Biodiversity of the Regional Landscape Park Samara Plavni within the first large reservoir in Europe

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The creation of reservoirs in river valleys for the accumulation of fresh water has been and remains an important issue around the world. This process has both positive and negative consequences for people and nature. Significant changes in the regime of rivers and their valleys, flooding of meadows and forests, flooding of soils and changes in the composition of flora and fauna of adjacent territories are taking place. In this article, we consider the restoration of the biodiversity of a site of disturbed lands after the creation of one of the first large reservoirs in Europe – the Dnieper (Zaporozhe) on the River Dnieper, which has existed since 1933. The territory of the Samara floodplains was formed on the floodplain of the mouth of the Samara River, as a result of which the territories of various forest, meadow and bog biotopes were flooded. For almost 90 years, new biotopes have been developing, and populations of plant and animal species, especially waterfowl, have been renewed and enriched. In the conditions of climate change and anthropogenic pressure, the existence of this territory has fallen into question. To control the conservation of biodiversity, it is necessary to apply various management methods, one of which is creation of nature reserves. The article presents the results of a complex of scientific studies that were carried out during the zoning of the regional park Samara Plavni to improve the management of the protection of water areas and river banks. We have investigated: hydrological features, species diversity of the flora and coenotic diversity of the vegetation, fauna of aquatic invertebrates, and terrestrial vertebrates. Zoning of the Regional Landscape Park was based on the composition of stable components of ecosystems. When applying the protected regime in different zones, conditions will be created for the preservation of habitats of species, including those protected in Europe: higher plants (*Senecio borysthenticus* (DC.) Andr. ex Czern., *Tragopogon borysthenticus* Artemcz.), reptiles (*Emys orbicularis* (Linnaeus, 1758), *Vipera renardi* (Christoph, 1861)), birds (*Aythya ferina* (Linnaeus, 1758), *Vanellus vanellus* (Linnaeus, 1758), *Haematopus ostralegus* Linnaeus, 1758, *Numenius arquata* (Linnaeus, 1758), *Alcedo atthis* (Linnaeus, 1758), *Lanius excubitor* (Linnaeus, 1758)), mammals (*Lutra lutra* (Linnaeus, 1758)). Such changes would increase the implementation of the reproductive potential of all species without exception in the studied ecosystems.

Keywords: biodiversity conservation; protected areas; reservoirs of Europe; flora; fauna; zoning of nature reserves.

Introduction

In Europe, since the late 19th century, legislation has been used to protect species and habitats. Since then, the nature conservation movement has been actively developing and the expansion of protected areas has taken place. After all, the creation nature reserves is an effective tool for the natural restoration of species (Musakwa et al., 2020; Thieme et al., 2020). Conservation and monitoring of biodiversity in protected areas, the importance of zoning of such areas are subjects of debate around the world (Becken et al., 2014; Hülber et al., 2017). In addition, reducing the rate of biodiversity loss has been the major objective of the Convention on Biological Diversity over the last 20 years (Perrings et al., 2010).

Human intervention in natural processes leads to unpredictable consequences. It is especially difficult to calculate all the consequences of such global changes as the flooding of a reservoir. The creation of reservoirs causes significant changes in the hydrological regime of rivers and their valleys: flooding of meadows, forests, flooding of soils and changes in the vegetation of territories (Chakraborty, 2021). Now it is important to determine how to reach a compromise between human water demand and the protection of river ecosystems (Kang et al., 2019). In this paper, we analyze the consequences and results of the restoration of disturbed lands after the creation of one of the first reservoirs in Europe. One of results of

the restoration was the creation of a Regional Landscape Park in these lands. A complex of scientific research of the territory has been carried out. It included the study of the hydrological features of the territory, identification of species diversity of flora, the diversity of vegetation cover, fauna of aquatic invertebrates (zoobenthos), and terrestrial vertebrates. Zoning of the Regional Landscape Park was conducted according to the composition of stable components of the ecosystem: flora of vascular plants, zoobenthos, batracofauna, herpetofauna). The examined water area was the Samara Bay, located at the confluence of the Samara River and the Dnieper River, where near-water flooded territories developed as a result of the flooding of the estuarine part of the floodplain of the Samara River during the creation of the first large reservoir in Europe – the Dnieper (Zaporozhye). The floodplain complex of the Samara River, like the floodplain landscapes of Europe in general (Schindler et al., 2016), is characterized by a high species diversity (Brygadyrenko, 2015, 2016; Didur et al., 2019). The Zaporozhye Reservoir was created in 1931–1934. The flooding of the Samara River floodplain led to the development of floodplains in the area of about 5 thousand hectares. Gradually, conditions were created here for the restoration of old biotypes and development of new biotopes. Until now, in the previously flooded areas of the floodplain, there has been a restoration of the species composition and an increase in biodiversity.

Materials and methods

The study area belongs to the regional Samara reach of the reservoir (Baranovsky, 2000), where the river and the lake conditions have combined. This has provided an increase in biodiversity. Within the framework of the Samara Plavni Regional Landscape Park, 2 hydrological sections are separated for the zoning of the Zaporozhye (Dnieper) Reservoir (Baranovsky, 2000). On the upper Novomoskovsky section (above the Novoselovsky bridge), the Samara River bed with its additional reservoirs is flooded. A floodplain-flooded complex was formed here, which united the waters of the branches and tributaries of the Samara River, swamps and meadows, floodplain forests. The lower Novoselovsky area (below the Novoselovsky bridge) is a completely submerged flooded complex.

By geographic regionalization, the basin of the Samara River is located in the territory of the South-West of the East European Plain, in the steppe zone, in the subzone of the Northern Steppe, Orel-Samara and Zaporozhye-Gulyaypol regions of the Dnieper lowland of the Left-Bank-Dnieper north-steppe province. The water area of the Samara Plavni Regional Landscape Park has the length of 9.7 km and is located in the section 13.6 to 23.3 km from the former mouth of the Samara River. The Samara River, a left tributary of the Dnieper River, flows through the territory of Donetsk, Kharkov and Dnepropetrovsk regions. The elevation of the source is 186.0 m above sea level. The mouth of the river is located within the city of Dnipro (Ust-Samara bridge), at 51.2 m elevation. The coordinates of the mouth are 48°27'21" N and 35°06'58" E. The length of the river is 324.0 km, and the basin area is 22,600 km². According to the hydrobotanical zoning of the Zaporozhye (Dneprovsky) Reservoir (Baranovsky, 2000), the water area and territory of the regional landscape park belong to the Novomoskovsky and Novoselovsky sections of the Samara reach. The Novomoskovsky area is an area where shallow waters alternate with wooded islands (mainly groves).

The territory of the Samara Plavni Regional Landscape Park is located in the backwater zone of the Zaporozhye (Dnieper) Reservoir. At a certain period, the water levels in the water area of the park corresponded to the water levels in the reservoir. Due to daily fluctuations in the water level in the reservoir, variable water exchange currents and change in the direction of currents in the Samara Bay are observed several times a day. In this regard, in most rivers and canals, the water regime is stagnant and low-flowing. The Samara River and its tributaries: Samarchuk, Podpolnaya, Peschanka and Solyonaya, flow through the park. The floodplain system includes a large number of branches and ducts. Their total length is 34.7 km. The Samara River is navigable from its mouth to the city of Novomoskovsk, including within the framework of the Regional Landscape Park waterway along the river. The Samara is included in the list of "The most important inland waterways of international importance". The navigation channel is regularly cleared along the waterway to ensure the safety of navigation.

The composition and changes in the diversity of flora and fauna in this territory and water area have been studied by scientists since 1980 (Baranovsky, 2000) with regular expedition trips: three trips per year (May, July, October) and a detailed survey of the territory and the water area in 2020 at 12 plots (three plots for each of the four allocated zones of the park). To study the flora of vascular plants in the water areas and the territory of the reserve, a complex of traditional field and cameral methods was applied. The methodological approach was based on the methods of Bel'gard (1950), on the ecomorphic analysis of forest communities and typological principles of the organization of forests in the steppe zone. When studying the flora of vascular plants, we used the methods of collection, herbarization and identification of species and analysis of the collections of the Herbarium of the Oles Honchar Dnipro National University. The species of vascular plants were identified according to the Flora of the European part of the RSFSR (1974–1989) and the Flora of Eastern Europe (1996–2004) using a Citoval microscope (Carl Zeiss Jena). Species names are given according to modern Ukrainian nomenclature publications (Mosyakin & Fedoronchuk, 1999).

Bioecomorphic characteristics (bioecological certification) of species were compiled according to Bel'gard (1950) and additions made by his followers and the results of their own research. Biomorphs and ecomorphs are given in tabular form using abbreviated symbols: biomorphs (one-,

two-, perennials) heliomorphs (relation to light) hygromorphs (relation to the aquatic environment) tropomorphs (relation to trophicity) cenomorphs (growth in certain phytocenoses). The names biomorph and ecomorph are presented according to the ecomorph system of Bel'gard (1950). In the process of ecomorphic analysis of the flora, species that had been found in different biotopes were given identification of complex ecomorphs (for example, HalPalPr), where the latter is considered the main one – Pr). The analysis of the adventive fraction was carried out according to the literature data (Richardson, 2000; Baranovsky et al., 2016; Karnyzoza & Baranovsky, 2020). The vegetation cover was investigated according to the generally accepted methods. The analysis of tree and shrub vegetation was carried out according to the typology of Bel'gard (1950).

To characterize the biodiversity of the water areas and territories of the Samara Plavni Regional Landscape Park, studies of the species composition of flora were carried out in various biotopes and ecotones (border areas between two biotopes) according to the European EUNIS system (Didukh et al., 2011). This classification has a hierarchical structure, which makes it possible to generalize information at different levels, reflects ecosystems from natural to artificial, has a successful coding and other features. According to the main biotopes: aquatic biotopes (C), bog biotopes (D), herbaceous biotopes (E), forest biotopes (G), semi-natural biotopes (I) and artificial biotopes (J) with subordinate categories of hygromorphs and cenomorphs are distributed as follows (Table 1).

Table 1

Correspondence of hygromorphs and cenomorphs to the main biotopes of the Samara Plavni Regional Landscape Park

Biotopes (according to the EUNIS system)	Main Ecomorphs	
	hygromorphs	cenomorphs
C1 Shallow stagnant water bodies	Pl, Hel, Hy	Aq, Pal
C2 Shallow waters of flowing water bodies	Hy, Hel, Pl	Aq
C3.2 The banks of reservoirs covered with high helophytes	Hel	Pal, Pr
D Wetlands biotopes	Hel, Hg	Pal, Aq
E1.2G Sandy steppes	X, Ms	Ps, St
E2 Mesotrophic meadows	Ms	Pr
E3 Hygrophytic meadows	Hg	Pr, Pal
G1 Deciduous forests	Ms, X	Sil, Ru
G3 Coniferous forests	X, Ms	Sil, Ru
F9.35 River banks' thickets of invasive shrubs	Hg	Ru, Sil
I1.22 Garden plots	Ms	Cu, Sil, Ru
J2 Scattered building	Ms	Ru, Cu, Sil

For qualitative evaluation, zoobenthos was sampled using a net, mainly in the thickets of higher aquatic vegetation. An Ekman-Burge model bottom bucket with the area of 1/40 m² was used for quantitative sampling. Samples were taken twice, the content of the bottom bucket was poured into a large container, from which the organisms were successively washed from the soil, transferred to laboratory glassware, and immediately fixated in 40% formalin. Further qualitative and quantitative analyses of the samples were carried out in the laboratory. The species identification was carried out according to the identification keys. The species identification and distribution of amphibians and reptiles was carried out using the standard methods of route counting and traps (McDiarmid et al., 2012; Graeter et al., 2013; Ali et al., 2018). The species composition of birds was determined visually using optical instruments, according to singing, and existing nests (Tomialojc, 1976, 1980; Kuchynska, 2005). The study of mammals was carried out by traces and visually, murine rodents and small insectivores – using traps (Hoffmann et al., 2010; Torre et al., 2018; Green et al., 2020). According to the zoning of the Samara Plavni Regional Landscape Park, the following parts are distinguished: a reserved zone, a recreational zone, a zone of regulated recreation and an economic zone. The reserved zone has two subzones: the upper one – in the Novomoskovsk area; the lower one is in the Novoselovsky site), the recreational zone occupies the main part of the regional landscape park, the regulated recreation zone is located in the Novomoskovsky site, the economic zone is also located in two sites (Fig. 1).

Results

Floristic diversity. The list of flora of vascular plants of the Samara Plavni Regional Landscape Park contains 626 species belonging to 90

families. Ecomorphic analysis shows that hemicryptophytes predominate among climamorphs; perennials predominate among biomorphs; scioheliophytes predominate among heliomorphs; mesotrophs predominate among trophomorphs; mesophytes and hygrophytes predominate among hygromorphs. Among the cenomorphs, most species are represented by meadow (233) and forest (206) species. The ruderal flora includes

251 species, including 140 adventive and 5 invasive species. The rare fraction comprises 70 species. Two of them are included in the European Red List, and 15 species are included in the Red Book of Ukraine (Table 2). All of them are included in the list of rare species of vascular plants in Dnepropetrovsk region. Most of them grow in protected and recreational areas.

Fig. 1. Zoning of the Samara Plavni Regional Landscape Park: the red line – the boundaries of the Samara Plavni Regional Landscape Park, red – the reserved zone, green – the zone of regulated recreation, yellow – the zone of stationary recreation, blue – the economic zone

Table 2
List of flora of vascular plants of the Samara Plavni Regional Landscape Park by zoning

Families	Species	Clima- morphs	Bio- morphs	Helio- morphs	Tropho- morphs	Hygro- morphs	Ceno- morphs	Protec- ted zone	Recre- ational zone	Stationary recreation zone	Econo- mic zone	Rare, ad- ventive, types
Equisetaceae	<i>Equisetum arvense</i> L.	G	Per	ScHe	MsTr	HgMs	RuSilPr	+	+	+	+	–
Equisetaceae	<i>E. fluviatile</i> L.	HKr	Per	ScHe	MsTr	HelHg	AqPal	+	–	–	–	RLD 3
Equisetaceae	<i>E. hyemale</i> L.	Ch	sFr	ScHe	MsTr	HgMs	PrSil	+	–	–	–	RLD 3
Dryopteraceae	<i>Dryopteris carthusiana</i> H. P. Fuchs.	HKr	Per	ScHe	MsTr	Ms	Sil	+	–	–	–	RLD 3
Dryopteraceae	<i>D. filix-mas</i> (L.) Schott	HKr	Per	HeSc	OgMsTr	Ms	Sil	+	–	–	–	RLD 3
Salviniaceae	<i>Salvinia natans</i> (L.) All.	T	Ann	ScHe	MsTr	Pler	Aq	+	+	+	+	RB U, RLD 3
Thelypteridaceae	<i>Thelypteris palustris</i> Schott	G	Per	HeSc	MsTr	Hg	SilPal	+	+	–	–	RLD 2
Pinaceae	<i>Pinus pallasiana</i> D. Don	Ph	Arb	ScHe	OgMsTr	XMs	Sil	–	+	+	+	–
Pinaceae	<i>P. sylvestris</i> L.	Ph	Arb	ScHe	OgMsTr	X-Hg	Sil	+	+	+	–	–
Alismataceae	<i>Alisma gramineum</i> Lej.	HKr	Per	He	MgTr	HelHg	PalAq	+	+	–	–	–
Alismataceae	<i>A. lanceolatum</i> With.	HKr	Per	He	MgTr	HelHg	PalAq	+	+	–	–	–
Alismataceae	<i>A. plantago-aquatica</i> L.	HKr	Per	ScHe	MsTr	HgHel	PalAq	+	+	+	+	–
Alismataceae	<i>Sagittaria sagittifolia</i> L.	HKr	Per	ScHe	MsTr	HgHy	PalAq	+	–	–	–	–
Alliaceae	<i>Allium angulosum</i> L.	G	Per	ScHe	MsTr	HgMs	Pr	+	–	–	–	–
Alliaceae	<i>A. flavescens</i> Bess.	G	Per	He	MsTr	MsX	PsPtSt	+	+	+	–	–
Alliaceae	<i>A. paczkoskianum</i> Tuzs.	G	Per	He	MsTr	MsX	PsSt	–	+	+	–	–
Alliaceae	<i>A. waldschteinii</i> G. Don fil.	G	Per	He	MsTr	XMs	StPr	+	+	+	+	–
Araceae	<i>Acorus calamus</i> L.	HKr	Per	He	MsTr	HgHel	PalAq	+	+	–	–	RLD3, Adv
Asparagaceae	<i>Asparagus officinalis</i> L.	HKr	Per	ScHe	MgTr	XMs	PrSt	+	+	+	–	–
Butomaceae	<i>Butomus umbellatus</i> L.	HKr	Per	He	MsTr	HgHel	PalAq	+	+	+	–	–
Convallariaceae	<i>Convallaria majalis</i> L.	G	Per	HeSc	MsTr	HgMs	Sil	+	+	–	–	RLD 3
Convallariaceae	<i>Polygonatum multiflorum</i> (L.) All.	G	Per	Sc	MgTr	Ms	Sil	+	+	+	–	–
Convallariaceae	<i>P. odoratum</i> (Mill.) Druce	G	Per	ScHe	OgTr	Ms	Sil	+	–	–	–	RLD 3
Cyperaceae	<i>Bolboschoenus maritimus</i> (L.) Palla	HKr	Per	He	AlkMgTr	HelHg	AqPal	+	+	+	+	–
Cyperaceae	<i>Carex acuta</i> L.	HKr	Per	He	MsTr	HelHg	AqPal	+	+	+	+	–
Cyperaceae	<i>C. acutiformis</i> Ehrh.	HKr	Per	ScHe	MsTr	Hg	SilPal	+	–	–	–	–
Cyperaceae	<i>C. bueckii</i> Wimm.	HKr	Per	He	AlkMgTr	HgMs	PalPr	+	+	–	–	RLD 4
Cyperaceae	<i>C. distans</i> L.	HKr	Per	He	AlkMgTr	HgMs	PrHal	–	+	–	–	–
Cyperaceae	<i>C. disticha</i> Huds.	HKr	Per	He	MsTr	HsMs	PalPr	+	–	–	–	–
Cyperaceae	<i>C. ligerica</i> J.Gay.	HKr	Per	He	OgTr	Ms	Ps	+	+	+	+	–
Cyperaceae	<i>C. melanostachya</i> Bieb. ex Willd.	HKr	Per	ScHe	AlkMgTr	Ms	PalPrSil	+	+	+	+	–

