

# Ecological condition and the recommended Red List of the Criş/Körös<sup>1</sup> river system

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## *Abstract*

This concluding study analyses the ecological condition of the river system. Its statements are based on the statements of the authors of this book. Although the polluted sections are not very long, the ecological condition and the living organisms of these rivers are endangered by the seriously high content of xenobiotics. The hydrotechnical works have a negative effect on the quality of the water. The red list concerns only the Criş/Körös Basin. In this Basin there are a lot of valuable areas which should be protected.

**Keywords:** Criş/Körös Rivers, ecological condition, Red List.

## *Discussion*

The statements of this concluding study are based on the statements of the authors of this book, and the red list was accomplished according to the their suggestions, too.

The condition of the river system (Crişul Alb/Fehér-Körös, Crişul Negru/Fekete-Körös, Crişul Repede/Sebes-Körös and Barcău/Berettyó) rivers is relatively good compared to other Transylvanian rivers. The observed pollution are not causing spectacular changes, only on some short sections of the rivers. On the lower reach of the three Criş/Körös rivers we identified associations and species whose presence indicate to fairly good water quality. For example, in all the three Criş/Körös rivers the presence of the Plecoptera, Ephemeroptera and *Bivalvia* fauna is significant.

Only on the 1st site the **Crişul Alb/Fehér-Körös** river can be considered as being in a natural state. This fact is supported by the studies from this book. On the 2nd sampling site the dam constructions at Mihăileni caused significant changes. On the 3rd site (downstream at Brad) a great influence of the drainage and the waste-water can be noticed.

1 The first name is Romanian, and the second Hungarian.

These two human effects break the continuous areal of such sensitive species like the Plecoptera, Ephemeroptera species and *Ancylus fluviatilis* snail. The abundancy of the Oligochaeta species is considerably high, as the consequence of the sediments rich in organic matter. Due to the natural clearing, the condition of the river is getting better before the 5th site (Almaş); this is why the *Ancylus fluviatilis* snail reappears. It is only from the 5th site that we could find the Unionida shells, although the 3rd and the 4th sites could well be suitable for their spreading; it is quite probable that they had stocked this reach in the past. On the middle and lower reach of the river the wooded territories are few, the river is bordered with agricultural land; so the river is affected by antropogenous influences. On the lower reach of the river the sensitive shell and fish species are present, but their heavy metal content is very high, this endangers their survival. Because of the heavy metal content we classified them into the "vulnerable" category of the red list. Before the 6th sampling site a dam tightens the river-bed down to Gyula (14th site). The dam is very close to the river-bed, thus the river ceases to have a flood area. During the regulation of the river-ways the bends were cut through, and because of this the overall view of the river resembles a canal. On the plain the slow water-run of the river creates favourable states for the eutrophication.

The Crişul Negru/Fekete Körös, like the Crişul Alb is undisturbed only at its spring area (8th site). At Ştei (9 site) residual and waste-waters flow into the river, and drastically change the biocenosis. At the 8th site the rare Plecoptera and Ephemeroptera species and the *Ancylus fluviatilis* snail are still present. They have disappeared from site 9. The Trichoptera species, belonging to the Hydropsychidae family, and the less sensitive Ephemeroptera species have survived. At this site, as the water is polluted with organic matters, the Oligochaeta species have the highest abundancy, especially the *Limnodrilus hoffmeisteri* and the *Tubifex tubifex*, the latter appearing only here and being present in a high number. At Borz (10th site) we observed higher diversity. The benthonic fauna is made up of Ephemeroptera, Odonata and Trichoptera species. Similarly, the diversity of the zooplankton is due to the better water quality. It is here that the unionid shells appear for the first time. The appearance of the submerged macrovegetation is indicated by the high trophic level. Besides the biological epuration of the waters, this relatively better condition due to a strong physico-chemical clearing, since in the Borz Straight the river has a faster water run and becomes richer in oxygen. At Tinca (11th site) the slower run of the river places down more and more sediments and organic matters, this is relevant by the benthonic fauna and by the content of the zooplankton: the diversity is lower. The zoobenthon is made up mostly by filtering organisms like Unionida, Tricophtera, which have great influence in the natural purification. The slow run of the river and the thicker sediment is due to the extreme growth of the submerged vegetation. At Zerind (site 12) and at Gyula (site 14) the associations indicate a slow and eutrophic water; this can be noticed especially in the composition of the zooplankton and the macrophyta vegetation. This reach of the Crişul Negru, like the Crişul Alb is canalised and straightened within a dam-system.

