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RESEARCH ARTICLE

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The widespread alteration of rivers in the Romanian Carpathians and the undisturbed Râul Alb

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Abstract

Physical alterations across the Romanian Carpathians have resulted in an ecocide in the form of the hydromophological disruption of n early every river. The primary cause has been two historical waves of hydropower development. Collectively, these projects were undertaken without consideration for their cumulative impact. Only one, small, ecologically complete and undisturbed river, Râul Alb, has survived. This river flows through a national park, a geopark, and three Natura 2000 sites. All of these, coupled with its spectacular heterogeneous water course, confirm Râul Alb as one of the top sites of natural heritage in Romania. However, Râul Alb was the proposed site for a hydropower project, consisting of two hydropower plants, one in the mountains and one in the depression downstream. Initially, an environmental permit was granted for this project. This was followed by a grassroots campaign and legal injunction that sought to halt the project. The campaign centred on a petition that reached over 116,000 signatures. The legal plaintiff argued that county and national laws were potentially breached by this project. Ultimately, the Alba Iulia Court of Appeal found in favour of the plaintiff and blocked the construction of the hydropower plants on administrative grounds (invoking one of the laws considered). Yet pressure to develop the untouched river remains.

KEYWORDS
ecologically complete river, free flowing, Râul Alb, undisturbed river, water management

1 | INTRODUCTION

Rivers are among the most disturbed habitats worldwide. Protecting the last natural rivers is a race against time. A milestone in this endeavour was the Wild and Scenic Rivers Act, issued in 1968 in United States. In Europe, the request of the conservationist for designating no-go areas on rivers is best illustrated by the Eco-Masterplan for Balkan Rivers (Chamberlain, 2018). As for Romania, the ecological status of most rivers is under severe pressure, due to specific historical and economic factors. It is much worse than in the neighbouring Balkan countries, where almost one-third of the large rivers still have a high ecological status (Schwarz, 2012). Râul Alb River represents the last chance to preserve a complete and near-natural river in Romania. It was identified by The Coalition for Environment (comprising 74 Romanian NGOs) as "*the last mountain river in the Romanian Carpathians ecologically, geomorphologically and hydromorphologically almost perfectly preserved*" (Coalition for Environment, 2015). European Wilderness Society nominated Râul Alb for the designation as wild river, in June 2018 (Vancura, 2018).

Râul Alb is an indirect tributary of Mureş River. The Mureş River Basin Management Plan was issued by the Romanian Waters National Administration (RWNA) and approved by the Government Decision No. 859/2016. A study financed by UNESCO shows that the RWNA assessment of the Mureş River Basin is in contrast with independent fieldwork (Schwarz, 2010). Râul Alb flows through Retezat National Park, the Ha eg Country Dinosaurs Geopark and three Natura 2000 sites. Despite this, in 2014 the Hunedoara Environmental Protection Agency (EPA) issued a permit for the construction of a hydropower

project on the Râul Alb. At that time an informal campaign to save the river began, culminating in a petition gathering 115,000 signatures (Dejeu, 2015). This awareness mobilized "The Natura 2000 Federation Coalition" of Romania, which initiated legal action.

Beside its value as a natural asset, Râul Alb is important as an ecological benchmark. Guidance document No. 10 for the implementation of the EU Water Framework Directive states that: "*for proper identification of reference conditions a water body with current conditions totally, or nearly totally, undisturbed is needed*" (European Commission, 2003). Moreover, there is literature to support the claim that relatively undisturbed rivers are needed as references, so that rivers with different degrees of disturbance can be assessed or restored (Lenders, Aarts, Strijbosch, & Van der Velde, 1998; Stoica, 2016; Wassen, Peeters, & Venterink, 2002). With Romania's extensive history of developing rivers for hydropower, especially given recent development incentives such as Green Certificates, the persistence of a generally undisturbed river such as Râul Alb has been against all odds.

2 | ANTHROPOGENIC IMPACTS ON VALLEYS IN THE CARPATHIANS

In order to show why Râul Alb is so valuable, we will demonstrate how Romanian rivers have been so fundamentally altered over the past two centuries. With such a widespread pattern of hydromorphological and fluvial alterations across Romania, the rivers in the Romanian Carpathians are generally deteriorated. The presence of any untouched rivers is highly unusual in this context.