Families	Species	Clima- morphs	Bio- morphs	Helio- morphs	Tropho- morphs	Hygro- morphs	Ceno- morphs	Protec- ted zone	Recre- ational zone	Stationary recreation zone	Econo- mic zone	Rare, ad- ventive, types
Cyperaceae	<i>C. muricata</i> L.	HKr	Per	ScHe	MgTr	Ms	Sil	+	–	–	–	–
Cyperaceae	<i>C. otrubae</i> Podp.	HKr	Per	ScHe	MgTr	HgMs	HalSilPr	+	+	+	+	–
Cyperaceae	<i>C. praecox</i> Schreb.	HKr	Per	He	MgTr	XM	StPr	+	+	+	+	–
Cyperaceae	<i>C. pseudocyperus</i> L.	HKr	Per	HeSc	OgMsTr	Hg	SilPal	+	–	–	–	–
Cyperaceae	<i>C. riparia</i> Curtis	HKr	Per	He	MsTr	Hg	Pal	+	+	+	+	–
Cyperaceae	<i>C. spicata</i> Huds.	HKr	Per	HeSc	MgTr	XM	PrSil	+	–	–	–	–
Cyperaceae	<i>C. vesicaria</i> L.	HKr	Per	He	MsTr	MsHg	PrPal	+	+	+	–	–
Cyperaceae	<i>C. vulpina</i> L.	HKr	Per	He	MsTr	MsHg	PalPr	+	+	+	+	–
Cyperaceae	<i>Cyperus fuscus</i> L.	T	Ann	He	OgMsTr	Hg	PsPal	+	+	–	–	–
Cyperaceae	<i>C. glomeratus</i> L.	T	Ann	He	OgMsTr	Hg	PalPs	+	–	–	–	RLD 1
Cyperaceae	<i>Eleocharis palustris</i> (L.) Roem. et Schult.	HKr	Per	He	MgTr	Hg	PrPal	+	+	+	+	–
Cyperaceae	<i>Scirpoides holoschoenus</i> (L.) Sojak.	G	Per	He	OgTr	HgMs	PrPs	+	+	+	–	–
Cyperaceae	<i>Scirpus lacustris</i> L.	HKr	Per	He	MsTr	HelHg	AqPal	+	+	+	+	–
Cyperaceae	<i>S. sylvaticus</i> L.	HKr	Per	HeSc	MsTr	Hg	SilPal	+	–	–	–	–
Cyperaceae	<i>S. tabernaemontani</i> C. C. Gmel.	HKr	Per	He	AlkMsTr	Hg	Pal	+	+	–	–	–
Hyacinthaceae	<i>Hyacinthella leucophaea</i> (C.Koch) Schur	G	Per	He	MsTr	MsX	PtSt	–	+	–	–	RLD 3
Hyacinthaceae	<i>Muscari neglectum</i> Guss.	G	Per	He	MsTr	XM	SMnSt	+	+	–	–	RLD 2
Hyacinthaceae	<i>Ornithogalum bouscheanum</i> (Kunth) Aschers.	G	Per	HeSc	MsTr	Ms	PrSil	+	–	–	–	RBUB, RLD 3
Hyacinthaceae	<i>O. fischerianum</i> Krasch.	G	Per	He	AlkMsTr	MsX	HalPrSt	+	+	–	–	–
Hyacinthaceae	<i>O. fimbriatum</i> Willd.	G	Per	ScHe	MsTr	Ms	Sil	+	–	–	–	RLD 2
Hyacinthaceae	<i>Scilla bifolia</i> L.	G	Per	ScHe	MsTr	XM	StSil	+	+	–	–	RLD 3
Hyacinthaceae	<i>S. sibirica</i> Haw.	G	Per	HeSc	MgTr	Ms	Sil	+	–	–	–	RLD 3
Hydrocharitaceae	<i>Elodea canadensis</i> Michx.	Hd	Per	HeSc	OgMsTr	Hyr	RuAq	+	+	+	–	Adv
Hydrocharitaceae	<i>Hydrocharis morsus-ranae</i> L.	Hd	Per	ScHe	MsTr	Pl er	Aq	+	+	+	+	–
Hydrocharitaceae	<i>Stratiotes aloides</i> L.	Hd	Per	ScHe	MsTr	Pl r	Aq	+	+	–	–	RLD 3
Hydrocharitaceae	<i>Vallisneria spiralis</i> L.	Hd	Per	HeSc	MsTr	Hyr	RuAq	+	+	–	–	RLD3, Adv
Iridaceae	<i>Crocus reticulatus</i> Stev. ex Adam.	G	Per	He	AlkMsTr	MsX	PrSt	+	+	–	–	RBUB, RLD 2
Iridaceae	<i>Gladiolus tenuis</i> Bieb.	G	Per	ScHe	MsTr	XM	Pr	+	+	–	–	RBUB, RLD 2
Iridaceae	<i>Iris halophila</i> Pall.	HKr	Per	He	AlkMsTr	XM	HalPr	–	+	–	–	RLD 2
Iridaceae	<i>I. pseudacorus</i> L.	G	Per	He	MsTr	Hg	Pal	+	+	+	–	–
Juncaceae	<i>Juncus articulatus</i> L.	HKr	Per	He	OgMsTr	MsHg	PalPr	+	+	–	–	–
Juncaceae	<i>J. atratus</i> Krok.	HKr	Per	He	MgTr	HgMs	Pr	+	+	–	–	–
Juncaceae	<i>J. bufonius</i> L.	T	Ann	ScHe	OgMsTr	MsHg	PsPr	+	+	–	–	–
Juncaceae	<i>J. compressus</i> Jacq.	HKr	Per	He	MgTr	MsHg	PalPr	+	+	+	–	–
Juncaceae	<i>J. effusus</i> L.	Hel	Per	He	MsTr	Hg	Pal	+	+	+	–	–
Juncaceae	<i>J. gerardii</i> Loisel.	HKr	Per	He	AlkMsTr	HgMs	HalPr	+	+	+	+	–
Juncaceae	<i>J. inflexus</i> L.	HKr	Per	He	MsTr	MsHg	Pr	+	+	–	–	–
Juncaginaceae	<i>Triglochin maritimum</i> L.	HKr	Per	He	AlkTr	MsHg	PalHalPr	+	+	+	+	–
Juncaginaceae	<i>T. palustre</i> L.	HKr	Per	He	MgTr	MsHg	HalPalPr	+	+	–	–	–
Lemnaceae	<i>Lemna gibba</i> L.	Hel	Per	ScHe	MsTr	Pl er	Aq	+	+	–	–	–
Lemnaceae	<i>L. minor</i> L.	Hel	Per	ScHe	MsTr	Pl er	Aq	+	+	+	+	–
Lemnaceae	<i>L. trisulca</i> L.	Hel	Per	HeSc	MsTr	Hyr	Aq	+	+	+	+	–
Lemnaceae	<i>Spirodela polirrhiza</i> (L.) Schleid.	Hel	Per	He	MsTr	Pl er	Aq	+	+	–	–	–
Lemnaceae	<i>Wolffia arrhiza</i> (L.) Horkel ex Wimm.	Hel	Per	He	MsTr	Pl er	Aq	+	+	+	–	RLD 3
Liliaceae	<i>Fritillaria meleagroides</i> Patrin ex Schult. et Schult.	G	Per	He	AlkMgTr	Ms	Pr	+	+	–	–	RBUB, RLD 2
Liliaceae	<i>Gagea erubescens</i> (Bess.) Schult. et Schult.	G	Per	ScHe	MgTr	Ms	RuSil	+	+	+	+	–
Liliaceae	<i>G. lutea</i> (L.) Ker-Gawl.	G	Per	HeSc	MsTr	Ms	Sil	+	+	–	–	RLD 3
Liliaceae	<i>G. pusilla</i> (F.W.Schmidt) Schult. et Schult.	G	Per	He	MgTr	XM	RuSt	+	+	+	+	–
Liliaceae	<i>Tulipa quercetorum</i> Klokov et Zoz	G	Per	HeSc	MgTr	Ms	StSil	+	+	+	–	RBUB, RLD 3
Najadaceae	<i>Caulinia minor</i> (All.) Coss. et Germ.	T	Ann	HeSc	MsTr	Hyr	Aq	+	+	–	–	RLD 2
Najadaceae	<i>Najas marina</i> L.	T	Ann	HeSc	MsTr	Hyr	Aq	+	+	+	+	–
Orchidaceae	<i>Dactylorhiza incarnata</i> L.	G	Per	He	MgTr	MsHg	PrPal	+	+	–	–	RBUE, RLD 1
Orchidaceae	<i>Epipactis palustris</i> (L.) Crantz	G	Per	ScHe	OgMsTr	MsHg	PalPr	+	+	–	–	RBUB, RLD 1
Orchidaceae	<i>Orchis coriophora</i> L.	G	Per	He	MsTr	HgMs	PalPr	+	+	–	–	RBUE, RLD 0
Orchidaceae	<i>O. palustris</i> Jacq.	G	Per	He	AlkMsTr	MsHg	PrPal	+	+	–	–	RBUP, RLD 2
Orchidaceae	<i>O. militaris</i> L.	G	Per	HeSc	MsTr	Ms	SilPr	+	+	–	–	RBUB, RLD 2
Poaceae	<i>Aegilops cylindrica</i> Host	T	Ann	He	OgMsTr	MsX	PsPtRu	–	–	–	+	–
Poaceae	<i>Agropyron pectinatum</i> (Bieb.) Beauv	HKr	Per	He	MsTr	X	St	–	+	+	+	–
Poaceae	<i>Agrostis gigantea</i> Roth.	HKr	Per	ScHe	MsTr	Ms	SilPr	+	+	–	–	–
Poaceae	<i>A. stolonifera</i> L.	HKr	Per	ScHe	OgMsTr	Hg	PrPal	+	+	+	+	–
Poaceae	<i>Alopecurus aequalis</i> Sobol.	T	Ann	He	OgTr	HgHel	PrPal	+	+	–	–	–
Poaceae	<i>A. arundinaceus</i> Poir.	G	Per	He	AlkMgTr	HgMs	HalPalPr	+	+	+	–	–
Poaceae	<i>A. geniculatus</i> L.	T	Ann	He	OgTr	HgMs	PalPr	+	+	–	–	–
Poaceae	<i>A. pratensis</i> L.	HKr	Per	He	MgTr	HgMs	Pr	+	+	+	+	–
Poaceae	<i>Anisantha sterilis</i> (L.) Nevski	T	Ann	ScHe	MsTr	MsX	PrStRu	–	–	+	+	Adv
Poaceae	<i>A. tectorum</i> (L.) Nevski	T	Ann	ScHe	OgMgTr	MsX	PsRu	+	+	+	+	Adv
Poaceae	<i>Apera spica-venti</i> (L.) P. Beauv.	T	Ann	ScHe	OgTr	XM	RuPs	–	+	+	+	Adv
Poaceae	<i>Avena fatua</i> L.	T	Ann	He	MsTr	MsX	Ru	–	–	+	+	Adv
Poaceae	<i>Beckmannia eruciformis</i> (L.) Host.	HKr	Per	ScHe	AlkMsTr	HgMs	PalPr	+	+	–	–	–
Poaceae	<i>Brachypodium sylvaticum</i> (Huds.) P. Beauv.	HKr	Per	Sc	MgTr	Ms	Sil	+	–	–	–	–

Families	Species	Clima- morphs	Bio- morphs	Helio- morphs	Tropho- morphs	Hygro- morphs	Ceno- morphs	Protec- ted zone	Recre- ational zone	Stationary recreation zone	Econo- mic zone	Rare, ad- ventive, types
Poaceae	<i>Bromopsis inermis</i> (Leys.) Holub	G	Per	He	OgMgTr	XMs	RuPrSt	+	+	+	+	—
Poaceae	<i>B. riparia</i> (Rehm.) Holub	G	Per	He	OgTr	MsX	PrSt	+	+	+	+	—
Poaceae	<i>Bromus hordeaceus</i> L.	T	Ann	ScHe	MsTr	XMs	Ru	—	—	+	+	—
Poaceae	<i>B. squarrosus</i> L.	T	Ann	ScHe	OgMgTr	MsX	RuPsSt	—	+	+	+	Adv
Poaceae	<i>Calamagrostis canescens</i> (Web.) Roth	HKr	Per	ScHe	MsTr	MsHg	SilPrPal	+	+	+	+	—
Poaceae	<i>C. epigeios</i> (L.) Roth	G	Per	ScHe	OgMsTr	Ms	PsSilPr	+	+	+	+	—
Poaceae	<i>Cenchrus longispinus</i> (Hack.) Fernald	T	Ann	He	OgTr	MsX	PsRu	—	—	+	—	Adv
Poaceae	<i>Dactylis glomerata</i> L.	HKr	Per	ScHe	OgMsTr	Ms	SilPr	+	+	+	+	—
Poaceae	<i>Digitaria sanguinalis</i> (L.) Scop.	T	Ann	He	OgMsTr	Ms	PsRu	+	+	+	+	Adv
Poaceae	<i>Echinochloa crusgalli</i> (L.) P. Beauv.	T	Ann	He	OgMgTr	MsHg	Ru	+	+	+	+	Adv
Poaceae	<i>Elytrigia repens</i> (L.) Nevski	G	Per	ScHe	MsTr	MsX- MsHg	SilStPr Ru	+	+	+	+	—
Poaceae	<i>Eragrostis minor</i> Host	T	Ann	He	OgMsTr	MsX	PsRu	+	+	+	+	Adv
Poaceae	<i>E. pilosa</i> (L.) P. Beauv.	T	Ann	He	OgTr	MsX	RuPtPs	+	—	—	—	Adv
Poaceae	<i>Festuca beckeri</i> (Hack.) Trautv.	HKr	Per	He	OgTr	X	StSilPs	—	+	+	—	—
Poaceae	<i>F. gigantea</i> (L.) Vill.	HKr	Per	Sc	MgTr	HgMs	Sil	+	+	—	—	—
Poaceae	<i>F. pratensis</i> Huds.	HKr	Per	ScHe	MsTr	HgMs	Pr	+	+	—	—	—
Poaceae	<i>F. regeliana</i> Pavl.	HKr	Per	He	AlkTr	MsHg	HalPr	+	+	+	+	—
Poaceae	<i>F. valesiaca</i> Gaudin.	HKr	Per	He	MgTr	X	St	—	+	+	—	—
Poaceae	<i>Glyceria maxima</i> (C. Hartm.) Holub.	HKr	Per	He	MsTr	HgHel	PalAq	+	+	—	—	—
Poaceae	<i>G. notata</i> (Chevall.)	HKr	Per	He	MsTr	Hg	PrPal	+	—	—	—	—
Poaceae	<i>Hierochloa odorata</i> (L.) P. Beauv.	G	Per	ScHe	OgMsTr	XMs	SilStPr	+	+	—	—	—
Poaceae	<i>Hordeum murinum</i> L.	T	Ann	He	MsTr	MsX	RuPsSt	—	—	+	+	Adv
Poaceae	<i>Koeleria sabuletorum</i> (Domin) Klokov	HKr	Per	He	OgTr	MsX	PsSt	—	+	+	—	—
Poaceae	<i>Leersia orizoides</i> (L.) Sw.	G	Per	HeSc	OgMsTr	HelHg	PrPal	+	—	—	—	RLD 3
Poaceae	<i>Lolium perenne</i> L.	HKr	Per	He	MgTr	XMs	RuPr	+	+	+	+	—
Poaceae	<i>Melica altissima</i> L.	HKr	Per	ScHe	MsTr	XMs	SMr	+	—	—	—	—
Poaceae	<i>Molinia caerulea</i> (L.) Moench	HKr	Per	ScHe	OgTr	Hg	SilPrPal	+	—	—	—	RLD 2
Poaceae	<i>Phalaroides arundinacea</i> (L.) Rauschert	HKr	Per	ScHe	MgTr	MsHg	PrPal	+	+	+	—	—
Poaceae	<i>Phleum pratense</i> L.	HKr	Per	He	MgTr	Ms	Pr	+	+	—	—	—
Poaceae	<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	HKr	Per	ScHe	MsTr	Hel	PalAq	+	+	+	+	—
Poaceae	<i>Poa angustifolia</i> L.	HKr	Per	ScHe	MsMgTr	MsX	SilPrSt	+	+	+	+	—
Poaceae	<i>P. annua</i> L.	T	Ann	HeSc	MsTr	Ms	RuSilPr	+	+	+	+	—
Poaceae	<i>P. bulbosa</i> L.	HKr	Per	He	OgMsTr	MsX	RuSilSt	+	+	+	+	—
Poaceae	<i>P. compressa</i> L.	HKr	Per	ScHe	OgMsTr	MsX	RuSt	+	+	+	+	—
Poaceae	<i>P. nemoralis</i> L.	HKr	Per	ScHe	MsTr	XMs	Sil	+	+	—	—	—
Poaceae	<i>P. palustris</i> L.	HKr	Per	He	MsTr	MsHg	PalPr	+	+	+	+	—
Poaceae	<i>P. pratensis</i> L.	G	Per	He	MsTr	Ms	Pr	+	+	+	+	—
Poaceae	<i>P. sylvicola</i> Guss.	HKr	Per	HeSc	MgTr	HgMs	SilPalPr	+	—	—	—	—
Poaceae	<i>P. trivialis</i> L.	HKr	Per	He	MsTr	HgMs	SilPalPr	+	—	—	—	—
Poaceae	<i>Puccinella distans</i> (Jacq.) Parl.	HKr	Per	He	AlkMsTr	XMs	RuHalPr	—	+	—	—	—
Poaceae	<i>Sclerochloa dura</i> (L.) P. Beauv.	T	Ann	He	MsTr	XMs	StRu	—	—	—	+	Adv
Poaceae	<i>Secale sylvestre</i> Host	T	Ann	He	OgTr	MsX	StRuPs	—	+	+	+	—
Poaceae	<i>Setaria glauca</i> (L.) P. Beauv.	T	Ann	He	MsTr	XMs	PsRu	—	+	+	+	Adv
Poaceae	<i>S. verticillata</i> (L.) H. B.	T	Ann	ScHe	MgTr	Ms	Ru	—	—	+	+	Adv
Poaceae	<i>S. viridis</i> (L.) P. Beauv.	T	Ann	He	OgMsTr	XMs	PsRu	+	+	+	+	Adv
Poaceae	<i>Stipa capillata</i> L.	HKr	Per	He	MsTr	X	PtSt	—	+	+	+	RBU U, RLD 3
Potamogetonaceae	<i>Potamogeton berchtoldii</i> Fieb.	HKr	Per	HeSc	MsTr	Hyr	Aq	+	+	+	+	—
Potamogetonaceae	<i>P. compressus</i> L.	HKr	Per	HeSc	MsTr	Hyr	Aq	+	+	—	—	—
Potamogetonaceae	<i>P. crispus</i> L.	HKr	Per	HeSc	MsTr	Hyr	Aq	+	+	+	+	—
Potamogetonaceae	<i>P. gramineus</i> L.	HKr	Per	ScHe	MsTr	PlHyr	Aq	+	+	—	—	RLD 3
Potamogetonaceae	<i>P. lucens</i> L.	HKr	Per	HeSc	MsTr	Hyr	Aq	+	+	—	—	—
Potamogetonaceae	<i>P. pectinatus</i> L.	HKr	Per	HeSc	MsTr	Hyr	Aq	+	+	+	+	—
Potamogetonaceae	<i>P. perfoliatus</i> L.	HKr	Per	HeSc	MsTr	Hyr	Aq	+	+	+	+	—
Sparganiaceae	<i>Sparganium erectum</i> L.	HKr	Per	He	MsTr	Hel	PalAq	+	+	—	—	—
Sparganiaceae	<i>S. minimum</i> Wallr.	HKr	Per	HeSc	MsTr	Hel	PalAq	+	—	—	—	RLD 4
Typhaceae	<i>Typha angustifolia</i> L.	HKr	Per	He	MsTr	Hel	PalAq	+	+	+	+	—
Typhaceae	<i>T. latifolia</i> L.	HKr	Per	He	MgTr	Hel	PalAq	+	+	+	+	—
Typhaceae	<i>T. laxmannii</i> Lepech.	HKr	Per	He	AlkMsTr	Hel	PalAq	+	+	+	+	—
Zannicheliaceae	<i>Zannichelia palustris</i> L.	HKr	Per	HeSc	AlkMsTr	Hyr	Aq	+	+	—	—	—
Aceraceae	<i>Acer campestre</i> L.	Ph	Arb	ScHe	MgMsTr	XMs	SMnSil	+	+	—	—	—
Aceraceae	<i>A. negundo</i> L.	Ph	Arb	He	Og-MgTr	MsX- HgMs	SilCuRu	+	+	+	+	Adv, Inv
Aceraceae	<i>A. platanoides</i> L.	Ph	Arb	HeSc	MgMsTr	Ms	Sil	+	+	—	—	—
Aceraceae	<i>A. tataricum</i> L.	Ph	ArbFr	ScHe	Og-MgTr	MsX- HgMs	SilSMn	+	+	+	+	—
Adoxaceae	<i>Adoxa moschatellina</i> L.	HKr	Per	HeSc	MsTr	Ms	Sil	+	—	—	—	RLD 4
Amaranthaceae	<i>Amaranthus albus</i> L.	T	Ann	He	MsTr	MsX	Ru	—	+	+	+	Adv
Amaranthaceae	<i>A. blitoides</i> S. Wats.	T	Ann	He	MsTr	MsX	Ru	—	+	+	+	Adv
Amaranthaceae	<i>A. retroflexus</i> L.	T	Ann	He	MsTr	MsX	Ru	+	+	+	+	Adv
Anacardiaceae	<i>Cotinus coggygria</i> Scop.	Ph	Fr	ScHe	Og-MgTr	MsX	SMnCu	—	—	+	+	Adv
Anacardiaceae	<i>Rhus typhina</i> L.	Ph	Arb	He	MsTr	MsX	SilCu	—	—	+	+	Adv
Apiaceae	<i>Aegopodium podagraria</i> L.	G	Per	HeSc	MgTr	Ms	Sil	+	—	—	—	—
Apiaceae	<i>Aethusa cynapium</i> L.	HKr	Ann	ScHe	MsTr	XMs	SilRu	+	+	—	—	Adv
Apiaceae	<i>Antriscus cerefolium</i> (L.) Hoffm.	T	Ann	HeSc	MsTr	XMs	SilRu	+	+	—	—	—
Apiaceae	<i>A. sylvestris</i> (L.) Hoffm.	HKr	Per	HeSc	MsTr	Ms	RuSil	+	+	+	+	—
Apiaceae	<i>Chaerophyllum bulbosum</i> L.	HKr	Bien	ScHe	OgTr	Ms	PrSil	+	+	—	—	—
Apiaceae	<i>C. prescottii</i> DC.	G	Bien	ScHe	MgTr	Ms	(Pr)SilRu	+	+	—	—	—
Apiaceae	<i>C. temulum</i> L.	HKr	Bien	HeSc	MsTr	Ms	RuSil	+	+	+	+	—