The upper stream of the Crişul Repede/Sebes Körös (from Şaula to the inflow of the Drăgan stream) has a very slow run. From the marsh springs it carries much organic matters and deposits a thick muddy sediment in this slightly sloping river-bed. Organisms typical to the hilly section stock the river. After the inflow of the Drăgan stream the Crişul Repede runs down on a steeper slope, and before the Criş Strait the Iad stream joins in. Here the Plecoptera, Ephemeroptera, Trichoptera and Gastropoda species begin to appear, which are typical to mountain region. From time to time the Iad stream comes rushing into the Crişul Repede with a great amount of cold water, which is absolutely damaging to the benthonic fauna and for the fish fauna. In the Vadu Crişului defile among the limestone rocks the river runs down in a steep slope, the water speed reaches 1,5 m/sec. Although the water is clean and rich in oxygen, the Plecoptera and Ephemeroptera species, which are typical to mountain region, are missing. This fact is probably due to the deep (sometimes 1,5 m) and fast running water. From the defile to the Aleşd locality the river condition is good, it is stocked by species characteristic to a submountain region. At Aleşd the organic matter load is growing, and the human influence is strong, due to the water-supply engineering works on the river. Between Aleşd and Oradea two dams have been built and the third is being constructed now right before Oradea. The constructions completely the river-bed, between the two dams the water runs in cemented canals, which is absolutely unfavourable for the living organisms that assure the natural purification. In the completed dam-lakes the deposition of the sediment has started and the first living organism characteristic to lake environment have appeared, for example the *Anodonta cygnaea*. On this reach it is in the old river-bed that we found the most varied benthonic fauna; but this is endangered, because the water is directed to a new, cemented river-bed. At Fughiu sampling site the river-bed preserves its natural state, but water-supply engineering works are in process near the river. Here too the riverside groves are missing, and agricultural territories surround the river-bed. Downstream to Oradea at Cheresig site the industrial (this city has a highly developed chemical industry) and the household waste-water, as well as the pollution of the stock-raising farms leave their marks on the river biocenosis. While taking the samples, we found dead shells which indicate poor water quality. On the plain region to Szeghalom the eutrophication process is going on; this fact is proved by the greenish colour of the water and by the presence of many aquatic weeds

The river-head of the Barcău/Berettyó river is on a hilly region, its water has a very good quality, it is rich in trout (*Salmo trutta fario*) to Boghiş sampling site. It can be stated that the river is very polluted starting from the region of Suplacu de Barcău, where the oil-pollution resulting from oil production was very significant, especially in 1994. Similarly, at Sântimreu we still could not find more exigent benthonic species except some Odonata species; but the quality of the water is improving after the oil-polluted section. This fact is proved by the presence of the *Sphaerium rivicola* species. The oil-pollution has not taken place without any consequences. It is very likely that from this river the following fish species have died out: *Leuciscus leuciscus*, *Gobio kessleri*, *Sabanejewia aurata* and *Gymnocephalus schraetseri*. On the Hungarian section of the river Berettyó, at Szeghalom,

the water has a very slow run, the presence of the weeds in a large number indicates a high trophic level, and the river is stocked by Gastropoda species, typical to still waters. We got ascertained of the fact that in this river the *Anodonta cygnea* existed in the recent past, because we found the shells of younger and older samples with unharmed ligament; but we couldn't identify living individs. During the research the iridescent oil layer came to the water surface from the disturbed sediment.

The speed of the Kettös-Körös and Hármás-Körös rivers, pressed between dam-system, is very slow. The slow water, together with a high organic and nutritive content, favours the eutrophication. The high level of eutrophication is also indicated by the high content of chlorophyll-a of the water.

### *Final conclusions*

In the Criş/Körös Basin on the middle and lower reach of the studied rivers we found significant human influences which have three main sources:

1. The absence of the contiguous forests and the extensive agriculture strongly affect the rivers.

2. The hydrotechnical works (barrages, dam-systems and dam-lakes and the river regulation in general) have a negative effect on the quality of the water.