Significant alterations to river ecologies across the Romanian Carpathians started with the practice of timber rafting. This involved felling trees near rivers, fixing them together, and then using the river to transport the logs for processing. The practice of timber rafting also involved removing the boulders from within rivers and building dams (Zsigmond, 2015). This type of hydromophological alteration impacted the mountain valleys and rivers throughout the Carpathians. This practice was common in Moldavia, Wallachia, and Transylvania (the three main historical regions of Romania). Key to this practice was the foreign trade of timber. The Treaty of Adrianople in 1829 allowed the foreign trade of timber from Moldavia and Wallachia. Also, in the first half of 19th century, after the Habsburg authorities stimulated timber rafting, the practice became widespread in Transylvania (Promberger & Promberger, 2015).

After this period of timber rafting in the 19th century, narrow-gauge railways started to penetrate the wilderness of the Carpathians. This began in 1892 at the mountain village of Comandău (Muica & Turnock, 2003). These railways expanded rapidly in the first half of 20th century, reaching close to 150 railway lines (Bellu, 2007). This development altered the geomorphology of the valleys. In the second half of 20th century, the narrow-gauge railways were replaced by forest roads, with only one narrow-gauge railway remaining in the Vaser Valley. The construction of forest roads along river courses represents an irreversible alteration of the geomorphology of Carpathian valleys.

Another impact has been population growth at the foothills of the mountains, where settlements have developed directly alongside rivers (Jakubowski, Miszczuk, Kawałko, Komornicki, & Szul, 2017). The result has been a sustained anthropogenic impact on the accompanying water courses. One of the main contemporary forces altering Romanian Carpathian valleys is sand-gravel extraction from river channels. This practice has developed during the second half of the 20th century, disturbing natural river courses and creating a bedload deficit (Administra ia Parcului Natural Lunca Mureşului, 2014; Kamboj, Kamboj, & Sharma, 2017; Sommerwerk et al., 2009).

Beginning in 1896 with the construction of the Sadu 1 hydropower plant, Carpathian rivers have been subject to the most serious form of alteration, hydropower developments. The main period of development for hydropower was between 1950 and 1990, when 115 large-scale hydropower stations were built (Constantinescu & Pâslaru, 1991). Large-scale hydropower developments often affect not only the river on which the reservoir is placed, but also many other rivers around it, via secondary water intakes (Eco-Tiras, 2019; Gheorghiescu, Stoican, & Drăghici, 2006).

Romania joining the European Union (EU) in 2007 (and the accompanying push for renewable energy) has underpinned the latest peak in hydropower projects on Romanian rivers. For example, the EU push for policies that promote an increase of renewable energy production in member states is encapsulated in EU Directive 2009/28/EC (European Union, 2009). Romania established a number of measures to facilitate the construction of new renewable energy projects. Such measures included the National Romanian Energy Strategy 2007–2020 (updated for 2011–2035) and the National Renewable Energy Action Plan. These policies are underpinned by key legislative measures such as Law No. 220/2008. The aim of this law is to promote investment in renewable technologies and incentivize energy production from renewable sources. Specifically, this law has incentivized the construction of new so called micro-hydropower plants (below 10 MW), which receive economic incentives in the form of Green Certificates. Since the introduction of the green certificate scheme in 2008, this policy context has contributed to more than 500 micro-hydropower stations being built, approved, or under construction in Romania (World Wild Fund [WWF], 2013).

The deforestation of mountain slopes also changes the river hydromorphology. Forest canopies in river valleys intercept and retain a considerable share of the rainfall. With the canopy removed, a large amount of water and soil ends up in rivers during heavy rainfall periods, disturbing the natural conditions. For instance, a compact spruce forest canopy retains 32–38% of rainfall, while a beech forest canopy retains 29–34% (Urdea, 2000). Further, it has been shown that intact canopies support healthy hydrological regimes by decreasing the rate at which snow melts (Urdea, 2000). To date, the deforestation of the mountain valley and rivershed of Râul Alb is insignificant (European Environment Agency, Joint Research Centre, 2018).