Families	Species	Clima- morphs	Bio- morphs	Helio- morphs	Tropho- morphs	Hygro- morphs	Ceno- morphs	Protec- ted zone	Recre- ational zone	Stationary recreation zone	Econo- mic zone	Rare, ad- ventive, types
Apiaceae	<i>Cicuta virosa</i> L.	Hel	Per	HeSc	MsTr	Hg	Pal	+	–	–	–	–
Apiaceae	<i>Cenolophium denudatum</i> (Homern) Tutin	HKr	Per	He	MgTr	HgMs	Pr	+	+	–	–	–
Apiaceae	<i>Conium maculatum</i> L.	HKr	Bien	He	MsTr	Ms	Ru	–	–	–	+	–
Apiaceae	<i>Daucus carota</i> L.	HKr	Per	ScHe	Og-MgTr	XM	Ru	+	+	+	+	–
Apiaceae	<i>Eryngium campestre</i> L.	G	Per	He	MsTr	X	RuSt	–	+	+	+	–
Apiaceae	<i>E. planum</i> L.	HKr	Per	ScHe	Og-MsTr	XM	StPr	+	+	–	–	–
Apiaceae	<i>Heracleum sibiricum</i> L.	HKr	Bien	ScHe	MsTr	Ms	SilPr	+	+	+	+	–
Apiaceae	<i>Oenanthe aquatica</i> (L.) Poir.	HKr	Per	ScHe	MsTr	Hg	Pal	+	+	+	+	–
Apiaceae	<i>Pastinaca sylvestris</i> Mill.	HKr	Bien	ScHe	MsTr	Ms	SilPr	+	–	–	–	–
Apiaceae	<i>Peucedanum oreoselinum</i> (L.) Moench.	HKr	Per	HeSc	OgTr	XM	SilPs	–	+	–	–	–
Apiaceae	<i>Seseli libanotis</i> DC.	HKr	Per	He	MsTr	XM	RuSt	–	+	+	+	–
Apiaceae	<i>Sum latifolium</i> L.	HKr	Per	ScHe	MsTr	Hg	Pal	+	+	+	–	–
Apiaceae	<i>S. sisaroides</i> DC.	HKr	Per	He	MsTr	Hg	Pal	+	+	–	–	–
Apiaceae	<i>Torilis japonica</i> (Houtt.) DC.	T	Bien	ScHe	MsTr	XM	RuSil	+	+	–	–	–
Aristolochiaceae	<i>Aristolochia clematitis</i> L.	G	Per	HeSc	MsTr	HgMs	RuPrSil	+	+	–	–	–
Aristolochiaceae	<i>Asarum europaeum</i> L.	G	Per	Sc	MgTr	Ms	Sil	+	–	–	–	RLD 3
Asclepiadaceae	<i>Asclepias syriaca</i> L.	G	Per	He	MsTr	XM	Ru	–	–	–	+	Adv
Asclepiadaceae	<i>Vincetoxicum hirsutifolium</i> Medik.	HKr	Per	ScHe	MsTr	MsX	StMnSil	+	+	–	–	–
Asclepiadaceae	<i>V. scandens</i> Sommier et Levier	HKr	Per	ScHe	MsTr	Ms	Sil	+	–	–	–	RLD 4
Asteraceae	<i>Achillea collina</i> J. Becker ex Rehb.	HKr	Per	He	MsTr	XM	StPr	+	+	–	–	–
Asteraceae	<i>A. micrantha</i> Willd.	HKr	Per	ScHe	OgTr	MsX	SilPs	–	+	–	–	–
Asteraceae	<i>A. nobilis</i> L.	HKr	Per	He	MsTr	MsX	PrRuSt	–	+	–	–	–
Asteraceae	<i>A. submillefolium</i> Klok. et Krytzka	HKr	Per	ScHe	MsTr	XM	SilPrSt	+	+	+	+	–
Asteraceae	<i>Ambrosia artemisiifolia</i> L.	T	Ann	ScHe	OgMgTr	X	Ru	–	+	+	+	Adv
Asteraceae	<i>Anthemis cotula</i> L.	T	Ann	He	MsTr	XM	Ru	+	+	+	+	Adv
Asteraceae	<i>A. ruthenica</i> Bieb.	T	Ann	ScHe	OgTr	X	RuSt	–	+	+	+	–
Asteraceae	<i>A. subtinctoria</i> Dobroc.	HKr	Ann	ScHe	MsOgTr	MsX	RuSt	–	+	–	–	–
Asteraceae	<i>Arctium lappa</i> L.	HKr	Bien	ScHe	MgTr	Ms	SilRu	+	+	+	+	–
Asteraceae	<i>A. nemorosum</i> Lej.	HKr	Bien	HeSc	MgTr	Ms	RuSil	+	–	–	–	–
Asteraceae	<i>A. minus</i> (Hill.) Bernh.	HKr	Bien	ScHe	MgTr	Ms	Ru	+	+	–	–	–
Asteraceae	<i>A. tomentosum</i> Mill.	HKr	Bien	He	MgTr	Ms	Ru	+	+	–	–	–
Asteraceae	<i>Artemisia abrotanum</i> L.	Ch	Fr	He	OgMsTr	HgMs	PalPr	+	–	–	–	–
Asteraceae	<i>A. absinthium</i> L.	HKr	Per	He	MsTr	XM	Ru	+	+	+	+	Adv
Asteraceae	<i>A. austriaca</i> Jacq.	Ch	Per	He	MsTr	X	RuSt	–	+	+	+	–
Asteraceae	<i>A. campestris</i> L.	HKr	Per	He	OgMsTr	X	SilPsSt	–	+	+	–	–
Asteraceae	<i>A. vulgaris</i> L.	HKr	Per	ScHe	MgTr	Ms	PrRu	+	+	+	+	–
Asteraceae	<i>Aster bessarabicus</i> Bernh. ex Rehb.	HKr	Per	ScHe	MgTr	MsX	SilSt	+	–	–	–	RLD 3
Asteraceae	<i>Anovae-angliae</i> L.	HKr	Per	ScHe	MgTr	Ms	Cul	–	–	–	+	Adv
Asteraceae	<i>A. salignus</i> Willd.	HKr	Per	He	MsTr	Ms	Cul	–	–	–	+	Adv
Asteraceae	<i>Bidens tripartita</i> L.	T	Ann	ScHe	MsTr	HgMs	PalPr	+	–	+	+	–
Asteraceae	<i>Calendula officinalis</i> L.	T	Ann	ScHe	MsTr	Ms	Cul	–	–	–	+	Adv
Asteraceae	<i>Carduus acanthoides</i> L.	HKr	Bien	He	MsTr	MsX	PrStRu	+	+	+	+	–
Asteraceae	<i>C. crispus</i> L.	HKr	Bien	ScHe	MsTr	Ms	SilRu	+	+	–	–	–
Asteraceae	<i>C. nutans</i> L.	HKr	Bien	He	MgTr	MsX	StRu	–	+	–	–	Adv
Asteraceae	<i>Centaurea cyamus</i> L.	HKr	Bien	He	MsTr	MsX	Ru	–	–	–	+	Adv
Asteraceae	<i>C. diffusa</i> Lam.	HKr	Bien	He	MsTr	X	StRu	–	+	+	+	Adv
Asteraceae	<i>C. jacea</i> L.	HKr	Per	ScHe	MgTr	Ms	Pr	+	+	–	–	–
Asteraceae	<i>C. scabiosa</i> L.	HKr	Per	ScHe	MgTr	MsX	StRu	–	+	+	–	–
Asteraceae	<i>C. trichocephala</i> M. Bieb.	HKr	Per	ScHe	MsTr	XM	PrSt	+	+	–	–	–
Asteraceae	<i>Chondrilla juncea</i> L.	HKr	Per	He	OgTr	MsX	RuStPs	–	+	+	+	–
Asteraceae	<i>Cichorium intybus</i> L.	HKr	Per	He	MsTr	MsX	RuStPr	+	+	+	+	Adv
Asteraceae	<i>Cirsium camum</i> (L.) All.	HKr	Per	He	AlkTr	Ms	PrHal	+	+	–	–	–
Asteraceae	<i>C. incanum</i> (S. G. Gmel.) Fisch.	G	Per	He	MgTr	MsHg	RuPr	+	+	+	+	–
Asteraceae	<i>C. setosum</i> (Willd.) Bess.	G	Per	He	MsTr	MsX	Ru	+	+	+	+	–
Asteraceae	<i>C. ucrainicum</i> Bess.	HKr	Bien	He	OgMsTr	X	RuSt	+	+	+	+	–
Asteraceae	<i>C. vulgare</i> (Savt.) Ten.	HKr	Bien	ScHe	MgTr	XM	Ru	+	+	+	+	–
Asteraceae	<i>Coniza canadensis</i> (L.) Cronq.	HKr	Bien	ScHe	OgMgTr	MsX	Ru	+	+	+	+	Adv
Asteraceae	<i>Crepis rhodifolia</i> M. Bieb.	T	Ann	He	MsTr	MsX	StRu	–	+	+	+	–
Asteraceae	<i>C. tectorum</i> L.	HKr	Bien	He	OgMsTr	MsX	PsStRu	+	+	+	+	–
Asteraceae	<i>Echinops sphaerocephalus</i> L.	HKr	Per	ScHe	MsTr	X	RuPrSt	+	–	–	–	–
Asteraceae	<i>Erigeron acris</i> L.	HKr	Bien	ScHe	MsTr	MsX	RuPrSt	+	+	+	+	–
Asteraceae	<i>E. podolicus</i> Bess.	HKr	Bien	He	OgMsTr	XM	StPr	+	+	+	+	–
Asteraceae	<i>Eupatorium cannabinum</i> L.	HKr	Per	ScHe	MgTr	HgMs	SilPr	+	+	–	–	–
Asteraceae	<i>Filago arvensis</i> L.	T	Ann	ScHe	OgMsTr	MsX	PsStRu	+	+	–	–	–
Asteraceae	<i>Galinsoga parviflora</i> Cav.	T	Ann	ScHe	MsTr	Ms	Ru	–	–	–	+	Adv
Asteraceae	<i>Grindelia squarrosa</i> (Pursh) Dunal.	HKr	Per	He	Og-MgTr	MsX	Ru	–	–	–	+	Adv
Asteraceae	<i>Helianthus annuus</i> L.	T	Ann	He	MgTr	XM	Cu	–	–	–	+	Adv
Asteraceae	<i>H. tuberosus</i> L.	G	Per	He	MgTr	XM	Cu	–	–	–	+	Adv
Asteraceae	<i>Helishysium arenarium</i> (L.) Moench.	HKr	Per	He	OgTr	MsX	StPs	+	+	+	+	–
Asteraceae	<i>Helipopsis scabra</i> Dunal.	G	Per	ScHe	MsTr	XM	Cu	–	–	–	+	Adv
Asteraceae	<i>Hieracium umbellatum</i> L.	HKr	Per	ScHe	OgTr	MsX	StPs	+	+	+	+	–
Asteraceae	<i>Inula britannica</i> L.	HKr	Per	He	MsTr	Ms	RuPr	+	+	–	–	–
Asteraceae	<i>I. germanica</i> L.	G	Per	He	MgTr	XM	StPr	+	+	–	–	–
Asteraceae	<i>I. helenium</i> L.	HKr	Per	He	MgTr	HgMs	Pr	+	–	–	–	RLD 3
Asteraceae	<i>I. salicina</i> L.	G	Per	ScHe	OgTr	XM	PrSMn	+	–	–	–	–
Asteraceae	<i>Iva xanthiifolia</i> Nutt.	T	Ann	ScHe	OgMgTr	XM	Ru	–	+	+	+	Adv
Asteraceae	<i>Jurinea longifolia</i> DC.	HKr	Per	He	OgTr	MsX	StPs	+	–	–	–	RLD 2
Asteraceae	<i>Lactuca chaxii</i> Vill.	T	Bien	HeSc	MgTr	Ms	Sil	+	–	–	–	–
Asteraceae	<i>L. serriola</i> Tomer	HKr	Bien	He	MsTr	XM	Ru	+	+	+	+	Adv
Asteraceae	<i>L. tatarica</i> (L.) C. A. Mey.	G	Per	He	MsTr	XM	HalRu	+	+	+	+	–

Families	Species	Clima- morphs	Bio- morphs	Helio- morphs	Tropho- morphs	Hygro- morphs	Ceno- morphs	Protec- ted zone	Recre- ational zone	Stationary recreation zone	Econo- mic zone	Rare, ad- ventive, types
Asteraceae	<i>Lapsana communis</i> L.	T	Ann	HeSc	MgTr	XMs	RuSil	+	+	–	–	–
Asteraceae	<i>Leontodon autumnalis</i> L.	HKr	Per	ScHe	MsTr	Ms	RuPr	+	+	–	–	–
Asteraceae	<i>Lepidothea suaveolens</i> (Pursh) Nutt.	T	Ann	He	MsTr	MsX	Ru	+	+	+	+	Adv
Asteraceae	<i>Matricaria recutita</i> L.	T	Ann	He	MsTr	MsX	Ru	+	+	+	+	Adv
Asteraceae	<i>Onopordum acanthium</i> L.	HKr	Bien	He	MsTr	MsX	Ru	–	+	+	+	Adv
Asteraceae	<i>Petasites spurius</i> (Retz.) Rechb.	G	Per	ScHe	OgTr	MsHg	Ps	+	–	–	–	Adv
Asteraceae	<i>Phalacrolooma annuum</i> (L.) Dumort.	HKr	Bien	ScHe	MsTr	MsX	Ru	–	–	+	+	Adv
Asteraceae	<i>Picris hieracioides</i> L.	HKr	Per	He	MsTr	MsX	RuSt	+	+	+	+	–
Asteraceae	<i>Pilosella echinoides</i> (Linn.) F. Schultz. et Sch.	HKr	Per	ScHe	OgMsTr	MsX	SilPsSt	–	+	+	+	–
Asteraceae	<i>P. floribunda</i> (Wimmer et Grab.) Fr.	HKr	Per	He	MsTr	HgMs	RuPr	+	+	–	–	–
Asteraceae	<i>P. officinarum</i> F. Schultz. et Sch.	HKr	Per	He	OgMsTr	XMs	PsSilPr	+	+	–	–	–
Asteraceae	<i>Pulicaria vulgaris</i> Gaertn.	T	Ann	He	AlkMsTr	MsHg	RuPr	+	+	–	–	–
Asteraceae	<i>Rutbeckia hirta</i> L.	T	Ann	He	MsTr	Ms	Cul	–	–	–	+	Adv
Asteraceae	<i>Scorzonera lachiniata</i> L.	HKr	Per	He	AlkTr	X-Ms	HalStPr	–	+	–	–	–
Asteraceae	<i>S. parviflora</i> Jacq.	HKr	Per	He	AlkTr	Ms	HalPr	–	+	–	–	–
Asteraceae	<i>Senecio borysthemicus</i> (DC.) Andr. ex Czern.	HKr	Per	ScHe	OgTr	XMs	Ps	–	–	–	–	ERL R, RLD 3
Asteraceae	<i>S. jacobaea</i> L.	HKr	Per	He	MsTr	MsX	SMnPsSt	+	+	–	–	–
Asteraceae	<i>S. vernalis</i> Waldst. et Kit.	T	Ann	ScHe	Og-MgTr	XMs	Ru	–	+	+	+	–
Asteraceae	<i>S. vulgaris</i> L.	T	Ann	He	MsTr	Ms	Ru	–	+	+	+	Adv
Asteraceae	<i>Serratula coronata</i> L.	HKr	Per	ScHe	MsTr	Ms	SMnPr	+	–	–	–	–
Asteraceae	<i>Solidago canadensis</i> L.	HKr	Per	ScHe	MsTr	XMs	RuCul	–	–	–	+	Adv
Asteraceae	<i>Sonchus arvensis</i> L.	G	Per	He	MgTr	XMs	PrRu	–	+	+	+	Adv
Asteraceae	<i>S. oleraceus</i> L.	T	Ann	He	MsTr	XMs	Ru	–	+	+	+	Adv
Asteraceae	<i>S. palustris</i> L.	HKr	Per	He	MsTr	MsHg	Pal	+	–	–	–	–
Asteraceae	<i>Tagetes patula</i> L.	T	Ann	He	MgTr	MsX	Cul	–	–	–	+	Adv
Asteraceae	<i>Tanacetum vulgare</i> L.	HKr	Per	He	OgMgTr	MsX	StRuPr	+	+	+	–	–
Asteraceae	<i>Taraxacum officinale</i> Wigg. aggr.	HKr	Per	ScHe	MsTr	Ms	RuPr	+	+	+	+	–
Asteraceae	<i>Tragopogon borysthemicus</i> Artemcz.	HKr	Bien	He	OgTr	MsX	PsSt	+	–	–	–	RLD 0, ERL I
Asteraceae	<i>T. major</i> Jacq.	HKr	Bien	He	MsTr	MsX	SMnRuSt	+	+	+	–	–
Asteraceae	<i>Tripleurospermum inodorum</i> (L.) Sch.	HKr	Bien	He	MgTr	MsX	Ru	+	+	+	–	Adv
Asteraceae	<i>Tripolium pannonicum</i> (Jacq.) Dobrocz.	HKr	Bien	He	Alk	MsHg	PalPrH	+	+	–	–	–
Asteraceae	<i>Tussilago farfara</i> L.	G	Per	He	MsTr	MsHg	RuPr	+	+	+	–	–
Asteraceae	<i>Xanthium albinum</i> (Widd.) H. Scholtz	T	Ann	He	Og-MgTr	XMs- MsHg	Ru	+	+	+	+	Adv
Asteraceae	<i>X. strumarium</i> L.	T	Ann	He	MsTr	HgMs- XMs	Ru	+	+	+	+	Adv
Berberidaceae	<i>Mahonia aquifolium</i> Nutt.	nPh	Fr	HeSc	OgMgTr	Ms	SilCu	–	–	–	+	Adv
Betulaceae	<i>Alnus glutinosa</i> (L.) Gaertn.	Ph	Arb	ScHe	MgTr	Hg	PalSil	+	–	–	–	RLD 3
Betulaceae	<i>Betula pubescens</i> Ehrh.	Ph	Arb	ScHe	MsOgTr	Hg	Sil	–	–	–	+	–
Boraginaceae	<i>Aegonychon purpureocauleruleum</i> (L.) Holub	HKr	Per	HeSc	MsMgTr	Ms	Sil	+	–	–	–	RLD 3
Boraginaceae	<i>Anchusa officinalis</i> L.	HKr	Bien	ScHe	OgTr	MsX	RuSilPs	+	+	+	–	Adv
Boraginaceae	<i>Asperigo procumbens</i> L.	T	Ann	ScHe	MsTr	XMs	Ru	–	+	+	+	–
Boraginaceae	<i>Buglossoides arvensis</i> (L.) I. M. Johnst.	HKr	Ann	ScHe	MsTr	MsX	Ru	+	+	+	–	Adv
Boraginaceae	<i>Cynoglossum officinale</i> L.	G	Ann	He	OgTr	XMs	Ru	–	+	+	+	Adv
Boraginaceae	<i>Lappula squarrosa</i> (Retz.) Dumort.	HKr	Bien	He	OgMsTr	MsX	RuSt	–	–	–	+	Adv
Boraginaceae	<i>Myosotis arvensis</i> (L.) Hill	T	Ann	He	MsTr	MsX	Ru	–	+	+	+	Adv
Boraginaceae	<i>M. laxa</i> Lehm. (<i>M. caespitosa</i> K. P. Suchultz)	HKr	Ann	ScHe	MsTr	MsX	PalPr	+	+	–	–	–
Boraginaceae	<i>M. micrantha</i> Pall. ex Lehm.	HKr	Per	He	MsTr	MsX	Ru	–	–	+	+	–
Boraginaceae	<i>M. nemorosa</i> Besser	HKr	Per	ScHe	MsTr	MsHg	SilPr	+	–	–	–	–
Boraginaceae	<i>M. scorpioides</i> L.	HKr	Per	ScHe	MsTr	Hg	PrPal	+	+	–	–	–
Boraginaceae	<i>M. sparsiflora</i> J.C. Mikan ex Pohl	HKr	Ann	ScHe	MsTr	MsX	RuSil	+	+	–	–	–
Boraginaceae	<i>Pulmonaria obscura</i> Dumort.	HKr	Per	HeSc	MsTr	Ms	Sil	+	–	–	–	–
Boraginaceae	<i>Symphytum officinale</i> L.	HKr	Per	ScHe	MgTr	MsHg	PalPr	+	+	–	–	–
Brassicaceae	<i>Alliaria petiolata</i> (Bieb.) Cavara et Grande	HKr	Per	HeSc	MsTr	XMs	RuSil	+	+	–	–	–
Brassicaceae	<i>Alyssum desertorum</i> Stapf.	T	Ann	He	MsTr	MsX	RuSt	–	+	+	+	–
Brassicaceae	<i>Arabis thaliana</i> (L.) Heynh.	HKr	Ann	He	OgTr	XMs	PsRu	–	+	–	–	Adv
Brassicaceae	<i>Barbarea stricta</i> Andr.	HKr	Ann	ScHe	MgTr	HgMs	PalPr	+	–	–	–	–
Brassicaceae	<i>B. vulgaris</i> R. Br.	HKr	Ann	ScHe	MsMgTr	Ms	PrRu	+	+	–	–	–
Brassicaceae	<i>B. incana</i> (L.) DC.	HKr	Bien	ScHe	Og-MgTr	XMs	Ru	+	+	+	+	–
Brassicaceae	<i>Bunias orientalis</i> L.	HKr	Bien	ScHe	OgMgTr	XMs	Ru	+	+	–	–	–
Brassicaceae	<i>Camelina microcarpa</i> Andrez.	T	Ann	He	MsTr	XMs	SilRu	+	+	–	–	Adv
Brassicaceae	<i>Capsella bursa-pastoris</i> (L.) Medik.	T	Ann	He	MsTr	XMs	Ru	+	+	+	+	Adv
Brassicaceae	<i>Cardaria draba</i> (L.) Desv.	G	Per	He	MsTr	MsX	Ru	–	–	–	+	Adv
Brassicaceae	<i>Chorispora tenella</i> (Pall.) DC.	T	Ann	He	MsTr	MsX	Ru	+	+	+	+	Adv
Brassicaceae	<i>Descurainia sophia</i> (L.) Webb et Plantl	T	Ann	He	MsTr	XMs	Ru	–	+	+	+	Adv
Brassicaceae	<i>Diplotaxis muralis</i> (L.) DC.	HKr	Ann	He	MsTr	MsX	PtRu	–	+	+	+	Adv
Brassicaceae	<i>D. tenuifolia</i> (L.) DC.	HKr	Per	He	MsTr	MsX	Ru	–	+	+	–	Adv
Brassicaceae	<i>Draba nemorosa</i> L.	T	Ann	He	MsTr	XMs	Ru	+	+	–	–	–
Brassicaceae	<i>Erophila verna</i> (L.) Bess.	T	Ann	He	OgMsTr	XMs	RuPsSt	–	+	+	–	–
Brassicaceae	<i>Erysimum cheiranthoides</i> L.	HKr	Bien	He	MsTr	Ms	Ru	–	+	+	–	Adv
Brassicaceae	<i>E. diffusum</i> Ehrh.	HKr	Bien	He	MsTr	X	RuSt	–	+	+	+	–
Brassicaceae	<i>Hesperidium tristis</i> (L.) G. Beck	HKr	Bien	He	MsMgTr	MsX	PrSt	+	–	–	–	RLD 3
Brassicaceae	<i>Hesperis sibirica</i> L.	HKr	Bien	HeSc	MsMgTr	Ms	Sil	+	–	–	–	Adv
Brassicaceae	<i>Lepidium latifolium</i> L.	HKr	Per	He	Og-MgTr	Ms	PrH	+	–	–	–	–
Brassicaceae	<i>L. ruderalis</i> L.	HKr	Ann	He	MsTr	MsX	Ru	–	–	–	+	Adv
Brassicaceae	<i>Microthlaspi perfoliata</i> (L.) F. K. Meyer	T	Ann	He	MsTr	XMs	PrStRu	–	+	+	+	Adv
Brassicaceae	<i>Rorippa amphibia</i> (L.) Bess.	G	Per	HeSc	MgTr	HyHg	AqPal	+	+	–	–	–