3. The industrial and the household waste-water is rather significant in several sections. Some elements of the fauna are endangered by a seriously high content of xenobiontics.

4. In the Basin of the Criş/Körös Rivers there are a lot of important areas wich should be protected, such as: Vadu Crişului Strait, thermal springs at Răbăgani and Băile Episcopopeşti, Cefa fish ponds and Rădvani wood.

### *Acknowledgments*

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### ***The recommended Red List of the Criș/Körös Rivers Basin***

The following red list has been compiled on basis of the suggestions of this volume's authors, according to the IUCN categorisation. We are aware of the fact that this list is not complete, and that the included species reveal only the momentary condition of the research. However, we do hope that this red list will serve as the basis of a new and more elaborate list.

This red list concerns only the Criș/Körös rivers Basin.

**Ex** = disappeared; cited in the bibliography or make part of a collection, but not found during the last 50 years.

#### **Pisces**

*Gobio kessleri* Dybows. (Barcău)

*Lota lota* L. (Barcău)

#### **Aves**

*Gyps fulvus* (Habl.)

**Ex?** = not found again during the research

#### **Macrophyta**

*Acorus calamus* L.

*Aldrovanda vesiculosa* L.

*Andromeda polifolia* L.

*Betula pubescens* Ehrh.

*Carex appropinquata* Schumacher

*Carex lasiocarpa* Ehrh.

*Cladium mariscus* (L.) Pohl.

*Drosera rotundifolia* L.

*Marsilia quadrifolia* L.

*Ophioglossum vulgatum* L.

*Rhynchospora alba* (L.) Vahl.

*Sparganium minimum* Hill.

*Vaccinium oxycoccos* L.

*Wolffia arrhiza* (L.) Horkel

#### **Heteroptera**

*Aphelocheirus aestivalis* Fabr.

*Hydrometra gracilentia* Horv.

#### **Pisces**

*Aspius aspius* (L.) (Barcău)

*Barbus barbus* (L.) (Barcău)

*Chondrostoma nasus* (L.) (Barcău)  
*Cottus gobio* L. (Drăgan, Barcău)  
*Gymnocephalus schraetser* (L.) (Barcău)  
*Leuciscus idus* (L.) (Barcău)  
*Leuciscus leuciscus* (L.) (Cr. Negru, Repede, Barcău)  
*Sabanejewia aurata balcanica* (Karam.) (Barcău)  
*Zingel streber* (Sieb.) (Cr. Repede, Barcău)  
*Zingel zingel* (L.) (Cr. Repede)

### **Aves**

*Falco cherrug* Gray  
*Neophron percnopterus* (L.)

E = endangered with immediate disappearance; population drastically reduced to a critical number, endangered with immediate disappearance (Ex) if the perturbing factors continue to exist

### **Macrophyta**

*Blackstonia perfoliata* (L.) Huds.  
*Carex pauciflora* Lightf.  
*Hottonia palustris* L.  
*Montia fontana* L., (M. verna Necker)  
*Nymphaea lotus* L.: var. *thermalis* (DC.) Tuzs.  
*Potamogeton obtusifolius* Mert. et Koch  
*Potamogeton trichoides* Cham. et Schlecht.  
*Salix aurita* L.  
*Salix rosmarinifolia* L.  
*Scheuchzeria palustris* L.  
*Schoenoplectus michelianus* L. (*Dichostylis michelianus* (L.) Nees)  
*Stellaria palustris* Retz.  
*Swertia perennis* L.  
*Swertia punctata* Baumg.  
*Vallisneria spiralis* L.

### **Gastropoda**

*Melanopsis parreyssi* Phill.  
*Theodoxus prevostianus* C. Pfeiff.

### **Bivalviva**

*Pseudanodonta complanata* Ross.

### **Ephemeroptera**

*Oligoneuriella rhenana* Imh.

### **Pisces**

*Thymallus thymallus* (L.) (Cr. Repede, Drăgan)

### **Amphibia** (Cr. Repede and Barcău)

*Pelobates fuscus* (Laur.)

### **Reptilia** (Cr. Repede and Barcău)

*Coronella austriaca* Laur.

*Elaphe longissima* (Laur.)

*Emys orbicularis* (L.)

*Vipera berus* (L.)

