Towards effective conservation and governance of Pontocaspian biodiversity in the Black Sea region

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Legal framework for Pontocaspian biodiversity conservation in the Danube Delta (Romania and Ukraine)

In preparation:
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Abstract
Legal arrangements play an important role in biodiversity conservation planning, implementation and coordination of actions. These arrangements are complex and operate on different levels of governance (from supranational to national), which means that the status of single species or populations may be governed by a set of interacting or even conflicting regulations, with increasing complexity for species that occur across national borders. Romania (EU member state) and Ukraine (non-EU member state) exemplify neighboring countries with different governance systems, which share the same endemic aquatic community that inhabits the transitional zones between freshwater and marine ecosystems, known as Pontocaspian (PC) biota. This community includes surrogate species such as sturgeons, and lesser-known crustaceans and mollusks and is severely threatened as a result of human activities. We assessed the legal basis for the protection of PC biota in the Danube Delta and the effectiveness of current conservation approaches based on a review of legal documents and literature, expert opinion, and practitioner reflections regarding PC biodiversity conservation. We found that PC invertebrate species are not adequately addressed in the current legal documents and that the surrogate approach (where protection of umbrella species results in protection of background species) does not work as there is little overlap between the habitats of sturgeons and PC invertebrate communities. Furthermore, the habitat definitions currently used in legal documents lack the level of detail needed to protect PC habitats that are characterized by specific salinity (brackish) conditions. We finish by sketching out recommendations towards improved legal and political frameworks for effective and efficient conservation of PC invertebrate biota.

3.1 Introduction

Biodiversity conservation benefits from a clear and transparent legal and political framework (De Klemm and Shine 1993; Díaz et al. 2019). International Environmental Regimes (IERs) set conservation goals and provide guidance on how to achieve these goals, whereas the national legislation provides a framework for the actions and restrictions at the national level to meet international obligations. A prominent example of an IER is the Convention on Biological Diversity (CBD 1992), which defines the global biodiversity goals and provides the policies for its parties (individual contracting countries) to implement. The European Union (EU), while establishing environmental policy for its member states (see e.g. Delreux and Happaerts 2016), is conceptually broader than an IER (Skjærseth and Wettestad 2002), because "EU member states have transferred national sovereignty to a supranational institution. Accordingly, EU laws are directly binding on the member states rather than requiring member states to ratify joint commitments, as is the case within international regimes" (Skjærseth and Wettestad 2002, p. 103).

Legal arrangements to address biodiversity conservation operate on different levels of governance from supranational (e.g., UN or EU) to national and sub-national. This means that rules and policies inevitably influence each other, whether they target the same or different environmental challenges (Visseren-Hamakers 2018). As a result, often the same species and single populations are governed by an interacting, combined set of regulations, more so if their distribution crosses national borders (Iwanski 2011; Singh 1999). Regulations may support each other, have no effect, or may counteract. Few studies have investigated the relationships and the combined performance of different rules and governance systems in the context of biodiversity conservation (Gomar et al. 2014; Visseren-Hamakers 2018). However, understanding the mutual effects of different legal instruments , and how these instruments deal jointly with conservation needs, is imperative for effective conservation outcomes (Visseren-Hamakers 2015). In this paper, we will assess the level of coherence among the regulations governing biodiversity conservation in one of Europe's largest deltas, the Danube Delta, which is under shared responsibility of Ukraine and Romania and that hosts a unique aquatic fauna.

Romania and Ukraine exemplify countries with different governance systems, which share the responsibility for effective conservation and governance of species and ecosystems within the Danube Delta (ICPDR 2015, 2020). Romania is an EU member state since 2007, while Ukraine is signatory to an EU-association agreement. Consequently, Romania is legally bound to EU Directives, including the Habitats Directive (EU 1992) and Birds Directive (EU 2009), respecting at the same time the national conservation legislation, while Ukraine is currently in the process of approximation to the EU acquis. The Danube Delta is internationally recognized as Europe's largest water purification system and important wildlife habitat and its management is regulated by a number of different rules and regulations (Baboianu 2016; Teampău 2020; The World Bank study team 2015). For example, as a 'Waterflow Habitat' it is a designated Ramsar site in Romania and Ukraine. Additionally, within the UNESCO Man and Biosphere Program, it is declared as a

"Danube Delta transboundary Biosphere Reserve Ukraine and Romania". Furthermore, the Danube Delta is protected and managed through the Danube River Protection Convention (1994) and the Bern Convention (1979). From all these treaties and policy instruments, the latter is the most significant for biodiversity conservation as it builds a network of protected areas such as Natura 2000 and Emerald sites in Romania and Ukraine respectively, to provide protection to threatened species and habitats (Díaz 2010; Evans 2012).

The Danube Delta shelters a unique, aquatic ecological community, known as the Pontocaspian (PC) biodiversity (Popa et al. 2009; Velde et al. 2019; Wesselingh et al. 2019), which is characterized by charismatic vertebrate species such as sturgeons, lesser-known invertebrate groups, such as mollusks and crustaceans, as well as diatoms and dinoflagellates (Grigorovich et al. 2003; Marret et al. 2004). PC habitats comprise transitional zones between the freshwater, and salt water bodies on coastal plains of the Black Sea and the Sea of Azov, such as lower stretches of rivers, lagoons, delta areas, estuaries, brackish lakes and bays, as well as the entire Caspian Sea (Gogaladze et al. Submitted; Zenkevitch 1963). However, many PC species also inhabit fresh waters in lower reaches of large rivers. The PC biota is threatened and rapidly declining due to direct anthropogenic drivers, such as damming of rivers, modification of marine and freshwater influx in coastal areas and invasive species among others (Son 2007a, b; Velde et al. 2019); as well as indirect drivers, such as limited knowledge on PC species and suboptimal institutional alignment of stakeholders (Gogaladze et al. 2020a; Gogaladze et al. 2020b; Wesselingh et al. 2019). The legal basis to address the decline of PC biodiversity, has not been studied, with the exception of sturgeon species (Munteanu et al. 2013; Reinartz et al. 2012).

Conservation of species can be achieved through ecosystem-based measures (also known as the coarse-filter approach) and/or species-based measures (also known as fine-filter approaches) (Glowka et al. 1998). Ecosystem-based conservation targets biotic communities, instead of individual species, and potentially benefits many species simultaneously. Biotic communities are often defined by surrogate taxa (Groves et al. 2000), which involve keystone, indicator, umbrella and flagship species (Favreau et al. 2006). Flagship species are primarily used to promote public awareness and to raise funds for conservation (Verissimo et al. 2011), while the protection of umbrella species is expected to benefit a wide range of co-occurring species (Caro 2010; Roberge and Angelstam 2004). Consequently, the flagship species selection is based on sociocultural considerations, whereas umbrella species are selected based on ecological criteria (Caro 2010; Verissimo et al. 2011). PC sturgeon species are both flagship and umbrella species of the Black Sea and Danube Delta region according to the International Commission for the Protection of the Danube River (ICPDR 2018, 2020). Whether sturgeons can be seen as surrogates for the other PC biota remains unclear. For example, studies on benefits to the invertebrate PC communities from sturgeon conservation are lacking. This may be, partly, explained by the fact that PC invertebrate species have disputed taxonomy, include multiple synonymies and misidentifications, and are mostly data deficient in IUCN assessments (see e.g. Wesselingh et al. 2019 for PC mollusk species).

Consequently, it might be the case that PC invertebrate species fall through the 'coarse filters' of area-based conservation approaches (and thus do not benefit from sturgeon conservation measures) and may require the 'fine-filter' of species or community-based approaches.
We use the Danube Delta case to assess whether the legal bases in Romania and Ukraine are sufficient to support the conservation of PC biodiversity, and study the impact of regulations from the supranational institutions, such as the EU. First, we analyze whether PC invertebrate species and flagship sturgeon species or their habitats are represented in the current legal documents. Second, we assess whether the different regulations are coherent among each other and whether regulations for sturgeons are likely to be relevant for other PC species and habitats. Following Gomar et al. (2014), we define coherence as the complementarity of action (mutual reinforcement) and not as post-accession compliance with EU environmental legislation, or consistency or compatibility of action (absence of contradiction). Third, we assess the degree to which the conservation of PC species and habitats is implemented, through examining the current conservation programs and plans and the extent to which PC habitats are covered by the network of protected areas (PAs) as well as the representation of PC species in the PA management plans..

3.2 Methods

PC habitats encompass several habitats from the European Nature Information System (EUNIS) classification (https://eunis.eea.europa.eu/). These are:

1. A2: Littoral sediment
2. C1.2: Permanent mesotrophic lakes, ponds and pools
3. C2.32: Metapotamal and hypopotamal streams
4. C2.41: Brackish water tidal rivers
5. C2.42: Freshwater tidal rivers (within low reaches of large rivers and estuaries in Ukrainian and Romanian sectors of Black and Azov seas)
6. X01: Estuaries
7. X03: Brackish coastal lagoons

In the Danube Delta (Fig. 3.1) all except 'C2.41: Brackish water tidal rivers' are present so we exclude it from the analysis. There are no tides in the BSB (Giosan et al. 1999), but the regular wind surges that occur in the open estuaries of the BSB, e.g., in the Danube and Don Deltas cause the upstream movement of the sea water into the deltas creating conditions that are similar to the 'tidal rivers' in the other sea basins. Therefore, we include the C2.42: Freshwater tidal rivers in our analysis. We adopt the definition of the Danube Delta area from WWF (2007) and The World Bank study team (2014, 2015), who include lower stretch of the Danube River – from Braila to the Black Sea; its 3 branches – Chilia, Sulina and Sf. Gheorghe and the floodplain lakes around these branches; Razim-Sinoe Lake complex in Romania to the south and a number of large lakes on the Ukrainian northern side of the delta (Fig. 3.1).