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Brassicaceae	<i>R. austriaca</i> (Crantz.) Bess.	HKr	Per	He	Og-MsTr	HgMs	RuPalPr	+	+	—	—	—
Brassicaceae	<i>Sinapis arvensis</i> L.	T	Ann	He	MgTr	MsX	Ru	—	+	+	+	Adv
Brassicaceae	<i>Sisymbrium altissimum</i> L.	HKr	Ann	He	MsTr	XMs	Ru	—	—	+	+	Adv
Brassicaceae	<i>S. loeselii</i> L.	HKr	Ann	He	OgMsTr	MsX	Ru	—	+	+	+	Adv
Brassicaceae	<i>S. polymorphum</i> (Murray) Roth	HKr	Ann	ScHe	MsTr	MsX	RuMnSt	—	+	+	+	Adv
Brassicaceae	<i>Syrenia cana</i> (Pall. et Mitt.) Neilr.	HKr	Bien	He	OgTr	MsX	Ps	+	—	—	—	RLD 3
Brassicaceae	<i>Thlaspi arvense</i> L.	T	Ann	He	MsTr	MsX	Ru	—	+	+	+	Adv
Brassicaceae	<i>Turritis glabra</i> L.	HKr	Ann	ScHe	MsTr	Ms	RuSMn	+	+	—	—	—
Caesalpiniaceae	<i>Gleditschia triacanthos</i> L.	Ph	Arb	He	MsTr	MsX	SilCu	—	+	+	+	Adv
Campanulaceae	<i>Campanula bononiensis</i> L.	HKr	Per	ScHe	MsTr	MsX	RuStSil	+	+	—	—	—
Campanulaceae	<i>C. glomerata</i> L.	HKr	Per	ScHe	MsTr	XMs	StPrSil	+	—	—	—	RLD 3
Campanulaceae	<i>C. persicifolia</i> L.	HKr	Per	HeSc	MsTr	Ms	PsSil	+	—	—	—	RLD 2
Campanulaceae	<i>C. rapunculoides</i> L.	HKr	Per	ScHe	MsTr	XMs	StPrSil	+	—	—	—	—
Campanulaceae	<i>C. rapunculus</i> L.	HKr	Bien	ScHe	MsTr	Ms	SMnPr	+	—	—	—	—
Campanulaceae	<i>C. sibirica</i> L.	HKr	Bien	He	MsTr	MsX	RuPrSt	+	+	—	—	—
Campanulaceae	<i>C. trachelium</i> L.	HKr	Per	HeSc	MsTr	Ms	SMnSil	+	—	—	—	RLD 3
Cannabaceae	<i>Cannabis ruderalis</i> Janisch.	T	Ann	He	MsTr	MsX	Ru	—	—	—	+	Adv
Cannabaceae	<i>Humulus lupulus</i> L.	G	Per	HeSc	MsTr	XMs-Hg	RuSil	+	+	+	+	—
Caprifoliaceae	<i>Lonicera tatarica</i> L.	nPh	Fr	ScHe	MsTr	MsX	SMnCu	—	—	+	+	Adv
Caprifoliaceae	<i>Sambucus nigra</i> L.	nPh	Fr	ScHe	MgMsTr	Ms	RuSil	+	+	—	+	—
Caprifoliaceae	<i>Viburnum opulus</i> L.	nPh	Fr	HeSc	MgTr	Ms	Sil	—	—	—	+	—
Caryophyllaceae	<i>Alsine media</i> L.	HKr	Ann	ScHe	MsMgTr	HgMs	SilRu	+	+	+	+	—
Caryophyllaceae	<i>Arenaria uvalensis</i> Pall. ex Spreng.	HKr	Ann	He	OgMsTr	MsX	PsStRu	+	+	—	—	—
Caryophyllaceae	<i>Cerastium holosteoides</i> Fries	HKr	Per	ScHe	MgMsTr	Ms	SMnPr	+	—	—	—	—
Caryophyllaceae	<i>Coronaria flos-cuculi</i> (L.) Four	HKr	Per	ScHe	MsTr	MsHg	SMnPalPr	+	—	—	—	RLD 2
Caryophyllaceae	<i>Cucubalus baccifer</i> L.	HKr	Per	HeSc	MgTr	HgMs	PrSil	+	—	—	—	—
Caryophyllaceae	<i>Dianthus campestris</i> Bieb.	HKr	Per	ScHe	OgMsTr	XMs	PsSMn	+	+	—	—	—
Caryophyllaceae	<i>D. laevigatus</i> (Grun.) Klokov	HKr	Per	He	OgTr	MsX	Ps	+	—	—	—	—
Caryophyllaceae	<i>D. platyodon</i> Klokov	HKr	Per	He	OgTr	MsX	SilPs	+	+	—	—	—
Caryophyllaceae	<i>D. stenocalyx</i> Juz.	HKr	Per	ScHe	MgMsTr	Ms	SMnPr	+	—	—	—	—
Caryophyllaceae	<i>Dichodon viscidum</i> (M. Bieb.) Holub	T	Ann	He	AlkTr	HgMs	HalPr	+	+	—	—	—
Caryophyllaceae	<i>Elisantae viscosa</i> (L.) Rupr	HKr	Ann	He	MsTr	XMs	PsPtSt	+	—	—	—	—
Caryophyllaceae	<i>Eremogone longifolia</i> (M. Bieb.) Fenzl	HKr	Per	He	OgMsTr	MsX	HalSt	+	+	—	—	RLD 2
Caryophyllaceae	<i>Gypsophila paniculata</i> L.	HKr	Per	He	OgMsTr	MsX	PsSt	+	+	—	—	—
Caryophyllaceae	<i>Herniaria polygama</i> J. Gay	T	Ann	He	MsOgTr	MsX	RuPs	+	+	—	—	—
Caryophyllaceae	<i>Holosteum umbellatum</i> L.	T	Ann	He	OgMsTr	XMs	RuPtSt	+	+	—	—	—
Caryophyllaceae	<i>Melandrium album</i> (Mill.) Garcke	HKr	Bien	ScHe	MsTr	MsX	RuSMnPr	+	+	+	—	—
Caryophyllaceae	<i>Moerhousia trinervia</i> (L.) Clairv.	HKr	Ann	HeSc	OgMsTr	HgMs	Sil	+	—	—	—	—
Caryophyllaceae	<i>Myosoton aquaticum</i> (L.) Moench	HKr	Per	ScHe	Og-MsTr	HgMs	PalPr	+	+	+	+	—
Caryophyllaceae	<i>Oberna behen</i> (L.) Ikonn.	HKr	Per	ScHe	MsTr	XMs	RuSMnPr	+	+	—	—	—
Caryophyllaceae	<i>Otites borysthena</i> (Grun.) Klokov	HKr	Per	He	MsOgTr	XMs	StPs	+	+	—	—	—
Caryophyllaceae	<i>Psammophilidella muralis</i> (L.) Ikonn.	T	Ann	He	MsTr	Ms	RuPrSt	+	+	—	—	—
Caryophyllaceae	<i>Saponaria officinalis</i> L.	HKr	Per	ScHe	OgMsTr	Ms	RuSMnPr	+	+	+	—	Adv
Caryophyllaceae	<i>Silene chlorantha</i> (Willd.) Ehrh.	HKr	Per	ScHe	OgMsTr	XMs	PsSilSt	+	—	—	—	—
Caryophyllaceae	<i>S. dichotoma</i> Ehrh.	HKr	Ann	He	MsTr	XMs	StRu	+	+	+	—	—
Caryophyllaceae	<i>Stellaria graminea</i> L.	HKr	Per	ScHe	OgMsTr	Ms	SMnPr	+	+	—	—	—
Caryophyllaceae	<i>S. holostea</i> L.	HKr	Per	HeSc	MsTr	Ms	Sil	+	+	—	—	—
Caryophyllaceae	<i>Steris viscaria</i> (L.) Raf.	HKr	Per	ScHe	OgMsTr	XMs	PrSMn	+	—	—	—	—
Celastraceae	<i>Euonymus europaea</i> L.	nPh	Fr	HeSc	MsTr	Ms	SMnSil	+	+	—	—	—
Celastraceae	<i>E. verrucosa</i> Scop.	nPh	Fr	HeSc	MsTr	Ms	SMnSil	+	—	—	—	—
Ceratophyllaceae	<i>Ceratophyllum demersum</i> L.	HKr	Per	Sc	AlkMgTr	Hy er	Aq	+	+	+	+	—
Ceratophyllaceae	<i>C. submersum</i> L.	HKr	Per	Sc	MgTr	Hy er	Aq	+	—	—	—	—
Chenopodiaceae	<i>Atriplex patula</i> L.	T	Ann	He	MsTr	XMs	Ru	—	—	+	+	—
Chenopodiaceae	<i>Asagittata</i> Borkh	T	Ann	He	AlkMsTr	MsHg	RuHalPr	+	+	+	—	Adv
Chenopodiaceae	<i>A. tatarica</i> L.	T	Ann	He	MsTr	MsX	RuHal	—	+	+	+	Adv
Chenopodiaceae	<i>Chenopodium album</i> L.	T	Ann	ScHe	MsTr	MsX	Ru	+	+	+	+	—
Chenopodiaceae	<i>C. hybridum</i> L.	T	Ann	HeSc	MsTr	XMs	SilRu	+	—	—	—	Adv
Chenopodiaceae	<i>C. polyspermum</i> L.	T	Ann	HeSc	OgMsTr	XMs	RuSMnPs	+	+	+	—	Adv
Chenopodiaceae	<i>C. urbicum</i> L.	T	Ann	He	MsTr	Ms	Ru	—	—	+	+	—
Chenopodiaceae	<i>Corispermum marschallii</i> Stev.	T	Ann	He	OgMsTr	HgMs	Ps	+	+	—	—	—
Chenopodiaceae	<i>Kochia laniflora</i> (S. G. Gmel.) Borb	T	Ann	ScHe	OgTr	MsX	RuSilPs	—	+	+	—	Adv
Chenopodiaceae	<i>Polycnemum arvense</i> L.	T	Ann	ScHe	OgMsTr	X	RuPsSt	—	+	—	—	Adv
Clusiaceae	<i>Hypericum perforatum</i> L.	HKr	Per	ScHe	OgMsTr	Ms	SMnPr	+	+	—	—	—
Convolvulaceae	<i>Calystegia sepium</i> (L.) R. Br.	HKr	Per	ScHe	MsTr	MsHg	PrPal	+	+	+	—	—
Convolvulaceae	<i>Convolvulus arvensis</i> L.	G	Per	ScHe	MsTr	MsX	Ru	+	+	+	+	—
Comaceae	<i>Swida sanguinea</i> (L.) Opiz.	Ph	Arb	HeSc	MsTr	Ms	Sil	+	—	—	—	—
Crassulaceae	<i>Hylotelephium polonicum</i> (Blok.) Holub	G	Per	ScHe	MsOgTr	XMs	SilPsPt	+	+	—	—	—
Cuscutaceae	<i>Cuscuta europaea</i> L.	T	Ann	He	Par	HgMs	PrSil	+	+	—	—	—
Cuscutaceae	<i>C. lupuliformis</i> Krock.	T	Ann	He	Par	Ms	SilRu	+	+	—	—	—
Dipsacaceae	<i>Knautia arvensis</i> (L.) Coult.	HKr	Per	He	MsTr	XMs	PrSMn	+	—	—	—	—
Dipsacaceae	<i>Scabiosa ochroleuca</i> L.	HKr	Per	ScHe	MsTr	MsX	PsPrSt	+	+	—	—	—
Elacagnaceae	<i>Elaeagnus angustifolia</i> L.	Ph	FrArb	He	AlkMsTr	X-HgMs	SMnPrRu	+	+	+	+	Adv, Inv
Elacagnaceae	<i>Hippophae rhamnoides</i> L.	Ph	ArbFr	He	OgMsTr	Ms	RuCu	—	+	—	—	Adv
Euphorbiaceae	<i>Euphorbia palustris</i> L.	HKr	Per	He	MgTr	MsHg	PalPr	+	+	—	—	—
Euphorbiaceae	<i>E. segueriana</i> Nesk.	HKr	Per	He	MsOgTr	MsX	PtStPs	+	+	—	—	—
Euphorbiaceae	<i>E. semivillosa</i> Prokh.	HKr	Per	ScHe	MsTr	Ms	PrSMn	+	+	—	—	—
Euphorbiaceae	<i>E. virgata</i> Wald. et Kit.	HKr	Per	ScHe	MsTr	Ms	RuPr	+	+	+	—	—
Fabaceae	<i>Amorpha fruticosa</i> L.	nPh	Fr	ScHe	OgMsTr	MsX-Hg	CuRuSil	—	+	+	—	Adv, Inv
Fabaceae	<i>Astragalus cicer</i> L.	HKr	Per	ScHe	MsTr	XMs	RuStPr	+	+	—	—	—
Fabaceae	<i>A. glycyphyllos</i> L.	HKr	Per	HeSc	MgTr	Ms	Sil	+	—	—	—	—

Families	Species	Clima- morphs	Bio- morphs	Helio- morphs	Tropho- morphs	Hygro- morphs	Ceno- morphs	Protec- ted zone	Recre- ational zone	Stationary recreation zone	Econo- mic zone	Rare, ad- ventive, types
Fabaceae	<i>A. varius</i> S. G. Gmel.	HKr	Per	He	OgTr	MsX	StPtPs	+	+	–	–	–
Fabaceae	<i>Caragana arborescens</i> Lam.	Ph	FrArb	ScHe	MsTr	MsX	SilCu	+	–	–	–	Adv
Fabaceae	<i>Chamaecytisus ruthenicus</i> (Fisch.ex Wol.) Klaskov	nPh	Fr	ScHe	OgMsTr	MsX	SilPsSt	+	–	–	–	–
Fabaceae	<i>Genista tinctoria</i> L.	nPh	Fr	ScHe	MsOgTr	XMs	PrSSMn	+	+	–	–	–
Fabaceae	<i>Lathyrus pratensis</i> L.	HKr	Per	He	MgTr	Ms	SMnPr	+	+	–	–	–
Fabaceae	<i>L. sylvestris</i> L.	HKr	Per	ScHe	MsTr	Ms	SilSMn	+	–	–	–	–
Fabaceae	<i>L. tuberosus</i> L.	G	Per	He	MsMgTr	MsX	RuPrSt	+	+	–	–	Adv
Fabaceae	<i>Lotus ucrainicus</i> Klokov	HKr	Per	He	MgMsTr	XMs	StPr	+	+	–	–	–
Fabaceae	<i>Medicago lupulina</i> L.	HKr	Ann	He	MsMgTr	Ms	RuSMnPr	+	+	+	–	–
Fabaceae	<i>Melilotus albus</i> Medik.	HKr	Bien	He	MsTr	MsX	RuPrSt	+	+	+	–	–
Fabaceae	<i>M. officinalis</i> (L.) Pall.	HKr	Bien	He	MsTr	XMs	RuStPr	+	+	+	–	–
Fabaceae	<i>Robinia pseudacacia</i> L.	Ph	Arb	He	Og-MgTr	X-Ms	CuSil	+	+	+	+	Adv
Fabaceae	<i>Securigera varia</i> L.	HKr	Per	He	MsTr	XMs	StSMnPr	+	+	–	–	–
Fabaceae	<i>Trifolium alpestre</i> L.	HKr	Per	He	MgTr	XMs	SilStPr	+	+	–	–	–
Fabaceae	<i>T. arvense</i> L.	T	Ann	He	MsTr	MsX	RuPsSt	+	+	–	–	–
Fabaceae	<i>T. medium</i> L.	G	Per	ScHe	MgTr	XMs	SilPr	+	+	+	–	–
Fabaceae	<i>T. montanum</i> L.	HKr	Per	HeSc	MgTr	XMs	SilPr	+	+	–	–	–
Fabaceae	<i>T. pratense</i> L.	HKr	Per	He	MgTr	HgMs	RuSilPr	+	+	+	–	–
Fabaceae	<i>T. repens</i> L.	HKr	Per	He	MgTr	HgMs	RuPr	+	+	+	+	–
Fabaceae	<i>Vicia angustifolia</i> Reichard	T	Ann	He	MsMgTr	XMs	RuPr	–	+	–	–	Adv
Fabaceae	<i>V. cracca</i> L.	HKr	Per	He	MsTr	HgMs	PrSt	+	+	–	–	–
Fabaceae	<i>V. hirsuta</i> (L.) S. F. Grag	T	Ann	ScHe	MsTr	MsX	RuSilSt	+	+	–	–	Adv
Fabaceae	<i>V. pisiformis</i> L.	HKr	Per	He	MsTr	Ms	Sil	+	–	–	–	–
Fabaceae	<i>V. tetrasperma</i> (L.) Schreb.	T	Ann	ScHe	MgTr	XMs	RuPr	+	+	–	–	Adv
Fagaceae	<i>Quercus robur</i> L.	Ph	Arb	ScHe	Og-MgTr	MsX- MsHg	Sil	+	+	+	+	–
Fumariaceae	<i>Corydalis cava</i> (L.) Schweigg. et Korte	G	Per	ScHe	MgTr	Ms	Sil	+	–	–	–	RLD 2
Fumariaceae	<i>C. marschalliana</i> Pers.	G	Per	ScHe	MgTr	Ms	Sil	+	–	–	–	RLD 2
Fumariaceae	<i>C. solida</i> (L.) Clairv.	G	Per	ScHe	MgTr	Ms	Sil	+	–	–	–	–
Fumariaceae	<i>Fumaria schleicheri</i> Soy.-Willem.	T	Ann	ScHe	MsTr	MsX	Ru	+	+	+	+	Adv
Gentianaceae	<i>Centaurium erythraea</i> Rafn.	HKr	Ann	ScHe	OgMsTr	XMs	StPr	+	+	–	–	–
Geraniaceae	<i>Erodium cicutarium</i> (L.) L. Her.	T	Ann	ScHe	OgMsTr	XMs	RuSilPsSt	+	+	–	–	–
Geraniaceae	<i>Geranium collinum</i> Steph.	HKr	Per	ScHe	AlkTr	HgMs	PalHalPr	–	+	–	–	–
Geraniaceae	<i>G. dvaricatum</i> Ehrh.	T	Ann	ScHe	OgMsTr	XMs	RuSil	+	–	–	–	–
Geraniaceae	<i>G. palustre</i> L.	HKr	Per	ScHe	MsTr	MsHg	PrPal	+	+	–	–	RLD 1
Geraniaceae	<i>G. pratense</i> L.	HKr	Per	HeSc	MsTr	Ms	PrSMn	+	+	–	–	RLD 4
Geraniaceae	<i>G. pusillum</i> L.	T	Ann	He	MsTr	MsX	Ru	+	+	+	–	Adv
Geraniaceae	<i>G. robertianum</i> L.	T	Ann	ScHe	OgMsTr	XMs	PtSil	+	–	–	–	–
Geraniaceae	<i>G. sanguineum</i> L.	G	Per	ScHe	OgTr	XMs	PsSil	+	–	–	–	–
Grossulariaceae	<i>Ribes aureum</i> Pursh	nPh	Fr	ScHe	MsTr	Ms	StSMnCu	–	–	+	+	Adv
Haloragaceae	<i>Myriophyllum spicatum</i> L.	HKr	Per	ScHe	MsTr	Hyr	Aq	+	+	+	+	–
Juglandaceae	<i>Juglans regia</i> L.	Ph	Arb	He	MsMgTr	Ms	SilCu	–	–	+	+	Adv
Lamiaceae	<i>Ajuga genevensis</i> L.	G	Per	ScHe	MsTr	XMs	RuPrSil	+	+	–	–	–
Lamiaceae	<i>Ballota nigra</i> L.	HKr	Per	ScHe	MsTr	Ms	Ru	+	+	+	+	Adv
Lamiaceae	<i>Betonica officinalis</i> L.	HKr	Per	ScHe	OgTr	Ms	PrSil	+	+	–	–	RLD 3
Lamiaceae	<i>Chaiturus marrubiastrum</i> (L.) Reichenb.	HKr	Ann	ScHe	MsTr	XMs	RuPrSMn	+	–	–	–	–
Lamiaceae	<i>Clinopodium vulgare</i> L.	HKr	Per	ScHe	MsTr	XMs	SilSMn	+	–	–	–	–
Lamiaceae	<i>Dracocephalum thymiflorum</i> L.	HKr	Ann	ScHe	OgMsTr	MsX	StSilRu	+	–	–	–	Adv
Lamiaceae	<i>Galeopsis tetrahit</i> L.	T	Ann	ScHe	OgMsTr	Ms	RuPsSil	+	+	–	–	–
Lamiaceae	<i>Glechoma hederacea</i> L.	HKr	Per	HeSc	MsTr	Ms	RuPrSil	+	+	–	–	–
Lamiaceae	<i>Lamium amplexicaule</i> L.	HKr	Ann	He	OgMsTr	XMs	Ru	+	+	+	–	Adv
Lamiaceae	<i>L. purpureum</i> L.	HKr	Ann	ScHe	MsTr	XMs	Ru	–	+	+	–	Adv
Lamiaceae	<i>Leonurus cardiaca</i> L.	HKr	Per	ScHe	MgTr	XMs	SMnRu	+	+	–	–	Adv
Lamiaceae	<i>L. villosus</i> Desf. ex D'Urv.	HKr	Per	ScHe	MsTr	MsX	Ru	+	+	+	–	–
Lamiaceae	<i>Lycoopus europaeus</i> L.	HKr	Per	ScHe	MgTr	MsHg	PrPal	+	+	+	+	–
Lamiaceae	<i>L. exaltatus</i> L. fil.	HKr	Per	ScHe	MgTr	MsHg	PrPal	+	+	–	–	–
Lamiaceae	<i>Mentha arvensis</i> L.	HKr	Per	ScHe	MsTr	HgMs	RuPrSil	+	+	–	–	–
Lamiaceae	<i>M. aquatica</i> L.	HKr	Per	ScHe	MsTr	Hg	PalAq	+	+	+	–	–
Lamiaceae	<i>Nepeta cataria</i> L.	HKr	Per	ScHe	MsTr	XMs	RuStSil	+	+	–	–	Adv
Lamiaceae	<i>Origanum vulgare</i> L.	HKr	Per	ScHe	MgTr	MsX	StSMnPr	+	–	–	–	–
Lamiaceae	<i>Prunella vulgaris</i> L.	HKr	Per	He	MgTr	Ms	RuPrSil	+	–	–	–	–
Lamiaceae	<i>Salvia nemorosa</i> L.	HKr	Per	He	MsTr	MsX	StMnPsSt	+	+	–	–	–
Lamiaceae	<i>S. verticillata</i> L.	HKr	Per	ScHe	MsTr	MsX	PrStRu	+	+	–	–	–
Lamiaceae	<i>Scutellaria galericulata</i> L.	G	Per	ScHe	MgTr	Hg	PrPal	+	+	–	–	–
Lamiaceae	<i>S. hastifolia</i> L.	HKr	Per	ScHe	MgTr	HgMs	PalPr	+	–	–	–	–
Lamiaceae	<i>Stachys palustris</i> L.	G	Per	ScHe	MgTr	Hg	PrPal	+	+	–	–	–
Lamiaceae	<i>S. sylvatica</i> L.	HKr	Per	HeSc	MgTr	Ms	Sil	+	–	–	–	–
Lamiaceae	<i>Teucrium scordium</i> L.	HKr	Per	ScHe	MgTr	HgMs	PalPr	+	+	–	–	–
Lamiaceae	<i>Thymus pallasianus</i> Heine. Braun	Ch	Per	ScHe	OgTr	MsX	SMnPs	+	+	–	–	–
Lentibulariaceae	<i>Utricularia vulgaris</i> L.	HKr	Per	ScHe	MgTr	Hyr	Aq	+	–	–	–	RLD3
Loranthaceae	<i>Viscum album</i> L.	nPh	Fr	ScHe	Par	HgMs	Sil	+	+	–	–	–
Lythraceae	<i>Lythrum salicaria</i> L.	HKr	Per	He	MgTr	MsHg	PrAqPal	+	+	–	–	–
Lythraceae	<i>L. virgatum</i> L.	HKr	Per	He	MgTr	MsHg	AqPalPr	+	+	–	–	–
Lythraceae	<i>Peplis portula</i> L.	HKr	Ann	ScHe	MsTr	MsHg	PsPalPr	+	+	–	–	–
Malvaceae	<i>Althaea officinalis</i> L.	HKr	Per	He	AlkMgTr	Ms	HalPalPr	+	+	–	–	Adv
Malvaceae	<i>Lavatera thuringiaca</i> L.	HKr	Per	ScHe	MgTr	MsX	RuStPr	+	+	–	–	–
Malvaceae	<i>Malva pusilla</i> Smith	T	Ann	ScHe	MsTr	XMs	Ru	+	+	+	+	Adv
Moraceae	<i>Morus alba</i> L.	Ph	Arb	He	MsTr	Ms	CuSilRu	+	+	+	+	Adv
Nymphaeaceae	<i>Nuphar lutea</i> (L.) Smith	HKr	Per	He	MsTr	Plr	Aq	+	+	–	–	RLD 3

