Threatened freshwater fishes and molluscs of the Balkan

Krbava minnow, Croatia: Krbavsko Polje karst © J. Freyhof

Potential impacts of hydropower projects

Report

Supported by:

Berlin, March 2012

Threatened freshwater fishes and molluscs of the Balkan, potential impacts of hydropower projects

Report

Dr. Jörg Freyhof

Liebstadter Gang 5

12587 Berlin, Germany

Tel.: ++49/30/64181707 freyhof@igb-berlin.de

Citation: Freyhof, J. 2012. Threatened freshwater fishes and molluscs of the Balkan, Potential impact of hydropower projects. Unpublished report, ECA Watch Austria & EuroNatur, 81 pp.

Content

Copyright holders of pictures shown in this report

Jörg Freyhof	freyhof@igb-berlin.de
Andreas Hartl	andi.hartl@t-online.de
Perica Mustafic	pmustafi@biol.pmf.hr
Müfit Özuluğ	mozulu@istanbul.edu.tr
Johannes Schöffmann	j.schoeffmann@hotmail.com
Society for the Protection of Prespa	spp@spp.gr

Aulopyge, a globally threatened relict genus, endemic to the Balkan © J. Freyhof

Summary

Following the recent European IUCN assessments, no other ecological group of species is as threatened as freshwater taxa. These assessments clearly highlight the insufficient conservation status of freshwater biodiversity in Europe. At least 44% of the freshwater mollusc (373 species) and 37% of Europe's freshwater fishes (194 species) as threatened within their global range amking these two taxagroups the most endangered in Europe. The freshwaters of the Balkan are the home of a very diverse and highly endemic freshwater fauna. From all European threatened species, 151 mollusks, (52%) and 52 freshwater fishes (28%) occur in the Balkan making **the Balkan the most important "hotspot" for threatened biodiversity in Europe and also within the Mediterranean Biodiversity hotspot.** About 75% of all of the threatened fishes and 70% of all threatened molluscs in the Balkan are highly vulnerable to the constructions of dams and habitat alternations which come along with the construction of dam-lakes. They are also very vulnerable to alien species invasion, which is an unavoidable side effect of damlake construction. Dams interrupt fish migrations, flush floods devastate rivers below dams, strong water level fluctuations in dam lakes and below dams degrade the habitat quality, dam lakes alternate habitats and are the most important open gate to alien species invasion. Therefore, the **construction of dams and dam-lakes poses the most serious threat to freshwater molluc and fish species in the Balkan and by this to the most threatened elements of biodiversity in Europe at all.**

1. Geographic coverage.

Here we understand the Balkans as the countries south of the rivers Drava and Danube as Slovenia, Croatia, Bosnia-Herzegovina, Albania, Macedonia and Bulgaria. In Greece, only the fishes of the Aliakmonas are included. Excluded from this study are the purely lacustrine fish species of Lakes Ohrid and Prespa, as both lakes will hardly be impacted by dam constructions. Species endemic to these lake basins, which need tributaries for example to spawn, are included in the coverage.

2. Threatened species and global importance.

The freshwaters of the Balkan are the home of a very diverse and highly endemic fish and mollusc fauna which represent a major biodiversity heritage and natural resource. Freshwater fish and mollusc species are only included into this study, if they have been assessed as Critically Endangered, Endangered or Vulnerable by the IUCN European Freshwater Fish Assessment (Cuttelod et al., 2011; Freyhof & Brooks, 2011). At the European scale, Cuttelod et al., (2011) consider at least 44% of the freshwater mollusc species (373 species) as threatened, with at least 12.8% of them being Critically Endangered, 10.5% Endangered and 20.4% Vulnerable. In addition 23 of the 109 Critically Endangered species are considered Possibly Extinct and five species are listed as already Extinct. From these threatened species, 151 (40 %) occur in the study area (Table 1), **making the Balkans the most important "hotspot" for threatened freshwater molluscs in Europe and also within the Mediterranean Biodiversity hotspot.**

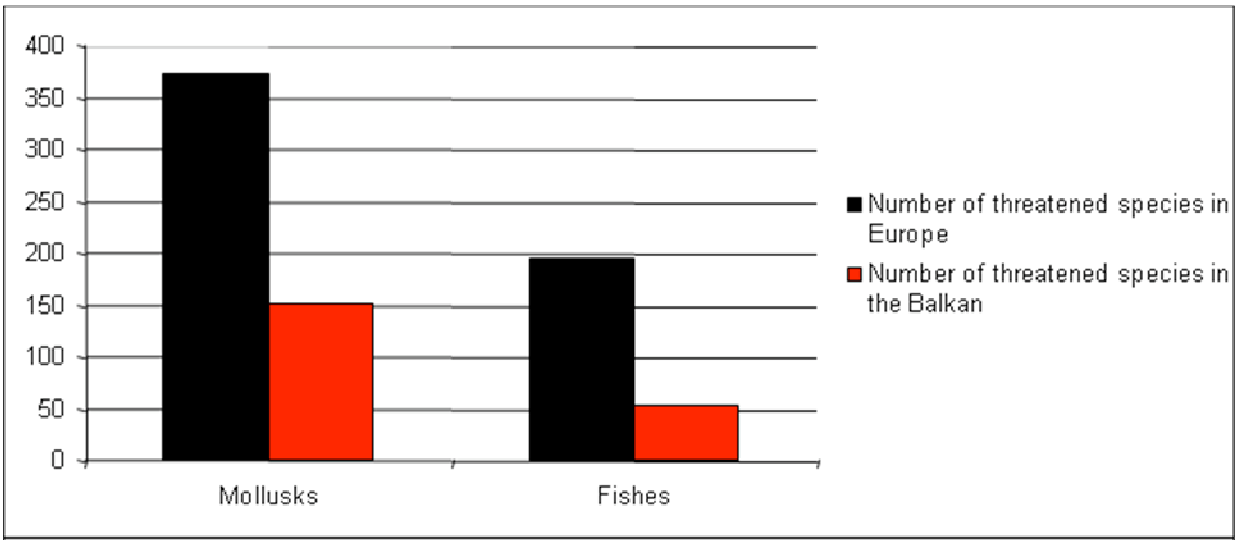


Fig. Numbers of threatened species of freshwater mollusks and fishes in Europe and in the Balkan.

Overall, at least 37% of Europe's freshwater fishes are threatened at a European scale, and 39% are threatened at the EU27 level. This is one of the highest threat levels of any major taxonomic group assessed to date for Europe (Freyhof & Brooks, 2011). Of all assessed species groups, this level of threat is second only to the one for freshwater molluscs. This is clearly highlighting the insufficient conservation of freshwater biodiversity in Europe.

There are 69 species of freshwater fishes and lampreys endemic to the Balkans south of the Danube and north of Greece. Several additional endemic species also exist in the Greek part of rivers which drain Macedonia and southern Bulgaria. Following this actual IUCN Red List, there are 52 species of globally threatened freshwater fishes distributed in the Balkans, from these, 39 species are endemic to the region. One additional species (from Lake Skadar basin) is already globally extinct. From the species endemic to the region, 30 are not threatened or have been assesses as Data Deficient or Near Threatened. While there are 194 species of threatened freshwater fishes at a European continental scale, about one quarter (28%) of the European threatened species occur in the Balkans. **The Balkan is one of the major hotspots for threatened freshwater fishes in Europe and also within the Mediterranean Biodiversity hotspot.** In fact, it should be suspected, that this is also true for other, less well known freshwater dependant species groups.

About 75% of all of the threatened fishes and 70% of all threatened molluscs in the Balkan are highly vulnerable to the constructions of dams and habitat alternations which come along with the construction of dam-lakes as alien species invasion, which is an unavoidable side effect. Therefore, the **construction of dams and dam-lakes poses the most serious threat to freshwater molluc and fish species in the Balkan and by this to the most threatened elements of biodiversity in Europe at all.**

The taxonomy of the European freshwater mollusc fauna is far from settled and this document follows the very recently published IUCN Red List assessment (Cuttelod et al., 2011). The taxonomy of freshwater fishes follows Kottelat & Freyhof (2007) and Freyhof & Brooks (2011).

3. Freshwater mollusc species accounts

Unio crassus, the most widespread threatened freshwater mollusc species on the Balkan © J. Freyhof

General remarks.

All together, the vulnerability of freshwater molluscs to hydropower projects is extremely high as most threatened species are restricted to caves and springs in Karst fields. The complex hydro-power and Karst water regulation systems have a major impact on all related aquatic habitats: drainage and regulation of Karst Poljes, water transfer from underground water to artificial tunnels and changes of the water quantitiy and quality. From all threatened species occurring in the Balkans, 88 (58 %) occur in springs or caves, sometimes in caves from which the water drains to springs. Even many of the lake endemic species are restricted to springs which drain within the lakes or close to the lakes. All the spring and underground habitats are threatened by the huge regulation projects for example in the Neretva-Trebiscnica and the Cetina drainage (as *Bithynia cettinensis*).

From all Threatened Eurpoean freshwater molluscs, 238 species (80 %) belong to the family Hydrobiidae and in the Balkans, 116 out of 151 threatened species belong to this family of miniature freshwater snails. Hydrobiids almost exclusively occur in springs and underground waters but are absent from larger streams and rivers. In the Balkans, only three Hydrobiids,

Vinodolia fluviatilis, *Islamia zermanica* and *Tanousia zrmanjae*, were reported from the river itself. *Islamia zermanica* and *Tanousia zrmanjae* are both endemic to Zrmanja River in Croatia, Most likely, both were associated to the underground part of ths highly karstic river. Both species are red listed as Critically Endangered and possibly extinct and it is suspected, that hydropower dams have modified the hydrological situation in the Zrmanja rivers (Falniowski, 2011a., b).

This example clearly demonstrates that the construction of hydropower plants and the associated lakes might massively impact even underground waters and lead to the extinction of species. Many Hydrobiids are highly threatened as they are very vulnerable to the damming of springs. Springs and spring fields are often captured for water abstraction (for example in the National Park Skadar for the coastal water supply) and to drain associated wetlands. These habitats are often highly modified leading to the extinction or extirpation of the highly endemic spring faunas including spring snails. Furthermore, springs are often used as washing places or/and suffer from pollution. It has also to be mentioned, that the modifications of the hydrological regime within hydrosheds might alternate also groundwater flows and therefore impact the biodiversity of underground waters and associated springs and spring streams to which all the highly diverse and endemic Hydrobiid fauna is restricted.

From the 151 threatened freshwater molluscs of the Balkans, only six (3%) occur in rivers and three are potentially directly impacted by hydropower projects. The majority of this threatened freshwater molluscs lives in springs and is threatened by the large regulations schemes of Karst poljes and whole water sheds, as well as by the creation of large accumulations, which will flood the springs inside.

The most important areas for threatened freshwater mollusc on the Balkans are the Lakes Ohrid, Prespa and Skadar where together 55 species (36 %) of threatened freshwater molluscs are endemic. Most endemic threatened species (37 spp.) are restricted to Lake Ohrid and associated springs in its catchment as well as to intralacustrine springs in Lake Ohrid. 10 threatened species are endemic to Lake Prespa and Lake Mikri Prespa, eight species are endemic to Lake Skadar and springs at its shores and two species are endemic to Lake Šasko, a small lake south of Lake Skadar, in the south of Montenegro, near the town of Ulcinj.

From these lacustrine or lacustrine-spring associated species, the eight species endemic to Lake Skadar basin seem to be at least potentially vulnerable to hydropower projects which might impact the spring habitats of those species and lacustrine populations of the bivalve *Microcondylaea bonellii* might be impacted by water level modifications of Lake Skadar.

Microcondylaea bonellii **Adriatic Mussel, Adriamuschel**

Dam lake habitats: Very little is known about the habitats of this species in the Lake Skadar basin and it is even possible, that this population might represent a species of its own. In Italy, this mussel has suffered a lot from various modification of its habitats. It is found in lakes as Lake Garda and Lake Skadar but is never found in dam-lakes. Therefore, the resistance against the impacts of dam constructions has to be considered as very low.

Distribution: *Microcondylaea bonellii* is known from Lake Skadar and the lower parts of the Morača drainage. It is also found in the Po drainage in Italy. It should be mentioned, that after many years of decline, this species is only known from very few viable populations in Italy now.

Unio crassus **Thick Shelled River Mussel, Bachmuschel**

Dam lake habitats: This mussel is restricted to running waters and in contrast to other Unio species, cannot exist within impoundments. The resistance against the impacts of dam constructions has to be considered as very low (depending on running waters).

Distribution: *Unio crassus* is widespread throughout Europe and Asia and obviously many different species are mixed up under this name. While being one of the most common freshwater mussels in Europe, this species has lost more than 90% of its former range and populations due to water pollution, stream sedimentation and dam constructions. Interestingly, the real reasons for its strong decline seem to be not really understood. The species inhabits a wide range of small streams from small lowland streams to medium sized rivers and seems to depend at least at a certain phase of the year on running waters. Remarkable populations exist in the Balkan part of the Danube catchment, for example in the Kolpa/Kupa in Slovenia and Croatia and in many other Danube tributaries. The Sava is evaluated as Natura 2000 site in Croatia due to the large population of this species. However, the distribution is very incompletely known,

Theodoxus transversalis **Striped Nerite, Gebänderte Kahnschnecke**

Dam lake habitats: Striped Nerites are very sensitive to pollution and the construction of dams. They are grazers on hard substrates and are unable to tolerate the accumulation of fine sediments on the hard surfaces they inhabit. Furthermore, they have high oxygen demands and have lost parts of their distribution areas following pollution. The regulation of the Danube has massively impacted this species and large parts of its former distribution are has been lost during the 20th century. The construction of damlakes almost automatically

eliminates this highly sensitive species. The resistance against the impacts of dam constructions has to be considered as very low (depending on clean hard surfaces).