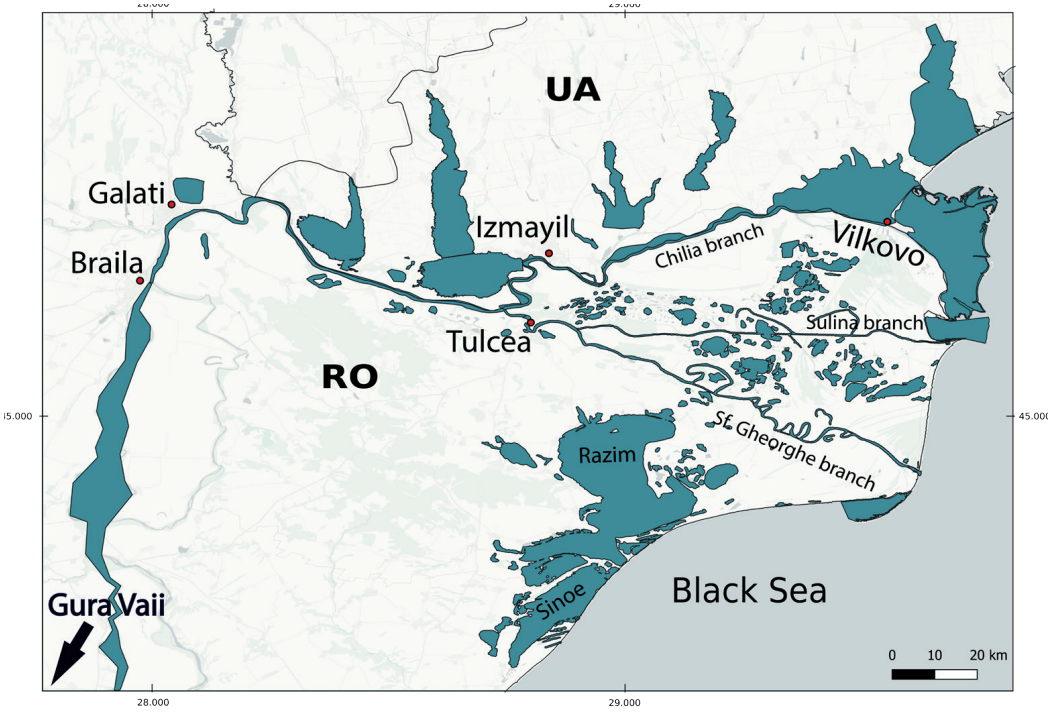

Figure 3.1. Pontocaspian Habitats in the Danube Delta are shown in blue. According to Gogaladze et al. (Submitted) PC habitats extend upstream the Danube River from Bralia up till Gura Vaii commune in Romania. This study, however, focuses on Danube Delta so the Danube River upstream from Braila is not included in the analyses.

3.2.1 Identifying relevant legal documents

We define Pontocaspian (PC) biodiversity related legal documents as those which directly promote the conservation of PC species and/or PC habitats. Legal documents for the analysis were selected on a global, regional (EU and the Black Sea) and national levels. Globally, all five biodiversity-related conventions (Koester 2002) plus the Convention on Environmental Impact Assessment in a Transboundary Context, also known as Espoo Convention (UNECE 1991) were included. The five global biodiversity-related conventions are: 1) Convention on Biological Diversity (CBD 1992); 2) Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973), also known as the Washington Convention; 3) Convention on the Conservation of Migratory Species of Wild Animals (CMS 1979) also known as the Bonn Convention; 4) Convention on Wetlands of International Importance Especially as Waterfowl Habitat (UNESCO 1971), also known as the Ramsar Convention; and 5) Convention for the Protection of the World Cultural and Natural Heritage (UNESCO 1972), commonly known and World Heritage Convention (WHC).

At regional level (EU and the Black Sea) we selected conventions based on two criteria. First, they had to list the species, ecological communities and habitat types, or any of these as a cornerstone for conservation efforts. Second, they had to be operational in Ukraine and/or in Romania. Most prominent example of such convention is the Bern Convention on the Conservation of European Wildlife and Natural Habitats (Council of Europe 1979). Additionally, we considered Convention on the Protection of the Black Sea against Pollution (Black Sea Commission 1992), also known as 'Bucharest Convention', which did not directly list the species and habitat types but whose implementation required listing of species and habitats on national and/or regional levels. Furthermore, we included in the analysis the Convention on cooperation for the protection and sustainable use of the river Danube (DRPC 1994), which ensures sustainability and effective nature conservation of the Danube River. At the EU level, all biodiversity-related Directives, such as: 1) The Birds Directive (EU 2009); 2) the Habitats Directive (EU 1992); 3) Water Framework Directive (EU 2000); and 4) Marine Strategy Framework Directive (EU 2008) were included. Additionally, we included the EU Wildlife Trade Regulations (EU 1996), which is the EU-Level implementation mechanism of CITES.

National Romanian laws were retrieved from the national biodiversity strategy and action plan of Romania (The Government of Romania 2014) and the fifth national report to the CBD (Ministry of Environment and Climate Change of Romania 2014). The list of Ukrainian national laws was built from the fifth and sixth national reports on implementation of the Convention on Biological Diversity (Ministry of Ecology and Natural Resources of Ukraine 2015, 2018). The official texts of national laws and their amendments, appendices and annexes were retrieved from the official legislative portals of Romania (http://legislatie.just.ro/) and Ukraine (https://zakon.rada.gov.ua/laws/main/index). Provisions of national laws were only available in official languages of the issuing countries so they were Google translated in English for analysis. All the legal documents and their amendments were read and carefully examined and only those were selected which a) provided lists of species and/or habitats; and/or b) which did not list species and/or habitats in their provisions but regulated public relations with regard to the listed species and habitats from the provisions of other laws.

Additionally, we examined IUCN Red Lists of species and habitats at EU level. For PC species presence, we analyzed the 'Red List of Non-Marine Mollusks' (Cuttelod et al. 2011), and the European Red List of Freshwater Fishes (Freyhof and Brooks 2011), and for PC habitat representation in IUCN assessments we examined the European red list of habitats, part 1: marine habitats (Gubbay et al. 2016), and European red list of habitats, part 2: terrestrial and freshwater habitats (Janssen et al. 2016).

3.2.2 Analysis

We applied a mix of quantitative and qualitative research approaches and methods to analyze the identified legal documents (Landman 2002). Quantitatively, we assessed firstly the extent to which

the identified legal documents mention PC species and habitats in their formulations, using key word search (see Appendix 3.1), and secondly, the degree to which PC habitats are covered by the existing network of protected areas (see below). Qualitatively, we thoroughly read all the identified legal documents to understand the PC biodiversity conservation context and framing (see below).

3.2.1.1 Quantitative analysis

To search for presence of PC species names in legal documents, we used all the recorded genus names known from the Danube Delta, within each PC group (see below), as search terms and scanned all the identified legal documents for presence of these terms (Appendix 3.1). We accounted for taxonomic synonymy and misidentification by selecting both currently accepted and synonymous genus names, which have been used by different authors in the last decade. In total we retrieved 70 invertebrate genus names belonging to mollusks - gastropods and bivalves (Wesselingh et al. 2019), crustaceans - amphipods, cumaceans, copepods (Monchenko 2003) and decapods (Policar et al. 2018), and mysidae (Audzijonyte et al. 2008). Finally, we searched cnidaria and hirudinea (Mordukhay-Boltovskoy 1960) as well as 2 vertebrate genus names of sturgeons (Appendix 3.1).

Spatial data on Important Bird Areas was retrieved from Birdlife Data Zone, (http://datazone.birdlife.org/site/search) and the Ramsar dataset from the Ramsar website (https://rsis.ramsar.org/). Data on Emerald network and Natura 2000 datasets were retrieved from the European Environment Agency (EEA, http://emerald.eea.europa.eu/, and https://natura2000.eea.europa.eu/ respectively). Spatial data on national protected areas was retrieved from IUCN World Database on Protected Areas (WDPA, https://www.iucn.org/theme/protected-areas/our-work/world-database-protected-areas). Data on PC habitats were retrieved from earlier work that defined, documented and mapped the PC habitats based on literature review and expert opinions (Gogaladze et al. Submitted). We calculated the area of PC habitats and its percentage covered by protected areas with a geometric overlying between the PC habitats and the protected area polygons in R package 'sf' (Pebesma 2018). For each PC habitat polygon, we calculated the surface area and the area percentage that is protected by the protected areas on three administrative levels: global (UNESCO, Ramsar Convention and Important Bird Areas), European (Natura 2000 network for Romania and Emerald network for Ukraine) and national (all types of national protected areas).

3.2.1.2 Qualitative analysis

Provisions of identified legal documents (Fig. 3.2, Appendix 3.2) were further read to understand how PC species and habitats were defined in the global, European and national legal arrangements and to examine whether PC biodiversity decline was addressed and how conservation measures and restrictions were framed. Additionally, we searched for and read the management plans of national protected areas, Natura 2000 and Emerald Network sites that covered the PC habitats to examine whether PC biodiversity was adequately addressed in the management plans.

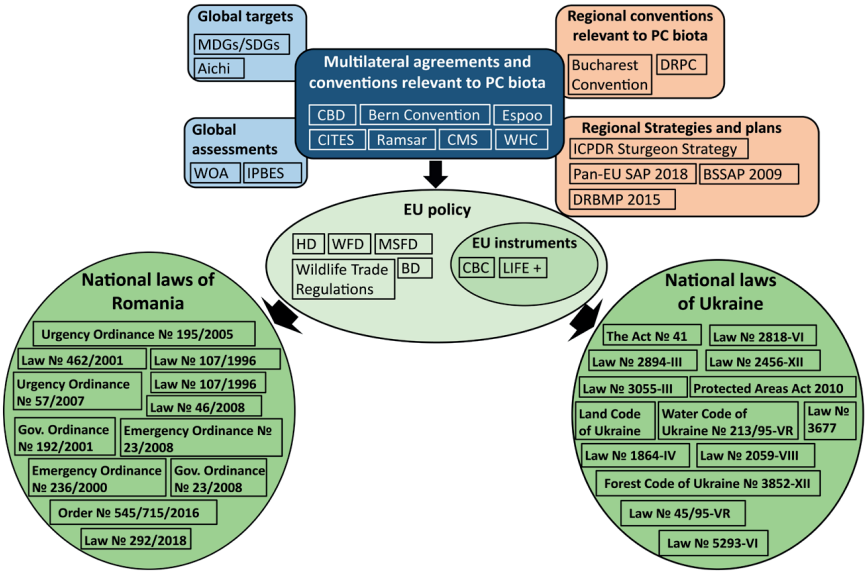

Figure 3.2. PC biodiversity conservation policy landscape. International Environmental Regimes (IERs) set the conservation goals and guidance on how to achieve these goals, which then shape EU policy. National legislation provides a framework for the actions and restrictions at the national level to meet the international obligations. See a full list and description of legal documents, as well as abbreviation definitions in Appendix 3.2.