Finally, the practice of river channelization has also significantly altered the hydromophology of rivers in the Romanian Carpathians (RWNA, 2013). RWNA is the central authority responsible for managing such processes. It operates at the river basin level and is also responsible

for the implementation of the EU directives, such as the Water Framework Directive. They also collect funds from those who pay to gather resources, like sand from riverbeds, or from polluters. In this way, they are financed from the alteration of rivers from their natural state.

Specific geographic, historical, demographic, social, legal, economic, and land ownership circumstances helped Râul Alb to be bypassed by all of the above-mentioned forms of ecological damage.

3 | DESCRIPTION OF RÂUL ALB

This riverine ecosystem of the Râul Alb originates in the third highest mountain massif in Romania, Retezat (Figure 1). It is labelled as an undisturbed river. From this perspective of Water Framework Directive, it classifies as high ecological status. According to Birk (2007), unaltered hydromophological conditions (or near-natural state conditions) encompass:

- stream type specific variability of channel depth and channel width, shallow profile, close connectivity of the stream and the floodplain.
- natural channel substrate conditions (composition and variability), presence of dead wood.
- bank profile and bank structure unmodified.
- presence of natural riparian vegetation (in most Eastern Continental GIG regions: forest).
- natural hydromorphological dynamic is maintained.
- low degree of anthropogenic land use in the floodplain.

Râul Alb perfectly fits the above characteristics. The unique importance of Râul Alb is that it is an ecologically complete Carpathian river, with crenon, rhithron and even a stretch exhibiting some potamon features, the last being placed down in the Ha eg Depression (Figure 1b). The natural value of this free-flowing river is doubled by the ecological richness of the valley, passing through all the altitudinal vegetation zones of the Romanian Carpathians and the sub-mountain depressions, plus the azonal vegetation in the floodplain formed in the Ha eg Depression. Above the timberline, like other rivers in the Carpathians, it is an autotrophic system, based on a grazing food chain (Šporka & Krno, 2003). Below the timberline, it turns into a heterotrophic system.

Due to the glacial past the valley of Râul Alb has a gravel-bed river floodplain. It provides a natural setting for interactions between aquatic, avian, and terrestrial species of all the eco-functional groups (Hauer et al., 2016). From Archaea and Bacteria populations to fish and otter, this river is a refuge for lotic biodiversity. In mountain river, planktonic bacteria cells are very scarce. Instead the biofilms on rocks, as well as the sediment and the detritus originating from the surrounding forest, constitute the basis of the food chain (Jass, Roberts, & Lappin-Scott, 2002). Many acidophilus diatom species are present in the pristine river, as *Hannaea arcus*, *Eunotia curvata*, *Eunotia praerupta*, *Eunotia serra var. diadema*, *Anomoeoneis serians var. brachysira*, *Neidium bisulcatum*, *Pinnularia biceps*, *Pinnularia brebissonii*, and *Caloneis ventricosa var. alpina* (Péterfi, 1993). At Râul Alb, cases of Trichoptera larvae or Dugesiidae living under stones also contribute as macroinvertebrates to the food chain. The undeveloped strip formed along the floodplain is the lower course of the river represents an