Distribution: This species is distributed in large rivers and major tributaries along the Danube drainage including the Tisza River subdrainage. Its geographical range includes Germany, Austria, Hungary (Rába, Hernád, Bódva, Upper-Tisza), Serbia (Juzna Morava, Velika Morava and Nisava), Bulgaria (Danube, Zlatna Panega), Romania and Croatia. The last record in Slovakia is from 1999 (Danube River), and the species is probably extinct from the Hungarian section of the Danube also. In fact, the actual distribution of this species in Croatia and Bosnia and Herzegovina is very incompletely known.

Bithynia cettinensis **Cetina Bithynia, Cetina-Schnauzenschnecke**

Dam lake habitats: The species lives in a river, where the flow is already managed by several hyrdolectric dams across the lower courses of the river, and there may be some threats from flow management, however the impact on the species is uncertain, as it may occur elsewhere in the catchment. The resistance against the impacts of dam constructions has to be considered as unknown.

Distribution: This species is endemic to Cetina River in the Adriatic basin in Croatia. Until now, it was only found in lower Cetina.

Pseudobithynia kirka **Krka Bithynia, Krka-Schnauzenschnecke**

Dam lake habitats: The Krka falls are situated within a national park, and are a major tourist destination. At present the risks to the site are minimal, and although the species is known from only one of the travertine waterfalls, there are 17 in total along the Krka river. The major threat would be the changes in water chemistry that might impact the calcium-rich waterfalls. No impact of dams could be suspected to this site. The resistance against the impacts of dam constructions has to be considered as very low, as the quantity of flow, quality, temperature and chemistry of water would change (inhabits waterfalls).

Distribution: This species is endemic to the lower Krka River in the Adriatic basin in Croatia and is only reported from the lower part of this river at Skradin. It was only found on the travertine terraces directly at the major waterfall, where the snails were resting on stones within highly oxygenated water.

Vinodolia fluviatilis

Dam lake habitats: The ecology of this species is poorly known and the reasons of its disappearance in Zrmanja are not understood. However, the construction of the large damlake at lower Zrmanja has massively impacted the downstream section of the river. A construction of a similar damlake at River Neretva might consequently lead to the extinction of this species. The resistance against the impacts of dam constructions has to be considered as unknown.

Distribution: This species is endemic to Croatia were it was known, but is no longer reported, from Zrmanja River. It is still found in the lower parts of Neretva River between Kula and Opuzen. It is restriced to freshwater habitats close to the estuary. There is a sluice planned at this site to mitigate the impacts of hydropower and stop salt water intrusion. This might impact the last habitats of this species.

Streber, *Zingel streber*, a highly rheophilic species endemic to the Danube drainage where it is not yet threatened, but will strongly decline due to future hydropower projects

© J. Freyhof

4. Freshwater fish accounts

General remarks. The Black Sea basin is inhabited by a number of anadromous, long distance migratory species which have already lost major parts of their distribution range and populations due to the construction of dams. They are the most important victims of dam constructions at the large rivers of the Black and Caspian Seas. No other group of European freshwater fishes show higher threat levels than anadromous species. Anadromous species are most vulnerable to dams as dams represent usually an impassable barrier for the essential migrations of these species.

In most cases, dams block the migration route of fishes. If they are well conceived, fish ladders can mitigate this impact, and allow migratory fishes to migrate further upriver. However, until now, very few rivers in Europe have been equipped with well-functioning fish ladders. Where several dams are built in a cascade, the cumulative effect of these dams can be devastating. Not only does this transform the river into a series of lakes over long distances,

with unsuitable habitats for native species, but even where fish ladders are in place, multiple damming is further reducing the probability that migratory fish might reach their spawning grounds. Anadromous (and also catadromous) fish species not only need to find their way upriver, but must also travel downstream. Where hydropower dams are in place, there is still no known effective solution to prevent fishes from being caught by turbines and killed.

Furthermore, there are many threatened species in the Balkan which depend on a) intact wetlands along lowland rivers, are b) restricted to the intact mountain and hill streams of or are c) restricted to small rivers on the Adriatic coast or even to few springs or poljes in the Dalmatian karst. For these species as for all resident species, the dam itself is not as important, but the alternations of the river ecosystem into a dam lake totally degrade their habitats and usually lead to the extirpation of the species.

For hydropower purposes, the outflow from dams is often managed on daily peak energy demand leading to regular short artificial floods followed by very low water levels. - The downstream sections experience a flash floods at regular intervals; a situation that is both devastating for fishes and for their freshwater habitat. In addition, large accumulations and storage lakes accumulate water during wet seasons. Small and average floods are eliminated and the important flood pulse effect that is providing the alluvial wetlands and floodplains with water is minimized. Important spawning grounds, side channels and alluvial habitats are lost with strong impact on threatened species as Umbra krameri and Cyprinus carpio and also for many biota not assessed for their global Red List status and unthreatened species. Furthermore, aquatic biota are often pumpeed up to the storage lakes or flush down to the dam lake. This leads to the breakdown of biogeografic barrieres and the invasion of alien species as it happened in Ricica polje with species pumped up from Zrmanja River. These Zrmaja native species as well as alien species already established in Zrmanja, have almost extirpated endangered fishes as *Telestes croaticus* in Ricica polje.

In the Mediterranean basin, there are many endemic species with very limited ranges. These are highly susceptible to the impact of introduced alien species. These may be predators or competitors, especially under "insular" conditions of Dalmatian catchments, where rivers and streams are naturally devoid of predatory fish, and where naturally species poor communities exist with little inter-specific competition. Local populations are easily wiped out from such catchments if ecologically more competitive species, from species-rich central and eastern European fish communities, invade their habitats. For example, in Montenegro, the connection between the Morača drainage (which is home to many endemic and threatened species) and the Danube that is currently planned in order to increase the supply of water for hydropower generators is likely to wipe out many of the native species of the Morača -Lake Skadar basin. Water transfer between subbasins is already existing in the Neretva Basin, where water form Bergava subbasin is transferred to

Trebisnica subbasin thorugh a tunnel in Dabarsko Polje. Several new similar connections are planned in the upper Neretva which lead to the successsive breakdown of biogeographic barrieres and by this to threating the often highly endemic biodiversity.

It is a great challenge to control the introduction of alien fish species, especially, if habitats like dam lakes are created which promise to be a suitable habitat for several widely used angling species. As we know well from Spain and Italy, introductions can lead to the local extinction of entire species assemblages. Sadly, every impoundment is nowadays routinely stocked with alien fish species by anglers. Hence, impoundments are often the starting point of alien fish invasions into entire river basins. Impoundments offer suitable conditions for recreational fisheries, but in the Mediterranean, most angling species known by local anglers and tourists from angling magazines, are not native. Predatory species which are deemed to make good game for recreational fisheries are particularly problematic as it is already the case in Lake Buško Blato, the globally most important single site for threatened *Chondrostoma phoxinus*, *Aulopyge huegeli* and *Squalius tenellus*. These three species, as most endemics of the Dalmatian Karst are highly vulnerable to alien species invasion due to their long evolution in absence of competitors and predators.

Also, all these species are sensitive to strong water level fluctuations in their habitats, especially during their spawning season in spring and summer. However, if alien species introductions are limited, several species are able to survive and even build up very large populations in impoundments as long as there are intact tributaries, as for example in the semi-natural storage lake Buško Blato fed by Karst springs and still connected to the underground system up- and downstream in the Cetina basin.

Construction of new dams, especially for hydropower, is a major concern for freshwater biodiversity conservation in the future. Hydropower is considered as a green technology, its catastrophic effects on biodiversity being voluntarily ignored. Fish ladders are all too quickly considered as an effective means to mitigate the negative side effects of dams. If the current scenarios for the construction of new dams become reality, the extinction risk will not only increase for migratory fishes, but also for many other species depending on larger rivers and streams with a continuous flow of water.

Danubian anadromous species

While the Danube holds more than 110 species of freshwater fishes, only eight threatened species occur in the study area. Four of those are anadromous migratory species. One additional threatened species, the eel *Anguilla anguilla*, is stocked in the upper Danube from where it migrates downstream. Eels also have been native to Danube, but were recorded

historically only in low numbers. The Danube is of minor importance for the conservation of eels.

Acipenser gueldenstaedtii Russian sturgeon, Waxdick © A. Hartl

Acipenser stellatus Stellate sturgeon, Sternhausen © A. Hartl

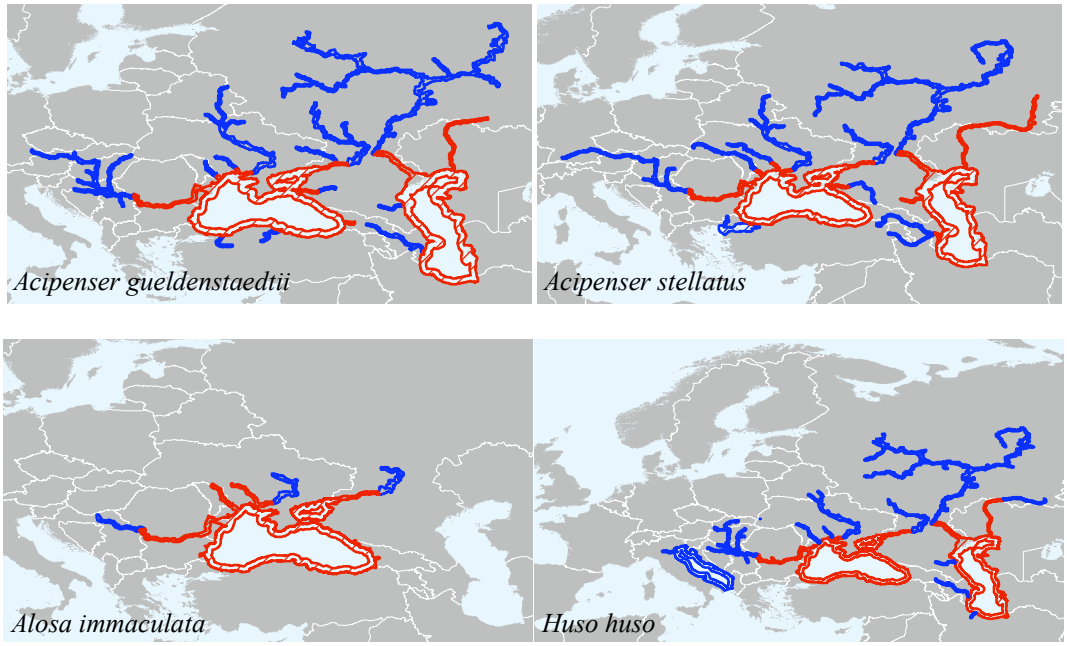
Alosa immaculata Black Sea shad, Donauhering © J. Freyhof

Huso huso Beluga, Hausen © A. Hartl

Dam lake habitats: None of these four species has managed to establish a population in the impoundments of the Danube and they have to be considered as very intolerant against the

construction of dams due to the blocking of migrations. Furthermore, due to their anadromous life history, a free up- and downriver movement between the spawning sites on the gravel beds of the main river and the Black Sea is crucial for their survival. To provide up- and downstream movements for such sensitive species as the herring *Alosa immaculata* and such large species as the sturgeons is a challenge from the technical side. In most cases, dams block the migration route of fishes. If they are well conceived, fish ladders can mitigate this impact, and allow these migratory fishes to migrate further upriver. However, until now, very few rivers in Europe have been equipped with well-functioning fish ladders which allow species as herrings and sturgeons to migrate through. Where several dams are built in a cascade, the cumulative effect of these dams can be devastating. Not only does this transform the river into a series of lakes over long distances, with unsuitable habitats for these species, but even where fish ladders are in place, multiple damming is further reducing the probability that migratory fish might reach their spawning grounds. Anadromous fish species not only need to find their way upriver, but must also travel downstream. Where hydropower dams are in place, there is still no known effective solution to prevent fishes from being caught by turbines and killed.

Distribution: In the study area, these anadromous species are native to the Danube only. The Danube is the globally second most important spawning rivers for all these species. Besides the Danube, only the Ural might hold such important spawning stock of these sturgeon species. Therefore, the Danube plays an important role in the global survival of the listed sturgeons. Today, *Alosa immaculata* and all the listed sturgeons spawn only below the Iron gate dam, the rest of the basin is unaccessable.



Distribution of *Acipenser gueldenstaedtii*, *A. stellatus*, *Alosa immaculata* and *Huso huso*. Actual range in red; historic range where species are extirpated in blue.

Acipenser nudiventris Vogt & Hofer, 1908-9

Acipenser nudiventris **Ship sturgeon, Glattdick**

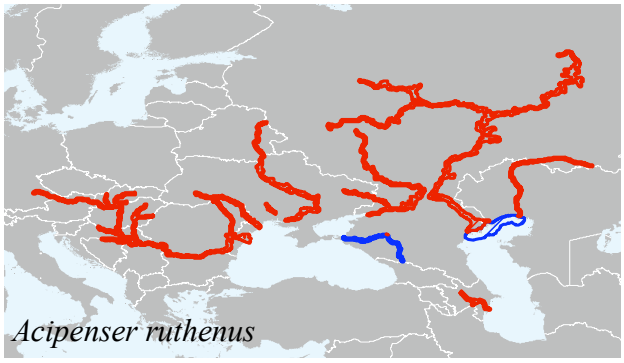
Very few, less than 10, isolated individuals of the Critially Endangered ship sturgeon might still exist in the Danube. There is no record of a reproduction of this species from the Danube since decades and no "population" exists anymore. Any effort to bring the few individuals together for artificial reproduction failed but they seems to be "concentrated" in the Croatian part of the Danube and Drava, which might, if these fishes still exist there, a critical area for this poorly known species which is at the verge of extinction.

