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**MONITORING OF THE AMPHIBIAN FAUNA IN THE
SEMENIC – CARAS GORGES NATIONAL PARK,
ROMANIA**

– Final Report –
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Project background

The herpetofauna of the Semenic – Caras Gorges National Park is diverse, as the area has one of the highest species richness of the Romanian Carpathians. We started the inventory of the herpetofauna in 2003, in the framework of the Rufford Small Grants for Nature Conservation “*Inventory of the reptile fauna in the SCG National Park*”. During this project, besides reptile inventory, the observed precarious situation of the amphibian species, mostly due to habitat disturbance, determined us to complete the herpetofauna inventory in order to draw management actions for the Park authority and Environmental Protection Agency. The amphibian conservation subject is also a “hot” topic in conservation biology.

Currently, there is a worldwide concern for the welfare of the amphibian species. They are especially sensitive to the global climate change due to their biological, ecological and behavioral characteristics. Therefore, the studies regarding amphibian response to the climate change, detailed inventories and other scientific work burgeoned in the past decade. For a temperate climate, such as the Romanian Carpathians, the negative effects are harder to observe but this doesn't mean that we shouldn't be concerned about amphibian species faith. As long-time known, the proactive conservation measures are the ones that can ensure the survival of species, as they usually are the cheapest and the researchers have more time to assess the results and eventually modify the methodology. Therefore, we proposed a few simple, but yet effective conservation measures to be implemented by the National Park Administration through their Management Plan.

In order to identify viable conservation measures for the Semenic – Caras Gorges National Park, we had to start with the basics. Intense bibliographic search and our previous field experience led us to the conclusion that **the amphibian species list in the region was not complete** and new data had to be added to get the “big picture”. Inventory of species, followed by monitoring of breeding sites and other wetlands in the park were the methods adopted to accomplish project's objectives.

We also emphasized the importance of the vernal pools for amphibian conservation. A vernal pool is a contained basin depression lacking a permanent above ground outlet. They contain water for a few months in the spring and early summer. By late summer and fall, a vernal pool is generally (but not always) dry. A vernal pool, because of its periodic drying, does not support breeding populations of fish. Many organisms have evolved to use a temporary wetland which will dry but where they are not eaten by fish. These organisms are the "obligate" vernal pool species, so called because they must use a vernal pool for various parts of their life cycles.

The vernal pool issue is the subject to a large number of studies all over the world; the efforts towards preserving, restoring, and better understanding the role of the vernal pools are worldwide and they have to be considered in the Semenic – Caras Gorges National Park as well.

Study area

The project area is the Semenic – Caras Gorges National Park, Romania (see map). The Law no 5 regarding the Approval of the National Territory Planning Scheme, *3rd Section - Protected Areas*, established the Park in 2000. The newly founded National Park is situated in Caras-Severin County, occupying a total surface of 36664.8 ha of mountainous area. The Park Administration was established in 2002; the staff is very cooperative and we mutually benefited from information exchange, logistic support and counseling. The final report of the first RSG was welcomed, as it brought insight into biodiversity conservation issues in the area and the information was inserted into the Management Plan.

There is a high natural conditions discrepancy between the eastern and western parts of the Park, and this issue determined the way and the regions where we carried out the project's activities. As the amphibians are inherently related to streams, lakes, peat bogs and other permanent or ephemeral wetlands, a preliminary assessment of the substrate characteristics, hydrographic network and streams' flow regime was initially required. The western part of the Park (the Anina Mountains) is completely composed of limestone; the rainfall is almost totally lost through crevices and most of the streams and ponds are temporary, therefore not suitable for amphibian breeding. As opposite, the eastern part of the Park (the Semenic Mountains) is all massive crystalline rocks that allowed the development of a dense and permanent hydrographic network. The Semenic Mountains are also the main source of a few large Romanian rivers, such as Nera, Barzava, and Timis.

An important contribution to this discrepancy has also the local climate. Although the climate of the Banat region has strong sub-Mediterranean influences expressed through hot dry summers and rainy (snowy) less cold winters, and high value of solar direct radiation, the Semenic Mountains benefit from heavy snow fall and lower temperatures. **This ensures a longer-lasting snow cover and supply of the hydrographic network and thus, a longer period for the vernal pools existence.**

The vegetation and habitats are also very diverse and forms altitudinal layers: sub-alpine grasslands (Semenic plateau), mixed deciduous and coniferous forests, deciduous forests (among them some of the Europe's last pristine beech forests), thermophilous scrub with sub-Mediterranean elements (sibleac) found only in the southwestern part of Romania, grasslands, meadows, riverside coppices, wetlands -peat bogs (the sources of Nera River on the Semenic plateau), hygrophilous vegetation along the rivers and at the reservoirs' ends. A large area of the Park is forested (approx 70%, especially in the eastern part); this, together with the existence of the dense hydrographic network, lakes, and climate conditions that ensure vernal pools' availability, contribute to the appearance of a rich temperate amphibian fauna.