3.3 Results

3.3.1 Pontocaspian biodiversity conservation legal landscape

We identified a complex legal and political framework within which PC biodiversity conservation is embedded (Fig. 3.2). For readability, we provide a full list and description of legal documents on global, regional and national levels, as well as their abbreviations in Appendix 3.2.

3.3.2 PC Species-based conservation

PC species were poorly represented in legal documents at all levels (Table 3.1 and Table A3.3.1). The Annexes of CITES and the Bern Convention did not list any PC invertebrate species. On EU level, the WFD did not list any PC species in its annexes. While the EU Wildlife Trade Regulations listed one sturgeon species, all six sturgeon species were listed in EU Habitats Directive. The MSFD listed the priority habitats and taxonomic groups, which encompassed benthic and pelagic habitats and habitats of special regional interest. Listed taxa included marine planktonic groups, benthic invertebrates, fishes, marine mammals and reptiles among others. PC groups, however, were not listed in MSFD.

Table 3.1. Pontocaspian genera represented in those identified legal documents that list the species names (Fig. 3.2, Appendix 3.2). LR: Low Risk, corresponds to IUCN's non-threatened categories 'least concern' and 'near threatened'. HR: High Risk, encompasses categories 'vulnerable', 'endangered' and 'critically endangered'. DD stands for 'Data Deficient'. Values in parentheses represent the number of species under the corresponding conservation category (see the PC species list in Appendix 3.3).

	UN Conventions (global and regional)			**EU**		**Romania**		**Ukraine**	**Other**	
PC groups	Bern Convention	CITES	CMS	Habitats Directive	EU Wildlife Trade Regulations	Emergency ordinance no 57/2007	Law. No. 192/2001	Law No. 3055-III	IUCN (EU)	Bucharest Convention
Amphipoda	-	-	-	-	-	-	-	HR (5)	-	HR (3) LR (1)
Bivalvia	-	-	-	-	-	3	-	HR (2)	LR (1)	-
Cnidaria	-	-	-	-	-	-	-	HR (1)	-	-
Decapoda	-	-	-	-	-	1	1	-	-	-
Gastropoda	-	-	-	1	-	-	-	LR (1)	HR (1) LR (4) DD (2)	-
Hirudinea	-	-	-	-	-	-	-	HR (1)	-	-
Mysida	-	-	-	-	-	-	-	HR (2)	-	HR (2)
Sturgeons	4	1	6	4	1	6	6	HR (6)	HR (6)	HR (2)

We identified 11 Romanian national legislative documents and 13 Ukrainian legislative documents that listed species and/or habitats, or regulated public relations with regard to the species and habitats listed in the provisions of other laws (Fig. 3.2, Appendix 3.2). National legal documents of Romania and Ukraine listed all six sturgeon species. As for the PC invertebrate species, Annex 4B on species of national interest of the Romanian Government Emergency Order no. 57/2007 listed all three limnocardiine bivalve species and one PC decapod species (Table 3.1 and Table A3.3.1). Other PC groups, however, were absent from Romanian national laws. As for Ukraine, the Red Data Book of Ukraine (RDBU), regulated by the Law No. 3055-III, listed few invertebrate species from different PC groups. Decapods were not listed in RDBU.

IUCN species assessments relevant to PC biodiversity on EU level were conducted for fish and mollusk species only. For other PC invertebrate species IUCN assessments were lacking. All but one species of sturgeon were listed as critically endangered in IUCN assessments (Table 3.1 and Table A3.3.1). As for PC mollusks, seven gastropod species were data deficient, and four gastropod species were least concern. Furthermore, the bivalve subfamily Lymnocardiinae (and the Cardiidae family to which it belongs) were completely absent. The Black Sea Red Data Book (BSRDB), which was created in response to the regional Bucharest Convention (Dumont et al. 1999), automatically included all species that were at that time in RDBU and Romanian laws, and supplemented those with two additional amphipod species, such as *Echinogammarus trichiatus* Martynov, 1932 (as *Chaetogammarus ischnus major*) and *Dikerogammarus villosus* (Sowinskii, 1894).

Table 3.2. PC habitat coverage by legal documents.

Zones	EUNIS Habitats types covering PC habitats	PC regional varieties in EUNIS Habitat Classification	Annex I of Resolution 4 (1996) of the Bern Convention (Emerald Network)	EU Habitats Directive Annex I (Natura 2000)	IUCN assessments (Gubbay et al. 2016; Janssen et al. 2016)	Covered PC biota	PC Invertebrate species presence
Freshened part of the Black Sea, mouths of branches of the Danube Delta	A2 Littoral sediment	A2.262 Pontogammarus maeoticus in fine mediolittoral sands	A2.2 Littoral sand and muddy sand	1140 Mudflats and sandflats not covered by seawater at low tide	Absent	Specific mid-littoral community widespread in the Black and Azov seas	RO, UA
		A2.326 Pontic polychaete dominated littoral muds; A2.327 Pontic oligochaete and chironomid dominated littoral muds; A2.328 Pontic "camca" habitat of River Danube mouths	A2.3 Littoral mud			Poor communities with Pontocaspian (Gammaridae, Polychaeta) and marine species	RO, UA
		A2.4 Littoral mixed sediment	A2.4 Littoral mixed sediment				
		A5.224 Pontic mobile sands of the Danube mouths	A5 Sublittoral sediment				
Estuarine transitional zones	X01 Estuaries	NA	X01 Estuaries	1130 Estuaries	Absent	Most of the communities of the PC invertebrates	UA
	X03 Brackish coastal lagoons	NA	X03 Brackish coastal lagoons	1150 Coastal lagoons	Absent	Cardiidae species	RO
Freshwater zones of the limans and deltas	C1.2 Permanent mesotrophic lakes, ponds and pools C2.32 Metapotamal and hypopotamal streams C2.42 Freshwater tidal rivers	NA	C1.222 Floating Hydrocharis morsus-ranae rafts; C1.223 Floating Stratiotes aloides rafts; C1.225 Floating Salvinia natans mats; C2.33 Mesotrophic vegetation of slow-flowing rivers	3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation	C1.2a Permanent oligotrophic to mesotrophic waterbody with Characeae (VU); C1.2b Mesotrophic to eutrophic waterbody with vascular plants (NT); C2.3 Permanent non-tidal, smooth-flowing watercourse (LC); C2.4 Tidal river, upstream from the estuary (EN)	Different vegetation can be used as habitat by different PC crustaceans and dreissenid bivalves	RO, UA

Table 3.3. Coverage of PC habitats by the network of protected areas across different administrative levels. Values are the percentages of PC habitats that are within protected areas. HD, SCI stands for Habitats Directive, Site of Community Importance and BD, SPA stands for Birds Directive, Special Protection Area (see Appendix 3.2. for details).

Protection type	Romania	Ukraine
UNESCO Man and Biosphere Programme	74%	32%
Ramsar sites	89%	57%
IBA	96%	45%
Natura 2000 (HD)	95%	NA
Natura 2000 (BD)	99%	NA
Emerald Sites	NA	96%
National protected areas	7%	32%

3.3.3 Area-based conservation

Important PC habitats such as the estuarine habitats of non-tidal seas (X01) and brackish coastal lagoons (X03) were poorly classified in the EUNIS habitat classification and absent as separate codes in Annex I of Resolution 4 (1996) of the Bern Convention and Annex I of Habitats Directive (Table 3.2; present only as complexes without distinction between littoral, benthic and pelagic zones). Regional varieties of PC habitats in freshened parts of the Black Sea and branches of the Danube Delta were used neither by the Bern Convention and EU Habitats Directive to structure the Natura 2000 and Emerald networks. Instead, higher level broad habitat types were used. For example, specific habitat in the Danube Delta such as 'A5.224 Pontic mobile sands of the Danube mouths' was represented by a higher level 'A5 Sublittoral sediment' habitat type. This higher-level habitat type failed to account for sublittoral sand in specific, variable salinity (estuarine) conditions (EUNIS habitat type A5.22). Furthermore, 'C1.2 Permanent mesotrophic lakes', 'C2.32 Metapotamal and hypopotamal streams, ponds and pools', and 'C2.42 Freshwater tidal rivers' were missing from the Annex I of Resolution 4 (1996) of the Bern Convention and Annex I of the Habitats Directive (Table 3.2). Within 'C1.2 Permanent mesotrophic lakes, ponds and pools' several types of vegetation (e.g., 'C1.222 Floating *Hydrocharis morsus-ranae* rafts' among others, see Table 3.2) are included in Annex I of Resolution 4 (1996) of the Bern Convention. However, these habitats are not valuable for PC species (Mordukhay-Boltovskoy 1960). The Ramsar Convention (1971), did not list habitats or species that need protection, but on the 9th Meeting of the Conference of the Parties (COP) Resolution IX.1 Annex E identified coastal tidal flats, rivers and streams, which form part of the PC habitats, as priority areas that shall receive more attention to improve integrated wetland inventory, assessment and monitoring. PC habitats were poorly represented in IUCN assessments (Table 3.2).

Most of the PC habitats in the Danube Delta were covered by the sites of international importance, such as IBAs, Danube Delta Biosphere Reserve and Ramsar sites (Table 3.3, Fig. 3.3). On European level, Natura 2000 sites and Emerald Network provided almost an absolute coverage of the PC habitats (Table 3.3). National protected areas partially covered the stretches of Danube River and few PC lakes in Romania and Ukraine, but ignored most of the important estuaries, which

contain important PC invertebrate communities. Management plans were not in place for most of the protected areas (see Table A3.4.1 in Appendix 3.4). In the protected area management plans that were in place PC invertebrate species were not mentioned, placing no restrictions on interventions that endanger them. Management plans were non-existent for Emerald Sites in Ukraine which encompassed PC habitats, because the Law "On the Territories of the Emerald Network" of Ukraine was not yet into force.