Acipenser ruthenus © A. Hartl

Acipenser ruthenus **Sterlet**

Dam lake habitats: Sterlets are able to keep small populations in dam lakes and are still found in few impoundments in Austria. Spawning takes place in strong-current habitats on gravel bottom which can be present below the turbines if the stretch with fast running water and gravel substrate is long enough. It has to be noted, that only very small populations are able to persist periodicly in impoundments, but can not spawn. Overfishing is an additional major thread for sterlets all over the Danube. The resistance against the impacts of dam constructions has to be considered as moderate (habitat alternations).

Distribution: Actually, sterlets are still widespread in the study area in the Danube, the Tiza, Velika Morava, Sava upriver to about Zagreb and Drava upriver to about the Slovenian border.



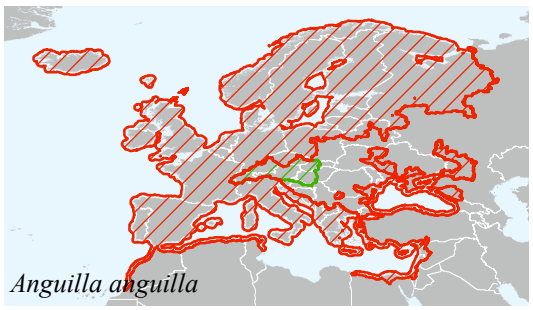
Distribution of *Acipenser ruthenus*. Actual range in red; historic range where species is extirpated in blue.

Anguilla anguilla © A. Hartl

Anguilla anguilla **Eel, Aal**

Dam lake habitats: The eel *Anguilla anguilla* is an obligatory catadromous migratory species which need to reach the sea for spawning. It is well capable to inhabit impoundments and it is also possible to build fish passes, which allow upstream migrating eel to reach the headwaters of the impoundment. Nevertheless, the construction of dams pose a very serious thread to the eel as it is technically very challenging to avoid, that downstream migrating eels move into the turbines and get killed there. This is a major problem at all hydropower dams and sluices preventing migration. Therefore, one dam along the migration route of eels means the death of almost all eels upriver of the dam and therefore the loss of the river stretch for this Critically Endangered species. Dams without turbines do not affect the downstream migration of eels. The resistance against the impacts of dam constructions has to be considered as very low (blocking of migration).

Distribution: Eel occur all over the Balkans where they have a free access to the sea including the smallest permanent streams and all rivers downstream of impassable dams. The species is still widespread in all Adriatic rivers but rare in the Black sea basin. In the Danube, eels are rare and the eels found today in the Danube mostly result from stockings.



Distribution of *Anguilla anguilla*. Actual range in red; alien range in green.

Alosa sp. Skadar © J. Freyhof

***Alosa* sp. Skadar** **Skadar shad, Skutari-Finte**

Dam lake habitats: *Alosa* sp. Skadar is a lacustrine species endemic to Lake Skadar. If damlakes at the Morača might impact this species depend on the question how much the ecosystem of Lake Skadar will be impacted by these dams. As *Alosa* sp. Skadar spawns along the shores of the lake in summer. It is not known to migrate upriver the Morača to the Drin or to the Adriatic Sea. A second species, Alosa fallax, which is also present in Lake Sadar drainage is migratory but not threatened globally. Lower water levels and fast fluctuations of the water levels during the spawning season impact this species. The invasion of alien species which will follow the connection of the Skadar drainage with the Danube will have strong consequences on the highly endemic fauna of Lake Skadar but it is not possible to predict if this Danubian invasion might impact this species. The resistance against the impacts of dam constructions upstream of Lake Skadar has to be considered as high. The flood regime of the lake will be altered and the system of lacustric and sublacustric springs will be stongly modified. Most likely, this will only marginally impact this species which spawns in the open water.

Distribution: Endemic to Lake Skadar

Alburnus mandrensis © J. Freyhof

***Alburnus mandrensis* Mandras shemaya, Mandras-Seelaube**

Dam lake habitats: *Alburnus mandrensis* is a lacustrine species endemic to Lake Mandras drainage in Bulgaria. While this species is able to exist in lacustrine conditions, it depends on inflowing streams and rivers to spawn. It spawns in riffles with strong current, on gravel bottom. Already today, several potential spawning streams are blocked by dams and the creation of additional dams in the Lake Mandras basin would massively impact this species and might lead even to its extinction. The resistance against the impacts of dam constructions has to be considered as low (blocking of spawning sites).

Distribution: Lake Mandras drainage (Black Sea basin in Bulgaria).

Alburnus schischkovi © Müfit Özuluğ

***Alburnus schischkovi* Rezowska shemaya, Rezowska-Seelaube**

Dam lake habitats: *Alburnus schischkovi* is a riverine species which migrates to upper reaches of tributaries to spawn. It spawns in riffles with heavy current on gravel bottom. While there are no data if this species would be able to inhabit dam lake conditions, it absolutely depends on fast flowing water of inflowing streams and rivers to spawn. The resistance against the impacts of dam constructions has to be considered as very low (blocking of spawning sites).

Distribution: Black Sea basin: Resowska (Turkey/Bulgaria) and Veleka (Bulgaria) drainages.

Aulopyge huegelii © J. Freyhof

Aulopyge huegelii **Ostrulj, Barbengründling**

Dam lake habitats: *Aulopyge huegelii* is a species which usually inhabits karstic streams and wetlands. It is able to colonize still water bodies and might spawn on wave washed shores or even on submerged logs and plants. It might be abundant in lacustrine conditions and its largest global populations are found in Lake Buško, which is an old reservoir created in a Karst polje with semi-natural conditions. While this species is able to survive well in impoundments as long as there are wetlands associated, natural springs and shallow shores, it is very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as low if rivers are regulated and transferred in dam lakes, and moderate in semi-natural accumulations (alien invasion).

Distribution: Karstic streams in Glamocko, Livanjsko and Duvanjsko poljes, Lakes Bushko and Blidinje (Bosnia-Herzegovina); Cetina and Krka drainages (Croatia).

Chondrostoma knerii © J. Freyhof

Chondrostoma knerii **Dalmatian nase, Dalmatische Nase**

Dam lake habitats: *Chondrostoma knerii* is a riverine species which migrates to upper reaches of tributaries to spawn. It also inhabits lacustrine habitats but for spawning, it migrates to streams or shallows of springs. May migrate some 10-20 km to spawning sites, which are often situated in tributaries. It spawns on plants, or other hard substrates in fast current. The resistance against the impacts of dam constructions has to be considered as very low (blocking of spawning sites).

Distribution: Lower and middle part of Neretva drainage mostly below Mostar (Croatia, Bosnia-Herzegovina). A very important habitat and spawning area is the spring field in Hutovo Blato.

Chondrostoma phoxinus © J. Freyhof

Chondrostoma phoxinus **Livno nase, Livno Nase**

Dam lake habitats: *Chondrostoma phoxinus* is a species which usually inhabits karstic streams and wetlands. It is able to colonize still water bodies (shallow clay pits without gravel, sand, current, waves or tributaries) and might spawn on submerged plants. It might be abundant in lacustrine conditions and its largest global populations is found in Lake Buško, which is a Karst polje which has been transferred into a reservoir. While this species is able to survive well in this impoundment as long as there are wetlands associated and shallow shores, it is very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as moderate (alien species invasion).

Distribution: Bosnia-Herzegovina: Glamocko, Livansjko and Duvanjsko poljes; Croatia: Cetina drainage.

Chondrostoma prespense Society for the Protection of Prespa

Chondrostoma prespense **Prespa nase, Prespa Nase**

Dam lake habitats: *Chondrostoma prespense* is a lacustrine species endemic to Lake Prespa drainage in Albania, Greece and FYROM. While this species is able to exist in lacustrine conditions, it depends on inflowing streams and rivers to spawn. It spawns in riffles with strong current, on gravel bottom. Already today, several potential spawning streams are blocked by dams and the creation of additional dams in the Lake Prespa basin would massively impact this species and might lead even to its extinction. The resistance against the impacts of dam constructions has to be considered as low (blocking of spawning sites).

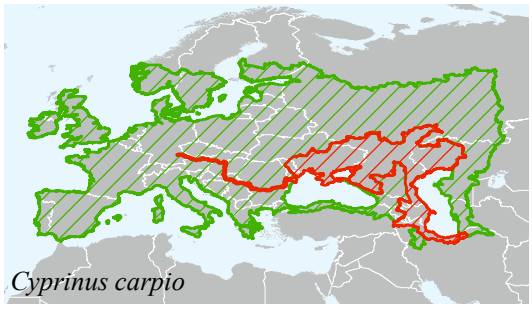
Distribution: Lakes Prespa basin (Greece, Macedonia, Albania).

Cyprinus carpio © J. Freyhof

Cyprinus carpio **Wild carp, Wildkarpfen**

Dam lake habitats: Carps are well adapted to survive in lacustrine environments as long as there are areas, in which terrestrial vegetaion is flooded in spring. While this is the case in dam lakes especially in the Mediterraean basin, strong water level fluctuations as well as steep and unvegetated lake shores poses problems for carp populations.In addition large accumulation have a huge impact on the natural flood pulse, which is needed to create the seasonal spawning sites. Red Listed are only so called "wild carps" which are much more rheophilic then domesticated carps and which seem to be less adaptable to damlake environments. Furthermore, feral carps are stocked to every reservoir and hybridize with wild stocks. Judging from the experience of Austrian damlakes, wild carps seem to be poorly able to build up permanent populations in damlakes and stocks are replaced by feral carps if a natural reproduction takes place at all. This seem to be a major problem, as the water levels in dam lakes hardly are high enough for a long enough time to allow a successful reproduction of carps. It is very sensitive to hybridization with feral carps which are always introduced into impoundments. The resistance against the impacts of dam constructions has to be considered as low (alien invasion, disturbance of flooding).

Distribution: Still widely distributed in the Danube and its major tributaries as Tiza, Velika Morava, Sava upriver to about Zagreb and Drava upriver to about the Slovenian border. Most important fish for commercial use at Lake Skadar (where it is an old introduction). Important populations are found in large wetland areas with regular and large flood events as in the Sava.



Distribution of *Cyprinus carpio*. Actual range in red; alien range in green.

Gobio kovatschevi © J. Freyhof

Gobio kovatschevi **Thracian gudgeon, Thrakischer Gründling**

Dam lake habitats: *Gobio kovatschevi* is a stream dwelling species which migrates to fast flowing waters to spawn. It spawns in shallow riffles with fast current. While there are no data if this species would be able to inhabit dam lake conditions, it depends on fast flowing water of inflowing streams and rivers to spawn. The resistance against the impacts of dam constructions has to be considered as very low (blocking of spawning sites).

Distribution. Rivers entering the Black Sea from river Provadiskaya (enters Black Sea near Varna, Bulgaria).south to Istanbul and rivers of Biga Peninsula, Western Anatolia.

Gobio skadarensis © J. Freyhof

Gobio skadarensis **Skadar gudgeon, Skutari-Gründling**

Dam lake habitats: *Gobio skadarensis* is a rheophilic species endemic to Lake Skadar drainage. While this species is able to exist in lacustrine conditions, it depends on inflowing streams and rivers to spawn. The creation of dam lakes in the lake Skadar basin will therefore strongly reduce the suitable habitat for this species. The invasion of alien species which will follow the connection of the Skadar drainage with the Danube will have strong consequences on the highly endemic fauna of Lake Skadar. It is not possible to predict if this Danubian invasion might impact this species in detail but the invasion of the Danubian *Gobio obtusirostris* will most likely eliminate this endemic species by hybridization. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Endemic to Lake Skadar drainage, most abundant in rivers Morača and Zeta.

Delminichthys adspersus © J. Freyhof

Delminichthys adspersus **Gaovica**

Dam lake habitats: *Delminichthys adspersus* inhabits karstic springs and streams. It is able to colonize still water bodies and might spawn on submerged plants. It is actually not found in impoundments but suspected to be able to survive under lacustrine conditions as long as there is dense underwater vegetation. This species is very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Vrljika drainage and Lake Crveno in Imotsko polje, Matica and Norin drainages, Lakes Kuti and Ba'ina in Neretva drainage (Croatia); Tihaljina and Trebizat system in Neretva drainage (Bosnia-Herzegovina).

Delminichthys ghetaldii © J. Freyhof

Delminichthys ghetaldii **Popovo minnow, Popovo Elritze**

Dam lake habitats: *Delminichthys ghetaldii* inhabits karstic springs and streams. It is able to colonize still water bodies and might spawn on submerged plants. It is actually not found in impoundments but suspected to be able to survive under lacustrine conditions as long as there is dense underwater vegetation. This species is very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Streams and springs in Popovo, Ljubomirsko, Dabarsko and Fatnicko poljes (Bosnia-Herzegovina); Bacina lakes and some springs in southern Dalmatia (Croatia).

Delminichthys jadovensis © J. Freyhof

Delminichthys jadovensis **Jadova minnow, Jadova Elritze**

Dam lake habitats: *Delminichthys jadovensis* inhabits karstic springs and streams. It is able to colonize still water bodies and might spawn on submerged plants. It is actually not found in impoundments but suspected to be able to survive under lacustrine conditions as long as there is dense underwater vegetation. This species is very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Croatia: River Lika and its tributary Jadova.

Delminichthys krbavensis © J. Freyhof

Delminichthys krbavensis **Krbava minnow, Krbava Elritze**

Dam lake habitats: *Delminichthys krbavensis* inhabits karstic springs and streams. It is able to colonize still water bodies and might spawn on submerged plants. It is actually not found in impoundments but suspected to be able to survive under lacustrine conditions as long as there is dense underwater vegetation. This species is very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Croatia: Krbavsko Polje karst.