The social and economic context of region where the project was implemented is continuously evolving in the benefit of the wildlife species, but we identified several problems that arise from the human activities (see Discussions part for details). There are eight localities surrounding the National Park (seven villages and one town). They are situated mostly on the northern border (Garana, Valiug, Secu, Cuptoare, and Iabalcea) and western border (Carasova, Garliste, and Anina). Excepting the town of Anina, all other

settlements are small or medium sized villages up to 2000 inhabitants (Carasova). The only activities developed by the villages' inhabitants that have a direct impact on the National Park's environment are the agricultural activities (pasturing and cropping on small surfaces, orchards).

Methods used in this project

In the RSG project "*Monitoring of amphibians in Semenik-Caras Gorges National Park*" we used several inventory and monitoring methods adapted to this temperate medium-high altitude region.

The most used and most effective was the **opportunistic search**, a method with long tradition in field herpetology. This was performed by walking on previously established transects in the park and turning over logs and rocks as well as checking for small ponds or ditches. The search performed, all objects were returned to a position similar to the original one, in an attempt to minimize the impact on the hiding places for the animals. The transects were selected so that most of the park area would be covered and not longer than 10 km to avoid errors in results due to fatigue.



Photos: A pond on Semenik Plateau at 1400m (left) Silviu Petrovan and Viorel Popescu on their opportunistic search and near a dam at Poneasca Valley (right)

The second method deployed was the selection and the **survey** of several aquatic and terrestrial habitats that were found to be species rich or that seemed optimal for amphibian development. The habitats chosen were at different altitudes and as diverse in composition as possible. This was done also with the help of military topographic maps 1: 25 000 that allowed the team members to check for possible amphibian breeding sites especially on the valleys of the rivers that cross the park (Barzava, Nera and Poneasca). We were very fortunate to possess a great deal of information on habitats in this protected area, information gathered during the first RSG project.

For these selected sites, in the total number of 8, we used more elaborate and detailed **survey methods** such as **day and night survey over a 48 hours period, performed two-three times in a 9 months period, anuran survey using male calling in the breeding season and net searching in the water for breeding newts and amphibian larvae.**



Photos: *S. Petrovan and M. Leu during night-time monitoring (left) and S. Petrovan during day monitoring on a pond at 1400 m on the Semenic Plateau*

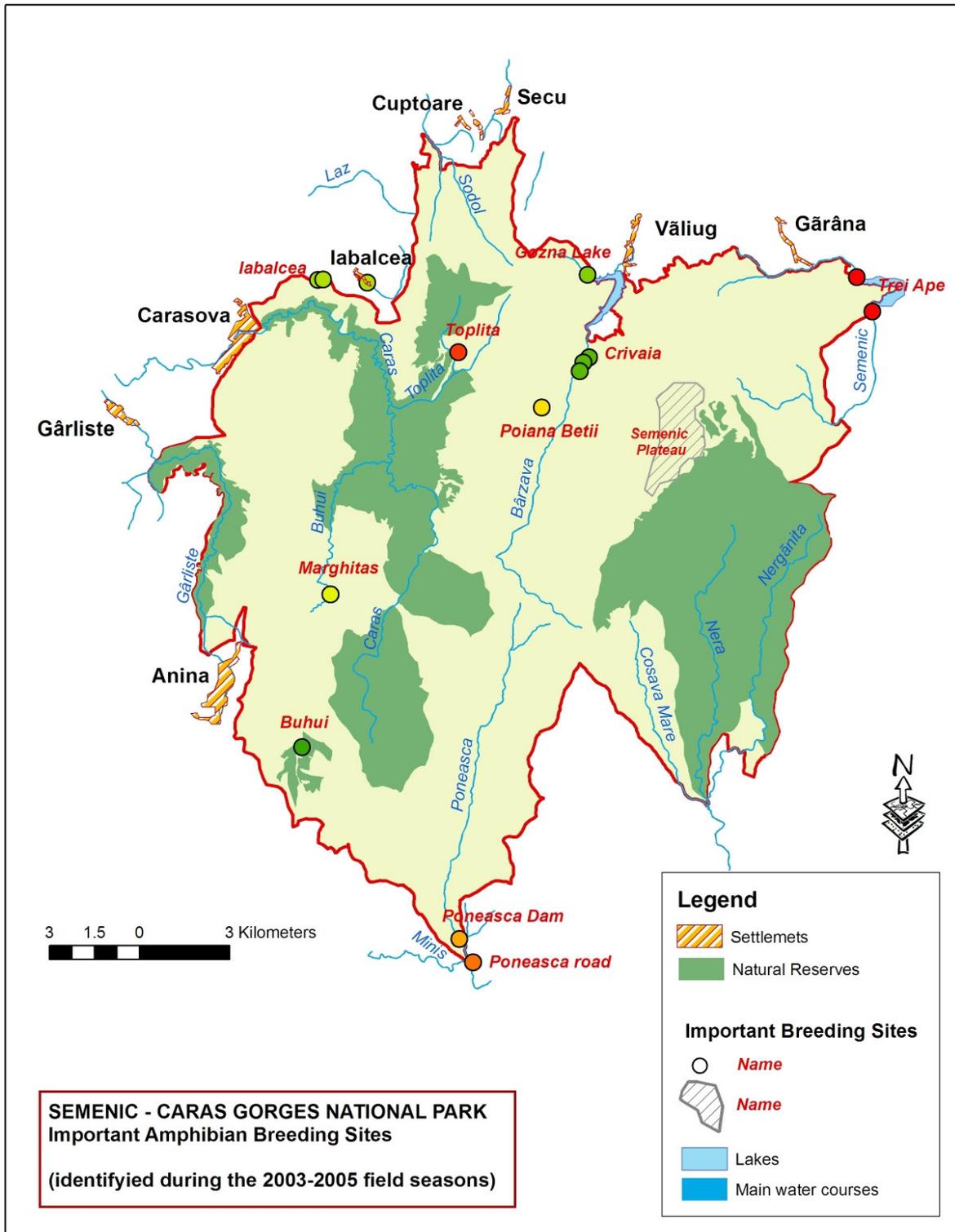
Night survey proved to be very effective especially in April-July after or during rain when we were able to observe and record data on species presence and abundance even for species which are more difficult to find in normal conditions such as *Hyla arborea*. The survey using male calling allowed to record species presence in difficult terrain, such as the tails of Trei Ape Lake and Gozna Lake where the abundance of tall, hygrophilous vegetation makes amphibian searching very ineffective and time consuming. We recorded the Green toad, *Bufo viridis* breeding calling at Valiug Lake, at 650 m altitude, in May during the night survey, but it took more than two hours before we could find and observe a single specimen.