Relevant Romanian and Ukrainian national legislations were not coherent (mutually reinforcing): neither vertically coherent, i.e., coherent with global treaties and the EU directives, nor horizontally coherent, i.e., coherent with each other. Reviewed reports and legal documents suggested that even though the national Romanian biodiversity legislation was in line with the provisions of CBD, most of the strategies and action plans for biodiversity conservation were not executed, because they were not adopted by normative acts and therefore had no legal power for enforcement (The Government of Romania 2014). Furthermore, Romania faced considerable administrative, governance and financial challenges in the implementation of EU Nature Directives (European Commission 2019). In general, biodiversity conservation-related Romanian legislation was characterized by frequent amendments due to compliance to the EU Directives, resulting in a very complex landscape of conservation laws, secondary laws and emergency amendments to the laws (Appendix 3.2, Table A3.2.1). According to the fifth National Biodiversity Strategy and Action Plan (NBSAP) of Romania, the frequent emergency amendments resulted in a situation in which, "a series of sanctions are omitted for the non – compliance with some legal provisions already established (The Government of Romania 2014, p. 39)". Biodiversity conservation related Ukrainian laws lacked the adequate subordinate legislation (regulations and guidelines). As part of European integration, many new Emerald sites were identified for designation and the Law of Ukraine "On the Territories of the Emerald Network" was presented for a public hearing by the Ministry of Ecology and Natural Resources of Ukraine (2018). However, this law is not yet into force resulting in the absence of management plans for Emerald sites and obstruction of coherence in the implementation of the Natura 2000/Emerald site protection in Romania and Ukraine respectively. Additionally, a previous study on stakeholder network functioning involved in PC biodiversity conservation identified incoherence within the Ukrainian environmental legislation, which resulted in a situation where some national laws were contradictory, which complicated PC biodiversity conservation planning (Gogaladze et al. 2020b).

Sturgeons were well protected by law as were their habitats. However, PC habitat range was larger (Fig. 3.1) than the sturgeon habitats which comprised only the Danube River and its three branches (Schmutz and Sendzimir 2018), therefore a large part of the PC habitats fell outside the regulatory scope of sturgeon related laws. Whether the co-occurring part of the PC invertebrate biodiversity benefited from sturgeon related laws was unclear. Sturgeon related laws provided protection to sturgeons by prohibiting the use of certain types of fishing gear, regulating and limiting the number of fishing gears, craft, and the power of vessels as well as building special

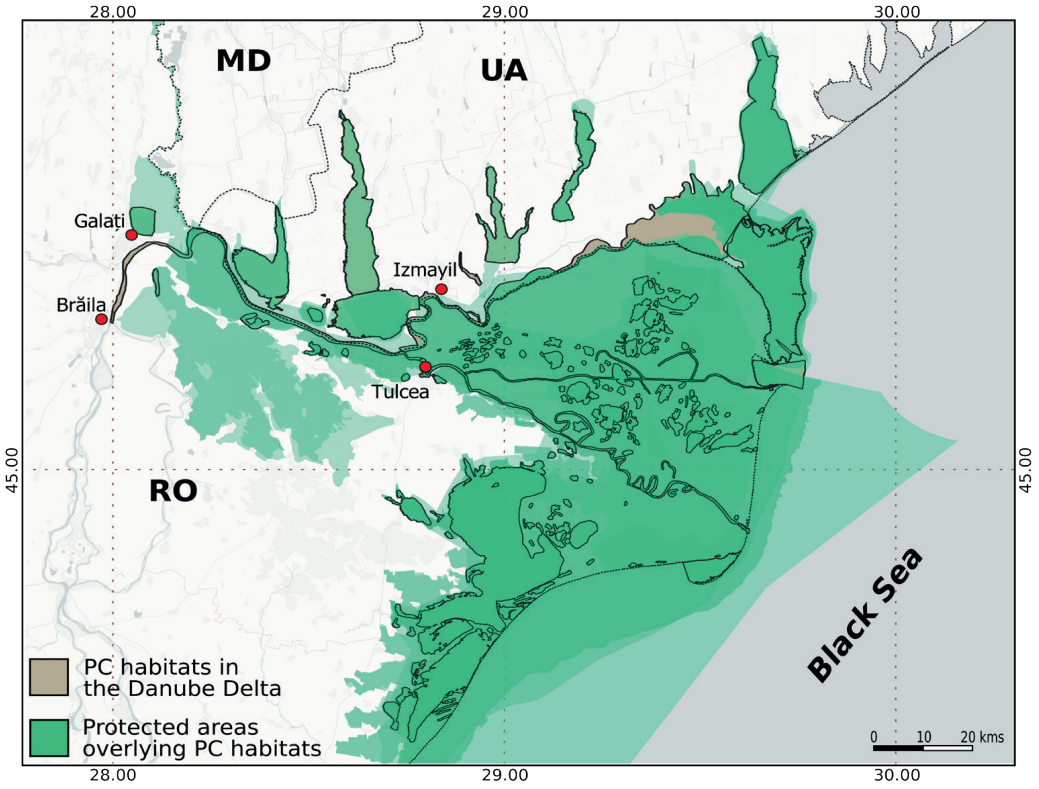

Figure 3.3. PC habitat coverage by protected areas, overlayed by Ramsar sites, UNESCO Biosphere Reserve and World Heritage Sites, Important Bird Areas, Emerald and Natura 2000 network sites and the national protected areas. Multiple overlays are indicated by darker green shades.

installations on dams that would allow the migration of sturgeons in the Danube River (e.g., Romanian Law. No. 192/2001 and Ukrainian Law №3677 in Appendix 3.2). Additionally, sturgeon-related laws regulated the restocking of sturgeon species in Romania and Ukraine (e.g., Order No. 84/2012 of Romania and Law № 5293-VI of Ukraine). Dam construction had been identified as one of the major threats to PC invertebrate biodiversity (Gogaladze et al. Submitted) and therefore dam removal could be expected to have positive impact on the PC invertebrate fauna.

3.4 Discussion

PC biodiversity conservation is embedded within a complex legal and political framework (Fig. 3.2). Some of the PC species and parts of PC habitats are included in the identified legal documents on global, regional and national levels, however, the majority of the PC invertebrate species and the specific conditions of the brackish PC habitats, such as the salinity gradients are not adequately addressed and defined. This results in the omission of PC invertebrate species from conservation

management plans and implementation, as well as the environmental impact assessment studies, leading to suboptimal conservation actions. Furthermore, we do not see legal coherence across relevant Ukrainian and Romanian legislations and across the PC species groups covered by different legal documents, which further hampers effective conservation planning.

3.4.1 Recommendations for improved laws and regulations

Laws and regulations that list the PC species and/or habitats need to be updated and amended according to the best available scientific knowledge. On EU-level, the Annexes of the Bern Convention list very few species of aquatic invertebrates, and endemic PC species are absent (Table 3.1 and Table A3.3.1). Inclusion of threatened PC invertebrate species in the appendices of Bern Convention, following the Recommendation No. 56 (1997) concerning guidelines to be taken into account while making proposals for amendment of Appendices I and II of the Convention and while adopting amendments, is important. The same applies to amendments of the EU Habitats Directive and Water Framework Directive. Listing PC invertebrate species in appendices of CITES is perhaps less urgent due to the low commercial and economic value of the PC invertebrate species resulting in low pressure on these taxa from international trade. Similarly, Convention on Migratory Species shall require no inclusion of PC invertebrate species in its appendices due to limited migration of these taxa. On Black Sea regional level, the Black Sea Red Data Book (Dumont et al. 1999) is outdated, and an update is urgent. It is also necessary to update the Red Data Book of Ukraine (Akimov 2009) and amend the species list in the Romanian Emergency ordinance no 57/2007 to adequately and consistently incorporate the missing PC invertebrate species in national legal documents.

Revision of Annex I of Resolution 4 (1996) of the Bern Convention (last revised in 2018), to account for the specific salinity conditions of PC habitats, can greatly benefit PC biodiversity conservation. Such a revision shall ideally aim to achieve two major goals, firstly to fully integrate the lower-level Danube Delta-specific habitat types from the EUNIS habitat classification into the Bern convention; and secondly to adequately classify the estuarine habitats of non-tidal seas (X01) and brackish coastal lagoons (X03), which are currently not classified in the EUNIS habitat classification and are absent as separate codes in Resolution 4 (1996) of the Bern Convention and Annex I of Habitats Directive. Estuarine habitats of non-tidal seas (X01) and brackish coastal lagoons (X03) are present only as higher-level habitat complexes without distinction between littoral, benthic and pelagic zones (see Table 3.2). Providing such detailed classification in the Bern Convention can be expected to result in an updated EUNIS habitat classification and Annex I of the Habitats Directive. The current poor classification of estuarine and lagoonal habitats in the Bern Convention could be understood as a holistic, umbrella approach, which leads to the coverage of all components of the habitat e.g., entire benthic and planktonic communities. However, covering only the large estuarine habitat complex without further detail, the Bern Convention fails to separate the brackish characteristics of PC habitats from "marine" conditions of the estuarine mouth districts.

This is consequential for PC invertebrate community conservation, since changes in salinity regime resulting in a decline of PC species (Son 2007b; Trichkova 2007; Varbanov 2002; Velde et al. 2019), will not formally be considered as destruction of the biotope. Indicating salinity regimes in estuarine habitats in ecological management programs is paramount, since all large rivers in the region have a controlled artificial regime of flooding and water use, that negatively affects PC biodiversity (Gogaladze et al. Submitted). Freshwater habitats are classified better in the Bern Convention but there is room for improvement. Specifically, only the thickets of aquatic plants are covered, but bottom and plankton communities are missing, whereas most of the PC communities inhabit mostly bottom substrates.

Different groups of PC animals (e.g., Cnidaria, Mollusca, Crustacea) are unevenly represented in different lists, and can benefit from consistency in conservation regulations. For example, in the Red Data Book of Ukraine, Cnidaria, Bivalvia and Crustacea are well embodied, but most of the endangered gastropods as well as the Europe's most endangered crayfish such as Pontastacus pachypus (Bláha et al. 2017; Policar et al. 2018) are absent (Table 3.1 and Table A3.3.1). Romanian Government Emergency Ordinance no. 57/2007 lists all 3 PC limnocardiine bivalve species, but all PC gastropods and other invertebrate PC groups are missing. IUCN assessments do not include most of the PC invertebrate groups, but only mollusks and crayfish are included in the European-level assessments (Cuttelod et al. 2011). Furthermore, most of the legal documents dealing with PC biodiversity conservation are outdated and in need of an update. One of the additional reasons for the non-inclusion of PC invertebrate taxa in legal documents may be the lack of a consistent taxonomy, which has made the production of a list of PC invertebrate species virtually impossible till now. Clearly, the taxonomy of PC biota needs to be updated, i.e. fix the taxonomic synonymy (see Appendix 3.3, but also Gogaladze et al. (Submitted), and Wesselingh et al. (2019)), before policymakers can be expected to include them in the legal documents.