Phoxinellus alepidotus © J. Freyhof

Phoxinellus alepidotus **Naked minnow, Schuppenlose Elritze**

Dam lake habitats: *Phoxinellus alepidotus* inhabits karstic springs and streams. It is able to colonize still water bodies and might spawn on submerged plants. It is actually not found in impoundments but it is able to survive under lacustrine conditions as long as there is dense underwater vegetation. This species is very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Streams in Glamocko, Livanjsko poljes. Also reported from Duvanjsko ploje, Lakes Bushko and Blidinje and intermittent streams Korana and Struga near Bosansko Grahovo (Bosnia-Herzegovina).

Phoxinellus dalmaticus © J. Freyhof

Phoxinellus dalmaticus **Cikola minnow, Cikola Elritze**

Dam lake habitats: *Phoxinellus dalmaticus* inhabits karstic springs and streams. It is able to colonize still water bodies and might spawn on submerged plants. It is actually not found in impoundments but it is able to survive under lacustrine conditions as long as there is dense underwater vegetation. This species is very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Croatia: stream Cikola in Krka drainage.

Phoxinellus pseudalepidotus © J. Freyhof

***Phoxinellus pseudalepidotus* Mostar minnow, Mostar Elritze**

Dam lake habitats: *Phoxinellus pseudalepidotus* inhabits karstic springs and streams. It is able to colonize still water bodies and might spawn on submerged plants. It is actually not found in impoundments but it is able to survive under lacustrine conditions as long as there is dense underwater vegetation. This species is very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Streams and lakes in Mostarsko Blato (Bosnia-Herzegovina).

Phoxinus strandjae © J. Freyhof

Phoxinus strandjae **Strandzha minnow, Strandzha Elritze**

Dam lake habitats: *Phoxinus strandjae* is a resident species which spawns in riffles with fastrent on gravel bottom. While there are no data if this species would be able to inhabit dam lake conditions, it can most likely not survive in such habitats. At least, it depends on streams and rivers to spawn. The resistance against the impacts of dam constructions has to be considered as very low (blocking of spawning sites).

Distribution: Veleka and Resowska drainages, draining from Strandzha range to Black Sea (Bulgaria, Turkey).

Scardinius knezevici © J. Freyhof

Scardinius knezevici **Skadar rudd, Skutari-Rotfeder**

Dam lake habitats: *Scardinius knezevici* is a lacustrine species endemic to Lake Skadar and Lake Ohrid. If damlakes at the Morača might impact this species depend on the question how much the ecosystem of Lake Skadar will be impacted by these dams. As *Scardinius knezevici* spawns along the shores of the lake in spring, lower water levels and fast fluctuations of the water levels during the spawning season impact this species. The invasion of alien species which will follow the connection of the Skadar drainage with the Danube will have strong consequences on the highly endemic fauna of Lake Skadar. It it is not possible to predict if this Danubian invasion might impact this species in detail but the invasion of the Danubian *Scardinius erythrophthalmus* will most likely eliminate this endemic species by hybridization. The resistance against the impacts of dam constructions has to be considered as moderate (alien species invasion).

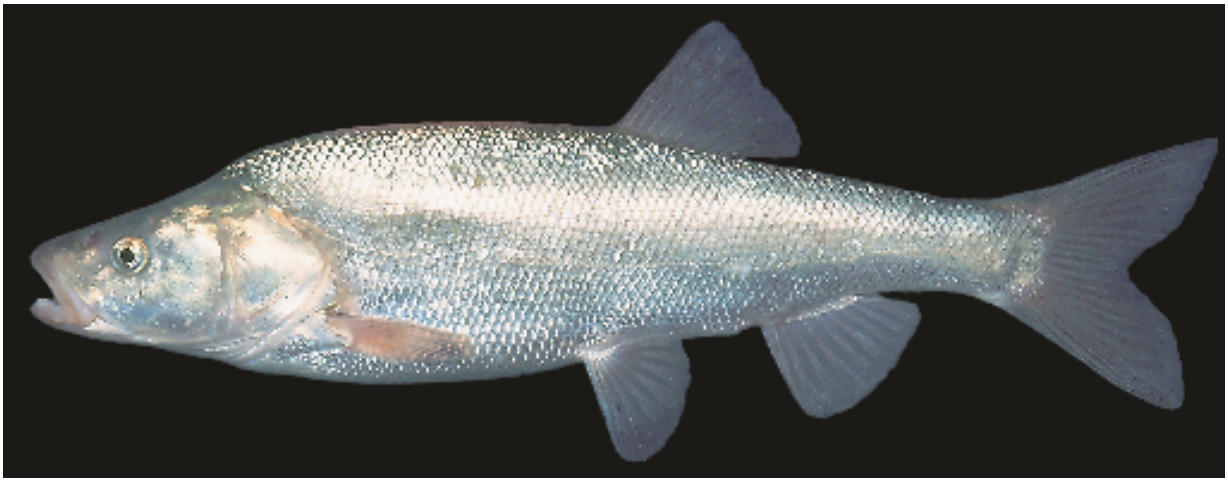
Distribution: Endemic Lakes Ohrid (Macedonia, Albania) and Skadar (Montenegro, Albania).

Squalius janae © J. Freyhof

Squalius janae **Dragonja chub, Dragonja-Döbel**

Dam lake habitats: *Squalius janae* is a riverine species which spawns in riffles on gravel substrate in fast flowing current. Actually, there are no data if this species survive in impoundments but closely related species are relatively tolerant and often inhabit dam lakes. They only need a free access to some tributaries to be able to find suitable spawning places. The resistance against the impacts of dam constructions has to be considered as moderate (blocking of spawning streams).

Distribution: River Dragonja drainage in Slovenia and Croatia.



Squalius microlepis © J. Freyhof

Squalius microlepis **Imotzki chub, Imotzki-Döbel**

Dam lake habitats: *Squalius microlepis* is a species which inhabits karstic streams and wetlands. It is able to colonize lakes and might spawn on submerged plants or on gravel on wave washed shores. While this species is able to survive well in impoundments as long as there are wetlands associated and shallow shores, it is very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as moderate (alien species invasion).

Distribution: Prolosko and Ricice basins near Imotski, Matica drainage near Vrgorac (Croatia); Tihaljina and possibly Trebizat (a Neretva tributary) drainages (Bosnia-Herzegovina).

Squalius svallize © J. Freyhof

***Squalius svallize* Neretva chub, Neretva-Döbel**

Dam lake habitats: *Squalius svallize* is a species which inhabits karstic streams and wetlands. The biology of this species is almost unknown and there are no data if this species is permanently able to survive in impoundments. Almost all species of *Squalius* spawn in fast flowing waters and it is therefore suspected, that this is the case in *S. svallize* also. It would therefore at least need access to tributaries with flowing waters to spawn. The resistance against the impacts of dam constructions has to be considered as moderate (blocking of spawning streams).

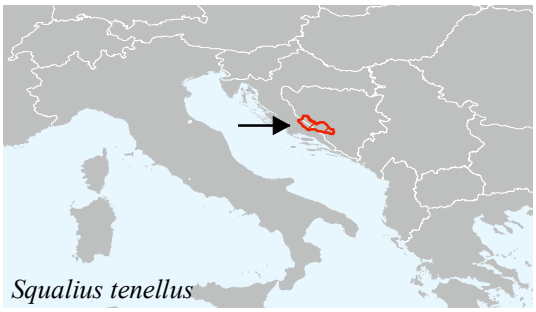
Distribution: Neretva, Trebisnjica and Ljuta drainages (Croatia, Bosnia-Herzegovina).

Squalius tenellus © J. Freyhof

Squalius tenellus **Livno masnica, Livno-Döbel**

Dam lake habitats: *Squalius tenellus* is a species which usually inhabits karstic streams and wetlands. It is able to colonize still water bodies and might spawn on wave washed shores. It might be abundant in lacustrine conditions and its largest global populations is found in Lake Buško, which is a reservoir in Livanjsko Polje. While this species is able to survive well in impoundments as long as there are wetlands associated and shallow shores, it is very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as moderate (alien species invasion).

Distribution: River Cetina, also in karstic streams in Livanjsko polje, Duvanjsko Polje, Lakes Buško and Mandecko near Livno. Possibly introduced to Lake Blidinje (Bosnia-Herzegovina) more than 100 years ago.



Telestes croaticus © J. Freyhof

Telestes croaticus **Croatian pijor, Ricica-Strömer**

Dam lake habitats: *Telestes croaticus* inhabits karstic springs and streams. It is able to colonize still water bodies but is suspected to depend on flowing waters of spring streams for reproduction. This species is also very sensitive to alien species invasions which always follow impoundments. It was found in the early phase of the impoundments of the Ricica damlake which is used as a storage for waters for the Zrmanja hydropower plant. While *Telestes croaticus* was able to survive under lacustrine conditions for several years, it has now vanished from the impoundment due to strong alien species invasion. As native and alien species were pumped from Zrmanja up to Ricica, this species is now almost extirpated in Ricica also due to alien species invasion. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Croatia: Lika-Jadova, Ricica and Otuca drainages.

Telestes fontinalis © J. Freyhof

Telestes fontinalis **Spring pijor, Quell-Strömer**

Dam lake habitats: *Telestes fontinalis* inhabits karstic springs and streams. It is able to colonize still water bodies but is suspected to depend on flowing waters of spring streams for reproduction. It is actually not found in impoundments and suspected not to be able to survive under lacustrine conditions. This species is also very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Croatia: karstic streams and springs in Krbava polje.

Telestes karsticus © J. Freyhof

Telestes karsticus **Karst pijor, Karst-Strömer**

Dam lake habitats: *Telestes karsticus* inhabits karstic springs and streams. It is able to colonize still water bodies but is suspected to depend on flowing waters of spring streams for reproduction. It is actually not found in impoundments and suspected not to be able to survive under lacustrine conditions. This species is also very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Small spring in Stajnica Polje, Sušik Creek in Lug Polje, and Jezero Lake and Jasenščica Creek in Jasenak Polje.

Telestes metohiensis © J. Freyhof

Telestes metohiensis **Striped pijor, Bosnischer Strömer**

Dam lake habitats: *Telestes metohiensis* inhabits karstic springs and streams. It is able to colonize still water bodies but is suspected to depend on flowing waters of spring streams for reproduction. It is actually not found in impoundments and suspected not to be able to survive under lacustrine conditions. This species is also very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Streams and springs in Nevesinje, Gacko, Cernica and Dabar poljes, probably also Lukovac polje (Bosnia-Herzegovina).

Telestes polylepis © P. Mustafic

Telestes polylepis **Croatian riffle dace, Kroatischer Strömer**

Dam lake habitats: *Telestes polylepis* inhabits karstic springs and streams. It is able to colonize still water bodies but is suspected to depend on flowing waters of spring streams for reproduction. It is actually not found in impoundments and suspected not to be able to survive under lacustrine conditions. This species is also very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Smit Lake and the Rupećica Sinkhole in the area of Zagorska Mrećznica.

Telestes turskyi © J. Freyhof

Telestes turskyi **Cikola riffle dace, Cikola Strömer**

Dam lake habitats: *Telestes turskyi* inhabits karstic springs and streams. It is able to colonize still water bodies but is suspected to depend on flowing waters of spring streams for reproduction. It is actually not found in impoundments and suspected not to be able to survive under lacustrine conditions. This species is also very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as very low (alien species invasion).

Distribution: Croatia: Cikola (Krka drainage).

Telestes ukliva © J. Freyhof

Telestes ukliva **Ukliva**

Dam lake habitats: *Telestes ukliva* inhabits almost all habitats in the Cetina drainage including karstic springs. It is suspected to depend on flowing waters of spring streams for reproduction. It is able to colonize still water bodies and is abundant in the Cetina damlake. It is actually found in impoundments and suspected to be able to survive under lacustrine conditions as long as suitable spawing streams remain accessible. This species is also very sensitive to alien species invasions which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as moderate (alien species invasion).

Distribution: Cetina drainage in Croatia.in Croatia.

Cobitis dalmatina © J. Freyhof

Cobitis dalmatina **Cetina spined loach, Cetina-Steinbeisser**

Dam lake habitats: *Cobitis dalmatina* inhabits soft bottoms in the Cetina drainage including karstic springs. It does not depend on flowing waters for reproduction but needs submerged vegetation as spawning substrate. It is able to colonize still water bodies and is abundant in the Cetina damlake. It is able to survive under lacustrine conditions. The resistance against the impacts of dam constructions has to be considered as moderate (alien species invasion).

Distribution: Croatia: Cetina drainage.

Cobitis illyrica © J. Freyhof

***Cobitis illyrica* Imotzki spined loach, Imotzki-Steinbeisser**

Dam lake habitats: *Cobitis illyrica* inhabits soft bottoms in the Imotzki polje including karstic springs. It does not depend on flowing waters for reproduction but needs submerged vegetation as spawning substrate. It is able to colonize still water bodies and is abundant in the Cetina damlake. It is able to survive under lacustrine conditions. The resistance against the impacts of dam constructions has to be considered as moderate (alien species invasion).

Distribution: Croatia: Imotzki polje.

Cobitis jadovaensis © P. Mustafic

Cobitis jadovaensis **Jadova spined loach, Jadova-Steinbeisser**

Dam lake habitats: *Cobitis jadovensis* inhabits soft bottoms in the Jadova polje but was found only once at one place. Species of *Cobitis* usually do not depend on flowing waters for reproduction and almost all are able to colonize still water bodies including impoundments. For this species, there are no data. The resistance against the impacts of dam constructions has to be considered as unknown.

Distribution: Croatia: Jadova polje.