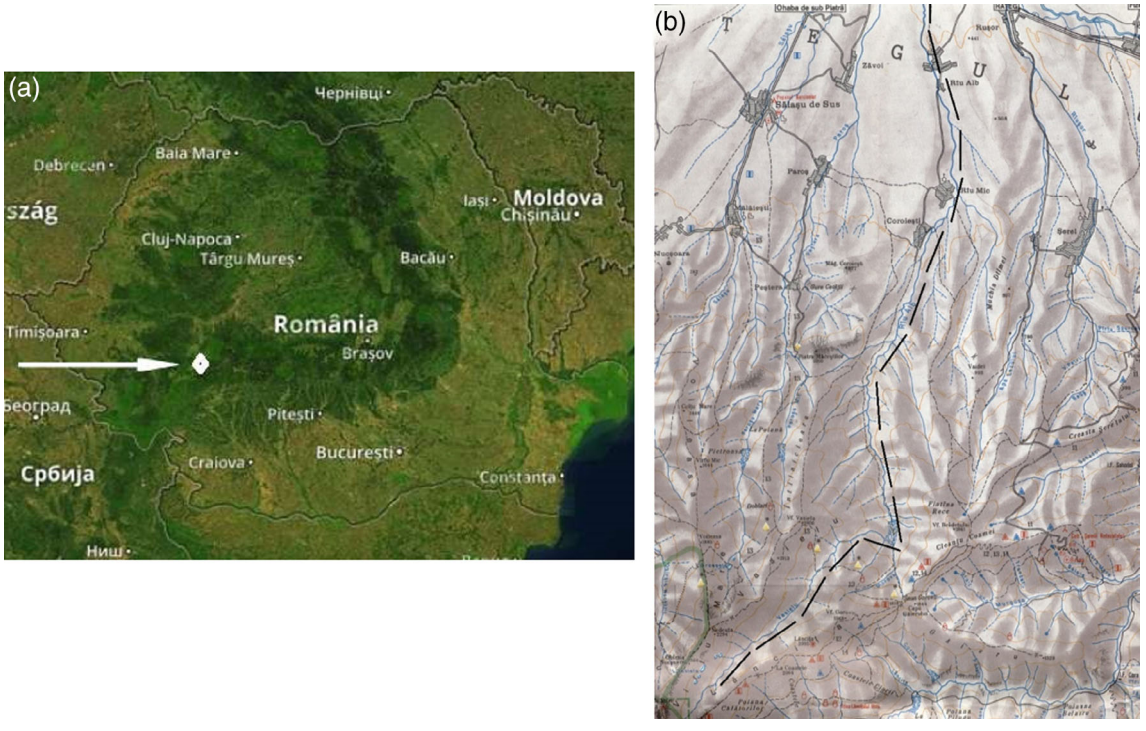

FIGURE 1 (a) Râul Alb location (white arrow); (b) River course (black broken line) [Color figure can be viewed at wileyonlinelibrary.com]

important connection between two isolated bodies of the Natura 2000 site "Strei-Ha eg" (code: ROSCI0236), a valuable asset for ecological connectivity.

Where Râul Alb originates in the Retezat Mountains there are some small glacial lakes, in an elongated glacial cirque known as Văsiel. This indicates that there was once a larger lake at the origin of the stream. At the neighbouring cirque of Galeş in the Retezat Mountains, pollen, conifer stomata, and plant macrofossil analyses revealed that sedimentation started 15.1–15.8 kcal BP (Ruszkiczay-Rüdiger et al., 2015). The small lakes of Văsiel dry up during severe droughts in the summer months. The main lake of Văsiel was described in 1973 as being 1 m deep and covering a surface of 0.2 ha (Popescu, 1973). The watershed of Râul Alb reaches maximum elevation at 2,463 m, in the alpine meadow altitudinal vegetation zone. The origin of the perennial water flow is at about 2,100 m of altitude, in the subalpine altitudinal vegetation zone. Here, Râul Alb is still just a small flowing spring that makes it ways through the thick layer of dwarf mountain pines (*Pinus mugo*), priority habitat type of Community interest (code 4070) of the Natura 2000 site ROSCI0087. As the pristine spring gathers water and becomes a river, it passes out of the *Pinus mugo* bushes and enters coniferous forest zone, than the mixed coniferous zone. Here, several patches of virgin forests have been identified (Ministry of Environment, Waters and Forests, 2020). In comparison with the other rivers in the Romanian Carpathians, most of which are accompanied by regular forest roads, Râul Alb is a rare specimen in Romania's natural heritage.

The fluvial valley begins by eroding the bottom of the glacial valley. It is in the upper coniferous belt where the crenon-rhithron ecotone is situated on Râul Alb. Downstream, the river current is fast, causing many white water ripples that give the river its name (the White River). The terminal moraine, cut by the riverbed to a depth of 10 m, is situated at an elevation of 1,050 m (Urdea, 2000). Lower still, an old growth beech forest takes the place of the mixed coniferous forest. Headwater riparian zones are covered by the same zonal vegetation as the slopes, represented at this level by the 9,110 habitat type of Community interest, Luzulo-Fagetum beech forests (Figure 2). After a very short gorge-like stretch, at about 800 m of altitude, the valley opens up. A large terrace expands outo the left, and this terrace is flanked to the West by an old course of Râul Alb, on which the Tucşoara tributary flows, parallel to the river course of Râul Alb. This tributary loses some of its waters into karst strainers. Below the gorge-like stretch, the azonal vegetation starts accompanying the river, mainly as 91E0 priority habitat: "Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*."