### **Aves**

*Otis tarda* L.

*Pandion haliaëtus* (L.)

*Falco peregrinus* (Tunst.)

V = vulnerable; decreasing population due to antropogenous influences.

They may be species with still abundant population,  
yet because of the disturbing factors they are likely to be  
to be transferred to the „E” category.

### **Macrophyta**

*Acorellus pannonicus* (Jacq.) Palla

*Alisma gramineum* Lej.

*Angelica archangelica* L.

*Carex magellanica* Lam.

*Elatine ambigua* Wighth.

*Elatine hexandra* DC.

*Elatine hungarica* Moesz

*Eriophorum vaginatum* L.

*Limosella aquatica* L.

*Menyanthes trifoliata* L.

*Myosurus minimus* L.

*Nymphaea alba* L.

*Nymphoides peltata* (Gmel.) O. Ktze.

*Pedicularis limnogenia* A. Kern.

*Pedicularis palustris* L.

*Ranunculus circinatus* Sibth.

*Ranunculus lateriflorus* DC.

*Ranunculus peltatus* Schrank

*Sagittaria subulata* (L.) Buch.

### **Mollusca**

*Anodonta anatina* L.

*Melanopsis parraeyssi* Phil.

*Theodoxus prevostianus* L.

*Unio crassus* Phil.

*Unio pictorum* L.  
*Unio tumidus* Phil.

### **Trichoptera (Cr. Alb)**

*Oecismus monedula* Hagen

### **Plecoptera**

*Dinocras cephalotes* Curtis  
*Isoperla rivulorum* Pictet

### **Ephemeroptera**

*Baetis alpinus* Pict.  
*Ecdyonurus dispar* Curt.  
*Ecdyonurus fluminum* Pict.  
*Ecdyonurus insignis* Etn.  
*Ecdyonurus venosus* Fabr.  
*Ephemera danica* Müll.  
*Habroleptoides modesta* Hagen  
*Polymitarcis virgo* Oliv.  
*Potamanthus luteus* L.

### **Pisces**

*Abramis brama* (L.) (Barcău)  
*Alburnoides bipunctatus* (Bloch), (Drăgan, Barcău)  
*Gobio uranoscopus frici* Vladykov (Cr. Repede)  
*Salmo trutta fario* L. (Cr. Alb, Repede, Barcău)

### **Amphibia (Cr. Repede and Barcău)**

*Bombina bombina* (L.)  
*Bufo viridis* Laur.  
*Hyla arborea* (L.)

### **Reptilia (Cr. Repede and Barcău)**

*Lacerta viridis* (Laur.)  
*Podarcis muralis* (Bilz)

### **Aves**

*Anser anser* (L.)  
*Aquila chrysaetos* (L.)  
*Aquila clanga* Pall.  
*Aquila heliaca* Savigny  
*Ardea purpurea* L.  
*Asio flammeus* (Pontopp.)  
*Aythya nyroca* (Göld.)  
*Botaurus stellaris* (L.)  
*Bubo bubo* (L.)  
*Ciconia nigra* (L.)

*Circaëtus gallicus* (Gmel.)  
*Chlidonias hybrida* (Pall.)  
*Crex crex* (L.)  
*Egretta garzetta* (L.)  
*Falco subbuteo* L.  
*Falco vespertinus* L.  
*Grus grus* (L.)  
*Haliaëtus albicilla* (L.)  
*Hieraaëtus pennatus* (Gmel.)  
*Nycticorax nycticorax* (L.)  
*Phalacrocorax pygmaeus* (Pall.)  
*Platalea leucorodia* L.  
*Plegadis falcinellus* (L.)  
*Podiceps griseigena* (Bodd.)  
*Tichodroma muraria* (L.)  
*Tyto alba* (C. L. Brehm)

**R** = rare; species with reduced population, which are not yet endangered by „E” or „V”, but the danger is still present.