Cobitis narentana © J. Freyhof

Cobitis narentana **Neretva spined loach, Neretva-Steinbeisser**

Dam lake habitats: *Cobitis narentana* inhabits soft bottoms in the wider Neretva drainage including karstic springs. It does not depend on flowing waters for reproduction but needs submerged vegetation as spawning substrate. It is able to colonize still water bodies and is abundant in the lakes at the lower Neretva. The resistance against the impacts of dam constructions has to be considered as moderate (alien species invasion).

Distribution: Neretva and Trebisnjica drainages (Croatia, Bosnia-Herzegovina).

Oxynoemacheilus pindus © J. Freyhof

Oxynoemacheilus pindus **Pindus stone loach, Pindus-Bachschmerle**

Dam lake habitats: *Oxynoemacheilus pindus* inhabits headwater streams with fast to moderate current and gravel or rock substrate. There are no data if this species is able to survive in damlakes but juding from its general biology and the situation found in other *Oxynoemacheilus* species, *O. pindus* is not able to inhabit impoundments. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Albania, Greece: Aoos, Semani, Shkumbini and Erzeni drainages.

Umbra krameri © A. Hartl

Umbra krameri **Mudminnow, Hundsfisch**

Dam lake habitats: This species is a specialized inhabitant of wetlands, often oxbows, with dense vegetation in the last phases of succession and has a very low competitive power. It is also found in large river wetlands in the lower parts of the major lowland rivers as in the Danube Delta and the Sava wetlands. This species is not easy to record and its distribution is still very incompletely known. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, disturbance of flooding). There are no records from dam lakes. The species strictly depend on densely vegetated habitats, which limit its distribution to wetlands and usually oxbows in the last phases of succession. Also, mudminnows need large floods to find new habitats to reach from one backwater to another.

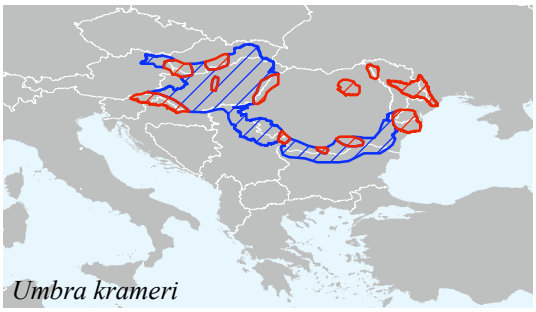
Distribution: In the Balkans south of the Danube, it is known from several places in the Sava wetlands downriver of Zagreb and should be expected to occur all along the Sava in suitable habitats until Belgrade. Also, it occurs in the lower parts of tributaries of the Sava and in wetlands of the Danube, often close to the confluence with the Sava and Danube as in Lonja, Zelina, Tamis, Velika Morava, Zasavica and Timok. The Sava wetlands are the world's third most important wetland complex inhabited by this species (after the Hungarian lowlands

and the lower Danube and Danube delta area). Additional hotspots for this species are the oxbows along the river Mura in Slovenia and Croatia and the wetlands along the Drava below the inflow of the Mura in Croatia.

A generalized map is given at
http://www.iucnredlist.org/apps/redlist/details/22730/0/rangemap

Actually, the species is known from:

- Wetlands of Mura river from Gibina (Slovenia) downriver to wetlands of Drava river at Suhopolje (Croatia) (Slovenia: known from the following oxbows. Kapitany lap, Gyula marof, Bednjaj, at village Petisovci, Szent kialy, Belovici, at village Kot, Podkev, at village Hotiza, channel near village Hotiza, below village Gaber, two oxbows near village Podturn)
- Wetlands of Sava in Lonjsko Polje and wetlands at lower parts of rivers Lonja and Zelina (Croatia)
- Oxbows and wetlands at lower Sava from the border of BiH and Serbia east to Obrenovac (Serbia)
- Channel near Bijeljina, which is a town near border with Serbia and Croatia, flood plain of Drina river, near confluence with Sava
- Wetlands, old river channels and oxbows of Sava between Bosuk and Jarak, at Tiza (Backo Gradiste), wetlands at Cetna and Sefkerin and at Danube upriver of Belgade, wetlands at Velika Moraca (Serbia)
- Lower Zasavica, a tributary to Sava and in canals at Bački Monoštor (Serbia)
- Srebarna Marsh near Silistra (Bulgaria)



Distribution of *Umbra*. Actual range in red; extirpated range in blue.

Hucho hucho © A. Hartl

Hucho hucho **Huchen**

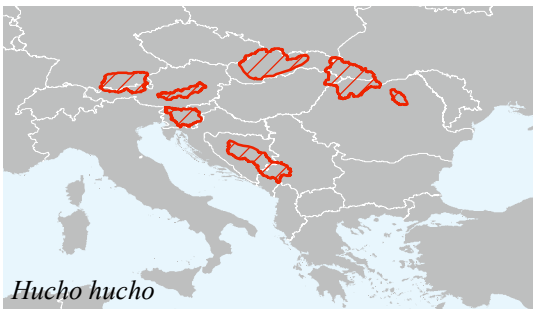
Dam lake habitats: This species inhabits the montane and submontane reaches of large streams and swift rivers with gravel beds, well oxygenated, fast-flowing water and temperatures rarely above 15°C. It prefers deep pools and shady water under overhanging vegetation and spawns in very clean gravel in fast-flowing water, usually in small river tributaries. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations). There are records from dam lakes and the species seem to use accidentally dam lakes as foraging ground. The species strictly depend on flowing waters and has already lost large parts of its historic distribution area due to dam constructions.

Distribution: This species is endemic to the Danube drainage and was once widely distributed in all submontane and montane tributaries of the Danube and in the Danube itself downriver to Budapest. Today, large parts of its former distribution have been lost due to dam constructions and the largest populations in the world are now distributed in the headwaters of the Sava, where this species is distributed in all major streams and rivers.

A generalized map is given at
http://www.iucnredlist.org/apps/redlist/details/10264/0/rangemap

In the Sava, Huchen are found in the Sava itself above Kranj. In the left tributaries is found in the following streams: Kamniska Bistrica, Savinja, Krapina and Tebez. In the right tributaries: Bohinja, Sora, Ljubljanica (and in Malo Grabno, Hribiski, Gradascica, Bista, Lubija), Krka, Kupa (Dobra, Kupcina, Trepca, Glina, Odra), Una (Sana, Sanica, Dabar), Vrbas (Ungar, Vrbanja), Bosna (Zeljeznica, Zujevina, Milijacka, Mokranska Milijacka, Dobrinja, Kasidolska Rijeka, Misoc, Ljubinja, Vogosce, Fojnica, Lepenica, Lasva, Usora, Gostovic, Krivaja, Bioscica, Kalinj, Stupancica, Spreca) and Drina (Tara, Piva, Sutjeska, Bistrica, Ceotina, Praca, Lim, Uvac, Drinjaca).

A second Balkan river for Huchen is the Drava, where it is known from the Mura (only in Austria) Melk, Pielach, and lower Gail rivers, also only in Austria



Salmo obtusirostris © J. Schöffmann

Salmo obtusirostris **Soft-muzzled trout, Weichmaulforelle**

Dam lake habitats: A stream and river resident species restricted to headwater of moderately cold streams with flowing waters. Not able to persist in dam lakes. Habitat modifications, water abstraction and alien trout introductions have already reduced the habitat of this species very much. This species is also very sensitive to the introduction of alien trouts which hybridize with the soft-muzzled trout or outcompete it. The resistance against the impacts of dam constructions has to be considered as very low (interruption of migrations, habitat alternations, alien species).

Distribution: Krka, Jardo, Vrljika (Croatia), Neretva (Bosnia-Herzegovina) and Zeta drainages (Montenegro). Introduced and established from Jardo to Zrnovnica drainages (Croatia) around 1960.

Salmo pelagonicus © J. Schöffmann

Salmo pelagonicus **Pelagos-trout, Pelagos-Forelle**

Dam lake habitats: A stream resident species restricted to headwater of cold streams with flowing waters. Not able to persist in dam lakes. Habitat modifications, water abstraction and alien trout introductions have already reduced the habitat of this species very much. This species is also very sensitive to the introduction of alien trouts which hybridize with the Pelagos trout or outcompete it. Large parts of its former distribution range are already lost to alien trouts. The resistance against the impacts of dam constructions has to be considered as very low (interruption of migrations, habitat alternations, alien species). Alien trout also immediately find their way into impoundments and from there invade the habitats of the Pelagos trout.

Distribution: Lower Vardar (Crna system) and upper Aliakmon drainages (Macedonia, Greece).

Salmo peristericus © J. Freyhof

Salmo peristericus **Prespa-trout, Prespa-Forelle**

Dam lake habitats: A stream resident or migratory lacustrine species entering streams to spawn, then returning to the lake. Habitat modifications and water abstraction have already interrupted the lower course of most streams and migratory populations seem to have vanished or are very rare. The distribution of resident populations is restricted to headwaters, possibly to two streams only. The resistance against the impacts of dam constructions has to be considered as very low (interruption of migrations, habitat alternations). Stream resident populations often inhabit upper headwaters and are less vulnerable.

Distribution: Lakes Prespa basin (Greece, Macedonia, Albania).

Valencia letourneuxi © A. Hartl

***Valencia letourneuxi* Zournas**

Dam lake habitats: Within the study area, *Valencia letourneuxi* is restricted to Lake Butrint and tributaries in habitats with dense vegetation and a very low predatory pressure. It is very sensitive to a high predatory pressure and by this to alien species invasion which always follow impoundments. It is even very sensitive to the invasion of alien *Gambusia holbrooki*, which even invade almost pristine habitats of this species. The resistance against the impacts of dam constructions has to be considered as very low (habitat alternations, alien species invasion).

Distribution: Albania (Lake Butrint) and western Greece, lower Arachthos, Acheron, Alfios and a stream on Corfu. Might be extirpated on Lefkas Island.

Distribution of *Valencia letourneuxi*. Actual range in red; extirpated range in blue.

Knipowitschia croatica © J. Freyhof

Knipowitschia croatica **Neretva dwarf goby, Neretva Zwerggrundel**

Dam lake habitats: *Knipowitschia croatica* is restricted to habitats with dense vegetation and a low predatory pressure. It inhabits spring-feed karst streams and small rivers. If an impoundment would be managed with semi-natural water level fluctuations which also allow dense shoreline vegetation, this species would most likely be able to exist in this kid of habitat. However, it is very sensitive to a high predatory pressure and by this to alien species invasion which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as low (habitat alternations due to increased water level fluctuations, alien species invasion).

Distribution: Bosnia-Herzegovina: lower Neretva drainage. Croatia: upper Matica drainage, springs in Neretva Delta (as Norin) and Bacina Lakes.

Knipowitschia mrakovcici © J. Freyhof

Knipowitschia mrakovcici **Visovac goby, Visovac-Grundel**

Dam lake habitats: *Knipowitschia mrakovcici* is restricted to Lake Visovac and tributaries in habitats with dense vegetation and a very low predatory pressure. It is very sensitive to a high predatory pressure and by this to alien species invasion which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as low (habitat alternations due to increased water level fluctuations, alien species invasion).

Distribution: Croatia: Lake Visovac and tributaries in middle Krka drainage.

Knipowitschia radovici © J. Freyhof

Knipowitschia radovici **Norin goby, Norin-Grundel**

Dam lake habitats: *Knipowitschia radovici* is restricted to habitats with dense vegetation and a very low predatory pressure. It inhabits spring-feed karst streams and small rivers as well as lakes. If an impoundment would be managed with semi-natural water level fluctuations which also allow dense shoreline vegetation, this species would most likely be able to exist in this kid of habitat. However, it is very sensitive to a high predatory pressure and by this to alien species invasion which always follow impoundments. The resistance against the impacts of dam constructions has to be considered as low (habitat alternations due to increased water level fluctuations, alien species invasion).

Distribution: Croatia: Neretva drainage: stream Norin, spring fields in Hutovo Blato wetlands and lakes in Neretva Delta (as Modo Oko).

Lake Buško, Livanjsko Polje Ramsar Site, Bosnia-Herzegovina © J. Freyhof

5. Impact of selected dam projects on threatened freshwater molluscs and fishes

Boskov Most (Macedonia)

The drainage of the River Drin is inhabited by many endemic species of freshwater mollusks and fishes. Two of the important freshwater biodiversity hotspots in Europe, Lake Skadar and Lake Ohrid are situated within this drainage. In Europe, the Drin drainage is most famous for a high diversity of trouts of the genus *Salmo*, which are found in some parts of the drainage. Most peculiar are the trouts of Lake Ohrid, where up to five species of endemic trouts might have existed, three seem to be extinct. Furthermore, *S. marmoratus* and *S. fariodes* (and maybe *S. dentex* which might be a synonym of *S. marmoratus*) were widespread in Drin drainage but little data are available about their actual distribution. Other species as *S. montenegrinus*, *S. taleri* and *S. obtusirostris* are restricted to the Morača River. While *S. marmoratus*, *S. ohridanus*, *S. letnica* and *S. obtusirostris* are widely accepted as own species, very little is known about the other species and all have been therefore assessed as Data Deficient.

Headwaters Mavrovo National Park, which is situated in the Drin drainage, are inhabited by few fish species including one species of trout which has been strongly managed in the past and which might represent *S. farioides*. This trout has been classified as Near Threatened as it is regionally strongly impacted by hybridization of non-native *Salmo trutta*. The Mavrovo

National Park is the second oldest and largest national park of Macedonia. In the middle of this National Park, the European Bank for Reconstruction and Development (EBRD) plans to finance the construction of a large hydroelectric dam for power generation. The so called "Boskov Most" project means a serious threat to the local trout population. The freshwater molluscs and fishes which occur within the borders of this National Park are poorly known and there is an urgent need for research. However, native trouts, while being most assessed as Data Defiencent, are of major concern to conservation and such trous might still be found in Mavrovo National Park.