We discovered that many of the important aquatic habitats that proved to be important sites for amphibian species reproduction are quite easily accessible by car and therefore a long-time survey protocol for anuran species in this park would probably be most effective and accurate if it would rely on recording male calling and direct observation in breeding season.



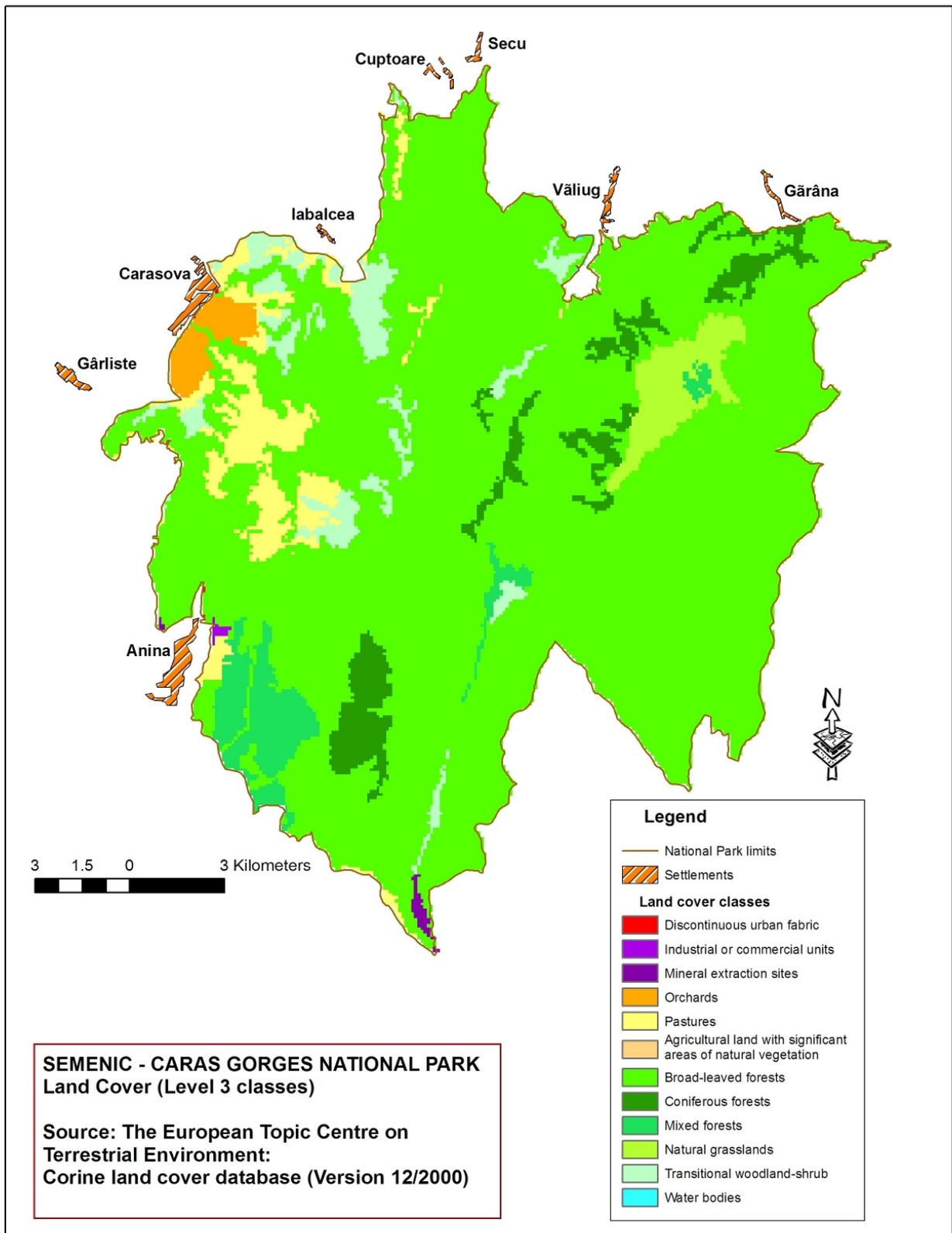
Photos: *Viorel Popescu and Mihai Leu (left); Silviu Petrovan and Cristian Tetelea (right) during their opportunistic search in the park area*