Families	Species	Clima- morphs	Bio- morphs	Helio- morphs	Tropho- morphs	Hygro- morphs	Ceno- morphs	Protec- ted zone	Recre- ational zone	Stationary recreation zone	Econo- mic zone	Rare, ad- ventive, types
Nymphaeaceae	<i>Nymphaea alba</i> L.	HKr	Per	ScHe	MsTr	Pl r	Aq	+	+	–	–	RLD 2
Oleaceae	<i>Fraxinus excelsior</i> L.	Ph	Arb	ScHe	MsMgTr	MsX- MsHg	Sil	+	+	+	+	–
Oleaceae	<i>Ligustrum vulgare</i> L.	Ph	Fr	ScHe	MsTr	MsX-Ms	PtSil	–	+	+	+	Adv
Oleaceae	<i>Syringa vulgaris</i> L.	nPh	Fr	ScHe	MsTr	MsX	Cu	–	–	–	+	Adv
Onagraceae	<i>Epilobium hirsutum</i> L.	HKr	Per	He	MgTr	MsHg	PrPal	+	+	–	–	–
Onagraceae	<i>E. roseum</i> Schreb.	HKr	Per	ScHe	MgTr	HgMs	PalPr	+	–	–	–	–
Onagraceae	<i>Oenothera biennis</i> L.	HKr	Bien	ScHe	OgMsTr	XMs	PsRu	+	+	+	–	Adv
Orobanchaceae	<i>Orobanchae cumana</i> Wallr.	TG	Per	He	Par	XMs	Ru	+	+	–	–	Adv
Orobanchaceae	<i>Phelipplanche arenaria</i> (Borkh.) Walp.	G	Per	He	Par	MsX	RuPs	+	+	–	–	Adv
Papaveraceae	<i>Chelidonium majus</i> L.	HKr	Per	HeSc	MsMgTr	Ms	RuSil	+	+	+	+	–
Plantaginaceae	<i>Plantago arenaria</i> Waldst. et Kit.	T	Ann	He	OgTr	MsX	RuPs	+	+	+	–	–
Plantaginaceae	<i>P. major</i> L.	HKr	Per	He	MgTr	Ms	RuPr	+	+	+	+	–
Plantaginaceae	<i>P. media</i> L.	HKr	Per	He	MgTr	MsX	RuSilPsSt	+	+	–	–	–
Plantaginaceae	<i>P. scabra</i> Moench.	T	Ann	He	OgTr	MsXX	RuPs	+	+	+	–	–
Polygalaceae	<i>Polygala comosa</i> Schruhr	HKr	Per	ScHe	MsTr	Ms	PrSMn	+	+	–	–	–
Polygonaceae	<i>Fallopia convolvulus</i> (L.) A. Love	T	Ann	ScHe	MsTr	XMs	Ru	+	+	–	–	Adv
Polygonaceae	<i>Persicaria amphibia</i> (L.) Delarbre	HKr	Per	ScHe	MsTr	PlrHg	AqPal	+	+	–	–	–
Polygonaceae	<i>P. hydropiper</i> L.	T	Ann	ScHe	MsTr	HgMs	RuSilPalPr	+	+	–	–	–
Polygonaceae	<i>P. lapathifolia</i> (L.) Delarbe	T	Ann	He	OgTr	HgMs	PalPsPr	+	+	–	–	–
Polygonaceae	<i>P. lapathifolia</i> (L.) Delarbe subsp. <i>andrze- jowskiana</i> (Klokov) Sojak	T	Ann	He	OgAlkTr	HgMs	PalPr	+	+	–	–	–
Polygonaceae	<i>P. maculosa</i> S. F. Gray	T	Ann	He	MsTr	Ms	RuPr	+	+	–	–	–
Polygonaceae	<i>Polygonum arenarium</i> Waldst. et Kit.	T	Ann	He	OgTr	Ms	SilPs	+	+	+	–	–
Polygonaceae	<i>P. aviculare</i> L.	T	Ann	ScHe	MsTr	MsX	Ru	+	+	+	+	–
Polygonaceae	<i>Rumex acetosa</i> L.	G	Per	He	MgTr	XMs	SMnPr	+	–	–	–	–
Polygonaceae	<i>Racetosella</i> L.	HKr	Per	ScHe	OgMsTr	Ms	PrSMnPs	–	+	+	–	–
Polygonaceae	<i>R. confertus</i> Willd.	HKr	Per	ScHe	MsTr	XMs	RuPrSMn	+	+	+	+	–
Polygonaceae	<i>R. crispus</i> L.	HKr	Per	He	MsTr	Ms	RuPr	+	+	+	+	–
Polygonaceae	<i>R. hydropatrum</i> Huds.	HKr	Per	He	MsTr	Hg	AqPal	+	+	–	–	–
Portulacaceae	<i>Portulaca oleracea</i> L.	T	Ann	ScHe	MsTr	XMs	Ru	–	+	+	+	Adv
Primulaceae	<i>Lysimachia nummularia</i> L.	HKr	Per	ScHe	MgTr	HgMs	SilPr	+	+	–	–	–
Primulaceae	<i>L. vulgaris</i> L.	HKr	Per	ScHe	MgTr	MsHg	Pal	+	+	–	–	–
Ranunculaceae	<i>Anemone ranunculoides</i> (L.) Holub	G	Per	HeSc	MgTr	Ms	Sil	+	–	–	–	RLD 3
Ranunculaceae	<i>Batrachium circinatum</i> (Sibth.) Spach	HKr	Per	HeSc	MgTr	Hy r	Aq	+	+	+	+	–
Ranunculaceae	<i>B. trichophyllum</i> (Chaix) Bosch	HKr	Per	HeSc	MgTr	Hy r	Aq	–	+	–	–	–
Ranunculaceae	<i>Ficaria verna</i> Huds.	G	Per	HeSc	MgTr	Ms	Sil	+	+	+	+	–
Ranunculaceae	<i>Ranunculus illiricus</i> L.	G	Per	ScHe	MsMgTr	XMs	PrSt	+	+	–	–	–
Ranunculaceae	<i>R. lingua</i> L.	HKr	Per	ScHe	MsTr	MsHg	PrPal	+	–	–	–	RLD 3
Ranunculaceae	<i>R. polyanthemus</i> L.	HKr	Per	ScHe	MsMgTr	XMs	StSMnPr	+	+	–	–	–
Ranunculaceae	<i>R. repens</i> L.	HKr	Per	ScHe	MgTr	HgMs	PalPr	+	+	+	–	–
Ranunculaceae	<i>R. sceleratus</i> L.	T	Ann	ScHe	MsMgTr	HgMs	PrPal	+	+	+	–	–
Ranunculaceae	<i>Thalictrum flavum</i> L.	HKr	Per	ScHe	MsMgTr	Hg	PalPr	+	+	–	–	–
Rhamnaceae	<i>Frangula alnus</i> Mill.	nPh	Per	HeSc	Og-MgTr	Ms-Hg	SMnSil	+	–	–	–	–
Rhamnaceae	<i>Rhamnus cataracta</i> L.	nPh	Per	ScHe	MgMsTr	XMs	SilSMn	+	–	–	–	–
Rosaceae	<i>Agrimonia eupatoria</i> L.	HKr	Per	ScHe	MgMsTr	XMs	SMnSt	+	+	+	–	–
Rosaceae	<i>Armeniaca vulgaris</i> Lam.	Ph	Arb	He	OgMsTr	MsX	RuSilCu	–	+	+	+	Adv
Rosaceae	<i>Cerasus avium</i> (L.) Moench	Ph	Arb	ScHe	MsMgTr	Ms	SilCu	–	–	+	+	–
Rosaceae	<i>C. mahaleb</i> (L.) Mill.	Ph	ArbFr	ScHe	MsTr	XMs	CuSMn	–	+	+	+	Adv
Rosaceae	<i>C. vulgaris</i> Mill.	Ph	Arb	ScHe	MgTr	XMs	RuCu	–	–	+	+	Adv
Rosaceae	<i>Crataegus fallacina</i> Klokov	Ph	Fr	ScHe	MsTr	MsX	SMnSil	+	+	–	–	–
Rosaceae	<i>C. leiomonogyna</i> Klokov	Ph	ArbFr	ScHe	MsTr	MsX	SMnPsSt	+	–	–	–	–
Rosaceae	<i>Filipendula ulmaria</i> (L.) Maxim.	G	Per	HeSc	MgTr	MsHg	SMnPalPr	+	–	–	–	–
Rosaceae	<i>Fragaria viridis</i> Duch.	HKr	Per	ScHe	MsTr	XMs	StSMn	+	–	–	–	–
Rosaceae	<i>Geum urbanum</i> L.	HKr	Per	ScHe	OgMsTr	Ms	RuSil	+	+	+	+	–
Rosaceae	<i>Malus domestica</i> Borkh.	Ph	Arb	ScHe	MsTr	Ms	RuCu	–	–	+	+	Adv
Rosaceae	<i>Potentilla anserina</i> L.	HKr	Per	He	AlkMgTr	MsHg	Pr	+	+	+	–	–
Rosaceae	<i>P. argentea</i> L.	HKr	Per	He	MsTr	MsX	SilPsStRu	+	+	+	+	–
Rosaceae	<i>P. incana</i> P. Gaertn., B. Mey. & Scherb.	HKr	Per	ScHe	OgMsTr	XMs	PtStPs	+	–	–	–	–
Rosaceae	<i>P. reptans</i> L.	HKr	Per	He	MsTr	HgMs	SMnPr	+	+	–	–	–
Rosaceae	<i>P. supina</i> L.	HKr	Ann	He	MsMgTr	Ms	PrRu	+	+	–	–	–
Rosaceae	<i>Prunus domestica</i> L.	Ph	Fr	ScHe	MsTr	MsX	SMnCu	–	–	–	+	Adv
Rosaceae	<i>P. steposa</i> Kotov	Ph	Fr	ScHe	MsTr	MsX	SMnSt	+	+	+	+	–
Rosaceae	<i>Pyrus communis</i> L.	Ph	Arb	ScHe	MgMsTr	MsX	StSMnSil	+	+	+	+	–
Rosaceae	<i>Rosa canina</i> L.	nPh	Fr	ScHe	MsTr	X-Ms	RuSMnSt	+	+	+	+	–
Rosaceae	<i>Rubus caesius</i> L.	nPh	Fr	ScHe	MsT	Ms	RuSil	+	+	+	–	–
Rubiaceae	<i>Galium aparine</i> L.	T	Ann	ScHe	MgTr	XMs	SilRu	+	+	+	–	–
Rubiaceae	<i>G. mollugo</i> L.	HKr	Per	ScHe	MsTr	XMs	SilPr	+	+	+	–	–
Rubiaceae	<i>G. palustre</i> L.	HKr	Per	ScHe	MgTr	MsHg	PalPr	+	+	–	–	–
Rubiaceae	<i>G. physocarpum</i> Ledeb.	HKr	Per	HeSc	MgTr	Ms	SilPr	+	+	–	–	–
Rubiaceae	<i>G. rivale</i> (Sibth. et Smim) Griseb.	HKr	Per	HeSc	MsTr	HgMs	SMnPr	+	–	–	–	–
Rubiaceae	<i>G. rubioides</i> L.	HKr	Per	He	MsTr	Ms	Pr	+	+	–	–	–
Rubiaceae	<i>G. uliginosum</i> L.	HKr	Per	HeSc	MsTr	MsHg	PrSilPal	+	+	–	–	RLD 4
Rubiaceae	<i>G. verum</i> L.	HKr	Per	ScHe	MsTr	XMs	PsSilSt	+	+	–	–	–
Salicaceae	<i>Populus alba</i> L.	Ph	Arb	He	OgMsTr	XMs-Hg	Sil	+	+	+	+	–
Salicaceae	<i>P. nigra</i> L.	Ph	Arb	He	OgMsTr	XMs-Hg	Sil	+	+	+	+	–
Salicaceae	<i>P. tremula</i> L.	Ph	Arb	ScHe	OgMsTr	HgMs	Sil	+	+	–	–	–
Salicaceae	<i>Salix acutifolia</i> Willd.	Ph	Fr	ScHe	OgTr	HgMs	SilSMnPs	+	+	+	–	–
Salicaceae	<i>S. alba</i> L.	Ph	Arb	ScHe	Og-MgTr	XMs-Hg	Sil	+	+	+	+	–
Salicaceae	<i>S. cinerea</i> L.	Ph	Fr	ScHe	MgMsTr	MsHg	SilPal	+	–	–	–	–

Families	Species	Climamorphs	Biomorphs	Heliomorphs	Trophomorphs	Hygromorphs	Cenomorphs	Protected zone	Recreational zone	Stationary recreation zone	Economic zone	Rare, adventive, types
Salicaceae	<i>S. fragilis</i> L.	Ph	Arb	He	MsTr	XMs-MsHg	SilPr	+	+	+	+	Adv
Salicaceae	<i>S. pentandra</i> L.	Ph	Fr	HeSc	MsTr	MsHg	PalSil	+	+	–	–	–
Salicaceae	<i>S. triandra</i> L.	Ph	Fr	He	MgTr	Ms-Hg	SilPr	+	+	+	+	–
Salicaceae	<i>S. vinogradovii</i> A. Skvorts.	Ph	Fr	He	OgMsTr	HgMs	SilPr	+	+	–	–	–
Scrophulariaceae	<i>Euphrasia pectinata</i> Ten.	T	Ann	ScHe	MsTr	X	SilSt	+	+	+	+	–
Scrophulariaceae	<i>Gratiola officinalis</i> L.	HKr	Per	ScHe	Og-MgTr	Ms	PsPr	+	+	–	–	–
Scrophulariaceae	<i>Linaria dulcis</i> Klok.	G	Per	He	OgTr	MsX	SilPs	+	+	–	–	–
Scrophulariaceae	<i>L. vulgaris</i> Mill.	G	Per	ScHe	MsTr	MsX	SMnPrRu	+	+	+	–	–
Scrophulariaceae	<i>Melanampyrum cristatum</i> L.	T	Ann	ScHe	MsTr	OgMs	SilPsPr	+	+	–	–	RLD 3
Scrophulariaceae	<i>M. nemorosum</i> L.	T	Ann	ScHe	OgMsTr	Ms	PsPrSil	+	–	–	–	RLD 3
Scrophulariaceae	<i>Odontines vulgaris</i> Moench	T	Ann	ScHe	MsTr	MsX	RuStPr	+	+	+	–	–
Scrophulariaceae	<i>Rhinanthus vernalis</i> (N.Zing.) Schischket Serg.	T	Ann	He	MsTr	Ms	RuSMnPr	+	+	–	–	–
Scrophulariaceae	<i>Scrophularia nodosa</i> L.	HKr	Per	HeSc	MsMgTr	Ms	PsMnSil	+	+	–	–	–
Scrophulariaceae	<i>Verbascum densiflorum</i> Bertol.	HKr	Bien	He	MsMgTr	XMs	RuPsSMn	+	+	–	–	–
Scrophulariaceae	<i>V. lychnitis</i> L.	HKr	Bien	ScHe	OgMsTr	MsX	RuSMn	+	+	–	–	–
Scrophulariaceae	<i>Veronica anagallis-aquatica</i> L.	HKr	Per	He	MsTr	HelHg	AqPal	+	–	–	–	–
Scrophulariaceae	<i>V. arvensis</i> L.	HKr	Ann	He	MsTr	MsX	StRu	+	+	–	–	Adv
Scrophulariaceae	<i>V. chamaedrys</i> L.	HKr	Per	ScHe	MsTr	Ms	PrSMn	+	+	–	–	–
Scrophulariaceae	<i>V. dillenii</i> Crantz	HKr	Bien	ScHe	OgTr	MsX	Sil	+	+	+	–	–
Scrophulariaceae	<i>V. longifolia</i> L.	HKr	Per	ScHe	MgTr	HgMs	SilPr	+	–	–	–	–
Scrophulariaceae	<i>V. persica</i> Poir.	T	Ann	He	MsTr	XMs	Ru	–	+	–	–	Adv
Scrophulariaceae	<i>V. scutellata</i> L.	HKr	Per	He	Og-MgTr	MsHg	PalPr	+	–	–	–	RLD 2
Scrophulariaceae	<i>V. spuria</i> L.	HKr	Per	ScHe	Og-MgTr	XMs	StSMn	+	+	–	–	–
Scrophulariaceae	<i>V. teucrium</i> L.	HKr	Per	ScHe	OgMsTr	XMs	StSMn	+	+	–	–	–
Scrophulariaceae	<i>V. verna</i> L.	HKr	Bien	He	MsTr	MsX	PrStRu	+	+	–	–	–
Simarubaceae	<i>Ailanthus altissima</i> (Mill.) Swingle	Ph	Arb	ScHe	OgMsTr	X-Ms	SilCuRu	–	–	–	+	Adv, Inv
Solanaceae	<i>Datura stramonium</i> L.	T	Ann	He	MgTr	Ms	Ru	–	–	+	+	Adv
Solanaceae	<i>Hyoscyamus niger</i> L.	HKr	Bien	He	MsTr	MsX	Ru	–	–	+	+	Adv
Solanaceae	<i>Lycium barbarum</i> L.	nPh	Fr	He	OgMsTr	MsX	CuRu	–	–	–	+	Adv
Solanaceae	<i>Lycopersicon esculentum</i> Mill.	T	Ann	He	MgTr	Ms	RuCu	–	+	+	+	Adv
Solanaceae	<i>Solanum dulcamara</i> L.	Ch	Per	ScHe	OgMsTr	MsHg	SilPal	+	+	–	–	–
Solanaceae	<i>S. nigrum</i> L.	T	Ann	He	MsTr	Ms	Ru	–	+	+	+	Adv
Tiliaceae	<i>Tilia cordata</i> Mill.	Ph	Arb	ScHe	MsMgTr	Ms	Sil	+	–	–	–	–
Ulmaceae	<i>Ulmus laevis</i> Pall.	Ph	Arb	HeSc	Og-MgTr	XMs-MsHg	Sil	+	+	–	–	–
Ulmaceae	<i>U. minor</i> Mill.	Ph	Arb	ScHe	MsTr	MsX	SilSMn	+	+	–	–	–
Ulmaceae	<i>U. pumila</i> L.	Ph	Arb	ScHe	OgMsTr	MsX	SilCuRu	+	+	+	+	Adv, Inv
Ulmaceae	<i>U. suberosa</i> Moench	Ph	Arb	ScHe	MsTr	X	SMn	+	–	–	–	–
Urticaceae	<i>Urtica dioica</i> L.	G	Per	He-Sc	MsMgTr	XMs-MsHg	SilRu	+	+	+	+	–
Urticaceae	<i>U. galeopsifolia</i> Wierzb. ex Opiz	HKr	Per	HeSc	MgTr	Ms-Hg	PalSil	+	+	–	–	–
Valerianaceae	<i>Valeriana officinalis</i> L.	HKr	Per	ScHe	MgTr	HgMs	SMnPr	+	–	–	–	RLD 3
Valerianaceae	<i>V. stolonifera</i> Czern.	HKr	Per	ScHe	MsMgTr	XMs-HgMs	PsMnSil	+	–	–	–	RLD 3
Valerianaceae	<i>Valerianella carinata</i> Loisel.	T	Ann	He	MsOgTr	Ms	RuPtPs	+	+	–	–	–
Violaceae	<i>Viola ambigua</i> Walkst. et Kit.	HKr	Per	ScHe	MsTr	MsX	SMnPs	+	+	+	–	–
Violaceae	<i>V. arvensis</i> Murray	HKr	Per	ScHe	OgMsTr	Ms	SilPsRu	+	–	–	–	Adv
Violaceae	<i>V. canina</i> L.	HKr	Per	ScHe	MsTr	Ms	PrSil	+	+	–	–	–
Violaceae	<i>V. hirta</i> L.	HKr	Per	ScHe	MsMgTr	MsX-Ms	StSil	+	+	–	–	–
Violaceae	<i>V. lavrencoana</i> Klokov	T	Ann	ScHe	OgTr	XMs	RuSilPs	+	+	–	–	–
Violaceae	<i>V. matutina</i> Klokov	HKr	Ann	ScHe	MsTr	XMs	RuSMnPr	+	+	–	–	–
Violaceae	<i>V. mirabilis</i> L.	HKr	Per	HeSc	MsMgTr	Ms	Sil	+	+	–	–	–
Violaceae	<i>V. odorata</i> L.	HKr	Per	HeSc	MsMgTr	Ms	RuSil	+	+	–	–	–
Violaceae	<i>V. rupestris</i> F. W. Schmidt	HKr	Ann	ScHe	OgMsTr	XMs	PtSilPs	+	+	–	–	–
Violaceae	<i>V. suavis</i> M. Bieb.	HKr	Per	HeSc	MsTr	HgMs	PrSil	+	+	–	–	–
Violaceae	<i>V. tricolor</i> L.	HKr	Ann	ScHe	MsTr	MsX	RuSMnPr	+	+	–	–	–
Vitaceae	<i>Parthenocissus quinquefolia</i> (L.) Planch.	nPh	Fr	ScHe	MsTr	Ms	SilCuRu	–	–	+	+	Adv, Inv
Vitaceae	<i>Vitis labrusca</i> L.	nPh	Fr	ScHe	MsTr	Ms	SilCuRu	–	–	–	+	Adv
Vitaceae	<i>V. vinifera</i> C. C. Gmel.	nPh	Fr	ScHe	MsTr	Ms	SilCuRu	–	–	–	+	Adv

Notes: Ann (Annuus) – annuals, Bien (Biennis) – biennials, Per (Perennis) – perennials, SFr (Suffrutex) – shrub, Fr (Frutex) – shrub, Arb (Arbor) – tree; climamorphs: Ph – phanerophyte, HKr – hemicyptophyte, Kr – cryptophyte, G – geophyte, T – therophyte; heliomorphs: He (Heliophiton) – heliophyte (light lovers), Sc (Sciophiton) – sciophyte (shade-bearing); trophomorphs: OgTr (Oligotroph) – oligotroph (plant of nutrient-poor soils), MsTr (Mesotroph) – mesotroph (medium-rich soils), MgTr (Megatroph) – megatroph (plant of nutrient-rich soils); hygromorphs: Hy (Hydatophyton) – hydatophyte (submerged), Pl (Pleistophyton) – pleistophyte (with floating leaves), Hel (Helophyton) – helophyte (air-water), Hg (Hygrophyton) – hygrophyte (humid habitats), Ms (Mesophyton) – mesophyte (habitats of average moisture), X (Xerophyton) – xerophyte (dry habitats); cenomorphs: Aq (Aqant) – aquant (aquatic), Pal (Paludosus) – paludant (marsh), Pr (Pratensis) – pratant (meadow), Sil (Silvaticus) – sylvant (forest), St (Stepposus) – stepant (steppe), SMn (Margosilvaticus) – sylvomargoant (forest species), Ps (Psammophyton) – psamophant (type of sandy soils), Pt (Petrophyton) – petrant (type of stony soils), Ru (Rudatus) – rudant (weedy), Hal (Halophyton) – halophant (a type of saline soils and reservoirs with high mineralization), Cu (Cultus) – a cultivator (a species that is cultivated); others: Par (Parasitus) – parasitic, r (Radicatus) – rooted, er (Eradicatus) – unrooted, Adv – adventive species, Inv – invasive species. RLD – Red List of Dniptrovsk Region (0 – extinct (a species about which there is no data on existence in the wild for about 50 years), 1 – endangered, 2 – vulnerable, 3 – rare, 4 – undefined (not enough information about the species or status it needs to be clarified), RBU – Red Data Book of Ukraine (E – endangered, B – vulnerable, R – rare, U – undefined). ERL – European Red List (R – rare, I – undefined).