FIGURE 2 Middle course of Râul Alb [Color figure can be viewed at wileyonlinelibrary.com]

Below 650 m of altitude the valley opens up as passes the foothills of the mountains and enters Ha eg Depression. In the almost flat main level of the depression, the river has carved a lower valley, including a functional floodplain and terrace. In the floodplain, the river splits into channels and the floodplain is covered with natural or semi-natural habitats (no tilled land), whose biological productivity is increased by the symbiosis between *Alnus glutinosa* and the nitrogen-fixing, filamentous bacteria of *Frankia* genus (Alloisio et al., 2010). As freshwater biodiversity depends on functionally healthy floodplains, and up to 90% of floodplains in Europe have lost functional health, the floodplain of Râul Alb has considerable conservation value (Tockner & Stanford, 2002). In the area surrounding the floodplain, besides semi-natural pastures, there are remains of another altitudinal vegetation zone, the sessile oak zone. In the lower stretch of the river course, epipotamon features set in. The water flow becomes slower. There are meanders in the large floodplain, with point bars in the convex bank, and river branches. There is a transit between a hard bottom and soft bottom. Due to the fast-flow, plankton is restricted to backwaters.

A variety of host/local rocks (Retezat granite, quartz-sericite schists, paragneiss, mica schists, Oxfordian-Aptian limestone and Vraconian-Cenomanian deposits) provide the conditions that promote ecological diversity (Urdea, 2000). The Tucşoara tributary has limestone in its drainage basin, which influences the production of macrozoobenthos in Râul Alb (Šporka & Krno, 2003).

In 2011, when the undertakings for building the hydropower project on Râul Alb begun, it was an undisturbed river. The forest road in the lower part of the valley ran along a geographic ridge or terrace that shadowed the river course, thus it was far from the river itself. Below the gorge-like stretch at about 800 m of altitude, the forest road crossed the river as it climbed the Eastern slope, leaving the valley. A short tractor path was advancing on the West slope, but far from the river, and it finished at a scree slope, off the 950 m contour line on the river course.

4 | LEGAL PROTECTIONS FOR RÂUL ALB

In 2011 Râul Alb and its valley were protected under a broad array of provisions. Notably it was protected by Emergency Ordinance (E.O.) No. 57/2007 (the law of protected areas), due to its position in Retezat National Park and the Ha eg County Dinosaurs Geopark. According to E.O. No. 57/2007, "national parks are the protected

areas whose purposes are protection and conservation of some representative samples for the national biogeographic space." From the evidence presented in this article, the last undisturbed river in the Romanian Carpathians constitutes such an example. The same law provides that: "the management of the national parks ensures maintaining the physico-geographical environment in a natural state." As for geoparks, the same E.O. No. 57/2007 provides that their management must be done according to UNESCO Guidelines. In turn, the UNESCO Guidelines ensure that geoparks "shall contribute to the conservation of significant geological features … including landforms and landscapes which provide information on various geoscientific disciplines such as … geomorphology … hydrology" (Global Geoparks Network, 2010). Again, an undisturbed river course, the last one in the Romanian Carpathians, represents such a landform.

The second main legal protection comes from the Directive 2000/60/EC of the European Parliament (Water Framework Directive). This states that "Member States shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water." Being a water body with high ecological status, a deterioration of the status from high to good, or even worse, constitutes a breaching of the Water Framework Directive. In July 2015, the Court of Justice of the European Union clarified that "there is deterioration as soon as the status of at least one of the quality elements, within the meaning of Annex V to the directive, falls by one class, even if that fall does not result in a fall in classification of the body of surface water as a whole." As derivative type hydropower plants involve diverting most of the river flow into a buried penstock, for up to several kilometres, it is likely that such a hydropower project on Râul Alb would deteriorate by at least one class quality elements listed in Annex V to Water Framework Directive. The five classes are: high, good, moderate, poor, and bad.