The dams will:

- The construction of dams will interrupt the migrations of fishes between the headwaters and the lower part of the river and by this will restrict the habitat to headwaters above the damlake.
- The damlakes will be stocked immediately with fishes to improve fisheries and it is not unlikely, that touristic infrastructures for recreations fisheries will be established. This will result in a massive introduction of alien fish species including non-native trouts which will then hybridize with the native populations.
- Flashfloods will devastate the river habitats below the dam and extirpate all species which need flowing waters for spawning or any other phase of their life cycle.

Hucho hucho © A. Hartl

Headwater of the Danube in Slovenia, Croatia and Bosnia-Herzegovina

Already the amount of new dams constructed in the headwaters of the Danube will lead to a strong decline of threatened and also several actually not threatened species in the Balkan. The flagship species of the Danube headwaters is the Danubian Salmon or Huchen, an Endangered freshwater fish also protected by the Natura 2000 Directive. It is very sensitive to water pollution and intolerant to the construction of dams. The Balkan is the hotspot for the globally most important populations of this species. Associated are globally important populations of grayling *Thymallus thymallus*, Streber *Zingel streber* and several other species which are actually not threatened, but will strongly decline with the dam construction.

Morača River and Lake Skadar basin (Montenegro)

Lake Skadar is the biggest lake in the Balkans and one of the most important wetlands in Europe. Lake Skadar, listed under the Ramsar Convention as a wetland of international significance, is one of Europe's five most important wintering sites for birds. 12 globally threatened species of freshwater snails and one threatened bivalve are native to Lake Skadar basin, eight of them restricted to small spring areas. From the 29 species of freshwater fishes are native to Lake Skadar basin, eight are endemic. Four species are globally threatened. These 17 threatened species are just an umbrella for all the taxagroups which have not yet been assessed making the Skadar basin one of the most important hotspots of freshwater biodiversity in the Mediterraean. This irreplacable wetland is strongly connected to the Morača River, which provides two thirds of the flows into Lake Skadar and which is an important spawning and foraging habitat for many of the native fish species as well as for some five of the treatened freshwater molluscs.

An international tender for a cascade of four hydropower plants: Andrijevo, Raslovići, Milunović and Zlatica, to exploite the hydropower potential of the River Morača upstream of Podgorica has been announced by the Montenegrin Government.

The dams will:

- The construction of dams will interrupt the migrations of fishes between the Morača and Lake Skadar.
- The construction of damlakes will change the riverine habitats into damlakes, unsuitable as a habitat for most of the native species.
- The damlakes will be stocked immediately with fishes to improve fisheries and it is not unlikely, that touristic infrastructures for recreations fisheries will be established. This will result in a massive introduction of alien fish species which will have very strong consequences on the fragile ecosystem of Lake Skadar and its native biocoenosis.
- Flashfloods will devastate the river habitats below the dam and extirpate all species which need flowing waters for spawning or any other phase of their life cycle.
- Massive flow regulations will also alternate the water level in Lake Skadar and by this impact the complete shoreline biocoenosis.
- The hydrological connection of the Morača (Adriatic basin) with the Tara drainage (Black Sea basin) will most likely lead to an invasion of alien species which will have strong consequences on the highly endemic fauna of Lake Skadar.

The construction of dams on the Morača will most likely represent the most serious single impact on a wetland habitat in Europe.

Globally threatened fishes native to Lake Skadar and Morača drainage

Alosa sp. Skadar, Gobio skadarensis, Salmo obtusirostris, Scardinius knezevici

Globally threatened molluscs native to Lake Skadar and Morača drainage

Microcondylaea bonellii, Bithynia skadarskii, Bithynia zeta, Bracenica spiridoni, Plagigeyeria montenigrina, Radomaniola elongata, Radomaniola lacustris, Vinodolia gluhodolica, Vinodolia matjasici, Vinodolia scutarica, Radix skutaris, Gyraulus meierbrooki, Valvata montenegrina.

Livanjsko polje (Bosnia and Herzegovina)

Livanjsko polje in Bosnia and Herzegovina is one of the largest karst fields in the world. It has been proclaimed a Ramsar site in 2008. Livanjsko polje is actually a combination of wetlands peatlands, meadows, springs and caves inhabited by endemic and rare species. Livanjsko polje is inhabited by the globally largest populations of four globally threatened freshwater fishes (*Aulopyge huegelii*, *Chondrostoma phoxinus*, *Phoxinellus alepidotus*, *Squalius tenellus*). It is therefore an European hotspot of threatened fishes. The biggest change in the hydrology of the field occurred in 1974 when the Orlovac Hydroelectric Power Plant (HPP) was build and by this Lake Buško, a Karst polje, has been transferred into a reservoir. Water was drained from Lake Buško in Livanjsko polje by a 12 km-long tunnel to the Cetina River to produce electricity. By this, Livanjsko polje was connected to the Cetina and since, *Squalius tenellus*, one of the fish species before endemic to Livanjsko polje, became invasive in Cetina. The largest global populations of three of globally threatened species are found in Livanjsko polje, especially in Lake Buško, These species are able to survive well in this impoundment as long as there are wetlands associated and shallow shores. However, all species are very sensitive to alien species invasions which always follow impoundments and uncontrolled alien species invasion is the major ongoing threat to these fishes.

A second phase of the project is now planned, which could lead to the total drying-up of springs and karst caves in the northwestern part of the field. Any additional diversion of water will not only have devastating impacts on the species and habitats that depend on these resources but it will also affect drinking water reservoirs on the river Cetina in Croatia.

- The construction of damlakes will change the stream habitats into damlakes, unsuitable as a habitat for most of the native species. Also important spring and cave habitats will be massively impacted.
- The damlakes will be stocked immediately with fishes to improve fisheries and it is not unlikely, that touristic infrastructures for recreations fisheries will be established. This will result in a massive introduction of alien fish species which will have very strong consequences on the fragile ecosystem of Livanjsko polje and its native biocoenosis.

Vjosa River and the Kalivac powerpant (Albania)

The Vjosa River (or Aoos in Greece) is one of the middle sized mountainous rivers which are only little impacted by human activities. It belongs to the Albanian zoogeographic region which is the home of many endemic fish species. The fish fauna of the Vjosa is still very incompletely known and threads are poly assessed. Vjosa shares most fish species with others Albanian rivers in the north and no endemic freshwarer mollusk or fish species are known up to now. The threatened fish species *Oxynoemacheilus pindus* inhabits riffles in fast flowing rivers in Erzeni, Shkumbini and Vjosa Rivers. This species is very intolerant to the construction of dam lakes.

The Kalivac powerpant is under construction.

The dams will:

- The construction of dams will interrupt the migrations of fishes between the headwaters and the lower part of the river and by this will restrict the habitat to headwaters above the damlake.
- The damlakes will be stocked immediately with fishes to improve fisheries and it is not unlikely, that touristic infrastructures for recreations fisheries will be established. This will result in a massive introduction of alien fish species which might then hybridize or compete with the native populations.
- Flashfloods will devastate the river habitats below the dam and extirpate all species which need flowing waters for spawning or any other phase of their life cycle.

6. Literature cited.

Cuttelod, A., Seddon, M. and Neubert, E. 2011. European Red List of Non-marine Molluscs. Luxembourg: Publications Office of the European Union.

Falniowski, A. 2011. *Vinodolia fluviatilis*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. <www.iucnredlist.org>. Downloaded on **06 December 2011**.

Falniowski, A. 2011a. *Islamia zermanica*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. <www.iucnredlist.org>. Downloaded on **06 December 2011**.

Falniowski, A. 2011b. *Tanousia zrmanjae*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. <www.iucnredlist.org>. Downloaded on **06 December 2011**

Freyhof, J. and Brooks, E. 2011. European Red List of Freshwater Fishes.

Luxembourg: Publications Office of the European Union.

Kottelat, M. & Freyhof, J. 2007. Handbook of European freshwater fishes. Kottelat, Cornol and Freyhof, Berlin, xiv + 646 pp.

Seddon, M. 2011. *Bithynia cettinensis*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. <www.iucnredlist.org>. Downloaded on **06 December 2011**.

Seddon, M. 2011. *Pseudobithynia kirka*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. <www.iucnredlist.org>. Downloaded on **06 December 2011**.

Solymos, P. & Feher, Z. 2011. *Theodoxus transversalis*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. <www.iucnredlist.org>. Downloaded on 06 December 2011

Threatened fish species in the water bodies of the Balkan

Anguilla anguilla occurs in all rivers which are open to the sea and is not especially mentioned in all rivers here.

Rivers of the Black Sea basin

Danube

Acipenser gueldenstaedtii

Acipenser nudiventris

Acipenser ruthenus

Acipenser stellatus

Alosa immaculata

Hucho hucho

Huso huso

Umbra krameri

Rivers of Istranca in Bulgaria and Turkey (Rezwe, Veleca..)

Gobio kovatschevi

Alburnus mandrensis

Alburnus schischkovi

Phoxinus strandjae

Rivers draining to the Adriatic Sea in Dalmatia north of Montenegro

Dragonja, Mirna,

Squalius janae

Zrmanja

Aulopyge huegelii

Krka

Aulopyge huegelii

Knipowitschia mrakovcici

Phoxinellus dalmaticus (only in Cikola)

Telestes turskyi (only in Cikola)

Cetina

Aulopyge huegelii

Chondrostoma phoxinus

Cobitis dalmatina

Squalius tenellus

Telestes ukliva

Jardo & Zrnovnica streams

Salmo obtusirostris

Lower Neretva including Trebisnjica, Matica, Tihaljina and Trebizat streams, as well as the Delta with its Karst springs and streams (Norin) and Lakes as Deransko (BiH) Kuti and Bacinaska (HR).

Chondrostoma knerii

Cobitis narentana

Delminichthys adspersus

Knipowitschia croatica

Knipowitschia radovici

Salmo obtusirostris

Squalius microlepis

Squalius svallize

Dalmatian poljes and springs

Small spring in Stajnica Polje, Sušik Creek in Lug Polje, and Jezero Lake and Jasenćica Creek in Jasenak Polje,

Telestes karsticus

Smit Lake and the Rupe´cica Sinkhole in the area of Zagorska Mre˘znica.

Telestes polylepis

Jadova Polje

Cobitis jadovaensis

Delminichthys jadovensis

Telestes croaticus

Krbavsko Polje

Delminichthys krbavensis

Telestes fontinalis

Glamocko Polje

Aulopyge huegelii

Chondrostoma phoxinus

Phoxinellus alepidotus

Livanjsko polje including Lake Buško

Aulopyge huegelii

Chondrostoma phoxinus

Phoxinellus alepidotus

Squalius tenellus

Lake Blidinje, Lake Mandecko

Aulopyge huegelii

Chondrostoma phoxinus

Squalius tenellus

Duvanjsko polje

Aulopyge huegelii

Chondrostoma phoxinus

Squalius tenellus

Ricica and Otuca polje

Telestes croaticus

Imotzki polje

Cobitis illyrica

Delminichthys adspersus

Salmo obtusirostris

Squalius microlepis

Popovo polje

Delminichthys ghetaldii

Ljubomirsko polje

Delminichthys ghetaldii

Dabarsko polje

Delminichthys ghetaldii

Fatnicko polje

Delminichthys ghetaldii

Nevesinje Polje

Telestes metohiensis

Gatačcko Polje

Telestes metohiensis

Cernicko Polje

Telestes metohiensis

Dabarsko Polje

Telestes metohiensis

Mostarsko Blato

Phoxinellus pseudalepidotus

Cobitis illyrica

Lake basins (Lakes and streams/rivers flowing into the lakes)

Lake Skadar and Morača drainage

Alosa sp. Skadar

Gobio skadarensis

Salmo obtusirostris

Scardinius knezevici

Lake Prespa

Chondrostoma prespense

Salmo peristericus

Rivers in southern Albania and West coast of Greece south to Korfu

Butrint Lake (Albania)

Valencia letourneuxi

Korfu

Valencia letourneuxi

Aoos/Vijosa, Semani, Shkumbini and Erzeni

Oxynoemacheilus pindus

Upper Aliakmon drainage

Salmo pelagonicus

Tabelle 1. Threatened freshwater molluscs of the Balkans, their thread category and distribution.