This method is already widely used in other countries with great success especially for determining species presence and population abundance at a given site.



To confirm and continue the reptile species survey that began in 2003 we used the same opportunistic search and some detailed searching in previously recorded habitats, concentrating on the most threatened species such as the sand viper, *Vipera ammodytes* and the skink *Ablepharus kitaibeli* in the Caras Gorges area as well as the viviparous lizard

Zootoca vivipara in the high and humid areas near Trei Ape Lake and on the Semenic Mountains Plateau



Species

During the 2004-2005 work seasons we have identified **12 amphibian species** which represents more than **60%** of the total **19 species present in the entire country** and there is a (slight) possibility that two other amphibian species exist here. Many species are present in large numbers which make this park even more important for amphibian conservation.

Here is a list of all amphibian species recorded and some punctual data on their status and recommendations.

Triturus (Mesotriton) alpestris, the Alpine newt has a large distribution in this park being present in almost all the areas between 500-1400 m, especially on stream valleys. We recorded its presence in breeding season in all kinds of small aquatic habitats, comprising drainage ditches on road sides in forested areas, small ponds with little or no vegetation and ponds created on the course of modest sized springs.

In certain areas we were able to observe populations of hundreds of individuals in a pond with a diameter less than 15m. Although in literature it is mentioned to live in the same habitats with *Triturus cristatus*, we could only find this species with the more common *Triturus vulgaris*, but this second one in significantly smaller numbers. We report it from several locations in the area, on all the important stream valleys, Poneasca, near the Trei Ape, Gozna, Buhui and Marghitas Lake and especially on the Barzava river valley.



Photos: *Triturus alpestris* – laying eggs (left) and during courtship in March (right)

The major threat seems to come from the small number of suitable ponds and the great fragility of these habitats. In fact, most of these ponds are situated along roads cut inside the forest and are directly influenced by the constant modifications of such gravel roads used by the forestry department. The simple creation of a drainage system, usually in the form of a concrete tube under the road, would completely destroy a pond that serves as breeding ground for possibly more than 200 Alpine newts.

Therefore, we suggest, besides the need for protection of the most important of these vernal ponds, also, the necessity to create some new, artificial ones, in areas less close to the roads, and therefore facing smaller risks related to pollution and destruction from road modifications. The cost for such ponds would be most likely minimal in these areas because of the rich hydrographic network. We believe that the possibility to use a small spring and the favorable terrain allows the creation of an optimal pond habitat, not only for this species but

for other amphibians as well without using any human-made material such as concrete, rubber or plastic.

Triturus vulgaris, the Common newt, was recorded in several places in the park area, at altitudes ranging from 300 to 1100m (mostly at 300-600m) but, despite that, always in small numbers, usually ranging from 10-50. It is easily spotted, in small ponds, in general with sun-warmed water, with or without vegetation. It was present most of times in the same ponds as *T. alpestris* at medium and high altitudes, with *T. cristatus* near Iabalcea and alone at low altitudes, being the only species present in Caras Gorges, in a few ponds created by “dead” branches of the river. We also recorded this species in a few very shallow ponds, not more than 15-20 cm deep, habitats that do not contain water for more than 3 months every year, around Valiug Lake.

It is the most adaptable of the newt species in Romania, and maybe on the entire European continent, able to live in a big variety of habitats, from sea level to almost 2000m but usually it prefers for breeding small ponds with good sun exposure and lots of vegetation.