A third main legal protection for Râul Alb is covered by the European Council Directive 92/43/EEC (Habitats Directive). A forth legal protection is Directive 2009/147/EC (Birds Directive). Most of the river length (except the downstream stretch) is included in Natura 2000 sites that are protected under the Birds and Habitats Directives. The headwaters are included in the "Mun ii Retezat" Special Protection Area (SPA) ROSPA0084 and also in Retezat Site of Community Importance (SCI) ROSCI0217. These two Natura 2000 sites overlap in the Retezat National Park. Even if the hydropower project is not placed inside these Natura 2000 sites, but in the vicinity, just downstream from them, if a stretch of a river is degraded, the whole river course is impacted. The Jurisprudence of the Court of Justice of the European Union provides (Judgment of the Court in Case No. C-142/16) that even a disturbance of the river course at 600 km downstream from a Natura 2000 site can have a significant effect on the site. Out of the bird species for which this SPA was designated, *Alcedo atthis*, *Ciconia nigra*, and *Ficedula parva* can be affected by a hydropower project. As for Retezat SCI, the species for which it was designated that may be impacted by a hydropower project are *Eudontomyzon danfordi*, *Cottus gobio* and *Lutra lutra* (European Commission, 2020; Tomlinson & Perrow, 2003). Downstream, at the site of the hydropower project proposed in 2011, lies another Natura 2000 site: Strei-Ha eg (ROSCI0236). Râul Alb is the only river in ROSCI0236 not impacted by hydropower projects or water withdrawal dams. Hydropower development at Râul Alb risks serious impact on the integrity of the whole Strei-Ha eg Natura 2000 site. It does not affect only the species in the standard data form of ROSCI0236, but also species of community interest which, out of negligence, were not included in the form, species like *Coenagrion ornatum*, which lives on the floodplain of Râul Alb (Butterflies & Moths around Romania and not only, 2020).

The Ramsar Convention on Wetlands provides the fifth legal protection for Râul Alb, stating that: "the Contracting Parties shall formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory." The evidence presented in this article suggests that deteriorating the last undisturbed river in the Romanian Carpathians with the introduction of hydropower technology does not fall within the Ramsar concept of "wise use."

The Bern Convention on the Conservation of European Wildlife and Natural Habitats is the sixth legal protection relevant to Râul Alb. The river and its floodplain are very important for protected species under Appendix II of the Convention, including: *Lutra lutra*, *Ciconia nigra*, *Crex crex*, *Alcedo atthis*, *Motacilla* sp., *Cinclus cinclus*, *Triturus cristatus*, *Bombina variegata*, and *Ophiogomphus cecilia*. The presence of the last species is also an indicator of hydromorphologically non-degraded streams, for mid-sized streams in lower mountainous areas of Central Europe (D05 stream type) (Lorenz, Hering, Feld, & Rolauffs, 2004).

The seventh legal protection for Râul Alb is Romanian Law No. 289/2002, which forbids reducing the surface of shelterbelts. Râul Alb has a pristine shelterbelt along its banks in the Ha eg Depression, where the penstock of the proposed hydropower development was to be located.

The E.O. No. 195/2005 (the law of environment) states that the projects which might have a significant impact on the environment are subjected to environmental impact assessment. It is the eighth law breached by the Hunedoara Environmental Agency, since the screening stage decision stated that the project was not to be subjected to environmental impact assessment.

The Convention on Biological Diversity is the ninth legal provision to compel Romanian authorities to protect the valley of Râul Alb. Because it represents the habitat of several threatened species, and Aichi target 12 is to prevent the extinction of species and improve the status of threatened species. It was ratified by Law No. 58/1994.

The tenth legal protection for the Râul Alb is the Carpathian Convention, which provides, under Article 6, paragraph c), that the Parties shall "pursue policies aiming at conserving natural water courses." It was ratified by Law No. 137/2010.

The Danube River Protection Convention is the 11th document to compel the conservation of Râul Alb, as its objectives include: "conservation, improvement and the rational use of surface waters and groundwater in the catchment area as far as possible." Furthermore, this Convention provides, under Article 15, scientific research obligations for the Contracting Parties. And, for proper scientific research of

the Danube tributaries in Southern Carpathians, a river in a near-natural state, as a benchmark, is a compulsory asset (Binder, Göttle, & Shuhuai, 2015).

The 12th legal protection for Râul Alb is Waters Law (No. 107/1996) which, besides the transposition of the non-deterioration principle from the Water Framework Directive, provides under Article 49 that new economic objectives in the floodplain are forbidden.