Class	Family	Genus	Species	IUCN Red List	Countries	Distribution
BIVALVIA	DREISSENIDAE	Congeria	kusceri	VU	Bosnia & Hercegovina/ Croatia	Caves mostly in the aera between Spilt, Mostar and Dubrovnik
BIVALVIA	UNIONIDAE	Microcondylaea	bonellii	VU	Montenegro/Albania	Lake Skadar
BIVALVIA	SPHAERIIDAE	Pisidium	edlaueri	EN	FYROM/Albania	Lake Ohrid
BIVALVIA	SPHAERIIDAE	Pisidium	maasseni	EN	FYROM/Albania/Greece	Lake Prespa
BIVALVIA	UNIONIDAE	Unio	crassus	VU	Slovenia/Croatia/Bosnia-Herzegovina /Montenegro	Widespread in Danube drainage
GASTROPODA	ACROLOXIDAE	Acroloxus	improvisus	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	ACROLOXIDAE	Acroloxus	macedonicus	CR	FYROM/Albania	Lake Ohrid
GASTROPODA	ACROLOXIDAE	Acroloxus	tetensi	VU	Slovenia	Cave river at source of River Krka
GASTROPODA	AMNICOLIDAE	Emmericia	expansilabris	VU	Croatia	Caves at Ombla source, might be present in the Dalmatian and Montenegrina coastal strip from Metkovia to Kotor
GASTROPODA	AMNICOLIDAE	Emmericia	ventricosa	VU	Bosnia & Hercegovina/ Croatia/Montenegro	Eastern Trebinijca valley and Ombla caves system.
GASTROPODA	BITHYNIIDAE	Bithynia	cettinensis	VU	Croatia	Cetina river
GASTROPODA	BITHYNIIDAE	Bithynia	prespensis	EN	FYROM/Albania/Greece	Lake Prespa
GASTROPODA	BITHYNIIDAE	Bithynia	skadarskii	EN	Montenegro/Albania	Lake Skadar
GASTROPODA	BITHYNIIDAE	Bithynia	zeta	EN	Montenegro/Albania	Lake Skadar
GASTROPODA	BITHYNIIDAE	Pseudobithynia	kirka	VU	Croatia	Krka River at Skradin
GASTROPODA	HYDROBIIDAE	Belgrandia	torifera	VU	Croatia	Stinjevac, near Vrgorac, Ombla Cave system, as well as springs at Metkovic, on the lakes of Bacine and Glusci.
GASTROPODA	HYDROBIIDAE	Belgrandiella	angelovi	VU	Bulgaria	Spring in Stara Planina Mts on the Shipka pass
GASTROPODA	HYDROBIIDAE	Belgrandiella	bachkovoensis	CR	Bulgaria	Spring near Bedechka River, park "Krairechen", town of Stara Zagora, Western Rhodopes
GASTROPODA	HYDROBIIDAE	Belgrandiella	bulgarica	VU	Bulgaria	Spring near a sink-hole, close to Polaten village, western Stara Planina Mountains
GASTROPODA	HYDROBIIDAE	Belgrandiella	bureschi	VU	Bulgaria	Karst spring at the village of Bankya, Tran district (close to the Serbian border).
GASTROPODA	HYDROBIIDAE	Belgrandiella	croatica	VU	Slovenia/Croatia	Few springs in the river basin of Kolpa/Kupa
GASTROPODA	HYDROBIIDAE	Belgrandiella	crucis	VU	Slovenia	Cave Križna jama and freshwater springs around cave near to Lož.
GASTROPODA	HYDROBIIDAE	Belgrandiella	dobrostanica	VU	Bulgaria	Gargina Dupka Cave, Mostrovo Village in the Western Rhodopes

GASTROPODA	HYDROBIIDAE	Belgrandiella	globulosa	VU	Slovenia	Cave Mrzla jama near Bločice, 3.5 km NNW from Lož and springs of Cemun and Obrh near Cerkniško jezero, Cerknica.
GASTROPODA	HYDROBIIDAE	Belgrandiella	hershleri	VU	Slovenia	Cave Mrzla jama near Bločice, 3.5 km NNW from Lož (type locality) and springs of Cemun and Obrh near Cerkniško jezero, Cerknica.
GASTROPODA	HYDROBIIDAE	Belgrandiella	hessei	VU	Bulgaria	Stream in Temnata Dupka cave at Lakatnik, Stara Planina Mts.
GASTROPODA	HYDROBIIDAE	Belgrandiella	pusilla	VU	Bulgaria	Cave at the source of the Petreska River, near Lakatnik, Stara Planina Mts
GASTROPODA	HYDROBIIDAE	Belgrandiella	schleschi	VU	Slovenia	Spring in caves at Cerknesko Jezero (Križna jama and sources around cave near to Lož) and Notranjski Park.
GASTROPODA	HYDROBIIDAE	Belgrandiella	substricta	VU	Slovenia	Springs of the river Ljubljanica, near Vrhnika.
GASTROPODA	HYDROBIIDAE	Belgrandiella	superior	VU	Slovenia	Springs east of Cerkniško jezero.
GASTROPODA	HYDROBIIDAE	Belgrandiella	zagoraensis	VU	Bulgaria	Spring near to the Bedechka river, in the Krairechen Park, near to the town of Stara Zagora
GASTROPODA	HYDROBIIDAE	Belgrandiella	zermanica	VU	Croatia	Zrmanja groundwater system, which can be geographically defined as the south-east border of Velebit, with subterranean flow along which Zrmanja flows into Krka.
GASTROPODA	HYDROBIIDAE	Boleana	umbilicata	VU	Slovenia	Springs of the river Ljubljanica in Vrhnika area.
GASTROPODA	HYDROBIIDAE	Bracenica	spiridoni	EN	Montenegro	Two springs at Skadar Lake: Spirov izvor and a sublacustrine spring in the lake (Karuc spring)
GASTROPODA	HYDROBIIDAE	Bythinella	gloeeri	CR	Bulgaria	Lepenitsa cave (273 metres in length), south of the town of Velingrad (Batashki Ridge, Western Rhodopes)
GASTROPODA	HYDROBIIDAE	Bythinella	kapelana	VU	Croatia	Spring at Majerovo vrelo in the Gacko polje.
GASTROPODA	HYDROBIIDAE	Bythinella	markovi	CR	Bulgaria	Gargina Dupka cave in Dobrostan karst system (West Rhodope Mountains).
GASTROPODA	HYDROBIIDAE	Bythinella	robiciana	VU	Slovenia	5 known sites in north and northeast Slovenia. 1) Potoce, near Preddvor, north of Kranj, 2) Paka Village near Velenje, 3) Steska Jama (Cave) near Zalec, 4) a spring near Dobrna, 5) Toplica spring near Celje
GASTROPODA	HYDROBIIDAE	Cavernisa	zaschevi	VU	Bulgaria	Dushnik cave near village of Iskrets, and Yamata cave at the village of Tserovo, both in western Stara Planina mountains
GASTROPODA	HYDROBIIDAE	Costellina	turrita	CR	Croatia	Croatia Jadro spring, near Sinj
GASTROPODA	HYDROBIIDAE	Dalmatella	sketi	CR	Croatia	Springs near the Krka River (downstream from the Skradinskim Bukom electric dam), Sibenik
GASTROPODA	HYDROBIIDAE	Ginaia	munda	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Gocea	ohridana	CR	FYROM/Albania	Lake Ohrid

GASTROPODA	HYDROBIIDAE	Graziana	slavonica	VU	Croatia	Jankovic Stream within the area of Mt Papuk
GASTROPODA	HYDROBIIDAE	Grossuana	thracica	CR	Bulgaria	Water emerges from the spring of Chirpan Bunar Cave. The cave is situated 3 km east of the village of Bolyarino
GASTROPODA	HYDROBIIDAE	Hadziella	deminuta	VU	Slovenia	Groundwater of the rivers Sava near Ljubljana and Savinja near Celje, and some thermal springs in central Slovenija
GASTROPODA	HYDROBIIDAE	Hadziella	krkae	VU	Slovenia	Springs and caves in the upper part of the Krka catchment
GASTROPODA	HYDROBIIDAE	Hadziella	rudnicae	CR	Croatia	Rudnica rijeka/River, Kamenica, Tounj (UTM: WL20) where it is found in a cave; Rudnica Cave VI
GASTROPODA	HYDROBIIDAE	Hadziella	sketi	VU	Croatia	Spilja kod Obrovca and Spilja kod mlina na Miljacki
GASTROPODA	HYDROBIIDAE	Hauffenia	jadertina	EN	Croatia	Spring in river valley of Jadro, near Spilt
GASTROPODA	HYDROBIIDAE	Hauffenia	media	VU	Slovenia/Croatia	Dolensko Cave, Vrlovka Cave, close to the border of Slovenia, with an entrance on the Kupa River
GASTROPODA	HYDROBIIDAE	Hauffenia	tovunica	CR	Croatia	Cave Tounjčica Tounj, in Karlovac County near to the city Ogulin
GASTROPODA	HYDROBIIDAE	Hauffenia	wagneri	VU	Slovenia	Recorded from four locations, a cave Raja peč near Sevnica (type locality), one spring near Sevnica and springs north from Trebnje (springs in the basin of river Mirna).
GASTROPODA	HYDROBIIDAE	Horatia	lucidulus	CR	Bulgaria	Spring in South Dobridza, Black Sea Coast.
GASTROPODA	HYDROBIIDAE	Horatia	macedonica	VU	FYROM	In four springs. One spring lies 15 km west of Skopje (spring at Matka Gorge), the other 3 lie further south near Kiceve, on springs near roads to Ohrid and Bitola.
GASTROPODA	HYDROBIIDAE	Horatia	novoselensis	VU	FYROM	Spring near Novo Selo just north of Struga town, north of Lake Ohrid
GASTROPODA	HYDROBIIDAE	Iglica	acicularis	VU	Bulgaria	Two sites, Dushnik cave near village of Iskrets, and Yamata cave at the village of Tserovo, both in western Stara Planina mountains in Bulgaria.
GASTROPODA	HYDROBIIDAE	Iglica	bagliviaeformis	EN	Bosnia & Hercegovina/ Croatia	Coastal cave systems in southern Dalmatia. The other localities where it was found are a spring in the South of Svitavsko blato near Metkovic, the spring Izvor kod Mlina near Plat, the Ljuta spring in Konavle and the Jazova cave near Cavtat
GASTROPODA	HYDROBIIDAE	Iglica	elongata	VU	Croatia	Caves in the River Krka National Park, source of river Jadro in the Middle Dalmatia
GASTROPODA	HYDROBIIDAE	Iglica	gracilis	VU	Slovenia	Caves and springs in basin of river Krka.
GASTROPODA	HYDROBIIDAE	Iglica	langhofferi	VU	Croatia/Slovenia	Cucerje stream (Medvednica National Park). Slovenia: cave Glija jama between Celje and Zidani Most
GASTROPODA	HYDROBIIDAE	Iglica	velkovrhi	CR	Slovenia	Thermal springs at Klunove Toplice, in the small village of

						Bušeca Vas, 7 km south-west of Brežice, Krško, in eastern Slovenia
GASTROPODA	HYDROBIIDAE	Insignia	macrostoma	VU	Bulgaria	Spring near a sink-hole, close to Polaten village in the western Stara Planina Mountains
GASTROPODA	HYDROBIIDAE	Islamia	bosniaca	VU	Bosnia & Hercegovina	Spring at Podgaj, above the road at Zenica, 11 km from Doboj
GASTROPODA	HYDROBIIDAE	Islamia	zermanica	CR/PE	Croatia	Zrmanja River
GASTROPODA	HYDROBIIDAE	Kerkia	brezicensis	VU	Slovenia	Karstic spring at the entry to Dvorce village, south-east of Brežice
GASTROPODA	HYDROBIIDAE	Kerkia	kusceri	CR	Slovenia	Source of the River Krka in cave
GASTROPODA	HYDROBIIDAE	Lanzaia	kotlusae	VU	Croatia	Single cave (Kotlua), close to Vrlika in Croatia
GASTROPODA	HYDROBIIDAE	Lanzaia	skradinensis	CR	Croatia	Two springs within National Park Krka
GASTROPODA	HYDROBIIDAE	Lanzaia	vjetrenicae	VU	Bosnia & Hercegovina / Croatia/Montenegro	Vjetrenica cave system, also at one cave each in Montenegro and Croatia
GASTROPODA	HYDROBIIDAE	Lanzaiopsis	savinica	VU	Slovenia	Spring Pecovski izvir north-west from Luce in Savinja Valley and small springs and the cave Zavratnikova jama in the surrounding area
GASTROPODA	HYDROBIIDAE	Lyhnidia	gjorgjevici	EN	FYROM/Albania	It is found in a small lake near St Naum and Tusemista (St Naum, Tušemišta ; Radoman 1985) adjacent to Lake Ohrid
GASTROPODA	HYDROBIIDAE	Lyhnidia	hadzii	CR	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Lyhnidia	karamani	CR	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Lyhnidia	stankovici	CR	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Malaprespia	albanica	CR	Greece	Lake Mikri Prespa
GASTROPODA	HYDROBIIDAE	Marstoniopsis	croatica	VU	Slovenia	Springs near Kostanjevica, 40 km west of Zagreb
GASTROPODA	HYDROBIIDAE	Marstoniopsis	vrbasi	CR	Bosnia & Hercegovina	Spring in Bočac in Vrbas valley, 28 km S of Banja Luka
GASTROPODA	HYDROBIIDAE	Micropyrgula	stankovici	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Narentiana	vjetrenicae	EN	Bosnia & Hercegovina	Cave Vjetrenica, Popovo polje
GASTROPODA	HYDROBIIDAE	Neofossarulus	stankovici	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Ohridohauffenia	depressa	EN	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Ohridohauffenia	minuta	CR/PE	FYROM	Spring at Studenicista (Bej Bunar) near Lake Ohrid
GASTROPODA	HYDROBIIDAE	Ohridohauffenia	rotonda	EN	FYROM	Springs (at St. Naum, Tusemista and Zagorican) on the south-east side of Lake Ohrid
GASTROPODA	HYDROBIIDAE	Ohridohauffenia	sanctinaumi	EN	FYROM/Albania	It is found in the Feeder springs (at St. Naum, Tusemista and Zagorican) on the south-east side of Lake Ohrid
GASTROPODA	HYDROBIIDAE	Ohridohoratia	carinata	EN	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Ohridohoratia	polinskii	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Ohrigocea	karevi	EN	FYROM/Albania	Lake Ohrid
GASTROPO	HYDROBIIDAE	Ohrigoce	miladinovor	EN	FYROM/Albani	Lake Ohrid