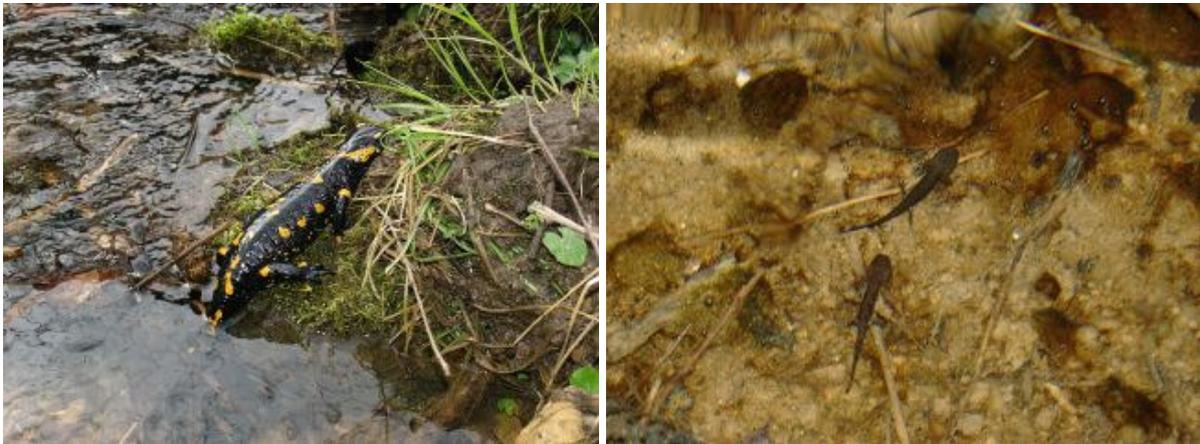
Photos: *Triturus vulgaris* in April (left) and *Triturus vulgaris* (right)

Triturus cristatus, the Northern Crested newt is the less encountered and the largest of the three newt species in the Semenic Caras Gorges National Park. It is usually found in breeding season in sun warmed aquatic habitats, more than 0, 5 m deep and such ponds are quite rare in this park. We could only find two breeding populations, one which is extremely small, probably less than 20 adult individuals, in a small vernal pond near Cuptoare village, and the other comprising several hundreds, in three ponds (the largest of more than 25m in diameter), near Iabalcea village at 350 m altitude. The first population could have been artificially created by the shepherds that use that pond as drinking spot for passing sheep. It is likely that some eggs arrived attached on the sheep feet from another pond, or some other possibility. Because it is so restricted, special attention should be paid to the Iabalcea ponds which could be in danger of pollution with the waste resulted from the traditional alcohol fabrication “*tuica*” using plums, which takes place in the immediate surrounding area.

Salamandra salamandra proved to be one of the most wide-spread species in the park were it seems it finds optimal living conditions. We recorded this species in almost all the searched locations ranging from 250m to 1400m. The number of observed specimens was impressive at times, when weather conditions (light rain) were optimal. We could also

determine large populations by the numbers of tail drags and foot marks in the soft mud covering the roads used by the forestry department. The only places where we didn't find this species are on the arid limestone hills near Carasova and Iabalcea villages and on the Semenic Mts. Plateau where it probably doesn't survive because of the lack of arboreal vegetation. High numbers were recorded on Caras Gorges, where it is usually found very close from the river, and near all the lakes and reservoirs, Trei Ape, Gozna, Margitas, Poneasca and Buhui. It prefers habitats on the edge of deciduous forest and clearings, with humid and rich soil, covered by dead leaf and decaying wood and it requires well oxygenated ponds for the larvae to develop.

The major threat identified for this species is the increasing level of road traffic on the Forestry roads where big numbers of this species are killed. Attention should also be paid to the breeding places for this species because it requires very clean and cold, small water bodies, such as springs which are rather rare and should be properly cared for.



Photos: Salamander - female preparing to give birth in March (left) larvae (right)

Rana temporaria, the Common frog is not only the most wide-spread amphibian species in this area, but also probably the most abundant. Yet, we discovered it is the one that is under the most intensive human pressure and therefore the one that requires the most of the authority's attention. We identified this species in all locations in the park with minimal conditions, such as the presence of humid forest and some water body even if very small. It is also the only amphibian species that we found in the grassy, sphagnum bogs situated on the Semenic Mts. Plateau, at over 1350m. It reproduces in very diverse habitats, from roadside ditches and small ponds to lake tails and slow rivers, in early spring, even before most of the ice on the water surface has melted.

In the beginning of our work in the Semenic-Caras Gorges National Park, in 2002 we were aware of some activities carried in this park related to the collection of *Rana spp.* for human consumption but our information and the field observations suggested that this is an isolated, small scale operation, performed by a handful of the local people more in the form of a traditional delicacy, inherited custom from the German population. Even if such activities are not normal in a National Park it didn't seem to represent a major problem at that time.