### Macrophyta

*Adoxa moschatellina* L.  
*Aster tripolium* L. ssp. *pannonicus* (Jacq.) Beck  
*Blysmus compressus* (L.) Panz.  
*Callitriche cophocarpa* Sendtn. (*C. polymorpha* Lönnr.)  
*Callitriche palustris* L. em. Druce (*C. verna* L.)  
*Carex buekii* Wimm.  
*Carex limosa* L.  
*Carex pendula* Host.  
*Centaurium littorale* (D. Turner) Gilmour (*C. uliginosum* (W. et K.) G. Beck)  
*Centunculus minimus* L.  
*Ceratophyllum submersum* L.  
*Chrysanthemum serotinum* L.  
*Dryopteris carthusiana* (Vill.) H. P. Fuchs  
*Eriophorum gracile* Koch  
*Heracleum palmatum* Baumg.  
*Juncus filiformis* L.  
*Juncus gerardi* Lois.  
*Juncus thomassii* Ten.  
*Lemna gibba* L.  
*Ludwigia palustris* (L.) Elliot  
*Lysimachia nemorum* L.  
*Nuphar lutea* (L.) Sibth. et Sm.  
*Potamogeton lucens* L.  
*Potamogeton pusillus* L.

*Sparganium emersum* Rehmann (*S. simplex* Huds.)  
*Stratiotes aloides* L.  
*Trollius europaeus* L.  
*Valeriana sambucifolia* Mikan  
*Valeriana simplicifolia* (Rchb.) Kabath  
*Zannichellia palustris* L.

### **Rotatoria**

*Brachionus bidentata* Anderson  
*Brachionus bidentata crassispineus* Hauer  
*Brachionus diversicornis homoceros* Wierz.  
*Brachionus nilsoni* Ahlstrom  
*Cephalodella fluviatilis* Zawadowsky  
*Cephalodella limosa* (Wulfert)  
*Cephalodella mucronata* (Myers)  
*Cephalodella obvia* (Donner)  
*Cephalodella theodora* Koch-Althaus  
*Dicranophorus epicharis* (Harring et Myers)  
*Encentrum wiszniewski* (Wulfert)  
*Encentrum fluviatilis* Wulfert  
*Encentrum oculatum* (Harring et Myers)  
*Encentrum orthodactylum* (Wulfert)  
*Eosphora thoa* Harring et Myers  
*Epiphanes macrourus* (Barrois et Daday)  
*Hexarthra fennica* (Levander)  
*Itura viridis* (Stenroos)  
*Lecane ohioensis appendiculata* (Levander)  
*Lecane stichaea* Harring  
*Lindia torulosa* Dujardin  
*Metadiaschiza trigona* Rousselet  
*Paradicranophorus hudsoni* (Glascott)  
*Postclausa hyptopus* (Ehrenberg)  
*Proales theodora* (Gosse)  
*Pseudoharringia similis* Fadeew  
*Ptygura melicerta* (Ehlenberg)  
*Rotaria tridens* Montet  
*Sinantherina procera* (Thorpe)  
*Taphrocampa selenura* Gosse  
*Trichocerca agnata* Wulfert  
*Trichocerca dixon-muttali* (Jennings)  
*Trichocerca insignis* (Herrick)  
*Trichotria curta* (Skorikov)

### **Bivalvia**

*Sphaerium corneum* L.

*Sphaerium lacustre* O.F. Müll.

*Sphaerium rivicola* Lam.

### **Trichoptera (Cr. Alb)**

*Oecetis notata* Rambur

*Oecetis testacea* Curtis

*Setodes punctatus* Fabricius

### **Heteroptera**

*Chartoscirta cincta* Herr.-Schaeff.

*Chartoscirta cocksi* Curtis

*Gerris argentatus* Schumm.

*Gerris costai* Herr.-Schaeff.

*Hebrus ruficeps* Thom.

*Limnporus rufoscutellatus* Latr.

*Macrosaldula scotica* Curtis

*Macrosaldula variabilis* Herr.-Schaeff.

*Microvelia pygmaea* Duff.

*Notonecta viridis* Delc.

*Saldula melanoscela* Fieb.

*Saldula palustris* Doug.

*Saldula pilosella* Fabr.

### **Plecoptera**

*Dinocras megacephala* Káp.

*Perla grandis* Rambur

*Rhabdiopteryx alpina* Küht.

*Rhabdiopteryx neglecta* Alb.

### **Ephemeroptera**

*Baëtis fuscatus* L.

*Baëtis muticus* L.

*Caenis rivulorum* Eaton

*Epeorus assimilis* Etn.

*Heptagenia sulphurea* Müll.