DA		a	um		a	
GASTROPODA	HYDROBIIDAE	Ohrigocea	ornata	EN	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Ohrigocea	samuili	EN	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Ohrigocea	stankovici	EN	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Paladilhiopsis	buresi	VU	Bulgaria	Stream in Temnata Dupka cave at Lakatnik, Stara Planina Mts.
GASTROPODA	HYDROBIIDAE	Paladilhiopsis	grobbeni	VU	Slovenia	Raja peč near Sevnica and springs in surroundings
GASTROPODA	HYDROBIIDAE	Parabythinella	macedonica	EN	FYROM/Albania/Greece	Lake Prespa
GASTROPODA	HYDROBIIDAE	Parabythinella	malaprespensis	CR	Greece	Lake Mikri Prespa
GASTROPODA	HYDROBIIDAE	Plagigeyeria	gladilini	VU	Bulgaria	Cave in Western Rhodopes
GASTROPODA	HYDROBIIDAE	Plagigeyeria	montenigrina	CR	Montenegro	Spring in Obodska Pećina cave near Rijeka Crnojevića, area of Skadar Lake
GASTROPODA	HYDROBIIDAE	Plagigeyeria	tribunicae	CR	Bosnia & Hercegovina	Cave Dejanova pećina in Bileća, E Hercegovina
GASTROPODA	HYDROBIIDAE	Plagigeyeria	zetaprotogona	EN	Montenegro	Source of river Zeta near Tunjevo village; spring at Vitoja; upper part of river Zeta
GASTROPODA	HYDROBIIDAE	Pontobelgrandiella	nitida	VU	Bulgaria	Restricted to 2 freshwater springs, one in Polaten and the second in Glozhene in the district of Teteven in Bulgaria (Stara Planina Mountains).
GASTROPODA	HYDROBIIDAE	Prespolitorea	malaprespensis	CR	Greece	Lake Mikri Prespa
GASTROPODA	HYDROBIIDAE	Prespolitorea	valvataeformis	CR	FYROM/Albania/Greece	Lake Prespa
GASTROPODA	HYDROBIIDAE	Pseudohoratia	brusinae	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Pseudohoratia	lacustris	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Pseudohoratia	ochridana	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Radomaniola	elongata	CR	Montenegro	Spring on Vranjina island in Lake Skadar
GASTROPODA	HYDROBIIDAE	Radomaniola	lacustris	CR	Montenegro/Albania	Lake Skadar near Murici, Montenegro
GASTROPODA	HYDROBIIDAE	Radomaniola	rhodopensis	VU	Bulgaria	Small spring in the tributary of the Pavelsko village main river (West Rhodopes),
GASTROPODA	HYDROBIIDAE	Sadleriana	cavernosa	CR	Croatia	Cave at Tounjčica
GASTROPODA	HYDROBIIDAE	Sadleriana	supercarinata	VU	Croatia	Springs in Gacko Polje.
GASTROPODA	HYDROBIIDAE	Saxurinator	brandti	VU	Bosnia & Hercegovina/ Croatia	In the region of Metković in Herzegovina and Ombla spring in southern Dalmacia
GASTROPODA	HYDROBIIDAE	Saxurinator	labiatus	CR	Croatia	Cave system at Mühlquelle in Izvor kod Mlina u Zatonu Malom (Zaton Mali)
GASTROPODA	HYDROBIIDAE	Saxurinator	montenegrinus	EN	Bosnia & Hercegovina/ Montenegro	Source of Čepelica river near Bileća town and a source near Stepen (near Bosnia-Montenegro border); Montenegro: a cave at Risan in Boka Kotorska
GASTROPODA	HYDROBIIDAE	Saxurinator	orthodoxus	CR	Montenegro	Sources of River Zeta near Straganik and Tunjevo
GASTROPODA	HYDROBIIDAE	Saxurinator	sketi	EN	Croatia	An anchialine lake (landlocked water body with a subterranean connection to

						the ocean) within cave Šipun in Cavtat (town), and in a cave near Obrovac (Spilja kod Obrovca, National Park, Krka)
GASTROPODA	HYDROBIIDAE	Stankovicia	baicaliiformis	CR	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Stankovicia	pavlovici	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Stankovicia	wagneri	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Strugia	ohridana	VU	FYROM	Large cave-spring, from which the Sum brook originates, south of Zagracani, about 4 km from Struga town.
GASTROPODA	HYDROBIIDAE	Tanousia	zrmanjae	CR/PE	Croatia	Zrmanja River
GASTROPODA	HYDROBIIDAE	Trachyochridia	filocincta	CR	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Vinodolia	fiumana	EN	Croatia	Spring Glogi, Podugrinac at Bribir and two closely adjacent springs: Drist spring near Bribir and a spring in the Javor village close to Rijeka.
GASTROPODA	HYDROBIIDAE	Vinodolia	fluviatilis	EN	Croatia	Zrmanja River and lower parts of the Neretva river between Kula and Opuzen
GASTROPODA	HYDROBIIDAE	Vinodolia	gluhodolica	EN	Montenegro	Spring at Velje Oko below the Gluhi Do village, Virpazar, Lake Skadar basin.
GASTROPODA	HYDROBIIDAE	Vinodolia	hadouphylax	CR	Bosnia & Hercegovina	Cave at Čepelica near Bileća
GASTROPODA	HYDROBIIDAE	Vinodolia	lacustris	CR	FYROM/Albania/Greece	Lake Prespa
GASTROPODA	HYDROBIIDAE	Vinodolia	matjasici	CR	Montenegro	Small spring near the Lipovik village, 31 km west of Podgorica and 49 km north west of Lake Skadar
GASTROPODA	HYDROBIIDAE	Vinodolia	scutarica	EN	Montenegro/Albania	Lake Skadar and springs adjacent to the lake in Albania
GASTROPODA	HYDROBIIDAE	Xestopyrgula	dybowskii	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	HYDROBIIDAE	Zaumia	kusceri	CR	FYROM	Springs of St. Naum, near Lake Ohrid
GASTROPODA	HYDROBIIDAE	Zaumia	sanctizaumi	CR/PE	FYROM/Albania	Lake Ohrid
GASTROPODA	LYMNAEIDAE	Radix	skutaris	EN	Montenegro/Albania	Lake Skadar
GASTROPODA	NERITIDAE	Theodoxus	prevostianus	EN	Slovenia	Buseca vas
GASTROPODA	NERITIDAE	Theodoxus	subterrelictus	EN	Bosnia & Hercegovina	Karstic area of Popovo Polje, near the city Trebinje
GASTROPODA	NERITIDAE	Theodoxus	transversalis	EN	River	Danube and lower parts of tributaries
GASTROPODA	PLANORBIDAE	Ancylus	lapicidus	EN	FYROM/Albania	Lake Ohrid
GASTROPODA	PLANORBIDAE	Ancylus	scalariformis	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	PLANORBIDAE	Ancylus	tapirulus	EN	FYROM/Albania	Lake Ohrid
GASTROPODA	PLANORBIDAE	Gyraulus	albidus	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	PLANORBIDAE	Gyraulus	crenophilus	EN	FYRPM/Albania	lake Ohrid and springs running to Ohrid
GASTROPODA	PLANORBIDAE	Gyraulus	fontinalis	EN	FYROM	Three springs in the Lake Ohrid catchment
GASTROPODA	PLANORBIDAE	Gyraulus	ioanis	CR	Montenegro	Šasko Lake, a small lake south of Lake Skadar, south of Montenegro, near the town of Ulcinj

GASTROPODA	PLANORBIDAE	Gyraulus	meierbrooki	EN	Montenegro/Albania	Lake Skadar
GASTROPODA	PLANORBIDAE	Gyraulus	shasi	CR	Montenegro	Šasko Lake, a small lake south of Lake Skadar, south of Montenegro, near the town of Ulcinj
GASTROPODA	PLANORBIDAE	Gyraulus	stankovici	EN	FYROM/Albania/Greece	Lake Prespa
GASTROPODA	PLANORBIDAE	Gyraulus	trapezoides	EN	FYROM/Albania	Lake Ohrid
GASTROPODA	PLANORBIDAE	Planorbis	macedonicus	EN	FYROM/Albania	Lake Ohrid
GASTROPODA	PLANORBIDAE	Planorbis	presbensis	VU	FYROM/Albania/Greece	Lake Prespa
GASTROPODA	VALVATIDAE	Valvata	hirsutecostata	VU	FYROM/Albania	Lake Ohrid
GASTROPODA	VALVATIDAE	Valvata	montenegrina	EN	Montenegro	Several closely located sites, river Mareza drainage (canals and pools), Skadar lake (Podlum and Karuc spring) and Maol Brato.
GASTROPODA	VALVATIDAE	Valvata	relicta	VU	FYROM/Albania	Lake Ohrid

Tabelle 2. Threatened freshwater fishes of the Balkans, their thread category and distribution.

Class	Family	Genus	Species	IUCN Red List
ACTINOPTERYGII	ACIPENSERIDAE	*Acipenser*	*gueldenstaedtii*	CR
ACTINOPTERYGII	ACIPENSERIDAE	*Acipenser*	*nudiventris*	CR
ACTINOPTERYGII	ACIPENSERIDAE	*Acipenser*	*ruthenus*	VU
ACTINOPTERYGII	ACIPENSERIDAE	*Acipenser*	*stellatus*	CR
ACTINOPTERYGII	ACIPENSERIDAE	*Huso*	*huso*	CR
ACTINOPTERYGII	ANGUILLIDAE	*Anguilla*	*anguilla*	CR
ACTINOPTERYGII	NEMACHEILIDAE	*Oxynoemacheilus*	*pindus*	VU
ACTINOPTERYGII	CLUPEIDAE	*Alosa*	*immaculata*	VU
ACTINOPTERYGII	CLUPEIDAE	*Alosa*	*sp. nov. 'Skadar'*	VU
ACTINOPTERYGII	COBITIDAE	*Cobitis*	*dalmatina*	VU
ACTINOPTERYGII	COBITIDAE	*Cobitis*	*illyrica*	CR
ACTINOPTERYGII	COBITIDAE	*Cobitis*	*jadovensis*	CR
ACTINOPTERYGII	COBITIDAE	*Cobitis*	*narentana*	VU
ACTINOPTERYGII	CYPRINIDAE	*Alburnus*	*mandrensis*	CR
ACTINOPTERYGII	CYPRINIDAE	*Alburnus*	*schischkovi*	EN
ACTINOPTERYGII	CYPRINIDAE	*Aulopyge*	*huegelii*	EN
ACTINOPTERYGII	CYPRINIDAE	*Chondrostoma*	*knerii*	VU
ACTINOPTERYGII	CYPRINIDAE	*Chondrostoma*	*phoxinus*	EN
ACTINOPTERYGII	CYPRINIDAE	*Chondrostoma*	*prespense*	VU
ACTINOPTERYGII	CYPRINIDAE	*Cyprinus*	*carpio*	VU
ACTINOPTERYGII	CYPRINIDAE	*Delminichthys*	*adspersus*	VU
ACTINOPTERYGII	CYPRINIDAE	*Delminichthys*	*ghetaldii*	VU
ACTINOPTERYGII	CYPRINIDAE	*Delminichthys*	*jadovensis*	CR
ACTINOPTERYGII	CYPRINIDAE	*Delminichthys*	*krbavensis*	CR
ACTINOPTERYGII	CYPRINIDAE	*Gobio*	*kovatschevi*	VU
ACTINOPTERYGII	CYPRINIDAE	*Gobio*	*ohridanus*	VU
ACTINOPTERYGII	CYPRINIDAE	*Gobio*	*skadarensis*	EN
ACTINOPTERYGII	CYPRINIDAE	*Phoxinellus*	*alepidotus*	EN
ACTINOPTERYGII	CYPRINIDAE	*Phoxinellus*	*dalmaticus*	CR
ACTINOPTERYGII	CYPRINIDAE	*Phoxinellus*	*pseudalepidotus*	VU
ACTINOPTERYGII	CYPRINIDAE	*Phoxinus*	*strandjae*	EN
ACTINOPTERYGII	CYPRINIDAE	*Scardinius*	*knezevici*	VU
ACTINOPTERYGII	CYPRINIDAE	*Squalius*	*janae*	VU
ACTINOPTERYGII	CYPRINIDAE	*Squalius*	*microlepis*	EN
ACTINOPTERYGII	CYPRINIDAE	*Squalius*	*svallize*	VU
ACTINOPTERYGII	CYPRINIDAE	*Squalius*	*tenellus*	EN
ACTINOPTERYGII	CYPRINIDAE	*Telestes*	*croaticus*	EN
ACTINOPTERYGII	CYPRINIDAE	*Telestes*	*fontinalis*	CR
ACTINOPTERYGII	CYPRINIDAE	*Telestes*	*metohiensis*	VU
ACTINOPTERYGII	CYPRINIDAE	*Telestes*	*polylepis*	CR

ACTINOPTERYGII	CYPRINIDAE	*Telestes*	*karsticus*	EN
ACTINOPTERYGII	CYPRINIDAE	*Telestes*	*turskyi*	CR
ACTINOPTERYGII	CYPRINIDAE	*Telestes*	*ukliva*	VU
ACTINOPTERYGII	GOBIIDAE	*Knipowitschia*	*croatica*	VU
ACTINOPTERYGII	GOBIIDAE	*Knipowitschia*	*mrakovcici*	CR
ACTINOPTERYGII	GOBIIDAE	*Knipowitschia*	*radovici*	VU
ACTINOPTERYGII	SALMONIDAE	*Hucho*	*hucho*	EN
ACTINOPTERYGII	SALMONIDAE	*Salmo*	*obtusirostris*	EN
ACTINOPTERYGII	SALMONIDAE	*Salmo*	*pelagonicus*	VU
ACTINOPTERYGII	SALMONIDAE	*Salmo*	*peristericus*	EN
ACTINOPTERYGII	UMBRIDAE	*Umbra*	*krameri*	VU
ACTINOPTERYGII	VALENCIIDAE	*Valencia*	*letourneuxi*	CR