Aquatic vegetation. The shallow waters are taken over by large thickets of *Phragmites australis* (Cav.) Trin. ex Steud. They occupy up to 90% of the water area and are often bordered by ribbon-like phytocenoses of *Typha angustifolia* L. and other aerial-aquatic plants and submerged vegetation. Areas with the depth of more than 2 m and the water areas

between them are occupied by groups of *Ceratophyllum demersum* L., often with layers of free-floating plants: *Lemna minor* L., *Spirodela polirrhiza* (L.) Schleid., *Hydrocharis morsus-ranae* L. Numerous branches of the Samara and its tributaries (Samarchuk and Peschanka) have submerged vegetation with a predominance of more rheophilic species: *Po-*

tamogeton perfoliatus L., *P. crispus* L., *P. pectinatus* L. There is a clear advantage of the thickets of *Phragmites australis* (Cav.) Trin. ex Steud., which make up about 80% of the overgrown water area. The Novoselovsky site is located just below, in the area near Novoselovka, and covers the water area with a more significant level of flooding, where there are rare wooded islands, and where there are thickets of *Phragmites australis* (Cav.) Trin. ex Steud. and *Typha angustifolia* L. which alternate with water areas partially occupied by a cenosis of submerged plants (mainly by phytocenoses of *Ceratophyllum* sp. and *P. pectinatus* L.).

Meadow and meadow-bog vegetation is represented by complexes of associations of mesophytes and hygrophytes. Mesophytic vegetation is represented mainly by associations with the predominance of *Poa pratensis* L. and *Elytrigia repens* (L.) Nevski with the participation of such species as *Trifolium repens* L., *Taraxacum officinale* L., *Urtica dioica* L., *Anthriscus sylvestris* (L.) Hoffm., *Arctium lappa* L., *Achillea submillefolium* Klok. et Krytca and others. In the economic zone, in the herbage of meadows, a more significant percentage is occupied by ruderal and ruderal-adventive species: *Bidens tripartita* L., *Ambrosia artemisiifolia* L., *Xanthium strumarium* L., *X. album* (Widd.) H. Scholtz, *Artemisia absinthium* L., *Iva xanthifolia* Nutt. There are also semi-natural groups of spontaneously natural origin comprising *Elaeagnus angustifolia* L. On the plots used for hayfields, xerophytization of meadows was observed, accompanied by a change in mesophilic forbs by weeds and resistant species: *Tanacetum vulgare* L., *Cirsium ucrainicum* L., *Carduus crispus* L., *C. acanthoides* L., *Artemisia vulgaris* L., *Lactuca serriola* Tomer, *Bertea incana* (L.) DC., *Chenopodium album* L., etc. In areas of the floodplain with increased soil mineralization, among meadow vegetation, there were groups with predominating *Festuca regeliana* Pavl. and *Carex distans* L. These cenoses include: *Juncus gerardi* Loisel., *Althea officinalis* L., *Scorzonera parviflora* Jacq., *Triglochin maritimum* L. and others. On wet and swampy meadows, the groups of creeping bent *Agrostis stolonifera* L., *Poa palustris* L., *Bolboschoenus maritimus* (L.) Palla dominate with hygrophilic species such as *Lycopus europaeus* L., *Ranunculus repens* L., *R. sceleratus* L., *Rumex crispus* L., *Carex vulpina* L., *Eleocharis palustris* (L.) Roem. et Schult., *Potentilla anserina* L., *Heracleum sibiricum* L., *Symphitum officinale* L., *Atriplex nitens* Schkuhr, *Mentha aquatica* L. In the Samara valley, where water bodies were gradually swamped and overgrown with air-aquatic vegetation, swamps have developed in the floodplain. Most of them are dominated by *Phragmites australis* (Cav.) Trin. ex Steud. including such wetland species as *Alisma plantago-aquatica* L. With., *Oenanthe aquatica* (L.) Poir., *Sium latifolium* L., *Butomus umbellatus* L., etc.

Trees and shrubs of the Samara Plavni Regional Landscape Park are represented by natural forest complexes, semi-natural groupings of spontaneous natural origin and man-made plantations. Natural oak forest com-

plexes are localized in floodplain habitats and belong to short-lived forest types. They are represented by a fairly wide range of short-lived forests in flooded habitats: pure oak forests, birch bark oak forests, birch-ash oak forests, elm-ash oak forests, linden oak forests. Natural tree and shrub vegetation is localized exclusively in the protected area in its northern part along the river. From the lower limit of the city of Novomoskovsk to the village of Peschanka, the Samara is represented mainly by the *Querceta roburi* groupings. Natural oak forests are of a derived type and have a mosaic pattern of spatial distribution. They are distinguished by one-, two-tiered low-growing stands. The floristic structure of the stand of natural oak forests of the Samara floodplain in the territory of the Samara Plavni Regional Landscape Park consists of typical short-lived tree species: *Quercus robur* L. (completely dominates in the species composition of natural oak forests), *Ulmus minor* Mill., *Ulmus laevis* Pall., *Fraxinus excelsior* L., *Acer tataricum* L. (in arboreal and bush form), less often *Tilia cordata* Mill., *Pyrus communis* L., *Acer campestre* L., *Acer platanoides* L., *Ulmus suberosa* Moench (singly). *Populus alba* L., *Populus nigra* L., and *Salix alba* L. are added to fresh and wet locations of the oak forest complex as local fragments of associations. Sometimes, under the canopy of natural oak forests, especially in the flooded areas of the Samara floodplains, groups of the adventive species *Elaeagnus angustifolia* L. wedge in. The shrub undergrowth in the natural oak forests is represented by the following native species: *Euonymus europaea* L., *E. verrucosa* Scop., *Rhamnus cathartica* L., *Swida sanguinea* (L.), *Crataegus leiomonogyna* Klok., *Crataegus fallacina* Klok., *Sambucus nigra* L., *Rubus caesius* L. Cenopopulations of *Vincetoxicum scandens* Somm. et Levier., which is included in the Red List of Dnepropetrovsk region. *Acer negundo* L., *Morus alba* L. and *Elaeagnus angustifolia* L. belong to the adventive fraction of natural oak forests. The composition of artificial plantations in the territory of the Samara Plavni Regional Landscape Park, including the recreational zones, contains the following species: *Robinia pseudacacia* L., *Ulmus minor* Mill., *Quercus robur* L., *Ulmus pumila* L., *Acer negundo* L., *Populus nigra* L., *Fraxinus excelsior* L., *Pinus sylvestris* L. (young specimens planted by local residents), *Rhus typhina* L., *Hippophae rhamnoides* L. A significant number of them are involved in the processes of spontaneous growth in the territory due to seed undergrowth and vegetative growth. The dendroflora of the regulated recreation and economic zones is also enriched with fruit and ornamental species.

Aquatic invertebrates. The fauna of zoobenthos in the Samara Plavni Regional Landscape Park includes 151 species (Table 3). They include 4 species from the Red Book of Ukraine (2009) and the Red List of Dnepropetrovsk Oblast (2011). Among the various groups of benthos, phytophilic (96 species) and pelophilic (51 species) dominate. Lithophilic, psamphilic and polytopic are represented by several species (Table 3).

Table 3
Distribution of aquatic invertebrates of the Samara Plavni Regional Landscape Park by zones

Families	Species	Environmental groups	Zones of the Regional Landscape Park				
			reserved	recreational	stationary recreation	economic	rare, adventive, species
Aeshnidae	<i>Aeshna grandis</i> Linnaeus, 1758	P	+	+	+	+	—
Aeshnidae	<i>A. viridis</i> Eversmann, 1836	Ph	+	+	+	—	—
Aeshnidae	<i>Anax imperator</i> Leach, 1815	Ph	+	—	—	—	RBU
Ampharetidae	<i>Hypania invalida</i> (Grube, 1860)	P	+	+	+	—	—
Asellidae	<i>Asellus aquaticus</i> (Linnaeus, 1758)	Ph	+	+	+	+	—
Astacidae	<i>Astacus leptodactylus</i> Eschscholtz, 1823	Ph	+	+	—	—	—
Baetidae	<i>Baetis rhodani</i> (Pictet, 1843)	Ph	+	+	+	—	—
Baetidae	<i>Cloeon dipterum</i> (Linnaeus, 1761)	Ph	+	+	+	+	—
Baetidae	<i>C. simile</i> Eaton, 1870	Ph	+	+	—	—	—
Bithyniidae	<i>Bithynia leachi</i> (Sheppard, 1823)	Ph	+	+	+	—	—
Bithyniidae	<i>B. tentaculata</i> (Linnaeus, 1758)	Ph	+	+	+	+	—
Caenidae	<i>Caenis horaria</i> (Linnaeus, 1758)	Ph	+	+	+	+	—
Caenidae	<i>C. macrura</i> Stephens, 1836	Ph	+	+	+	—	—
Calopterygidae	<i>Agrion virgo</i> (Linnaeus, 1758)	Ph	+	+	—	—	—
Cardiidae	<i>Monodacna colorata</i> (Eichwald, 1829)	P	+	+	—	—	—
Ceratopogonidae	<i>Bezzia</i> sp.	P	+	—	+	+	—
Ceratopogonidae	<i>Ceratopogon</i> sp.	P	+	—	—	—	—
Ceratopogonidae	<i>Culicoides (Monoculicoides) riethi</i> Kieffer, 1914	Ph	+	+	+	—	—
Chaoboridae	<i>Chaoborus</i> sp.	P	+	+	+	+	—
Chironomidae	<i>Ablabesmyia monilis</i> (Linnaeus, 1758)	Ph	+	+	—	—	—

Families	Species	Environmental groups	Zones of the Regional Landscape Park				
			reserved	recreational	stationary recreation	economic	rare, adventive, species
Chironomidae	<i>Chironomus plumosus</i> (Linnaeus, 1758)	P	+	+	+	+	—
Chironomidae	<i>Corynoneura celeripes</i> Winnertz, 1852	P	+	—	—	—	—
Chironomidae	<i>Cricotopus algarum</i> (Kieffer, 1911)	Ph	+	—	—	—	—
Chironomidae	<i>C. sylvestris</i> (Fabricius, 1794)	Ph	+	—	—	—	—
Chironomidae	<i>Cryptochironomus defectus</i> (Kieffer, 1913)	P	+	+	+	—	—
Chironomidae	<i>Endochironomus albipennis</i> (Meigen, 1830)	P	+	+	—	—	—
Chironomidae	<i>Synendotendipes dispar</i> (Meigen, 1830)	P	+	+	+	+	—
Chironomidae	<i>Endochironomus tendens</i> (Fabricius, 1775)	Ph	+	+	+	—	—
Chironomidae	<i>Glyptotendipes cauliginellus</i> (Kieffer, 1913)	Ph	+	+	+	+	—
Chironomidae	<i>Dicrotendipes nervosus</i> (Staeger, 1839)	P	+	+	+	+	—
Chironomidae	<i>Microtendipes chloris</i> (Meigen, 1818)	P	+	+	—	—	—
Chironomidae	<i>Tanytus punctipennis</i> Meigen, 1818	P	+	+	+	—	—
Chironomidae	<i>Polypedium nubeculosum</i> (Meigen, 1804)	P	+	+	+	+	—
Chironomidae	<i>P. scalaenum</i> (Schrank, 1803)	P	+	+	—	—	—
Chironomidae	<i>Psectrocladius psilopterus</i> (Kieffer, 1906)	Ph	+	+	+	+	—
Chironomidae	<i>Procladius choreus</i> (Meigen, 1804)	P	+	+	+	+	—
Chironomidae	<i>Tanytarsus gregarius</i> Kieffer, 1909	P	+	—	—	+	—
Chironomidae	<i>Cladotanytarsus mancus</i> (Walker, 1856)	P	+	+	+	—	—
Coenagrionidae	<i>Coenagrion pulchellum</i> Vander Linden, 1825	Ph	+	+	—	—	—
Coenagrionidae	<i>Ischnura elegans</i> Vander Linden, 1820	Ph	+	+	—	—	—
Corixidae	<i>Sigara striata</i> (Linnaeus, 1758)	Ph	+	+	—	—	—
Corophiidae	<i>Corophium curvispinum</i> G. O. Sars, 1895	P	+	+	+	—	—
Crambidae	<i>Paraponyx stratiotata</i> (Linnaeus, 1758)	Ph	+	+	—	—	—
Cristatellidae	<i>Cristatella mucedo</i> Cuvier, 1798	Ph	+	—	—	—	—
Culicidae	<i>Anopheles</i> sp.	Ph	+	+	+	+	—
Dreissenidae	<i>Dreissena bugensis</i> Andrusov, 1897	L	+	+	+	+	—
Dreissenidae	<i>D. polymorpha</i> (Pallas, 1771)	P	+	+	+	—	—
Dytiscidae	<i>Cybister lateralmarginalis</i> (De Geer, 1774)	Ph	+	+	—	—	—
Dytiscidae	<i>Dytiscus marginalis</i> Linnaeus, 1758	Ph	+	+	+	—	—
Dytiscidae	<i>Laccophilus hyalinus</i> (De Geer, 1774)	Ph	+	+	+	—	—
Ecnomidae	<i>Ecnomus tenellus</i> (Rambur, 1842)	Ph	+	+	+	+	—
Ephemeridae	<i>Ephemerella vulgata</i> Linnaeus, 1758	Ph	+	+	—	—	—
Gammaridae	<i>Echinogammarus ischnus</i> (Stebbing, 1899)	Ph	+	—	—	—	—
Gammaridae	<i>E. warpachowskyi</i> Sars, 1897	Ph	+	+	—	—	—
Gammaridae	<i>Dikerogammarus haemobaphes</i> (Eichwald, 1841)	P, Ps	+	+	+	—	—
Gammaridae	<i>D. villosus</i> (Sowinsky, 1894)	P, Ps	+	+	+	—	—
Gammaridae	<i>Obesogammarus crassus</i> (Sars, 1894)	Ph	+	+	—	—	—
Gammaridae	<i>Gammarus pulex</i> (Linnaeus, 1758)	Ph	+	—	—	—	—
Gammaridae	<i>Euxinia maeoticus</i> (Sovinskij, 1894)	Ph	+	+	—	—	—
Gammaridae	<i>Obesogammarus obesus</i> (Sars, 1894)	Ph	+	+	—	—	—
Gammaridae	<i>Pontogammarus robustoides</i> (Sars, 1894)	Ph	+	+	—	—	—
Gerridae	<i>Aquarius paludum</i> (Fabricius, 1794)	Ph	+	+	—	—	—
Glossiphoniidae	<i>Batrachobdella paludosa</i> (Carena, 1824)	Ph	+	—	—	—	—
Glossiphoniidae	<i>Glossiphonia complanata</i> (Linnaeus, 1758)	Ph	+	+	—	+	—
Glossiphoniidae	<i>Helobdella stagnalis</i> (Linnaeus, 1758)	Ph	+	—	—	—	—
Gomphidae	<i>Gomphus vulgatissimus</i> Linnaeus, 1758	Ph	+	+	—	—	—
Gyrinidae	<i>Gyrinus marinus</i> Gyllenhal, 1808	Ph	+	+	—	—	—
Halipidae	<i>Haliphys flavicollis</i> Sturm, 1834	Ph	+	+	—	—	—
Halipidae	<i>H. fluviatilis</i> Aube, 1836	Ph	+	+	+	—	—
Halipidae	<i>H. ruficollis</i> (De Geer, 1774)	Ph	+	+	+	—	—
Heptageniidae	<i>Heptagenia sulphurea</i> (Müller, 1776)	Ph	+	+	—	—	—
Hirudinidae	<i>Hirudo medicinalis</i> Linnaeus, 1758	Ph	+	—	—	—	RBU
Hydridae	<i>Hydra vulgaris</i> Pallas, 1766	P	+	+	—	—	—
Hydrobiidae	<i>Lithoglyphus naticoides</i> (C. Pfeiffer, 1828)	Ph	+	+	+	+	—
Hydrodromidae	<i>Hydrodroma despicens</i> (Müller, 1776)	Ph	+	+	+	—	—
Hydrophilidae	<i>Berosus luridus</i> (Linnaeus, 1760)	Ph	+	+	—	—	—
Hydrophilidae	<i>Enochrus quadripunctatus</i> (Herbst, 1797)	Ph	+	+	+	—	—
Hydrophilidae	<i>Hydrobius fuscipes</i> (Linnaeus, 1758)	Ph	+	—	—	—	—
Hydrophilidae	<i>Hydrous piceus</i> (Linnaeus, 1758)	Ph	+	+	—	—	—
Hydropsychidae	<i>Hydropsyche ornatula</i> McLachlan, 1878	Ph	+	+	+	—	—
Hydroptilidae	<i>Agraylea multipunctata</i> Curtis, 1834	Ph	+	+	—	—	—
Janiridae	<i>Jaera sarsi</i> Valcanov, 1936	L	+	+	—	—	RBU
Leptoceridae	<i>Athripsodes cinereus</i> (Curtis, 1834)	Ph	+	+	+	—	—
Leptoceridae	<i>Triaenodes bicolor</i> (Curtis, 1834)	Ph	+	+	—	—	—
Libellulidae	<i>Libellula depressa</i> Linnaeus, 1758	P	+	+	+	+	—
Limneciidae	<i>Limnesia maculata</i> (Müller, 1776)	Ph	+	+	—	—	—
Lumbriculidae	<i>Lumbriculus variegatus</i> (Müller, 1774)	P	+	+	+	+	—
Lymnaeidae	<i>Limnaea stagnalis</i> (Linnaeus, 1758)	Ph	+	+	+	+	—
Lymnaeidae	<i>Omphiscola glabra</i> (O. F. Müller, 1774)	Ph	+	+	—	—	—
Lymnaeidae	<i>Radix auricularia</i> (Linnaeus, 1758)	Ph	+	+	+	+	—
Lymnaeidae	<i>R. balthica</i> (Linnaeus, 1758)	Ph	+	+	+	—	—
Lymnaeidae	<i>Stagnicola palustris</i> (O. F. Müller, 1774)	Ph	+	+	—	—	—
Melanopsidae	<i>Fagotia esperi</i> (A. Ferussac, 1823)	Ph	+	+	—	—	—
Mesoveliidae	<i>Mesovelia furcata</i> Mulsant & Rey, 1852	Ph	+	+	—	—	—
Molannidae	<i>Molanna angustata</i> Curtis, 1834	Ph	+	+	—	—	—

Families	Species	Environmental groups	Zones of the Regional Landscape Park				
			reserved	recreational	stationary recreation	economic	rare, adventive, species
Mysidae	<i>Katamysis warpachowskyi</i> Sars, 1893	P, Ph	+	–	–	–	RBU, Adv
Mysidae	<i>Limnomysis benedeni</i> Czerniavsky, 1882	Ph	+	+	+	–	–
Mysidae	<i>Paranymis lacustris</i> (Czerniavsky, 1882)	Ph	+	+	–	–	–
Naididae	<i>Ophidonais serpentina</i> (O. F. Müller, 1773)	P	+	+	–	–	–
Naididae	<i>Stylaria lacustris</i> (Linnaeus, 1767)	Ph	+	+	+	+	–
Naididae	<i>Uncinaxis uncinata</i> (Orsted, 1842)	P	+	+	+	–	–
Naucoridae	<i>Ilyocoris cimicoides</i> (Linnaeus, 1758)	Ph	+	+	+	+	–
Nepidae	<i>Ranatra linearis</i> (Linnaeus, 1758)	Ph	+	+	+	+	–
Nepoidea	<i>Nepa cinerea</i> Linnaeus, 1758	Ph	+	+	+	–	–
Neritidae	<i>Theodoxus fluviatilis</i> (Linnaeus, 1758)	L	+	+	+	–	–
Notonecta	<i>Notonecta glauca</i> Linnaeus, 1758	Ph	+	+	+	+	–
Oligoneuriidae	<i>Oligoneuriella rhenana</i> (Imhoff, 1852)	Ph	+	+	–	–	–
Phryganeidae	<i>Phryganea grandis</i> Linnaeus, 1758	Ph	+	+	+	–	–
Physidae	<i>Physella acuta</i> (Draparnaud, 1805)	Ph	+	+	–	–	–
Pionidae	<i>Piona coccinea</i> (Koch, 1836)	Ph	+	+	+	–	–
Piscicolidae	<i>Piscicola geometra</i> (Linnaeus, 1761)	Ph	+	+	–	–	–
Planorbidae	<i>Ancylus fluviatilis</i> O. F. Müller, 1774	Ph	+	+	–	–	–
Planorbidae	<i>Planorbarius corneus</i> (Linnaeus, 1758)	P, Ph	+	+	+	+	–
Planorbidae	<i>Planorbis planorbis</i> (Linnaeus, 1758)	Poly	+	+	+	+	–
Platynemididae	<i>Platynemis pennipes</i> Pallas, 1771	Ph	+	+	–	–	–
Pleidae	<i>Plea atomaria</i> (Pallas, 1771)	Ph	+	+	+	–	–
Plumatellidae	<i>Plumatella fungosa</i> (Pallas, 1768)	Ph	+	+	–	–	–
Polycentropodidae	<i>Cyrmus flavidus</i> McLachlan, 1864	Ph	+	+	+	+	–
Polycentropodidae	<i>Neureclipsis bimaculata</i> (Linnaeus, 1758)	Ph	+	+	+	+	–
Polycentropodidae	<i>Polycentropus flavomaculatus</i> (Pictet, 1834)	Ph	+	+	+	–	–
Pseudocumatidae	<i>Pseudocuma cercarioides</i> Sars, 1894	Ph	+	+	+	–	–
Sialidae	<i>Sialis lutaria</i> (Linnaeus, 1758)	P	+	+	–	–	–
Sisyridae	<i>Sisyrta fuscata</i> (Fabricius, 1793)	Ph	+	+	–	–	–
Sphaeriidae	<i>Pisidium amnicum</i> (O. F. Müller, 1774)	Ps	+	+	–	–	–
Sphaeriidae	<i>P. casertanum</i> (Poli, 1791)	Ps	+	+	–	–	–
Sphaeriidae	<i>P. supinum</i> Schmidt, 1850	P	+	+	–	–	–
Sphaeriidae	<i>Sphaerium corneum</i> (Linnaeus, 1758)	Ph	+	+	+	–	–
Spongillidae	<i>Spongilla lacustris</i> (Linnaeus, 1758)	P	+	+	–	–	–
Stratiomyidae	<i>Stratiomys</i> sp.	Ph	+	+	+	+	–
Syrphidae	<i>Eristalis</i> sp.	Ph	+	+	+	+	–
Tabanidae	<i>Tabanus</i> sp.	Ph	+	+	+	+	–
Tubificidae	<i>Limnodrilus claparedeanus</i> Ratzel, 1869	P	+	+	–	–	–
Tubificidae	<i>L. hoffmeisteri</i> Claparède, 1862	P	+	+	–	–	–
Tubificidae	<i>Tubifex tubifex</i> (Müller, 1774)	P	+	+	+	+	–
Unionidae	<i>Anodonta anatina</i> (Linnaeus, 1758)	P, Ps	+	+	–	–	–
Unionidae	<i>A. cygnea</i> (Linnaeus, 1758)	P, Ps	+	+	+	–	–
Unionidae	<i>Unio pictorum</i> (Linnaeus, 1758)	Poly	+	+	+	–	–
Unionidae	<i>U. tumidus</i> Philipsson, 1788	P, Ps	+	+	+	–	–
Valvatidae	<i>Valvata piscinalis</i> (O. F. Müller, 1774)	P	+	+	+	–	–
Valvatidae	<i>V. naticina</i> Menke, 1845	Ph	+	+	–	–	–
Viviparidae	<i>Viviparus viviparus</i> (Linnaeus, 1758)	Ph	+	+	+	+	–

Notes: Ph – phytophilic, P – pelophilic, Ps – psamphilic, L – lithophilic, Poly – polytropic, RBU – Red book of Ukraine.