Unfortunately, the intensive field research activities performed in the 2005 field season proved that the collection of *Rana spp.* and in particular *Rana temporaria* represents a most

worrying phenomenon, due to the huge number of individuals killed in the beginning of the mating season and the fact that it seems to cover most of the important breeding sites in the region. We discovered this type of poaching in massive quantities in at least three locations but information from locals suggests that in the last few years people started collecting frog legs in several other places as well throughout the park area. Pictures taken at these locations give an idea on the number of individuals killed.



Photos: *R. temporaria* male during migration at Trei Ape (left) and *R. temporaria* male on the Semenic Plateau (right)

Biggest danger comes from the fact that these animals can be gathered in satisfying quantities only in early spring when they start migrating from the forested areas to the aquatic sites where they were born, sometimes covering as much as 3-5 km. Therefore an over-collection of adults that didn't have the time to breed could severely impact a population covering a large area. *R. temporaria* represents a very important link in the food chain because not only it consumes a large amount of invertebrate prey, but it is an important source of food for several bird, mammal and reptile species. It is estimated that it is consumed by more than 80 different animal species in Europe and such dramatic declines in wild populations could have a hard to estimate effect on other species that rely, at least partly on it.

Another potential danger for this species is the unfortunate introduction by the Fishing and Hunting Sport Association, Caras-Severin branch, of the zander, or pike perch (*Schizostedion lucioperca*) in the Trei Ape and Gozna Lakes for recreational fishing. These lakes, even if are not in the park area itself represent some of its borders and therefore habitats for its species. The pike perch is a well known problem fish for biodiversity conservation because of its adaptability and voracious appetite. *R. temporaria* populations in this park largely depend on the tails of the lakes in the region for breeding, in spite of the big resident trout populations.

However, the impact of the very recent (last two-three years) introduction of the pike perch on amphibians is hard to predict and should have been properly analyzed. Funds should be directed now for the investigation of this matter that could have been so easily avoided taking into account the large efforts made in Europe and elsewhere to eradicate fish introductions that had devastating impact on amphibian populations. In fact, it is easy to notice that all three newt species which are present in the park are completely absent in the larger water bodies inhabited by fish, even if their habitat is sometimes less than 10 meters away.



Photos: *R. temporaria* and *R. dalmatina* at poneasca poached larvae (left) and *Rana temporaria* eggs (right)

Rana dalmatina, the Agile frog, has a much more restricted presence in the park than *R. temporaria*, being mostly a low and medium altitude species. It is found in relatively dry deciduous forest habitats and breeds in various types of ponds, ditches and marshes. We were able to record its presence in several locations, ranging between 300-500 meters, in broad leaf forest habitats. The biggest populations we discovered are on the Poneasca River Valley where this species is being poached in big numbers along *R. temporaria* from which it is rather difficult to distinguish and at the Iabalcea ponds.



Photos: *Rana dalmatina* mating (left) and *Bufo bufo* eaten by a polecat (right)

Bufo bufo, the Common toad can be found in big numbers in most of the park studied locations. It is quite adaptable and is usually found in forested habitats where it can disperse at significant distances, of several kms. For breeding it prefers large aquatic areas, such as lakes, slow rivers and deep ponds. It is rather abundant in a few places in the park, such as the Trei Ape, Iabalcea and Poneasca populations which probably consist of several thousands individuals each. Such strong populations are becoming increasingly rarer throughout Europe from various reasons and should be properly protected.

We discovered an interesting situation at a series of ponds in the Caras Gorges, where a small, isolated population of Common toad is being predated in large proportion by several polecat individuals (*Mustela putorius*) and probably one adult otter (*Lutra lutra*) but such events are natural and normal in a healthy ecosystem. Much more distressing is the recent

years increase in road traffic, both because of tourism developing and increasing forestry activities. This takes a big percent of the population and is likely to increase even more. Special care should be taken to avoid situations where roads are intersecting the migration path to the breeding site. In such situations the park administration should restrict the access by night of the vehicles during the one or two week's period when they mate.

This simple measure would significantly increase the survival chances for this species, especially near the village Iabalcea, where the new, more modern road resulted in increasing car traffic and higher speeds creating a real massacre of the toad population, forced to cross this road when migrating to the aquatic breeding sites.

Bufo viridis, the Green Toad, is much less frequent in this area than the Common Toad, because it typically lives in warmer, dryer habitats situated at lower altitudes. It is present in small numbers on the Caras Valley and Poneasca Valley especially in the part near the village, because of its demonstrated preference for human made habitats, such as gardens and it extends up to 600 m on the Gozna Lake. It breeds in shallow water ponds, with no aquatic vegetation. Recorded individuals are large and beautifully colored. We could observe by night, several young Grass Snake individuals (*Natrix natrix*) hunting the larvae of this species in a small ditch created by a truck on an earth road.

