retention has its full function, which indirectly reduces the negative impact on hydromorphological elements. • Regulation of the watercourse bed should be carried out in such a way as to enable the flow of underground water towards the surface watercourse by using adequate materials for stabilizing the watercourse. • In order to avoid the negative cumulative impact of planned hydrotechnical structures on a watercourse, the planned facilities should be dimensioned so that they meet the needs of already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse.
Biodiversity	• For the construction of the reservoir, plan the intervention in such a way as not to interrupt the continuity of the water flow (river integrity) and to preserve the ecologically acceptable flow downstream with the use of the technology that leads to the least water turbidity. When planning location, avoid endangered and rare habitat types (according to nature protection regulations) and limit the permanent loss of riparian vegetation to the smallest possible extent. Also, the continuity of the migration routes of freshwater fish should be ensured. • While planning the location of detention basins, avoid rare and endangered habitat types (in accordance with regulations in the field of nature protection). • Bank stabilization and construction of revetments should be planned in the least possible extent (minimal required length and height). If possible, use natural materials. If not, stabilise only the lowest part of the riverbank, and upper part should be left intact (natural). If the construction of stone revetment is necessary on some sections, it should be constructed in the roughly, by leaving old developed trees, covering the riverbanks and revetment slopes with soil and humus for the development of natural vegetation).

PROJECT / COMPONENT	MEASURE
	• During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the construction equipment.
Cultural heritage	• Prior to the commencement of work, the protective measures in the area of protected cultural property shall be determined in cooperation with the conservation department of the relevant ministry and, depending on the assessment of the situation, the further procedure shall be agreed upon. • For all intended interventions in the space, including temporary use of the premises for the purpose of construction of the accompanying infrastructure, special conditions in the field of protection and preservation of cultural property and confirmation of the project documentation of the intended intervention in the premises in accordance with the special conditions or prior authorization for the planned works shall be obtained from the conservation department of the competent ministry.
Adaptation to climate changes	• Ensure ecologically acceptable flow downstream from the reservoir and use of water for other purposes, except irrigation.

Construction of land reclamation facilities

Theme	Measure
Forests and forestry	• Projects near forest edges should be carried out in such a way as not to damage the edge trees. • For water bodies from which water is taken, ensure the preservation of a favorable water regime for forest habitats dependent on it.
Game and hunting	• To the greatest extent possible, avoid occupation and fragmentation of habitats. • Perform works outside the nesting period. • Perform works outside the mating period, especially for big game • Restrict the movement of machinery outside the working zone.
Water	• Water intakes should be carried out in such a way that the ecologically acceptable flow downstream of the intakes is not disturbed, that is, the hydromorphological condition of the water bodies does not deteriorate. • When several irrigation systems are planned on the same watercourse or reservoir, they should be planned together in order to avoid cumulative impacts and disruption of the environmentally acceptable flow in watercourses, i.e. lowering the water level in reservoirs. • When planning new water extractions, all existing water intake should be taken into account in the calculation of water availability. • In periods of reduced water inflow, limit the use of irrigation systems, that is, the capture of water. • In order to avoid the negative cumulative impact of the planned hydrotechnical buildings, the planned facilities should be dimensioned so that they meet the needs of the already built facilities upstream and downstream, so as not to endanger the existing hydrotechnical system on the watercourse. • Protection of waters and water bodies should be planned and carried out in the entire area, with stricter criteria in the area of sanitary protection zones (including potential ones) in accordance with the ordinance establishing sanitary protection zones of water sources and decisions on sanitary protection zones of water springs.
Biodiversity	• Plan structural works in such a way as to minimize the impact on natural state of present habitats and the riverbed.