The modern batracofauna (Amphibia) of the area of the Samara Plavni, which was studied, includes one species of amphibian of the Cau-data group and five amphibian species of the Anura group. These species represent three different ecological groups (complexes): wetland (river, lake and wetland ecosystems), meadow and forest (artificial forest belts, Table 4). The herpetofauna (Reptilia) of the studied site was characterized by the presence of both hygrophilic reptile species and meso and xerophilic species. In total, 7 species of reptiles belonging to five ecological complexes were noted: wetland (river, lake and wetland ecosystems), meadow, forest (forest belts, artificial forest plantations), edge and steppe (Table 4). This accounts for 64.0% of 11 species of Dnepropetrovsk region. Of these species, three (almost 43%) are included in the Red Book of Ukraine and are protected at the state level. Four species (57%) are protected at the regional level.

Avifauna. The Regional Landscape Park Samara Plavni is one of the richest natural complexes in ornithological terms. Its avifauna is composed of 210 species (Table 5). Of the 210 species recorded in the Regional Landscape Park Samara Plavni, 31 species (14.7%) are listed in the Red Book of Ukraine. More than half of the latter are birds of the wetland complex (18 species – 8.5%). Another 24.3% of the species composition is included in the Red Book of Dnipropetrovsk region. In general, the avifauna of the Samara floodplains is represented by six ecological complexes (Table 6): wetland, forest, edge, steppe, synanthropic, meadow.

The dominant group of avifauna species in the study area, comprising 42.4% of the total species composition, belongs to the wetland complex.

Birds associated with forest habitats make up the second important group – 24.7%. The third group in terms of representation and importance is made up of forest species of birds – 18.6% of the total species composition. Other groups of birds do not reach the subdominant level and their share in the species composition is less than 10.0%: steppe species – 7.6%, synanthropic species associated with human dwellings – 3.8%, meadow habitat species – 2.9% of the total species composition. According to the status of residence, the most numerous group of species is nesting birds (45.2%). If we also take into account the sedentary species (16.3%) and those that feed in the study area, but do not nest in it (5.2%), then the summer population of the study area makes up 66.7% of the total species composition.

The theriofauna of the areas of the Samara floodplains, which were studied, includes 31 species of mammals belonging to 6 orders and 12 families and represent four ecological groups (complexes): wetland (river, lake and wetland ecosystems), meadow, steppe and forest (Table 7). The Rodentia fauna (11 species) is characterized by the largest number of species. The second place in terms of the number of species number belongs to Insectivora – 6 species from 3 families. Carnivora has 6 species from 2 families. Chiroptera is represented by five species. The smallest number of species was seen for Lagomorpha – 1 species.

Table 4

Distribution of amphibian and reptile species (stable components of ecosystems) of the Samara Plavni Regional Landscape Park by zones

Families	Species	Ecological groups or ecological complex	Zones of the Regional Landscape Park				
			reserved	recreational	stationary recreation	economic	rare, adventive, species
Salamandridae	<i>Lissotriton vulgaris</i> (Linnaeus, 1758)	SilAqPal	+	+	+	–	BC 3; RLD
Bombinatoridae	<i>Bombina bombina</i> (Linnaeus, 1761)	SilAqPal	+	+	+	–	BC 2; RLD
Hylidae	<i>Hyla orientalis</i> Bedriaga, 1890	AqPal	+	+	+	–	BC 2; RLD
Pelobatidae	<i>Pelobates vespertinus</i> (Pallas, 1771)	SilStPr	–	+	+	–	BC 2; RLD
Bufonidae	<i>Bufotes viridis</i> (Laurenti, 1768)	SilStPr	+	+	+	+	BC 2; RLD
Ranidae	<i>Pelophylax ridibundus</i> Pallas, 1771	SilAqPal	+	+	+	+	BC 3
Emydidae	<i>Emys orbicularis</i> (Linnaeus, 1758)	AqPalSil	+	+	+	–	BC 2; RLD
Lacertidae	<i>Lacerta agilis</i> (Linnaeus, 1758)	SilStPrMar	+	+	+	+	BC 2
Colubridae	<i>Natrix natrix</i> (Linnaeus, 1758)	AqPal	+	+	+	+	BC 3
Colubridae	<i>Natrix tessellata</i> (Laurenti, 1768)	AqPal	+	+	–	–	BC 3
Colubridae	<i>Elaphe sauromates</i> Pallas, 1811	StMar	–	+	–	–	BC 2 RBU RLD
Colubridae	<i>Coronella austriaca</i> Laurenti, 1768	SilMar	+	+	+	–	BC 2 RBU RLD
Viperidae	<i>Vipera renardi</i> Christoph, 1861	SilStPrMar	–	+	+	–	BC 2 RBU RLD

Notes: Sil – species that occurs in forests, forest belts, St – in steppes, Pr – in meadows, Mar – at forest edges, Aq-Pal – in aquatic and wetland ecosystems; conservation status: KKKU – the species is included in the Red Book of Ukraine, RLD – the species is included in the Red List of Dnepropetrovsk Oblast; BC ap – protected by the Bern Convention, contained in the corresponding Appendix 2 or 3.

Table 5

Species composition of the avifauna of the Regional Landscape Park Samarskie Plavni

Families	Latin Name	Ecological Complex	Residence Status	RBU	RLD	BC
Accipitridae	<i>Accipiter gentilis</i> (Linnaeus, 1758)	Sil	Ass	–	–	+
Accipitridae	<i>A. nisus</i> (Linnaeus, 1758)	SilMn	Migr, Hib	–	–	+
Accipitridae	<i>Aquila clanga</i> Pallas, 1811	Sil	Acc	+	+	+
Accipitridae	<i>A. pomarina</i> C. L. Brehm, 1831	Sil	Acc	+	+	+
Accipitridae	<i>A. chrysaetos</i> (Linnaeus, 1758)	Sil	Migr, Hib	+	+	+
Accipitridae	<i>Buteo lagopus</i> (Pontoppidan, 1763)	St	Hib	–	–	+
Accipitridae	<i>B. rufinus</i> (Cretzschmar, 1827)	Sil	T, Migr	+	+	+
Accipitridae	<i>B. buteo</i> (Linnaeus, 1758)	Sil	Nest	–	–	+
Accipitridae	<i>Circus cyaneus</i> (Linnaeus, 1766)	St	Migr	+	+	+
Accipitridae	<i>C. pygargus</i> (Linnaeus, 1758)	St	Migr	+	+	+
Accipitridae	<i>C. aeruginosus</i> (Linnaeus, 1758)	AqPal	Nest	–	–	+
Accipitridae	<i>Hieraaetus pennatus</i> (Gmelin, 1788)	Sil	T, Migr	+	+	+
Accipitridae	<i>Haliaeetus albicilla</i> (Linnaeus, 1758)	AqPal	Ass	+	+	+
Accipitridae	<i>Milvus migrans</i> (Boddaert, 1783)	Sil	T, Migr	+	+	+
Accipitridae	<i>Pernis apivorus</i> (Linnaeus, 1758)	Sil	Migr	–	+	+
Aegithalidae	<i>Aegithalos caudatus</i> (Linnaeus, 1758)	Sil	Ass	–	–	+
Alaudidae	<i>Alauda arvensis</i> Linnaeus, 1758	St	Nest	–	–	+
Alaudidae	<i>Calandrella cinerea</i> (Gmelin, 1789)	St	Migr	–	–	+
Alaudidae	<i>Eremophila alpestris</i> (Linnaeus, 1758)	St	Hib	–	–	+
Alaudidae	<i>Galerida cristata</i> (Linnaeus, 1758)	St	Ass	–	–	+
Alaudidae	<i>Lullula arborea</i> (Linnaeus, 1758)	SilMn	Nest	–	–	+
Alaudidae	<i>Melanocorypha calandra</i> (Linnaeus, 1766)	St	Migr	–	–	+
Alcedinidae	<i>Alcedo atthis</i> (Linnaeus, 1758)	AqPal	Nest	–	–	+
Anatidae	<i>Anas platyrhynchos</i> Linnaeus, 1758	AqPal	Nest	–	–	+
Anatidae	<i>A. crecca</i> Linnaeus, 1758	AqPal	Nest	–	–	+
Anatidae	<i>A. strepera</i> Linnaeus, 1758	AqPal	Nest	+	+	+
Anatidae	<i>A. penelope</i> Linnaeus, 1758	AqPal	Migr	–	–	+
Anatidae	<i>A. acuta</i> Linnaeus, 1758	AqPal	Migr	–	+	+
Anatidae	<i>A. querquedula</i> Linnaeus, 1758	AqPal	Nest	–	–	+
Anatidae	<i>A. chpeata</i> Linnaeus, 1758	AqPal	Migr	–	+	+
Anatidae	<i>Anser anser</i> (Linnaeus, 1758)	AqPal	Nest	–	–	+
Anatidae	<i>A. albifrons</i> (Scopoli, 1769)	AqPal	Migr	–	–	+
Anatidae	<i>A. fabalis</i> (Latham, 1787)	AqPal	Migr	–	–	+
Anatidae	<i>Aythya ferina</i> (Linnaeus, 1758)	AqPal	Nest	–	–	+
Anatidae	<i>A. fuligula</i> (Linnaeus, 1758)	AqPal	Migr	–	–	+
Anatidae	<i>A. marila</i> (Linnaeus, 1761)	AqPal	Migr	–	–	+
Anatidae	<i>Bucephala clangula</i> (Linnaeus, 1758)	AqPal	Migr	+	+	+
Anatidae	<i>Cygnus olor</i> (Gmelin, 1789)	AqPal	Nest	–	–	+
Anatidae	<i>C. cygnus</i> (Linnaeus, 1758)	AqPal	Migr	–	+	+
Anatidae	<i>C. bewickii</i> Yarrell, 1830	AqPal	Acc	+	+	–
Anatidae	<i>Netta rufina</i> (Pallas, 1773)	AqPal	Nest	+	+	+
Anatidae	<i>Mergus albellus</i> Linnaeus, 1758	AqPal	Migr	–	+	+
Anatidae	<i>M. merganser</i> Linnaeus, 1758	AqPal	Migr	–	–	+
Anatidae	<i>Rufibrenta ruficollis</i> (Pallas, 1769)	AqPal	Migr	+	+	+
Anatidae	<i>Tadorna ferruginea</i> (Pallas, 1764)	AqPal	T	+	+	+
Ardeidae	<i>Ardea cinerea</i> Linnaeus, 1758	AqPal	Nest	–	–	+
Ardeidae	<i>A. purpurea</i> Linnaeus, 1766	AqPal	Nest	–	–	+
Ardeidae	<i>Ardeola ralloides</i> (Scopoli, 1769)	AqPal	Nest	+	+	+
Ardeidae	<i>Botaurus stellaris</i> (Linnaeus, 1758)	AqPal	Nest	–	–	+
Ardeidae	<i>Ciconia ciconia</i> (Linnaeus, 1758)	AqPal	Nest	–	–	+
Ardeidae	<i>Egretta alba</i> (Linnaeus, 1758)	AqPal	Nest	–	–	+
Ardeidae	<i>E. garzetta</i> (Linnaeus, 1766)	AqPal	Nest	–	–	+
Ardeidae	<i>Ixobrychus minutus</i> (Linnaeus, 1766)	AqPal	Nest	–	–	+
Ardeidae	<i>Nycticorax nycticorax</i> (Linnaeus, 1758)	AqPal	Nest	–	–	+

Families	Latin Name	Ecological Complex	Residence Status	RBU	RLD	BC
Ardeidae	<i>Platalea leucorodia</i> Linnaeus, 1758	AqPal	Acc	+	+	+
Apodidae	<i>Apus apus</i> (Linnaeus, 1758)	Syn	T, Migr	—	—	+
Bombycillidae	<i>Bombycilla garrulus</i> (Linnaeus, 1758)	Sil	Hib	—	—	+
Caprimulgidae	<i>Caprimulgus europaeus</i> Linnaeus, 1758	SilMn	Nest	—	—	+
Certhiidae	<i>Certhia familiaris</i> Linnaeus, 1758	Sil	Ass	—	—	+
Charadriidae	<i>Charadrius dubius</i> Scopoli, 1786	AqPal	Nest	—	—	+
Charadriidae	<i>Himantopus himantopus</i> (Linnaeus, 1758)	AqPal	Migr	+	+	+
Charadriidae	<i>Vanellus vanellus</i> (Linnaeus, 1758)	AqPal	Nest	—	—	+
Columbidae	<i>Columba palumbus</i> Linnaeus, 1758	SilMn	Nest	—	—	+
Columbidae	<i>C. oenas</i> Linnaeus, 1758	SilMn	Migr	+	+	+
Columbidae	<i>C. livia</i> Gmelin, 1789	Syn	Ass	—	—	+
Columbidae	<i>Streptopelia decaocto</i> (Frivaldszky, 1838)	SilMn	Nest	—	—	+
Columbidae	<i>S. turtur</i> (Linnaeus, 1758)	Sil	Nest	—	—	+
Coraciidae	<i>Coracias garrulus</i> Linnaeus, 1758	St	M	+	+	+
Corvidae	<i>Corvus monedula</i> Linnaeus, 1758	SilMn	Ass	—	—	—
Corvidae	<i>C. frugilegus</i> Linnaeus, 1758	SilMn	Ass	—	—	—
Corvidae	<i>C. cornix</i> Linnaeus, 1758	SilMn	Ass	—	—	—
Corvidae	<i>C. corax</i> Linnaeus, 1758	SilMn	Ass	—	—	+
Corvidae	<i>Garrulus glandarius</i> (Linnaeus, 1758)	Sil	Ass	—	—	+
Corvidae	<i>Pica pica</i> (Linnaeus, 1758)	SilMn	Ass	—	—	—
Cuculidae	<i>Cuculus canorus</i> Linnaeus, 1758	SilMn	Nest	—	—	+
Falconidae	<i>Falco subbuteo</i> Linnaeus, 1758	SilMn	Nest	—	+	+
Falconidae	<i>F. columbarius</i> Linnaeus, 1758	SilMn	Hib	—	—	+
Falconidae	<i>F. vespertinus</i> Linnaeus, 1766	SilMn	Migr	—	+	+
Falconidae	<i>F. tinnunculus</i> Linnaeus, 1758	SilMn	Nest	—	—	+
Emberizidae	<i>Emberiza calandra</i> Linnaeus, 1758	SilMn	Nest	—	—	+
Emberizidae	<i>E. citrinella</i> Linnaeus, 1758	SilMn	Ass	—	—	+
Emberizidae	<i>E. schoeniclus</i> (Linnaeus, 1758)	AqPal	Nest	—	—	+
Emberizidae	<i>E. hortulana</i> Linnaeus, 1758	SilMn	Nest	—	—	+
Emberizidae	<i>Plectrophaenax nivalis</i> (Linnaeus, 1758)	SilMn	Hib	—	—	+
Fringillidae	<i>Acanthis cannabina</i> (Linnaeus, 1758)	SilMn	Ass	—	—	+
Fringillidae	<i>A. flammea</i> (Linnaeus, 1758)	Sil	Hib	—	—	+
Fringillidae	<i>Carduelis carduelis</i> (Linnaeus, 1758)	SilMn	Ass	—	—	+
Fringillidae	<i>Chloris chloris</i> (Linnaeus, 1758)	Sil	Ass	—	—	+
Fringillidae	<i>Coccothraustes coccothraustes</i> (Linnaeus, 1758)	Sil	Ass	—	—	+
Fringillidae	<i>Fringilla coelebs</i> Linnaeus, 1758	Sil	Nest	—	—	+
Fringillidae	<i>F. montifringilla</i> Linnaeus, 1758	SilMn	Migr, Hib	—	—	+
Fringillidae	<i>Loxia curvirostra</i> Linnaeus, 1758	Sil	Acc	—	—	+
Fringillidae	<i>Pyrrhula pyrrhula</i> (Linnaeus, 1758)	Sil	Migr, Hib	—	—	+
Fringillidae	<i>Spinus spinus</i> (Linnaeus, 1758)	Sil	Hib	—	—	+
Gaviidae	<i>Gavia stellata</i> (Pontoppidan, 1763)	AqPal	Migr	—	+	+
Gaviidae	<i>G. arctica</i> (Linnaeus, 1758)	AqPal	Migr	—	+	+
Gruidae	<i>Grus grus</i> (Linnaeus, 1758)	AqPal	Migr	+	+	+
Haematopodidae	<i>Haematopus ostralegus</i> Linnaeus, 1758	AqPal	Migr	+	+	+
Hirundinidae	<i>Riparia riparia</i> (Linnaeus, 1758)	AqPal	Nest	—	—	+
Hirundinidae	<i>Hirundo rustica</i> Linnaeus, 1758	Syn	Nest	—	—	+
Hirundinidae	<i>Delichon urbica</i> (Linnaeus, 1758)	Syn	Nest	—	—	+
Laridae	<i>Chlidonias niger</i> (Linnaeus, 1758)	AqPal	Nest	—	—	+
Laridae	<i>C. leucopterus</i> (Temminck, 1815)	AqPal	Nest	—	—	+
Laridae	<i>C. hybrida</i> (Pallas, 1811)	AqPal	Nest	—	—	+
Laridae	<i>Hydroprogne caspia</i> (Pallas, 1770)	AqPal	Acc	+	+	+
Laniidae	<i>Lanius collurio</i> Linnaeus, 1758	SilMn	Nest	—	—	+
Laniidae	<i>L. minor</i> Linnaeus, 1758	SilMn	Nest	—	—	+
Laniidae	<i>L. excubitor</i> Linnaeus, 1758	SilMn	Migr, Hib	+	+	+
Laridae	<i>Larus ridibundus</i> Linnaeus, 1766	AqPal	Nest	—	—	+
Laridae	<i>L. cachinnans</i> Pallas, 1811	AqPal	Nest	—	—	—
Laridae	<i>L. canus</i> Linnaeus, 1758	AqPal	Acc	—	—	+
Laridae	<i>Sterna hirundo</i> Linnaeus, 1758	AqPal	Nest	—	—	+
Laridae	<i>S. albifrons</i> Pallas, 1764	AqPal	T, Migr	+	+	+
Meropidae	<i>Merops apiaster</i> Linnaeus, 1758	St	Migr	—	—	+
Motacillidae	<i>Anthus campestris</i> (Linnaeus, 1758)	SilMn	Migr	—	+	+
Motacillidae	<i>A. trivialis</i> (Linnaeus, 1758)	SilMn	Nest	—	—	+
Motacillidae	<i>A. pratensis</i> (Linnaeus, 1758)	SilMn	Migr	—	—	+
Motacillidae	<i>A. cervinus</i> (Pallas, 1811)	SilMn	Migr	—	—	—
Motacillidae	<i>Motacilla flava</i> Linnaeus, 1758	St	Nest	—	—	+
Motacillidae	<i>M. citreola</i> Pallas, 1776	Pr	Nest	—	—	+
Motacillidae	<i>M. cinerea</i> Tunstall, 1771	Pr	Migr, Hib	—	—	+
Motacillidae	<i>M. alba</i> Linnaeus, 1758	Pr	Nest	—	—	+
Muscicapidae	<i>Ficedula albicollis</i> (Temminck, 1815)	Sil	Nest	—	—	+
Muscicapidae	<i>F. parva</i> (Bechstein, 1794)	Sil	Nest	—	+	+
Muscicapidae	<i>Muscicapa striata</i> (Pallas, 1764)	SilMn	Nest	—	—	+
Muscicapidae	<i>Saxicola rubetra</i> (Linnaeus, 1758)	St	Nest	—	—	+
Muscicapidae	<i>S. torquata</i> (Linnaeus, 1766)	St	Nest	—	—	+
Muscicapidae	<i>Oenanthe oenanthe</i> (Linnaeus, 1758)	St	Nest	—	—	+
Muscicapidae	<i>Phoenicurus phoenicurus</i> (Linnaeus, 1758)	Syn	Nest	—	—	+
Muscicapidae	<i>P. ochruros</i> (S.G.Gmelin, 1774)	Syn	Nest	—	—	+
Muscicapidae	<i>Erithacus rubecula</i> (Linnaeus, 1758)	Sil	Nest	—	—	+
Muscicapidae	<i>Luscinia luscinia</i> (Linnaeus, 1758)	Sil	Nest	—	—	+
Muscicapidae	<i>L. svecica</i> (Linnaeus, 1758)	AqPal	Nest	—	—	+
Muscicapidae	<i>Turdus pilaris</i> Linnaeus, 1758	Sil	Ass	—	—	+
Muscicapidae	<i>T. merula</i> Linnaeus, 1758	Sil	Ass	—	—	+