The threat level seems to be low for this species even if it suffers from the same increasing of the car traffic.



Photos: A female of *Bufo viridis* (left) and *Hyla arborea* (right)

Hyla arborea, the Common Tree frog is probably the least abundant amphibian species in this park although we recorded its presence, helped by the distinctive, loud, breeding call in several places in the studied area. The only locations with some bigger number of recorded individuals, more than 15 males observed calling at one time, was on the Poneasca Valley, in a rare, deciduous forest habitat, near the road and the same Iabalcea ponds.

It was found breeding sometimes in very shallow ponds, even 10-20 cm deep, which make it very vulnerable to desiccation and the consequent death of the larvae. It was breeding in the same pond with *B. bufo*, *B. viridis*, *B. variegata* and maybe also *R. dalmatina*. We identified a small population at Trei Ape Lake at 750m altitude where *R. dalmatina* and *B. viridis* are absent.

Bombina variegata, the Yellow-bellied toad is also a species with good distribution in this area, because the hilly landscape favors its presence. It is more aquatic than other amphibian species and particularly likes small ponds with good sun exposure and no vegetation on the edge of the roads where it can be seen for most of the spring and summer. In our opinion the species is in decline at least in the Trei Ape Lake area in the last 3-4 years, probably because the increased road traffic on the forestry earth and gravel roads destroyed its preferred breeding places that were situated on the road itself. Except for the high altitudes, of more than 1200-1300m and the places with thick forest cover, it is almost omnipresent in this park.

Rana ridibunda, the Marsh frog is one of the two green frog species present in this park, although *Rana lessonae* could be present as well. It lives in big numbers in some large water bodies, such as Trei Ape Lake and it breeds much later than the other resident amphibians, such as *R. temporaria* or *B. bufo*. Major threat could be collecting for leg consumption although we have no evidence on that in this area as well as the possible danger resulting from the pike perch introductions.

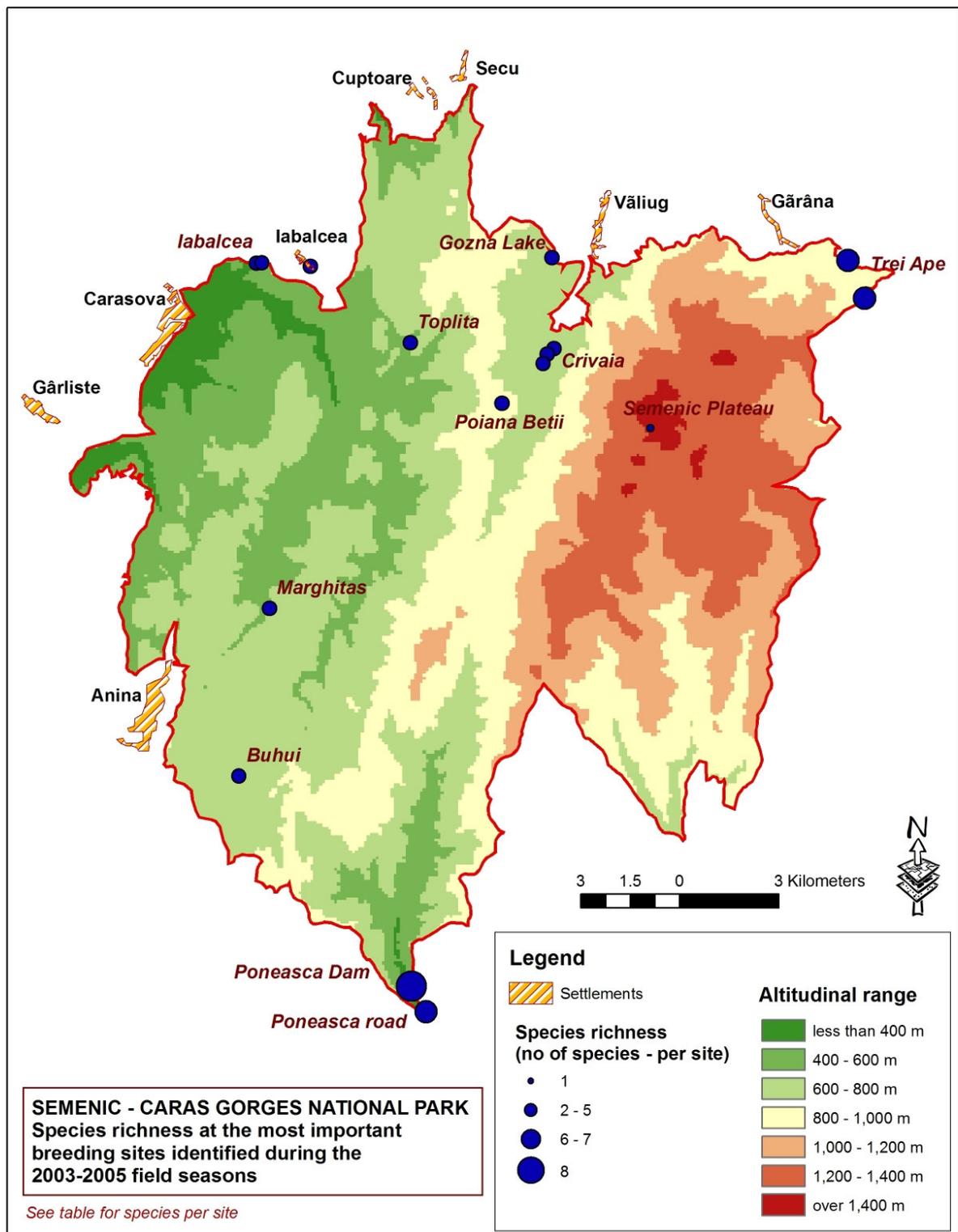
Rana kl. Esculenta, the Edible frog is the hybrid form separated from *R. ridibunda* and *R. lessonae* and it seems to be more abundant than the first in the region, being found also in smaller water bodies on the side of the road or at the forest edge. We recorded this species in several places in the park, from 300 to almost 900m.