Selection criteria for inclusion of species in national policy documents and assessments shall also be based on best scientific knowledge and transparent criteria in Romania and Ukraine. Unlike the broad-sweep, largely unbiased IUCN approach, evaluation of species for conservation purposes at the national level often depends on the availability and interests of experts and conservation organizations (Martín-López et al. 2007; Martín-López et al. 2009). For example, the selection process of taxa for evaluation in the Red Data Book of Ukraine (RDBU) is voluntary, thus depending on the willingness of the members of the RDBU commission as well as the state representatives, rather than on any transparent criteria (MOS, pers. comm). The same applies to Romania (Gogaladze et al. 2020a). Consequently, there is often a bias towards the 'preferred species' (species that are well known or have specialists working on them) resulting in omission of other species from evaluations. This automatically translates to the decisions made on choices of species for inclusion in the regional Black Sea Red Data Book (BSRDB). As a result, some common widespread species are given the status of "vulnerable" or even "endangered" in RDBU and BSRDB (MOS, pers. comm).

Revisions and amendments in the current legal documents, that shall be based on best scientific knowledge and transparent criteria, can be expected to improve the legal coherence on both horizontal (between Romania and Ukraine) and vertical (between Romania and EU as well as Ukraine and EU) levels. Legal coherence is an important requirement for effective implementation of conservation policy (Gomar et al. 2014) and an urgent priority in the cross-border conservation context of the Danube Delta. Many species and habitats, including PC biodiversity, cannot be maintained in single and/or isolated protected areas due to their dependence on specific interrelationships within their environment. Therefore, the Habitats Directive encourages EU member states, as well as the countries of the Eastern European partnership to ensure the ecological coherence of the Natura 2000 and Emerald Networks. Currently, effective management of Natura 2000 sites in Romania and the Emerald sites in Ukraine is hampered due to administrative challenges in the former (European Commission 2019) and absence of adequate legislation in the latter (Ministry of Ecology and Natural Resources of Ukraine 2018). However, teams of national and international experts are working hard on addressing these challenges and significant progress has already been made in preparing the Natura 2000 management plans in Romania and drafting new environmental laws and amending the existing laws in Ukraine to improve the biodiversity conservation framework. Such legal framework can be expected to benefit PC biodiversity conservation, as long as PC biodiversity is adequately integrated in legal documents and conservation plans.

3.4.2 How can PC biota be better protected?

PC invertebrate biodiversity conservation requires PC invertebrate community-tailored conservation approaches. Literature suggests that Romania and Ukraine meet most of the objectives of conserving globally important biological diversity within the Danube Delta, e.g. the wetlands and bird populations (The World Bank study team 2014). The endemic PC biodiversity, however, is declining and the legal basis to remedy this decline is weak in case of sturgeons (see e.g. ECODIT LLC 2017; ICPDR 2018, 2020), or non-existent in case of most invertebrate PC groups. The demise of PC sturgeon populations is recognized by the EU, the International Commission for the Protection of Danube River (ICPDR), and individual country authorities (ECODIT LLC 2017; ICPDR 2018). However, the majority of the associated invertebrate species are not part of the biodiversity conservation agenda. We argue that insufficient legal recognition of invertebrate PC biodiversity is an important driver of their demise, which, in turn, could be due to poor knowledge on PC species identities (Wesselingh et al. 2019) and their distributions (Gogaladze et al. Submitted), resulting into low conservation priority and the incentive for stakeholders to act (Gogaladze et al. 2020a; Gogaladze et al. 2020b). Improving the knowledge base on different aspects of PC biodiversity and informing the conservation practitioners and decision makers on the urgent need of PC biodiversity conservation is required to adequately address this biota.

PC invertebrate species shall be integrated in the protected area management plans. National protected areas do not cover most of the PC habitats in the Danube Delta (Table 3.3). Although Natura 2000 and Emerald sites cover most of the PC habitats, these networks only provide protection to species that are listed in the Annexes of Habitats and Birds Directives and the Appendices of the Bern Convention. PC invertebrate species are absent from relevant Annexes and Appendices (see Table 3.1 and Table A3.3.1), which means that they are automatically absent from site evaluations and environmental impact assessment studies. Unlike the national protected areas, on Natura 2000 and Emerald sites practically all types of activities are permitted, provided that they do not cause adverse impact on the species and habitats for which the given site was created. Therefore, PC invertebrate species cannot be adequately protected through the Natura 2000 and Emerald Network sites. Poor classification of PC habitats in Bern Convention (Table 3.2) could further limit the adequate assessments and site evaluations within the PC habitats. Additionally, the Emerald Network is relatively new and not yet fully integrated in Ukrainian legislation.

3.4.3 Does the flagship approach work here?

We did not find any studies or reports demonstrating the effectiveness of the conservation of sturgeons as surrogate species for wider PC taxa conservation. Furthermore, we argue that sturgeon species may not be considered as umbrella species for the PC invertebrate biodiversity. As mentioned in the introduction, flagship species are mostly used to promote public awareness and to raise funds for conservation (Verissimo et al. 2011), while the protection of umbrella species is expected to benefit a wide range of co-occurring species (Caro 2010; Roberge and Angelstam 2004). Sturgeons are indeed well-known by the general public, scientific community and policy makers and sturgeon conservation has received considerable funding from different sources, most notably from the EU LIFE program (https://ec.europa.eu/easme/en/life). However, sturgeon conservation cannot be expected to fully support the protection of PC invertebrate communities because sturgeon habitats make up only a small fraction of the entire PC range within Danube Delta. Danube sturgeons have been reported to inhabit the Danube River and its three branches (Schmutz and Sendzimir 2018). Many invertebrate PC species, however have been reported from isolated and/or semi-isolated lakes in and around the Danube Delta (Fig. 3.1), where Sturgeons have not been found. Therefore, sturgeon-related conservation measures and approaches can theoretically only benefit the co-occurring invertebrate communities. Future studies are needed to fully understand the ecological relationships between sturgeons and other PC taxa and showcase the benefits of sturgeon conservation for PC invertebrate biota in the Black Sea region.

Even if sturgeons cannot provide adequate protection to wider PC biodiversity through surrogacy, the sturgeon conservation networks create an excellent platform for the integration of lesser-known PC invertebrate biodiversity in the conservation programs. For example the Program "Sturgeon 2020" aims at halting sturgeon loss and improving their population sizes through 1) Acquiring political support for sturgeon conservation; 2) Capacity building and law enforcement;

3) In-situ sturgeon conservation; 4) Ex-situ sturgeon conservation; 5) Socio-economic measures in support of sturgeon conservation; and 6) Raising public awareness (ICPDR 2018, 2020). These measures, coupled with capacity building for conservation practitioners are urgently required also for the invertebrate PC communities and the sturgeon conservation networks can greatly help achieve it if financially supported and incentivized.

3.5 Conclusion

This study examined the current legal basis for addressing the decline of endemic aquatic biodiversity in Romania and Ukraine, known as Pontocaspian biota. The study showed that PC habitats and invertebrate species are poorly represented in international and national legal documents, even though they urgently require protection. Although the protected area network covers large parts of PC habitats, management plans are either not in place or fail to address the PC biodiversity conservation, providing incidental and therefore sub-optimal protection to the PC biodiversity. Furthermore, current PC biodiversity related legal landscape is incoherent on both horizontal (between Romania and Ukraine) and vertical (between Romania and EU as well as Ukraine and EU) levels. PC flagship species such as the sturgeon species are recognized to be under great threat and are well represented in legal documents. They can, however, not be considered as effective umbrella species for the conservation of wider PC taxa due to habitat mismatches. We recommend updating of laws and regulations that list the PC species and/or habitats and amendments according to the best available scientific knowledge. PC invertebrate biodiversity conservation requires integration of this biota in the protected area management plans and the development of PC invertebrate community-tailored conservation approaches.

Appendices

Appendix 3.1. Key search terms used for PC species and habitat presence in legal documents.
Appendix 3.2. PC biodiversity legal landscape
Appendix 3.3. PC species presence in the analyzed legal documents.
Appendix 3.4. Protected areas overlaying the PC habitats in the Danube Delta.

Appendix 3.1. Key search terms used for PC species and habitat presence in legal documents.

PC species

Table A3.1.1. Pontocaspian (PC) invertebrate groups, approximate number of PC species within each group (depending on author interpretations) and list of the parent genus names. Genus names listed here are used as key terms for the analysis to search for the PC species presence in the identified legal documents (Appendix 3.2). These names are known for Danube Delta and include both, currently accepted but also unaccepted terms, which have been used by different authors in the last decade.

	PC groups †	Number of species	Reference	PC genus names
Invertebrate	Cnidaria	2-4	(Mordukhay-Boltovskoy 1960)	*Cordylophora, Moerisia, Odessia, Polypodium*
	Hyrudinea	1	(Mordukhay-Boltovskoy 1960)	*Archaeobdella*
	Polychaeta	3	(Mordukhay-Boltovskoy 1960)	*Hypania, Hypaniola, Manajunkia*
	Gastropoda	12	(Wesselingh et al. 2019)	*Theodoxus, Neritina, Caspia, Clathrocaspia, Laevicaspia, Pyrgula, Euxinipyrgula, Turricaspia, Clessiniola*
	Bivalvia	6	(Wesselingh et al. 2019)	*Adacna, Monodacna, Hypanis, Dreissena*
	Amphipoda	40-45	(Mordukhay-Boltovskoy 1960)	*Gammarus, Dikerogammarus, Pontogammarus, Echinogammarus, Obessogammarus, Stenogammarus, Niphargoides, Niphargogammarus, Chaetogammarus, Iphigenella, Cardiophilus, Gmelina, Amathilina, Gmelinopsis, Turkogammarus, Corophium, Chelicorophium*
	Mysidae	10	(Audzijonyte et al. 2008)	*Paramysis, Katamysis, Limnomysis, Hemimysis*
	Decapoda	2	(Policar et al. 2018)	*Astacus, Pontastacus*
	Isopoda	1	(Mordukhay-Boltovskoy 1960)	*Jaera*
	Copepoda	12	(Monchenko 2003)	*Halicyclops, Schyzopera*
	Cladocera	4-5	(Mordukhay-Boltovskoy 1960)	*Cercopagis, Evadne*
	Cumacea	11	(Mordukhay-Boltovskoy 1960)	*Pterocuma, Stenocuma, Pseudocuma, Schizorhynchus*
	Acari	1	(Mordukhay-Boltovskoy 1960)	*Caspiahalacarus*
Vertebrate	Sturgeons	5-6	(Eschmeyer and Bailey 1990)	*Acipenser, Huso*

† We exclude Turbellaria, parasitic worms, Ostracoda, Bryozoa and Oligochaeta, because there is no common agreed understanding among specialists which species in these groups are Pontocaspian relics.