Families	Latin Name	Ecological Complex	Residence Status	RBU	RLD	BC
Muscicapidae	<i>T.s. iliaceus</i> Linnaeus, 1766	Sil	Migr	—	—	+
Muscicapidae	<i>T. philomelos</i> C.L.Brehm, 1831	Sil	Nest	—	—	+
Muscicapidae	<i>T. viscivorus</i> Linnaeus, 1758	Sil	M	—	+	+
Oriolidae	<i>Oriolus oriolus</i> Linnaeus, 1758	Sil	Nest	—	—	+
Pandionidae	<i>Pandion haliaetus</i> (Linnaeus, 1758)	AqPal	T, Migr	+	+	+
Paradoxomithidae	<i>Panurus biarmicus</i> (Linnaeus, 1758)	AqPal	Ass	—	—	+
Paridae	<i>Remiz pendulinus</i> (Linnaeus, 1758)	AqPal	Nest	—	—	+
Paridae	<i>Parus palustris</i> Linnaeus, 1758	Sil	Ass	—	—	+
Paridae	<i>P. ater</i> Linnaeus, 1758	Sil	Migr, Hib	—	—	+
Paridae	<i>P. caeruleus</i> Linnaeus, 1758	Sil	Ass	—	—	+
Paridae	<i>P. major</i> Linnaeus, 1758	Sil	Ass	—	—	+
Passeridae	<i>Passer domesticus</i> (Linnaeus, 1758)	Syn	Ass	—	—	—
Passeridae	<i>P. montanus</i> (Linnaeus, 1758)	Syn	Ass	—	—	—
Phalacrocoracidae	<i>Phalacrocorax carbo</i> (Linnaeus, 1758)	AqPal	Nest	—	—	+
Phalacrocoracidae	<i>Ph. pygmaeus</i> (Pallas, 1773)	AqPal	Acc	+	+	—
Phasianidae	<i>Perdix perdix</i> (Linnaeus, 1758)	St	Ass	—	—	+
Phasianidae	<i>Coturnix coturnix</i> (Linnaeus, 1758)	St	Nest	—	—	+
Phasianidae	<i>Phasianus colchicus</i> Linnaeus, 1758	SilMn	Ass	—	—	+
Picidae	<i>Jynx torquilla</i> Linnaeus, 1758	Sil	Nest	—	—	+
Picidae	<i>Picus canus</i> Gmelin, 1788	Sil	Nest	—	—	+
Picidae	<i>Dendrocopos major</i> (Linnaeus, 1758)	Sil	Ass	—	—	+
Picidae	<i>D. syriacus</i> (Hemprich et Ehrenberg, 1833)	Sil	Ass	—	—	+
Picidae	<i>D. medius</i> (Linnaeus, 1758)	Sil	Nest	—	+	+
Picidae	<i>D. minor</i> (Linnaeus, 1758)	Sil	Ass	—	—	+
Podicipedidae	<i>Podiceps ruficollis</i> (Pallas, 1764)	AqPal	Nest	—	+	+
Podicipedidae	<i>P. nigricollis</i> C.L.Brehm, 1831	AqPal	Nest	—	+	+
Podicipedidae	<i>P. cristatus</i> (Linnaeus, 1758)	AqPal	Nest	—	—	+
Prunellidae	<i>Prunella modularis</i> (Linnaeus, 1758)	Sil	Migr	—	—	+
Rallidae	<i>Rallus aquaticus</i> Linnaeus, 1758	AqPal	Nest	—	—	+
Rallidae	<i>Porzana porzana</i> (Linnaeus, 1766)	AqPal	Nest	—	—	+
Rallidae	<i>P. parva</i> (Scopoli, 1769)	AqPal	Nest	—	—	+
Rallidae	<i>Crex crex</i> (Linnaeus, 1758)	Pr	Nest	—	+	+
Rallidae	<i>Gallinula chloropus</i> (Linnaeus, 1758)	AqPal	Nest	—	—	+
Rallidae	<i>Fulica atra</i> Linnaeus, 1758	AqPal	Nest	—	—	+
Regulidae	<i>Regulus regulus</i> (Linnaeus, 1758)	SilMn	Migr, Hib	—	—	+
Scolopaciidae	<i>Tringa ochropus</i> Linnaeus, 1758	AqPal	T, Migr	—	—	+
Scolopaciidae	<i>T. glareola</i> Linnaeus, 1758	AqPal	T, Migr	—	—	+
Scolopaciidae	<i>T. nebularia</i> (Günther, 1767)	AqPal	T, Migr	—	—	+
Scolopaciidae	<i>T. totanus</i> (Linnaeus, 1758)	AqPal	Nest	—	—	+
Scolopaciidae	<i>T. erythropus</i> (Pallas, 1764)	AqPal	Migr	—	—	+
Scolopaciidae	<i>T. stagnatilis</i> (Bechstein, 1803)	AqPal	Migr	+	+	+
Scolopaciidae	<i>Actitis hypoleucos</i> (Linnaeus, 1758)	AqPal	Migr	—	—	+
Scolopaciidae	<i>Phylomachus pugnax</i> (Linnaeus, 1758)	Pr	Migr	—	—	+
Scolopaciidae	<i>Calidris minuta</i> (Leisler, 1812)	AqPal	Migr	—	—	+
Scolopaciidae	<i>C. temminckii</i> (Leisler, 1812)	AqPal	Migr	—	—	+
Scolopaciidae	<i>Calidris alpina</i> (Linnaeus, 1758)	AqPal	Migr	—	—	+
Scolopaciidae	<i>Lymnocyrtus minimus</i> (Brönnich, 1764)	AqPal	Migr	—	—	+
Scolopaciidae	<i>Gallinago gallinago</i> (Linnaeus, 1758)	AqPal	Migr	—	—	+
Scolopaciidae	<i>Scolopax rusticola</i> Linnaeus, 1758	Pr	Migr	—	—	+
Scolopaciidae	<i>Numenius arquata</i> (Linnaeus, 1758)	AqPal	Migr	+	+	+
Scolopaciidae	<i>Limosa limosa</i> (Linnaeus, 1758)	AqPal	T, Migr	—	+	+
Sittidae	<i>Sitta europaea</i> Linnaeus, 1758	Sil	Ass	—	—	+
Stercorariidae	<i>Stercorarius parasiticus</i> (Linnaeus, 1758)	AqPal	Acc	—	—	+
Strigidae	<i>Asio otus</i> (Linnaeus, 1758)	Sil	Ass	—	—	+
Strigidae	<i>A. flammeus</i> (Pontoppidan, 1763)	Sil	Ass	+	+	+
Strigidae	<i>Otus scops</i> (Linnaeus, 1758)	Sil	Nest	+	+	+
Strigidae	<i>Athene noctua</i> (Scopoli, 1769)	Sil	Ass	—	+	+
Sturnidae	<i>Sturnus vulgaris</i> Linnaeus, 1758	Sil	Nest	—	—	+
Sylviidae	<i>Locustella luscinioides</i> (Savi, 1824)	AqPal	Nest	—	—	+
Sylviidae	<i>L. fluviatilis</i> (Wolf, 1810)	AqPal	Nest	—	+	+
Sylviidae	<i>Acrocephalus schoenobaenus</i> (Linnaeus, 1758)	AqPal	Nest	—	—	+
Sylviidae	<i>A. agricola</i> (Jerdon, 1845)	AqPal	Nest	—	+	+
Sylviidae	<i>A. palustris</i> (Bechstein, 1798)	AqPal	Acc	—	—	+
Sylviidae	<i>A. scirpaceus</i> (Hermann, 1804)	AqPal	Nest	—	—	+
Sylviidae	<i>A. arundinaceus</i> (Linnaeus, 1758)	AqPal	Nest	—	—	+
Sylviidae	<i>Hippolais icterina</i> (Vieillot, 1817)	Sil	Nest	—	—	+
Sylviidae	<i>Sylvia nisoria</i> (Bechstein, 1795)	SilMn	Nest	—	—	+
Sylviidae	<i>S. atricapilla</i> (Linnaeus, 1758)	SilMn	Nest	—	—	+
Sylviidae	<i>S. borin</i> (Boddaert, 1783)	SilMn	Nest	—	—	+
Sylviidae	<i>S. communis</i> Latham, 1787	SilMn	Nest	—	—	+
Sylviidae	<i>S. curruca</i> (Linnaeus, 1758)	SilMn	Nest	—	—	+
Sylviidae	<i>Phylloscopus trochilus</i> (Linnaeus, 1758)	Sil	Migr	—	—	+
Sylviidae	<i>P. collybita</i> (Vieillot, 1817)	Sil	Nest	—	—	+
Sylviidae	<i>P. sibilatrix</i> (Bechstein, 1793)	Sil	Nest	—	—	+
Troglodytidae	<i>Troglodytes troglodytes</i> (Linnaeus, 1758)	SilMn	Migr	—	—	+

Notes: ecological complex: AqPal (aqa-paludosus) – wetland, Sil (silvaticus) – forest, Pr (pratensis) – meadow, Syn (synanthropus) – synanthropus, St – steppe, SilMn – forest edge; residence status: Nest – breeding migratory, Migr – migratory, T – feeds in summer, but does not nest in the study area, Hib (hibernans) – wintering, Ass (assiduus) – sedentary, Acc (accidentales) – migratory, accidental; status in the Red Data Book of Ukraine and the region: Ne – disappearing, E – missing, R – rare, Vu – vulnerable; BC – listed in the annexes of the Berne Convention.

Table 6

The ratio of the species composition of ecological complexes and groups of birds by status of residence (%)

Ecological complexes	Nesting migratory species	Feeding but do not nest	Feed, migrate	Wintering	Accidental	Migratory	Migrants, wintering	Sedentary	Total
Wetland	22.4	0.5	2.8	–	3.3	12.5	–	0.9	42.4
Forest	8.1	–	1.4	1.4	1.4	2.4	1.4	8.6	24.7
Meadow	1.4	–	–	–	–	0.9	0.6	–	2.9
Synanthropic	1.9	–	0.5	–	–	–	–	1.4	3.8
Steppe	2.9	–	–	0.9	–	2.9	–	0.9	7.6
Marginal	8.5	–	–	0.9	–	2.9	1.9	4.4	18.6
Together	45.2	0.5	4.7	3.2	4.7	21.6	3.9	16.2	100.0

Table 7

Species composition of the mammalian fauna of the Samara floodplain

Family	Latin name of the species	Ecological complex	Conservation status
Talpidae	<i>Talpa europaea</i> Linnaeus, 1758	PrSil	–
Erinaceidae	<i>Erinaceus roumanicus</i> Barrett-Hamilton, 1900	StPrSil	BC 3
Sorecidae	<i>Sorex araneus</i> Linnaeus, 1758	StPrSilSin	BC 3
Sorecidae	<i>S. minutus</i> (Linnaeus, 1758)	SilPr	RLD, BC 3
Sorecidae	<i>Crocodyria leucodon</i> (Hermann, 1780)	StAqPal	RBU, RLD, BC 3
Sorecidae	<i>C. suaveolens</i> (Pallas, 1811)	StSilSin	RLD, BC 3
Vespertilionidae	<i>Eptesicus serotinus</i> Schreber, 1774	PrSilStSin	BC 2
Vespertilionidae	<i>Myotis daubentonii</i> (Kuhl, 1817)	SilAqPal	RBU, RLD, BC 2
Vespertilionidae	<i>Nyctalus noctula</i> (Schreber, 1774)	Sil	RBU, RLD, BC 2
Vespertilionidae	<i>Plecotus auritus</i> (Linnaeus, 1758)	SilSin	RBU, RLD, BC 2
Vespertilionidae	<i>Vespertilio murinus</i> Linnaeus, 1758	SilSin	RBU, RLD, BC 2
Canidae	<i>Vulpes vulpes</i> Linnaeus (1758)	StPrSil	–
Canidae	<i>Nyctereutes procyonoides</i> Gray (1834)	SilAqPal	–
Mustelidae	<i>Martes martes</i> Linnaeus (1758)	PrSilStSin	BC 3
Mustelidae	<i>M. foina</i> (Erxleben, 1777) G. Fischer de Waldheim, 1817	SilSin	BC 3
Mustelidae	<i>Mustela (Putorius) putorius</i> (Linnaeus, 1758)	Sil	RLD, BC 2
Mustelidae	<i>Lutra lutra</i> (Linnaeus, 1758)	AqPal	RBU, RLD, BC 2
Leporidae	<i>Lepus europaeus</i> Pallas (1778)	StPr	BC 2
Gliridae	<i>Dryomys nitedula</i> Pallas, 1778	Sil	BC 3
Muridae	<i>Apodemus agrarius</i> Pallas (1778)	StSin	–
Muridae	<i>Mus musculus</i> Linnaeus (1758)	StPrSilSin	–
Muridae	<i>Sylviaemus flavicollis</i> (Melchior, 1834)	PrSilSin	–
Muridae	<i>S. sylvaticus</i> (Linnaeus, 1758)	PrSilSin	–
Muridae	<i>Micromys minutus</i> (Pallas, 1771)	PrSilSin	–
Muridae	<i>Rattus norvegicus</i> Berkenhout (1769)	SilPrSin	–
Cricetidae	<i>Myodes glareolus</i> (Schreber, 1780)	Sil	–
Cricetidae	<i>Microtus arvalis</i> (s. lato) (Pallas, 1778)	PrSilSin	–
Cricetidae	<i>Arvicola amphibius</i> (Linnaeus, 1758)	AqPal	–
Cricetidae	<i>Ondatra zibethicus</i> (Linnaeus, 1766)	AqPal	–
Suidae	<i>Sus scrofa</i> (Linnaeus, 1758)	SilStPr	–
Cervidae	<i>Capreolus capreolus</i> (Linnaeus, 1758)	SilPr	BC 3

Notes: Ph – phytophilic, P – pelophilic, Ps – psamphilic, L – lithophilic, Poly – polytopic; Sil – a species, found in forests, forest belts, St – in steppes, Pr – in meadows, Mar – at forest edges, Aq-Pal – in aquatic and wetland ecosystems; conservation status: RBU – the species is included in the Red Book of Ukraine, RLD – the species is included in the Red List of Dnepropetrovsk Oblast; BC ap – protected by the Berne Convention, contained in the corresponding Appendix 2 or 3.

Discussion

Creation of nature reserves in reservoirs is used as a tool for biodiversity conservation in many countries. According to international studies, almost 20.0% of existing large dams occur within protected areas. In more than two thirds of these cases, dams were constructed before the creation of protected areas in the past 70–300 years (Thieme et al., 2020). In our case, the Landscape Regional Park was created 70 years after the creation of the reservoir. The impact of protected area management actions is rarely assessed. The main reasons for this finding are a lack of financial resources, gaps in managerial capacity, or poor understanding of how to counter threats (Adams et al., 2015). Therefore, the presented studies are important not only for the zoning of the territory, but also for further analysis of the dynamics of biodiversity. The zoning of protected areas is also important because parts of the reservoir often become recreation areas for water and other types of tourist activities.

The creation of the Zaporozhye Reservoir caused significant changes in the hydrological regime of the valley: meadows and floodplains of forests were flooded, which led, first of all, to a change in the vegetation of the territory. Researchers in other countries also focus on this (Chakraborty, 2021). Over 70 years, a new floodplain and flooded complex have developed. Some plant species were lost due to flooding, while others recovered their populations. Today, the analysis of the flora of the regional landscape park indicates its significant richness, systematic and ecomorphic diversity despite anthropogenic transformation. The anthropogenic

transformation of the territory of the regional landscape park is evidenced by the large amount of ruderal flora. Its amount significantly predominates in the regulated recreation zone, and especially in the economic zone.

The difference between the vegetation cover of shallow waters from other parts of the park lies in the prevalence of scattered centers of overgrowth and the spread of phytocenoses, rare for the area of *Potamogeton lucens* L. According to the known gradations of the degree of overgrowth of water bodies, the territory of the floodplains is highly overgrown (the degree of overgrowth is more than 40%). Natural oak forests (birch-ash oak forests, elm-ash oak forests, linden oak forests) are common in the Samara riverbed zone, which is associated with a lighter texture of the soil and a deeper standing of groundwater. These natural oak forests are distinguished by significant cenotic condition and species diversity and are the most valuable dendrological objects of the park. Increase in moisture in edaphotopes downstream of the Samara River is seen in the increase in mesophilic and hygromesophilic tree, shrub and herbaceous species. In addition to the leading hydrological factor, the state of forests is influenced by the recreational load, which can be estimated as average. Also it is important that green zones near the megapolis are able to absorb pollutants and keep them from entering groundwater (buffer tank for heavy metals) (Didur et al., 2019) this is important in the manifestation of human health potential.

According to international studies, invertebrates make up the bulk of the diversity of freshwater animals, both systematically and functionally, but they are underrepresented in assessments of the effectiveness of pro-

tected areas with a strong bias towards vertebrate monitoring (Acreman et al., 2020). Also, benthos is one of the stable elements of ecosystems.

All six amphibian species found in the study area make up 60% of the species composition of the batrachofauna of Dnepropetrovsk region (Bulakhov et al., 2007). All amphibian species have a permanent residence status in their biotopes. The noted 7 species of reptiles make up 58.3% of the species diversity of the herpetofauna of Dnipropetrovsk region, which is due to the relatively high area of the site itself and the presence of various locations with suitable ecological conditions for these species. The study area is characterized by the presence of species in need of protection. All species of reptiles living in this area have a conservation status: all 7 species are protected by the Bern Convention. Of these, three species (almost 43%) are included in the Red Book of Ukraine and are protected at the state level. Four species (57%) are included in the Red Book of Dnipropetrovsk region and are protected at the regional level. All reptile species have a permanent residence status. Dice snake *N. tessellata* has expanded its range in the region over the recent decades (Yermolenko et al., 2016) and inhabited the studied area. The conservation of this territory will lead to an increase in the number of species due to decrease in the disturbance factor and the preservation of natural biotopes. In addition, preconditions for increasing biological diversity and monitoring of it will appear, the importance of which cannot be overestimated (Sigwart et al., 2018).

The diversity in the biotopes of the Regional Landscape Park, and a large area allow 210 species of birds to live there. Because of the flooded area, the dominant group of avifauna species belongs to the wetland complex. Habitat monitoring and the importance of protected areas inhabited mainly by wintering species of aquatic birds has been studied and confirmed by scientists from different countries (Musilová et al., 2018; Gaget et al., 2020; Pavón-Jordán et al., 2020). In the same territories, the composition of migrants can change every few years (Ponomarenko, 2005; Bulakhov et al., 2009, 2013). The share of synanthropic species is rather low and corresponds to the natural areas of the region. This indicates a low level of transformation of the studied territory and its relative preservation. In areas subject to high anthropogenic load, the proportion of synanthropic species in the species composition reaches 7–9%. Within the study area, there are both wide deep-water areas and shallow and aquatic ecosystems that are rich in macrophytic vegetation. Therefore, on the one hand, there are species associated with large water surfaces (some species of anseriformes, loons and others), and on the other hand, types of water bodies that overgrow (anseriformes, herons) and species characteristic of thickets of higher aquatic vegetation (some herons, rails).

The second most important is the forest ecological complex of birds. The birds of this complex also have a fairly diverse and large territorial base. Their main habitats are floodplain forests. The forests of the study area are diverse, among them there are both dense-crowned and semi-openwork species. This leads to the fact that the forest complex even includes quite specialized species. The main basis of habitation for birds of the marginal ornithocomplexes (18.5%) is the thickets of various shrubs along the banks. They create favourable conditions for the birds of the forest. The habitat of steppe birds comprises river banks and insular areas with remaining steppe biotopes. However, the proportion of steppe birds in the species composition is relatively small (7.6%). Meadow birds are represented by a very small share – 2.8% of the total species composition due to the small area of integral meadows and their fragmented nature. In addition, most of these species in the study area are migrants and do not stay for a long time in the studied ecosystems. The large percentage of nesting birds indicates that the territory has a sufficiently high reproductive potential for birds and is a place for them to feed in the summer.

The main bases of residence for synanthropic species are human settlements. One-story and low-rise buildings prevail in the area, as well as various options for nursery gardens for household plots. All this creates conditions for the habitation of synanthropic birds and explains their presence in the avifauna in the study area.

The sites of the Regional Landscape Park are valuable for migratory birds. Migrants of all groups make up more than 75.2% of the total species composition. More than half of all migrants are types of the wetland complex. In winter, the avifauna is represented by sedentary species, and those that are found all year round. The share of such species in the avifauna is not very significant and the basis for such a phenomenon is the state of the

topical diversity in the studied territory. In general, the indicators of avifauna protection are relatively high and are not inferior to those of the natural reserves of the region. The presence of species listed in the Red Book of Ukraine and the list of the Bern Convention requires taking into account the interests of preserving natural environments.

The territory is characterized by the presence of 17 mammal species (55% of the mammalian species composition of the oblast), which are protected by the Bern Convention. Nine species (29%) are included in the Red Book of Dnipropetrovsk region and are protected at the regional level. Six species (19%) are listed in the Red Book of Ukraine and are protected at the state level (Bulakhov & Pakhomov, 2006).

Conclusion

Within the framework of the Samara Plavni Regional Landscape Park, a floodplain-flooded complex has developed, which united forest floodplain forests, branches and tributaries of the Samara River, meadows, wetlands and the water area of the flooded complex. Due to the variety of biotopes presented, the territory has significant biodiversity and a large number of rare species that are protected in the region, the country, and Europe. According to the zoning of the Samara Plavni Regional Landscape Park, the following zones have been identified: a reserved zone, a recreational zone, a regulated recreation zone and an economic zone. The protected area has a high level of biodiversity. The recreational zone occupies the main part of the regional landscape park and is slightly inferior to the protected zone in terms of the richness of plant and animal species. Zoning of the Samara Plavni Regional Landscape Park is of great importance for optimizing the ecological balance of territories and water areas and protecting flora and fauna. With the application of the reserve regime, the disturbance factor will decrease, conditions will be created for the preservation of the habitats of mammals, including those protected by the state. Such changes will increase the implementation of the reproductive potential of all species without exception in the ecosystems studied.

To maintain the aquatic ecosystems of the Samara Plavni Regional Landscape Park in the conditions favourable for aquatic biocenoses, it is necessary to develop and implement measures (not prohibited by law) to restore their hydrological state, disturbed as a result of anthropogenic impact, first of all – clearing silted, swampy channels and mechanical mowing of reed beds.

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