	• During construction and maintenance, implement appropriate measures to prevent the introduction and spread of invasive alien plant and animal species (in accordance with regulations from the field of nature protection) with mandatory removal of plant and mud remains, removal of remaining living organisms, and drying of the equipment. • All water withdrawals must be developed at the catchment level in order to avoid cumulative impact to the ecologically acceptable flow in watercourses or on water level in the lakes. • Ensure a year-round favorable hydrological regime downstream of the reservoir, i.e. ecologically acceptable flow in the watercourses in order to enable the unhindered development of aquaculture in the existing fish farms.
Protected areas	• During planning the expansion of the existing irrigation system and irrigation distribution network for irrigation system Gat-extension (Project No. 72) plan the organization of the construction site in such a way as to minimize the damage to the natural habitats in the Mura-Drava Regional Park.
Landscape	• Change the terrain morphology as little as possible. • Preserve the existing landscape pattern (follow the existing subdivision) within valuable cultivated areas. • Preserve developed vegetation and use natural materials Preserve developed vegetation and use natural materials (especially within protected areas such as *Regional Park Mura - Drava* and *Park Architecture Monument Zagreb - Park Maksimir*). • After construction, rehabilitate all areas affected by the construction works in such a way that they are brought to a state similar as it was before the start of construction.
Cultural heritage	• When planning how to proceed in the premises, the conservation department of the relevant ministry shall be consulted beforehand and further action shall be determined according to the assessment of the situation. • In case of projects in the immediate vicinity of archaeological protection zones (Orljava - Londža irrigation system next to Mihaljevačko polje - Beč archaeological zone), carry out a preliminary archaeological research of the site and ask for advice from the conservation department of the relevant ministry. • When building water structures, provide for professional archaeological supervision (permanent or occasional) during the execution of all earthworks in the construction area. If necessary, discontinue the work, carry out protective archaeological research and conservation of findings in consultation with the Conservation department of the relevant Ministry.
Population and human health	• When planning new water extractiones, ensure water supplies for other purposes, primarily for human consumption.
Adaptation to climate changes	• When planning new water extractions, all previously performed extractions should be taken into account in the calculation of water availability. • In periods of reduced water inflows, limit the use of irrigation systems, that is, provide water for human consumption as well. • For water bodies from which water is taken, ensure the preservation of a favorable water regime for forest habitats dependent on it.

4.2 Environmental Monitoring Program

At the territory of the Republic of Croatia, monitoring of a number of parameters of the state of the environment is carried out, the results of which are for the most part an integral part of the Environmental Protection Information System (ESPI), which is managed by the Institute for Environmental and Nature Protection of the Ministry of Economy and Sustainable Development, and the database used by other competent institutions. Furthermore, mechanisms for monitoring the state of the environment have been established in the Republic of Croatia through environmental impact assessment procedures and through the issuance of water law acts for individual projects.

Water Monitoring

According to the Water Area Management Plan for the period 2016-2020, in order to achieve the goals of water protection and protection against the adverse effects of water, the following parameters are monitored:

- monitoring and evaluation of the state of water quality
- monitoring and evaluation of bathing water quality
- monitoring and evaluation of indicators of eutrophication in sensitive areas
- monitoring of nitrate concentration in areas subject to nitrate pollution of agricultural origin
- monitoring and determination of hydrological conditions (including monitoring, collection, control, processing, storage and publication of hydrological data, analysis of the hydrological regime, forecasting of extreme hydrological phenomena, floods and droughts), assessment of flood risks, monitoring of the state of watercourses and the state of regulation and protection water facilities.
– monitoring of underground water levels
- monitoring the quality of water used for irrigation

The state of water bodies is monitored by Hrvatske vode (Croatian Waters). According to the Law on Meteorological and Hydrological Activities in the Republic of Croatia (NN 66/2016), the State Hydrometeorological Institute of the Republic of Croatia conducts monitoring of the state of surface and underground waters within the framework of the national monitoring network.

The monitoring of the state of surface waters takes place according to the Rulebook on the state network of the meteorological and hydrological monitoring system (Official Gazette 142/21). Hydrological monitoring is carried out in cooperation with the Državni hidrometeorološki zavod (State Hydrometeorological Institute), Hrvatske vode, Hrvatska elektroprivreda (Croatian Electrical Company) and other interested legal bodies (national parks, nature parks, Ministry of the Sea, Transport and Infrastructure), according to the Rulebook on the relationship between the state network and other meteorological and hydrological networks (Official Gazette 142 /21) as well as according to the Decision on determining the position of meteorological, hydrological, meteorological-oceanographic and phenological stations of interest to the Republic of Croatia and the Decision on their work program (Official Gazette 143/21).

Groundwater level monitoring has been established on hundreds of piezometers in the valleys of the Drava and Sava rivers. A large number of piezometers were constructed for the purposes of designing and monitoring the operation of hydroelectric power plants planned and/or constructed on these rivers. The largest number is in the western part of the Drava and Sava basins. Organized monitoring has not been established in the Sava basin downstream from Sisak, except in the area of the Spačva

basin ecosystem, which is not part of the national monitoring network carried out by the State Hydrometeorological Institute of the Republic of Croatia.

Verified data on the state of surface and underground waters are stored in the archive database of the State Hydrometeorological Institute, and reports are submitted on an annual basis according to the Ordinance on the Archive of Data, Products and Information (Official Gazette 142/21).