*Rhithrogena semicolorata* Curt.

*Syphlonurus lacustris* Eaton

### **Coleoptera - Dytiscoidea (Crișul Alb and Negru)**

*Hyphydrus ovatus* (L.)

*Ilybius ater* (Deg.)

### **Pisces**

*Abramis ballerus* (L.) (Cr. Alb, Repede, Barcău, Hármas K.)

*Abramis sapa* (Pall.) (Cr. Negru, Hármas K.)

*Alburnus alburnus* (L.) (Barcău)

*Aspius aspius* (L.) (Cr. Repede)  
*Barbus peloponnesius petenyi* Heckel, (Drăgan)  
*Blicca bjoerkna* (L.) (Cr. Repede)  
*Cobitis taenia danubialis* Bacescu (Hármas K., Barcău)  
*Cottus gobio* L. (Cr. Alb)  
*Eudontomyzon danfordi* Regan, (Cr. Alb, Negru, Repede, Drăgan)  
*Gobio kessleri* Dybow. (Hármas K.)  
*Gymnocephalus balonii* Holcik and Hensel, (Cr. Repede)  
*Gymnocephalus cernuus* (L.) (Cr. Alb, Negru, Repede, Drăgan)  
*Leuciscus cephalus* (L.) (Drăgan)  
*Lota lota* (L.) (Cr. Alb, Negru, Repede, Hármas K.)  
*Perca fluviatilis* L. (Barcău)  
*Phoxinus phoxinus* (L.) (Barcău)  
*Rhodeus sericeus* (Bloch) (Hármas K.)  
*Rutilus rutilus* (L.) (Barcău)  
*Sabanejewia aurata balcanica* (Karam.) (Hármas K.)  
*Silurus glanis* (L.) (Cr. Alb, Negru, Repede)  
*Stizostedion lucioperca* (L.) (Cr. Repede)  
*Stizostedion volgense* (Gmel.) (Cr. Alb, Negru, Hármas K.)  
*Vimba vimba* (L.) (Hármas K.)  
*Zingel streber* (Siebold) (Hármas K.)  
*Zingel zingel* (L.) (Cr. Alb, Negru, Hármas K.)

### **Amphibia** (Cr. Repede and Barcău)

*Bombina variegata* (L.)  
*Bufo bufo* (L.)  
*Rana arvalis* Nilss.  
*Rana dalmatina* (Bonap.)  
*Rana temporaria* (L.)  
*Salamandra salamandra* (L.)  
*Triturus alpestris* (Laur.)  
*Triturus cristatus* (L.)  
*Triturus vulgaris* (L.)

### **Reptilia** (Cr. Repede and Barcău)

*Anguis fragilis* (Nord.)  
*Laacerta vivipara* Jacq.  
*Natrix tessellata* (Laur.)

### **Aves**

*Anas strepera* L.  
*Anser albifrons* (Scop.)  
*Anser fabalis* (Lath.)  
*Anthus pratensis* (L.)  
*Apus melba* (L.)  
*Aquila pomarina* C.L. Brehm

*Ardeola ralloides* (Scop.)  
*Aythya fuligula* (L.)  
*Aythya marila* (L.)  
*Bombycilla garrulus* (L.)  
*Calidris alba* (Pall.)  
*Circus aeruginosus* (L.)  
*Clangula hyemalis* (L.)  
*Chlidonias leucopterus* (Temm.)  
*Dendrocopos minor* (L.)  
*Dryocopus martius* (L.)  
*Egretta alba* (L.)  
*Emberiza cia* L.  
*Ficedula parva* (Bechst.)  
*Gallinago gallinago* (L.)  
*Gavia arctica* (L.)  
*Glareola pratincola* (L.)  
*Himantopus himantopus* (L.)  
*Hippolais icterina* (Vieill.)  
*Hydroprogne tschegreava* (Lepechin)  
*Lanius excubitor* L.  
*Larus fuscus* L.  
*Limicola falcinellus* (Pont.)  
*Luscinia svecica* (L.)  
*Melanitta fusca* (L.)  
*Mergus merganser* L.  
*Mergus serrator* L.  
*Milvus migrans* (Bodd.)  
*Monticola saxatilis* (L.)  
*Numenius phaeopus* (L.)  
*Pernis apivorus* (L.)  
*Phalaropus lobatus* (L.)  
*Pluvialis apricaria* (C.L. Brehm)  
*Pluvialis squatarola* (L.)  
*Podiceps nigricollis* C. L. Brehm  
*Recurvirostra avosetta* L.  
*Remiz pendulinus* (L.)  
*Sturnus roseus* (L.)  
*Tringa hypoleucos* L.