PC habitats

Optimum PC habitats, defined by Gogaladze et al. (Submitted) contain following habitat types from the EUNIS habitat classification (https://eunis.eea.europa.eu/):

1. A2: Littoral sediment
2. C1.2: Permanent mesotrophic lakes, ponds and pools
3. C2.32: Metapotamal and hypopotamal streams
4. C2.41: Brackish water tidal rivers
5. C2.42: Freshwater tidal rivers (within low reaches of large rivers and estuaries in Ukrainian and Romanian sectors of Black and Azov seas)
6. X01: Estuaries
7. X03: Brackish coastal lagoons

We searched for these habitat types in identified legal documents to check for presence of PC habitats. Additionally, we searched in the identified legal documents for the following key words: "Pontocaspian", "Ponto-caspian", "Ponto", "Pontic", "lagoon", "liman", "estuary", "stream", "lake", "river", "coastal", "transitional", "brackish", "anomalohaline" and "freshwater".

Appendix 3.2. PC biodiversity legal landscape

Global targets and assessments

MDGs/SDGs - Millennium Development Goals (MDGs), started a global effort in 2000 to tackle poverty and hunger, which was in 2012 replaced by the Sustainable Development Goals (SDGs), whose objective was to "produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world". Aichi Biodiversity targets are a set of 20 global targets under the Strategic Plan for Biodiversity 2011-2020. World Ocean Assessments (WOA) is a report on the state of the planet's oceans, which includes the Black Sea and the Danube Delta (UN group of experts 2016). Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) performs regular and timely assessments of knowledge on biodiversity and ecosystem services and their interlinkages at the global level (Díaz et al. 2019). Full names and descriptions of biodiversity conventions, EU Directives and the national laws of Romania and Ukraine are provided below.

Biodiversity conventions

Bern Convention - Convention on the Conservation of European Wildlife and Natural Habitats (1979) aims to preserve the wild flora and fauna in Europe. It provides the lists of threatened species under two categories: 'Strictly Protected' (Annex I for plants and Annex II for animals) and 'Protected' (Annex III). Habitats, which shall be protected are listed in Annex I of the Resolution No. 4 (1996) of the Convention. Habitat list was initially based on the Palaearctic Classification (Devilliers and Devilliers-Terschuren 1996), but this classification is no longer supported so, in 2019 a revised Annex I was adopted based on the EUNIS classification (Evans and Roekaerts 2015). Annex I is periodically updated, last time being December 2019 (https://rm.coe.int/16807469e7).

Bucharest Convention - Convention on the Protection of the Black Sea against Pollution (1992), addresses biodiversity conservation in its provisions, among other environmental concerns, in response to which the Black Sea Red Data Book was developed listing the endangered species and their habitats.

CBD - Convention on Biological Diversity (1992) is a global agreement of nations to achieve effective biodiversity conservation, sustainable use of the components of biodiversity and equitable sharing of the benefits arising from the genetic resources (article 1). The convention defines the overall biodiversity goals and provides the policies for its parties (individual contracting countries) to implement. The local context of every party is different, so the countries determine the course of action for implementing the provisions of the convention in their own unique way through the preparation and implementation of National Biodiversity Strategies and Action Plans (NBSAPs).

CITES - Convention on the International Trade in Endangered Species of Wild Fauna and Flora (1973) is an international agreement that prevents species from becoming or remaining object of unsustainable exploitation by international trade (https://www.cites.org/). Within the EU, provisions

of CITES are implemented through the Wildlife Trade Regulations. EU Council Regulation (EC) No 338/97 covers the species listed in the Appendices I-III of CITES, in its Annexes A-C respectively. Annexes A and B also include some of the non-CITES species, and Annex D includes mostly no-CITES species to protect the native European species, which are under the Habitats Directive (https://ec.europa.eu/environment/cites/legislation_en.htm).

CMS - Convention on the Conservation of Migratory Species of Wild Animals (1979) is an international treaty of the United Nations for the conservation and sustainable use of migratory animals and their habitats (https://www.cms.int/en/legalinstrument/cms). The convention lists threatened species in Appendix I, and species that require international agreement to conserve in Appendix II.

DRPC - Danube River Protection Convention (1994) forms an overall legal instrument aiming to ensure that the surface and ground waters of the Danube River Basin are sustainably and equitably managed. DRPC is implemented by the International Commission for the Protection of the Danube River (ICPDR). The ICPDR consists of delegates from all Contracting Parties to the DRPC, but also developed a framework allowing other organizations to join. Biodiversity conservation is one of the key priorities for the ICPDR. As a result, ICPDR monitors Danube River biodiversity and develops and implements conservation programs and strategies.

Espoo convention - Convention on Environmental Impact Assessment in a Transboundary Context (1991) aims at preventing, reducing and controlling negative transboundary environmental impacts from proposed development interventions at an early stage of planning. Convention does this by institutionalizing a standardized process of transboundary environmental impact assessment (EIA). In considering proposed activities the concerned Parties may consider whether the activity is likely to have a significant adverse transboundary

impact on the national protected areas, Ramsar sites, sites of special scientific interest or cultural heritage sites (Appendix III). According to the convention the effects of human activities on 'valued' biological species and organisms shall also be considered.

Ramsar Convention - Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1971) is an international treaty on the protection of the wetlands of international importance (Matthews 1993). This convention does not list species or habitats that shall be protected. However, on the 9th Meeting of the Conference of the Parties (COP), Resolution IX.1 Annex E identified coastal tidal flats and rivers and streams as priority areas that shall receive more attention to improve integrated wetland inventory, assessment and monitoring.

WHC - Convention for the Protection of the World Cultural and Natural Heritage (1972) aims to identify and protect the world's natural and cultural heritage by establishing a list of properties that have outstanding universal value, which is referred to as the World Heritage List. Such properties represent the part of the cultural and natural heritage of states that are Parties to the WHC.

EU Directives

European Union's implementation of the commitments outlined in CBD and Bern Convention is achieved through four directives: 1) The Council Directive 79/409/EEC on the protection of wild birds, adopted in 1979 (Birds Directive); 2) the Habitats Directive (EU 1992); 3) Water Framework Directive (WFD); and 4) Marine Strategy Framework Directive (MSFD). The Birds Directive is about protecting wild bird species, which naturally occur within the EU. The Habitats Directive complements the Birds Directive by including additional animal and plant species and their habitats. The Directive lists natural habitat types of community interest in its Annex I. Animal and plant species of community importance are listed in three different annexes. Annex II lists the species whose conservation requires designation of special areas of conservation (SAC). Annex IV lists those species, which are strictly protected beyond the SACs; and Annex V lists the species whose taking from the wild and exploitation may be subject to management measures. Central to the Habitats Directive is the creation of 'Natura 2000', an EU-wide ecological network comprising all areas that are protected under the Birds Directive (Special Protection Areas, SPAs) and the Habitats Directives (SACs composed of sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II). Equivalent to Natura 2000 in non-EU European countries, such as Ukraine, is the Emerald Network, which is based on the Bern Convention. WFD aims to maintain and/or improve the ecological conditions of water bodies within the EU. This Directive is not focused on biodiversity conservation and lists the taxonomic groups only as indicators for monitoring the water quality. Marine Strategy Framework Directive (MSFD) extends the WFD to the marine realm. Similar to the WFD, the MSFD obliges the EU member states to monitor the water quality based on biological, chemical and physical indicators (Annex III). MSFD lists the priority habitats and taxonomic groups. Listed habitats encompass benthic and pelagic habitats, habitats that are listed in the Habitats Directive that belong to the marine realm, and habitats of special regional interest. Listed taxa include marine planktonic groups, benthic invertebrates, fishes, marine mammals and reptiles among others.

Cross Border Cooperation (CBC) is a key element of the European Neighbourhood Policy (ENP), which promotes cooperation between EU countries and neighbourhood countries sharing a land border or sea crossing. CBC supports and encourages cross-border cooperation among Romania, Ukraine and Moldova (https://www.ro-ua.net/en/). LIFE program is a funding instrument of EU for environment and climate action, that supports biodiversity conservation programs in the Danube Delta, e.g., LIFE for Danube Sturgeons Project (https://danube-sturgeons.org/the-project/).

Table A3.2.1. National laws and resolutions of Romania and Ukraine related to Pontocaspian biodiversity conservation.