Forest ecosystems

Monitoring of the conditions of forest ecosystems at the national level has been carried out since 1987 within the framework of the International Cooperative Program on Assessment of Monitoring of Air Pollution Effects (ICP Forests). Since 2007, the Forest Ecosystem Damage Monitoring Program has been carried out according to the Ordinance on the method of data collection, the network of points, maintaining the register and the conditions for using data on the damage to forest ecosystems (Official gazette 129/06). Monitoring is carried out in cooperation with the Croatian Forestry Institute, the Faculty of Forestry and Croatian Forests, with the National Coordination Center at the Croatian Forestry Institute, and reports are submitted on an annual basis.
Due to the potential negative impact of the construction of certain interventions on the hydrological regime in the lowland forest stands dependent on the same, it is proposed to establish monitoring of water regime, health status and dynamics of the stand structure for the water management departments for the middle and lower Sava (project areas 20, 24, 29 and 35), Mura and upper Drava (project area 36) and Danube and lower Drava (project area 37). Monitoring should be established for projects that are assessed to lead to changes in the hydrological regime, in terms of the absence of floods in areas with regular floods, lowering of groundwater levels, excessive retention of water in stands etc. At the end of the monitoring, it is necessary to submit a report and, if needed, continue with further monitoring.

The Multiannual Programme plans to systematically monitor the indicators of the results of the Program's implementation and the achievement of goals, as well as the continuation of the implementation of individual projects. Monitoring of individual projects will be carried out at the level of WMDs. Data will be collected on the physical and operational progress of each individual project. Monitoring of the results of irrigation systems construction is carried out at the county level.

In the proposed program for monitoring the implementation of individual projects, it is necessary to include the monitoring of the implementation of environmental and ecological network protection measures proposed by the Strategic study.

For irrigation systems, carry out constant monitoring of affected amounts of water in order not to impair the ecologically acceptable flow in watercourses, that is, to prevent unacceptable lowering of groundwater level.

4.3 Brief overview of considered reasonable alternatives of the Multiannual Programme

Multiannual Programme for the Construction of Regulation, Protection and Land Reclamation Water Facilities for the Period until 2030 does not consider variant solutions. The strategic study analysed the development of the environment without the implementation of the Multiannual Programme, which includes 58 projects for the construction of regulation and protection facilities and 93 projects for the

construction of land reclamation facilities. However, it should kept in mind that not all planned projects will be realized in the upcoming period for which this Multiannual Programme is adopted. The mentioned projects will be implemented depending on the results of further elaboration, i.e. at the level of preparation of technical documentation of a higher level of detail (feasibility studies, conceptual or main projects).

Likewise, during the preparation of the Multiannual Programme itself and during the preparation of a strategic environmental assessment study of the Multiannual Programme, the developer revised the preliminary list of projects according to the established protection priorities and according to the results of the first environmental impact analyses with an emphasis on the areas of the ecological network. The final list of projects is the result of the iterative process of creating a multiannual programme and analysing possible environmental impacts.

5 Conclusion of the conducted assessment

The strategic study analysed the possible impacts of the planned projects of the Multiannual Programme.

The Multiannual Programme plans to build a series of **water protection projects** systematized into project units formed according to the relevant flood defence systems, spatial location and area of influence (area of a small basin, municipality or city, etc.). The strategic study analysed possible impacts on the environment at the level of project units, not at the level of individual projects. This approach ensures a better understanding of the wider effects, especially the cumulative effects of the program's impact on the environment. At the same time, individual water structures were also considered according to the following types:

- linear buildings in the riverbed - revetments, channel
- linear structures in the flood area - embankment, canal, wall, bank stabilization
- regulation of floods, erosion and landslides
- partitions in the riverbed
- retention
- reservoirs
- water intakes
- regulation of watercourses and revitalization
- combined and unclassified buildings – hydrotechnical system, notification buildings, flood protection system (general)

Irrigation projects are reviewed individually and at the level of water management departments. Land reclamtaion facilities can be divided into two groups

- water intakes (including the distribution network)
- irrigation systems (extension of existing systems)

An analysis of the characteristics and spatial arrangement of the projects determined that the greatest pressure is expected on the following components of the environment: biological diversity, forests and forestry, ecological network areas, protected nature areas, landscape and cultural heritage. Through the Strategic Environmental Assessment procedure, possible pressures on individual components of the environment were identified, and environmental protection measures were proposed in accordance with the aforementioned.