I = undetermined status; species in „E”, „V” or „R”,  
 but there is not enough information to define it exactly.

### **Macrophyta**

*Polygonum bistorta* L.  
*Rumex stenophyllus* Ldb.  
*Suaeda maritima* (L.) Dumort

### **Aves**

*Arenaria interpres* (L.)

*Asio otus* (L.)  
*Bucephala clangula* (L.)  
*Charadrius hiaticula* L.  
*Chlidonias niger* (L.)  
*Dendrocopos medius* (L.)  
*Plectrophenax nivalis* (L.)  
*Scolopax rusticola* L.  
*Sterna albifrons* Pall.  
*Sterna hirundo* L.

**K** = not well known; species considered to be exposed to danger,  
but there is not enough valid information.

### **Macrophyta**

*Cicerbita alpina* (L.) Wallr.  
*Cirsium helenioides* (L.) Hill. (*C. heterophyllum* (L.) Hill.)  
*Iris sibirica* L.  
*Iris spuria* L.  
*Moehringia muscosa* L.  
*Myriophyllum verticillatum* L.  
*Senecio fluviatilis* Wallr.  
*Sicyos angulata* L.  
*Taraxacum palustre* (Lyons) Symons  
*Triglochin palustris* L.

### **Trichoptera** (Cr. Alb)

*Hydropsyche modesta* Navás

### **Heteroptera**

*Velia raulii* Tam.

### **Ephemeroptera** (Cr. Repede)

*Baëtis vernus* Curt.  
*Baëtis scambus* Etn.  
*Habrophlebia lauta* Mc.L.  
*Torleya belgica* Lest.

### **Aves**

*Acrocephalus schoenobaenus* (L.)  
*Alcedo atthis* (L.)  
*Anas acuta* L.  
*Anas clypeata* L.  
*Anas crecca* L.  
*Anas penelope* L.  
*Anthus campestris* (L.)  
*Anthus spinoletta* (L.)

*Apus apus* (L.)  
*Aythya ferina* (L.)  
*Branta ruficollis* (Pall.)  
*Calidris alpina* (L.)  
*Calidris ferruginea* (Pont.)  
*Calidris minuta* (Leisl.)  
*Calidris temminckii* (Leisl.)  
*Caprimulgus europaeus* L.  
*Circus cyaneus* (L.)  
*Circus macrourus* (Gmel.)  
*Circus pygargus* (L.)  
*Emberiza schoeniclus* (L.)  
*Falco columbarius* L.  
*Ficedula albicollis* (Temm.)  
*Ficedula hypoleuca* (Pall.)  
*Haematopus ostralegus* L.  
*Jynx torquilla* L.  
*Lanius minor* Gmel.  
*Larus canus* L.  
*Larus minutus* Pall.  
*Limosa limosa* (L.)  
*Locustella luscinioides* (Savi)  
*Locustella naevia* (Bodd.)  
*Luscinia megarhynchos* C.L. Brehm  
*Mergus albellus* L.  
*Milvus milvus* (L.)  
*Numenius arquata* (L.)  
*Panurus biarmicus* (L.)  
*Phalacrocorax carbo* (L.)  
*Picoides tridactylus* C.L. Brehm  
*Podiceps auritus* (L.)  
*Porzana parva* (Scop.)  
*Porzana porzana* (L.)  
*Rallus aquaticus* L.  
*Serinus serinus* L.  
*Stercorarius parasiticus* (L.)  
*Stercorarius pomarinus* (Temm.)  
*Streptopelia turtur* (L.)  
*Tadorna ferruginea* (Pall.)  
*Tadorna tadorna* (L.)  
*Tringa erythropus* (Pall.)  
*Tringa glareola* L.  
*Tringa nebularia* (Gunn.)  
*Tringa ochropus* L.  
*Tringa stagnatilis* (Bechst.)  
*Tringa totanus* (L.)

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