The Convention Concerning the Protection of the World Cultural and Natural Heritage is the 13th legal protection on our list. It confers protection for this river, as "habitat of threatened species," one of the "natural areas of outstanding universal value from the point of view of science, conservation or natural beauty." Romania endorsed the Convention by Decree No. 187/1990.

The European Landscape Convention, ratified by Law No. 451/2002, constitutes the 14th legal protection. The heritage value of Râul Alb and its valley consists in its natural configuration, referred to in Article 1(d).

The 15th legal protection is Law No. 86/2000, for the ratification of the Aarhus Convention. The Hunedoara Environmental Agency

TABLE 1 Protection laws and competent authorities

Law	Protective provision	Competent executive authority	Law enforcement
Emergency ordinance 57/2007	• Art. 27, Para. (1) • Annex 1, b) and l) • Art. 28, para. (1) and (10) • Art. 52, i)	• Hunedoara environmental agency • Hunedoara environmental guard • Romanian police • Prosecutors' offices	X
Water framework directive	• Art. 4(1)(a)(i) • Art. 4(1)(c) • Annex VII, point A.5	• RWNA • European Commission	X
Habitats directive	• Art. 6(2) • Art. 12(1)	• Ministry of Environment and climate change • European Commission	X
Birds directive	• Art .1(2)	• Ministry of Environment and climate change • European Commission	X
Ramsar convention	• Art. 3, para. 1.	• Directorate for Biodiversity, Ministry of Environment, and climate change	X
Bern convention	• Art. 6	• Directorate for Biodiversity, Ministry of Environment, and climate change	X
Law no. 289/2002	• art. 26	• Ministry of Environment and climate change • National Forest Administration-Romsilva	X
Emergency ordinance 195/2005 (the law of environment)	• Art. 11, para. (2)	• Hunedoara environmental agency	X
Convention on biological diversity	• Aichi target 12	• Directorate for Biodiversity, Ministry of Environment and climate change	X
Carpathian convention	• Art. 6, para. (c)	• Ministry of Environment and climate change	X
Danube River protection convention	• Art. 2, para. (1) • Art. 15	• Ministry of Environment and climate change • The secretariat of the ICPDR	X
Law no. 107/1996 (waters law)	• Art. 2^1, para. (1), a) • Art. 49	• Ministry of Environment and climate change • RWNA	X
Convention concerning the protection of the world cultural and natural heritage	• Art. 3 • Art. 5, point 2	• Romanian government • The world heritage committee	X
European landscape convention	• Art. 1, d • Art. 5, b	• Ministry of Regional Development and Public Administration	X
Aarhus convention	• Art. 6, para. 2.	• Hunedoara environmental agency	X
Government decision no. 2151/11/2004	• Art. 3, para. (4)	• Administration of the Ha eg Country Dinosaurs Geopark, Bucharest university • Hunedoara environmental agency • National Environmental Guard	Invoked by Alba Iulia court of appeals

kept the project secret during all the environmental impact assessment procedure performed in 2013.

The 16th legal protection is Government Decision No. 2151/11/2004. It is the regulatory document which established the "Ha eg Country Dinosaurs Geopark" Nature Park. The Decision states that, until a management plan is approved for the nature park, a special conservation zone is established on the surfaces where the nature park is overlapped by other protected areas. So, since a management plan was proposed only in 2015 and was never approved, and the Natura 2000 site "Strei-Ha eg" was established in 2007, overlapping a large part of the nature park, all overlapping area still represents a special conservation zone. Hydropower plants, as any other form of exploitation or use of natural resources, are forbidden in such a zone.

There is also an administrative provision that should have prevented the permit for the two hydropower plants: the Environmental Permit No. 10938/December 10, 2012, issued for the "Energy Strategy of Romania for 2007–2020, updated for the period 2011–2020.". It provides that: "In those SCI designated for protecting fish, otter and crayfish or for the impacted habitats shall not be proposed/approved/accepted the development/emplacement of micro-hydropower plants."