Romania (RO)		Ukraine (UA)	
Laws and regulations	**Description**	**Laws and Regulations**	**Description**
Government Urgency Ordinance No. 195/2005 on environmental protection, approved by Law no. 265/2006 and last updated on 22/12/2007 https://lege5.ro/Gratuit/hazdinrs/ordonanta-de-urgenta-nr-195-2005-privind-protectia-mediului?d=2020-08-24	This normative act was adopted as a matter of urgency to fulfill the requirements of the EU in the process of integration and regulates environmental protection in Romania. This emergency ordinance is the basis of subsequent environmental legislation.	The Act of Ukraine on the protection of environment (1991, No. 41). https://zakon.rada.gov.ua/laws/show/1264-12	The act defines the overall legal environmental framework and is very important for all the environmental activities. It briefly discusses biodiversity conservation in general terms (including aquatic living resources) through the prevention of economic activities from nature reserves and objects which are subject to special protection, such as those listed in the Red Book of Ukraine.
NA	NA	Law of Ukraine on the Main Principles (Strategy) of the State Environmental Policy of Ukraine for the period up to 2020 (2010, No. 2818-VI). https://zakon.rada.gov.ua/laws/show/2818-17#Text	The law aims to stabilize and improve the ecological conditions in Ukraine through the integration of environmental values and concerns into the development strategies of different sectors. Target 5 of the law, specifically addresses the loss of biological and landscape diversity and aims at conserving rare and endemic biological species in compliance with the EU regulations.
NA	NA	Law on the Red Book of Ukraine (2002, No. 3055-III). https://zakon.rada.gov.ua/laws/show/3055-14#Text	The objective of the law is to regulate public relations regarding the conservation, utilization and reproduction of rare and endangered species of flora and fauna listed in the Red Book of Ukraine, with the purpose of preventing the extinction of such species from nature and ensuring the preservation of species and genetic diversity. This law itself does not list species.
NA	NA	Law on Fauna (2001, No. 2894-III). https://zakon.rada.gov.ua/laws/show/2894-14#Text	The law ensures the protection of wildlife by the establishment of the rules and standards for protection and rational use of wildlife objects; the creation of ecological network and state reserves as well as the identification of new areas (which are subject to special protection); development and implementation of conservation programs and action plans for the species included in the Red Book of Ukraine.
Government Emergency Ordinance No. 236/2000 on the regime of protected natural areas, conservation of natural habitats, wild flora and fauna (http://legislatie.just.ro/Public/DetaliiDocument/25339), approved with modifications and completions by Law no. 462/2001 (http://legislatie.just.ro/Public/DetaliiDocument/29936), and its Annexes No. 2, 3, 4 and 5 updated by Order No. 1198 of the 25th of November 2005.	This emergency ordinance aims to guarantee the conservation and sustainable use of the natural heritage by regulating the conservation of biological diversity by conserving natural habitats; national protected area categories, natural habitat types and establishment and management of national protected areas, among others. The Emergency Ordinance lists natural habitats whose conservation require the declaration of special conservation areas in Annex 2, Annex 3 is a continuation of Annex 2 for the establishment of the network of special conservation areas and lists the plants and animals whose conservation requires the designation of special areas of conservation. Furthermore, Annexes 4 and 5 list the species of community importance that require strict protection.	Law on the Ukraine Nature Reserve Fund (1992, No. 2456-XII; amended in January 2010) https://zakon.rada.gov.ua/laws/show/2456-12#Text	The law defines the legal basis for the organization, protection and effective use of the nature reserve fund of Ukraine, which includes the biosphere reserves and national nature and landscape parks, among others.

(continuation Table A3.2.1.)

Romania (RO)		Ukraine (UA)	
Laws and regulations	**Description**	**Laws and Regulations**	**Description**
NA	NA	Law on Ecological Network of Ukraine (2004, No. 1864-IV). https://zakon.rada.gov.ua/laws/show/1864-15#Text	Ecological network is built on the foundations provided by the existing protected areas including the Emerald Network. Among others, the ecological networks include the territories that are habitats of species of fauna and flora listed in the Red Data Book of Ukraine. The law provides the framework for formation and management of ecological networks. The legal basis for the formation of the national ecological network are the laws of Ukraine "On the protection of the environment" (1264-12), "On the nature reserve fund of Ukraine" (2456-12), "On the animal world" (3041-12), "On flora world "(591-14), Land Code of Ukraine (561-12), Forest Code of Ukraine (3852-12) and Water Code of Ukraine (213/95-BP).
Urgency Ordinance No. 57/2007 regarding the management of protected areas and the conservation of natural habitats and wild flora and fauna (http://legislatie.just.ro/Public/DetaliiDocument/83289) approved by Law No. 49 of April 7, 2011 (http://legislatie.just.ro/Public/DetaliiDocumentAfis/127715)	This Urgency Ordinance transposes the Habitats Directive into the national Romanian laws and shapes the policies concerning the protected areas. On the date of entry into force of this Emergency Ordinance the Government Emergency Ordinance no. 236/2000 shall be repeated. The Emergency Ordinance lists the priority habitats in Annex 2 and propriety species in Annexes 3, 4A, 4B, 5A, 5B, 5C, 5D and 5E as a cornerstone for conservation.	Protected Areas Act (last amended December 2010): The main framework for the governance, conservation, and effective use of protected areas in Ukraine	The Act provides a legal base for establishing and managing protected areas. Also, it establishes a classification of protected areas in Ukraine.
Forest Code - Law no. 46/2008 (updated in 2016) http://legislatie.just.ro/Public/DetaliiDocumentAfis/227177.	The Forest Code regulates not only forested lands, but also water bodies within the forests and the associated biodiversity	Forest Code of Ukraine (1994, No 3852-XII. Last amended in December 2010). https://zakon.rada.gov.ua/laws/show/3852-12#Text	The Forest Code covers not only forested lands, but all lands supervised by the State Agency of Forest Resources, which include many wetlands and certain agricultural lands.
Water Law No. 107/1996	The Law regulates the use, conservation and protection of water resources, including the coastal ecosystems of the Black Sea and Danube Delta.	Water Code (1995, No. 213/95-VR. last amended in December 2010) https://zakon.rada.gov.ua/laws/show/213/95-%D0%B2%D1%80#Text	The Water Code defines roles and responsibilities of state institutions in water management, briefly mentioning that waters found within protected areas are thereby protected.
NA	NA	Land Code of Ukraine (2002, №2768-III). https://zakon.rada.gov.ua/laws/show/2768-14#Text	The Land Code ensures rational land use and protection of lands. It divides all the land into nine categories, including a category "water lands" which is relevant to PC biodiversity

(continuation Table A3.2.1.)

Romania (RO)		Ukraine (UA)	
Laws and regulations	**Description**	**Laws and Regulations**	**Description**
Law No. 292 of December 3, 2018 on assessing the impact of certain public and private projects on the environment. http://legislatie.just.ro/Public/DetaliiDocumentAfis/208590	This law regulates the environmental impact assessment of public and private projects that may have significant effects on the environment. Namely, on biodiversity, paying special attention to protected species and habitats in accordance with the provisions of Government Emergency Ordinance no. 57/2007, approved with amendments and completions by Law no. 49/2011, with subsequent amendments and completions.	Law of Ukraine on environmental impact assessment (No. 2059-VIII, 2017) https://zakon.rada.gov.ua/laws/show/2059-19#Text	The law provides framework for environmental impact assessments (EIAs) that apply to new projects that may have adverse impacts on the environment.
Governmental Emergency Ordinance No. 23/2008 on the fisheries and aquaculture. http://legislatie.just.ro/Public/DetaliiDocument/90207	This Emergency Ordinance is a general regulatory framework under which a secondary legislation is issued related to the fisheries sector. It regulates the conservation and exploitation of living water resources in the Black Sea and Danube Delta by laying down measures concerning the organizational and administrative responsibilities related to fishing, control and observance of legislation, responsibilities and sanctions and scientific research in the field. This Emergency Ordinance was issued for swift adoption of the EU legal framework in accordance to the Community Fisheries Policy.	NA	NA
Law No. 192 of 19 April 2001 on fish stocks, fisheries and aquaculture. http://legislatie.just.ro/Public/DetaliiDocumentAfis/46009	Regulates fishing periods and duration in different areas in Romania, including Danube Delta and Razim-Sione complex. In Annex 2 the law lists species which are prohibited to catch. Annex 4 lists the minimum dimensions of the fish, mollusk, amphibian (e.g., frogs) and crustacean species that can be fished in Romanian waters.	Law №3677 of 2011 on Fishery, Industrial Fishery and Protection of Water Biological Resources. https://zakon.rada.gov.ua/laws/show/3677-17#Text	This Law defines the basic principles of activity and state regulation in the field of fisheries, conservation and rational use of aquatic bioresources, the order of relations between public authorities, local governments and economic entities engaged in fishery activities in inland water bodies of Ukraine, inland marine waters and territorial sea.
Order no. 545/715/2016 on measures to restore and conserve sturgeon populations in natural fish habitats https://lege5.ro/Gratuit/geydknrvgm2a/ordinul-nr-545-715-2016-privind-masurile-de-refacere-si-conservare-a-populatiilor-de-sturioni-din-habitatele-piscicole-naturale	This order aims to conserve sturgeon populations in natural waters from threats and to develop sturgeon aquaculture.	Law № 5293-VI of 2013 about aquaculture. https://zakon.rada.gov.ua/laws/show/5293-17#Text	This Law defines the basic principles of development and functioning of aquaculture and provides the legal basis for the activities of executive authorities and local governments in the field of aquaculture. Sturgeons are briefly mentioned in the law.

Appendix 3.3. PC species presence in the analyzed legal documents.

Table 3.3.1. PC species presence in the analyzed legal documents.

		UN Conventions		EU		Romania		Ukraine	Other	
	Species	**Bern convention**	**CITES and CMS**	**Habitats Directive**	**EU Wildlife Trade regulation**	**Emergency Ordinance no 57/2007**	**Law. No. 192/2001**	**Law No. 3055-III**	**IUCN (EU)**	**Bucharest Convention (RO; UA)**
Amphipoda	Dikerogammarus villosus	-	-	-	-	-	-	-	-	VU (VU; VU)
	Niphargogammarus intermedius (as Niphargoides intermedius in RBDU)	-	-	-	-	-	-	VU	-	-
	Gmelina pussila	-	-	-	-	-	-	VU	-	-
	Iphigenella acanthopoda	-	-	-	-	-	-	EN	-	VU (-; VU)
	Lanceogammarus andrussovi (as Iphigenella andrussovi in BSRDB and RDBU)	-	-	-	-	-	-	VU	-	LR (NE; LR)
	Shablogammarus chablensis (as Iphigenella shablensis in BSRDB and RDBU)	-	-	-	-	-	-	VU	-	VU (-;-)
Bivalvia	Adacna fragilis (as Hypanis laeviuscula (Milachevitch, 1916) in RBDU)	-	-	-	-	Present	-	VU	-	-
	Dreissena bugensis	-	-	-	-	-	-	-	LC	-
	Dreissena polymorpha	-	-	-	-	-	-	-	NA¥	-
	Monodacna colorata	-	-	-	-	Present	-	-	-	-
	Hypanis plicata	-	-	-	-	Present	-	VU	-	-
Cnidaria	Odessia maeotica (as Moerisia maeotica in BSRDB and RDBU)	-	-	-	-	-	EN	-	VU (EN; VU)	
Decapoda	Astacus astacus	-	-	Present	-	Present	Astacus sp.	-	-	-
Gastropoda	Clathrocaspia knipowitchii (as Caspia knipowitchii in EURL)	-	-	-	-	-	-	-	LC	-
	Laevicaspia ismailensis (as Turricaspia ismailensis in EURL)	-	-	-	-	-	-	-	VU B1ab(iii)	-
	Theodoxus danubialis (as Theodoxus prevostianus in EU Habitats Directive and Emergency Ordinance no 57/2007)	-	-	Present	-	Present	-	-	LC	-
	Theodoxus fluviatilis	-	-	-	-	-	-	-	LC	-
	Turricaspia dimidiata	-	-	-	-	-	-	-	DD	-

(continuation Table A3.3.1.)