Besides the acts above, there is also the so called soft law, which also provides protection for Râul Alb River. For instance, the "Resolution Conservation of the last wild rivers of Europe" (code 2.47), issued by the World Conservation Congress of International Union for Conservation of Nature (IUCN), at the conference held in Amman in 2000, call on the European countries to "preserve all remaining wild and semi-wild rivers in a state close to natural." Also concerning IUCN, since the Romanian Ministry of Environment is a member of the organization, it should follow the IUCN guidelines. One of these is "Guidelines for conserving connectivity through ecological networks and corridors," which emphasizes and regulates the crucial role of connectivity in nature conservation (IUCN, 2020). The flood plain of Râul Alb represents a corridor between two isolated surfaces of the Natura 2000 site "Strei-Ha eg," and should be protected accordingly.

5 | INVOLVEMENT BY THE PUBLIC AUTHORITIES

The Hunedoara EPA issued the final approval document (screening stage decision) for the proposed hydropower project, on August 23, 2013. A year later on August 29, 2014, the Hunedoara EPA posted on its internet site the reviewed screening stage decision. During the court case, it was claimed by the plaintiff that the original screening decision, its announcement and the appropriate assessment (i.e., all the documents mandatory for public information/participation) were not posted on the EPA's website, as is required. Nevertheless, the second screening stage decision came to the attention of the environment sector in Romania which prompted a 2-year campaign to save the river. On 24 May, 2015, another controversy erupted as representatives for the proposed hydropower project clashed with journalists and activists at the river (Riverwatch, 2015).

Table 1 lists all the laws that were potentially breached by the proposed hydropower project. Notwithstanding the case of Jiu Gorge, only the Râul Alb case encompasses more potential breaches (Carpa, Maior, & Dejeu, 2017).

One of the authorities responsible for protecting parts of Râul Alb is the administrator of the Ha eg County Dinosaurs Geopark. At the time of the proposed hydropower project, the administrator of the geopark was the University of Bucharest. This administrator issued the permit for the hydropower project to proceed and publicly supported the hydropower project.

On April 14, 2015, the Natura 2000 Coalition Federation of Romania initiated two lawsuits: one lawsuit in order to annul the revised Screening Stage Decision No. 1327/August 26, 2013, and a second lawsuit in order to suspend the Screening Stage Decision while the first lawsuit was pending. On July 9, the second lawsuit succeeded, so the river was safe until the final decision in the annulment lawsuit. In December 2015, the initial lawsuit to annul the screening stage decision was lost by the Natura 2000 Federation Coalition. Although this was appealed and upheld by the Alba Iulia Appeal Court in November 2016, meaning that the river was saved from this round of proposed development. Interestingly, it was not proper laws that were used to win the case and prevent the development, but the provisions of a government decision. Essentially, as the Geopark was managed by a caretaker administrator, it was unable to formally approve developments in the special conservation zone. Nevertheless, they did issue permits for the development and these were used by the Hunedoara EPA to approve the project.

6 | CONCLUSIONS

The undisturbed and ecologically complete Râul Alb would have been altered forever by a hydropower project. To date Râul Alb has managed to avoid all of the anthropogenic activities that have altered rivers in the Romanian Carpathians from their unaltered state. Remaining undisturbed in this way provides Râul Alb with significant conservation value. When a proposal was made and initially granted to undertake a hydropower development on Râul Alb, there were many legal provisions that provided varying levels of protection for Râul Alb. Ultimately, the Appeal Court of Alba Iulia found that the Hunedoara EPA did not follow correct procedure when issuing screening stage permits, thus, the project was rendered illegal before main work had commenced.

At the inception of the community action against the development of Râul Alb, numerous public authorities in Romania and Europe were made aware of the case. Ultimately, it was an appeal court that made reference to a procedural provision that prevented the action. This situation shows that in this case, despite a plethora of legal provisions and authorities at the local, national, and international scale, undisturbed rivers like Râul Alb are still subject to development pressures. And further, that such pressures are not easily resisted with the existing legal frameworks.

Despite some of the early project work that was conducted and halted for the legal action over the hydropower development, the Râul Alb river course still retains a high ecological status. Still, as this case shows, there is no guarantee that this status will be maintained. The biggest present threat for the river course and floodplain of Râul Alb consists of a proposed fish farm development in the first wide floodplain stretch at the exit from the mountains.

Broadly, this case shows that there is a significant discrepancy between the law and its enforcement. This undermines confidence in Romanian national jurisprudence regarding rivers and the conservation of natural heritage.

DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting this study is available within the article or in the material cited.

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