		UN Conventions		EU		Romania		Ukraine	Other	
	Species	**Bern convention**	**CITES and CMS**	**Habitats Directive**	**EU Wildlife Trade regulation**	**Emergency Ordinance no 57/2007**	**Law. No. 192/2001**	**Law No. 3055-III**	**IUCN (EU)**	**Bucharest Convention (RO; UA)**
	Clessinola variabilis (as Turricaspia variabilis in EURL)	-	-	-	-	-	-	-	DD	-
	Laevicaspia lincta (as Turricaspia lincta in EURL)	-	-	-	-	-	-	Rare	LC	-
Hirudinea	Archaeobdella esmonti	-	-	-	-	-	-	VU	-	-
Mysida	Katamysis warpachowskyi	-	-	-	-	-	-	EN	-	EN (NE; EN)
	Hemimysis anomala	-	-	-	-	-	-	EN	-	EN (NE; EN)
Sturgeons	Acipenser nudiventris	-	Present in CMS	Present	-	Present	Present	EX	CR	-
	Acipenser ruthenus	Present	Present in CMS	Present	-	Present	Present	EN	VU	-
	Acipenser sturio	Present	Present in CMS and CITES	Present	Present	Present	Present	EX	CR	-
	Acipenser gueldenstaedtii	-	Present in CMS	Present	-	Present	Present	VU	CR	VU (VU; VU)
	Acipenser stellatus	Present	Present in CMS	Present	-	Present	Present	VU	CR	VU (VU; VU)
	Huso huso	Present	Present in CMS	Present	-	Present	Present	EN	CR	

¥ According to EU IUCN list of non-marine mollusks "species were considered to be Not Applicable (NA) if they were judged to be of marginal occurrence in the region. Species were regarded as of marginal occurrence if it was estimated that less than 1% of their global range lies within Europe and if the European populations are not disjunct of the main species range".

Appendix 3.4. Protected areas overlaying the PC habitats in the Danube Delta.

Table A3.4.1. International regional and national protected areas that cover parts of the PC habitats in the Danube Delta. Percentages of PC habitats that are within protected areas are reported in Table 3.3.

Administrative level	Designation type	Site name	Site ID	Area (km^2)	PC habitats covered (Gogaladze et al. Submitted)	Management Plan	Country
Global	World Heritage Site (natural or mixed)	Danube Delta	67728	3124.4	Most of the PC habitats in Romania	Not Reported	RO
Global	Ramsar Site	Danube Delta	68147	6470	Most of the PC habitats in Romania	Management plan is implented and available	RO
Global	IBA	Lake Beibugeac (Plopu)	RO084	2.4	Floodplain lakes south to Sf. Gheorghe branch	NA	RO
Global	IBA	Black Sea	RO082	1429.55	Sakhalin area and Musura Bay	NA	RO
Global	IBA	Danube Delta	RO081	5155.8	Most of the PC habitats in Romania	NA	RO
Global	IBA	Beştepe - Mahmudia	RO083	42.9	Floodplain lakes south to Sf. Gheorghe branch	NA	RO
Global	Ramsar Site	Kartal Lake	166896	5	Northern floodplain lakes west of Izmail	Management plan is not implented and not available	UA
Global	Ramsar Site	Kugurlui Lake	166898	65	Kugurlui Lake	Management plan is not implented and not available	UA
Global	Ramsar Site	Kyliiske Mouth	166899	328	Chilia branch and outer delta lakes downstream from Vilkovo	Management plan is not implented but is available	UA
Global	Ramsar Site	Sasyk Lake	166904	210	Sasyk Lake	Management plan is not implented and not available	UA
Global	UNESCO-MAB Biosphere Reserve	Dunaisky	220032	464.03	Chilia branch and outer delta lakes downstream from Vilkovo and Chilia branch of Danube River, upstream from Vilkovo	Not Reported	UA
Global	IBA	Sasyk lake	UA085	228	Sasyk lake	NA	UA
Global	IBA	River Danube	UA082	25	A stretch of the River Danube, Chilia branch, near Kiliya town	NA	UA
Global	IBA	Stentsivs'ko-Zhebriyanivs'ki plavni	UA084	420	Chilia branch of Danube River, upstream from Vilkovo	NA	UA
Global	IBA	Kugurluj and Kartal lakes	UA081	192	Kugurluj and Kartal lakes	NA	UA
Global	IBA	Kytaj lake	UA083	50	Kytaj lake	NA	UA
Global	IBA	Kagul lake	UA080	105	Kagul lake	NA	UA
European	Site of Community Importance (Habitats Directive)	Delta Dunării	ROSCI0065	4532.0526	Most of the PC habitats in Romanian part of the Danube Delta	Present	RO

(Continuation Table A3.4.1.)

Administrative level	Designation type	Site name	Site ID	Area (km2)	PC habitats covered (Gogaladze et al. Submitted)	Management Plan	Country
European	Site of Community Importance (Habitats Directive)	Delta Dunării - zona marină	ROSCI0066	3357.2249	Sakhalin area and Musura Bay	Present	RO
European	Special Protection Area (Birds Directive)	Beştepe - Mahmudia	ROSPA0009	36.5133	Floodplain lakes south to Sf. Gheorghe branch	Present	RO
European	Special Protection Area (Birds Directive)	Delta Dunării şi Complexul Razim - Sinoie	ROSPA0031	5078.2463	Most of the PC habitats in Romanian part of the Danube Delta	Present	RO
European	Special Protection Area (Birds Directive)	Lacul Beibugeac	ROSPA0052	4.6861	Floodplain lakes south to Sf. Gheorghe branch	Present	RO
European	Special Protection Area (Birds Directive)	Marea Neagră	ROSPA0076	1489.7589	Sakhalin area and Musura Bay	Present	RO
European	Special Protection Area (Birds Directive)	Lacul Brateş	ROSPA0121	158.7484	Lake Brates	Absent	RO
European	Emerald Network	Danube Biosphere Reserve	UA0000018	501.27	Bistroe Channel of the Danube Delta and upper tip of Lake Sasyk	Absent	UA
European	Emerald Network	Izmailski Ostrovy	UA0000182	35.43	Kiliya Branch of Danube River and lake Lung located near town Izmail	Absent	UA
European	Emerald Network	Systema Dunaiskykh Ozer	UA0000142	526.58	Lakes Kagul, Kugurlui, Yalpug, Katlabukh and Kitai.	Absent	UA
European	Emerald Network	Sasyk Lyman	UA0000151	189.51	Lake Sasyk		UA
National	Nature Reserve	Ostrovul Prut	183971	0.82	Danube River Braila-Tulcea (small part close to Galati)	Not reported	RO
National	Nature Reserve	Călugăru - Iancina	193264	1.37	Lake Razim-Golovita (small coastall part)	Not reported	RO
National	Nature Reserve	Dealurile Beştepe	193266	3.48	Floodplain lakes south to Sf. Gheorghe branch	Not reported	RO
National	Nature Reserve	Enisala	193267	0.62	Floodplain lakes south to Sf. Gheorghe branch	Not reported	RO
National	Natural Park	Parcul Natural Lunca Joasă A Prutului Inferior	196473	81.08	Lake Brates; small part of the Danube River (close to Galati)	Not reported	RO
National	Scientific Reserve	Insulele Prundu Cu Păsări	392158	1.86	Part of Lake Razim-Golovita	Not reported	RO
National	Scientific Reserve	Insula Ceaplace	392159	1.18	Part of Lake Razim-Golovita	Not reported	RO
National	Nature Reserve	Corbu - Nuntaşi - Histria	9388	18.03	Coastal lakes near Lake Sinoe	Not reported	RO
National	Nature Reserve	Complexul Sacalin Zătoane	11184	190.54	Sakhalin area	Not reported	RO

(Continuation Table A3.4.1.)

Administrative level	Designation type	Site name	Site ID	Area (km2)	PC habitats covered (Gogaladze et al. Submitted)	Management Plan	Country
National	Nature Reserve	Roşca - Buhaiova	31702	92.99	Floodplain lakes between Chilia and Sulina branches	Not reported	RO
National	Nature Reserve	Pădurea Letea	31703	24.47	Floodplain lakes between Chilia and Sulina branches	Not reported	RO
National	Nature Reserve	Grindul Şi Lacul Răducu	31704	27.12	Floodplain lakes between Chilia and Sulina branches	Not reported	RO
National	Nature Reserve	Lacul Nebunu	31705	1.36	Floodplain lakes between Chilia and Sulina branches	Not reported	RO
National	Nature Reserve	Pădurea Caraorman	31706	22.57	Floodplain lakes between Sulina and Sf. Gheorghe branches	Not reported	RO
National	Nature Reserve	Complexul Vătafu - Lunguleț	31707	15.68	Floodplain lakes between Sulina and Sf. Gheorghe branches	Not reported	RO
National	Nature Reserve	Complexul Periteașca - Leahova	31708	41.55	Lake Leahova	Not reported	RO
National	Nature Reserve	Sărăturile Murighiol	31709	1.01	Floodplain lakes south to Sf. Gheorghe branch	Not reported	RO
National	Nature Reserve	Arinișul Erenciuc	31710	0.3	Small coastal part of Sf. Gheorghe branch of Danube River	Not reported	RO
National	Nature Reserve	Insula Popina	31711	0.89	Small part of Lake Razim	Not reported	RO
National	Nature Reserve	Capul Doloșman	31713	1.03	Small coastal part of Lake Razim	Not reported	RO
National	Nature Reserve	Grindul Lupilor	31714	21.45	Part of Lake Razim-Golovita	Not reported	RO
National	Nature Reserve	Grindul Chituc	31717	24.94	Coastal lakes near Sinoe	Not reported	RO
National	Nature Reserve	Lacul Potcoava	183474	7.28	Floodplain lakes between Sulina and Sf. Gheorghe branches	Not reported	RO
National	Nature Reserve	Lacul Belciug	183475	1.12	Floodplain lakes south to Sf. Gheorghe branch	Not reported	RO
National	Nature Reserve	Cetatea Histria	183476	4.33	Part of Lake Sinoe	Not reported	RO
National	National Biosphere Zapovednik	Dunaiskiy / Danube Delta	160873	464.02	Chilia branch and outer delta lakes downstream from Vilkovo and Chilia branch of Danube River, upstream from Vilkovo	Not reported	UA


Supreme