Results

Between January 2005 and March 2006 we spent more than 50 days in the field, gathering almost 300 hours of observation with teams comprising between 1-6 members, but usually 2-3. We have recorded more than 100 different aquatic sites used by amphibians as breeding habitats, ranging from the tail of 66ha² lake (the point in which the river enters the lake) to ponds less than 2m² formed in the tire tracks left in the mud by a truck. From these we selected 8 that we considered the most important, and we focused our research to this more limited number.

We have conducted several day and night surveys in breeding season to these sites to determine the species diversity and to gather as much data as possible on species abundance at each location. We evaluated each of these 8 aquatic habitats and recorded data on location, type of habitat, total surface, maximum depth, surface occupied by vegetation, type of riparian vegetation, shadow percent, presence of predators (both terrestrial and aquatic), type of surrounding habitat, distance from roads and more.

All these data will be shared with the Semenic-Caras Gorges National Park Administration. We recorded all amphibian species present in each of these habitats and estimated their numbers at these locations in two or more moments. When possible (smaller sites) we identified and counted all egg masses as this is an excellent method to record the number of reproductive females especially for *Rana temporaria* and *R. dalmatina*.



The exact number proved to be impossible to record for most amphibian species because of the high density during the explosive breeding time. This is the case for *Bufo bufo*, *Rana temporaria*, which gather in populations probably comprising as much as 1000 individuals in a single location and to a lesser extent even for *Triturus cristatus*, which although rare in the entire park area, forms an abundant population of hundreds of individuals in a series of three neighboring ponds near Iabalcea.

We have identified 12 amphibian species (Table1) in the entire park surface but there is the possibility for the existence of two more species, *Pelobates fuscus* and *Rana lessonae* which we were unable to identify in this region even if we have verbal confirmation on both species existence. If present in the park area *Pelobates fuscus* is very restricted and confined to one or two locations in the lowest parts of the park because its preference for sandy or easy-to-dig-in soil.

Although these 12 species are regarded as fairly common European species, *Triturus cristatus*, *Hyla arborea* and *Bombina variegata* are strictly protected species in the Bern Convention and special attention should be given to their conservation in the park area.

With the materials we gathered we created an interactive CD that presents all amphibian and reptile species present in this park, data on their identification, biology, habitat preference and conservation and six panels that give information on amphibian and reptile species in the park.

We were able through the results of the project financed by Rufford Foundation not only to create an accurate image of the species presence and distribution in this park but also to understand the problems that reptiles and amphibian populations face in the region. With the help of the data gathered during 2003-2005 in the two RSG projects the team was able to raise an alarm signal on the necessity to protect the rich herpetofauna species diversity in this area. In this scope we printed leaflets about the species and we present to the local schools lessons plan about the amphibians. Five posters presenting the species biology, their needs of both aquatic and terrestrial habitats and their measure of protection were printed to help pupils to understand amphibians. Because of our desire to do something about these problems and as a natural continuation of these two projects we were able to obtain further financing on a project called “*Save the amphibians in Semenic-Caras Gorges National Park*” by the **Dutch Embassy**, through the **MATRA KNIP Nature Programmes**.

This project means that the results obtained in the two RSG projects are given an additional, long-lasting effect and include a training session with the newly employed rangers from Semenic-Caras Gorges National Park and Nera Gorges-Beusnita National Park on the identification and conservation measures for amphibian and reptile species. A protocol was established with the Park Administration on a simple monitoring scheme that will put an end to the illegal harvesting of brown frogs for leg consumption.

The best result however is that all the data gathered in the 2005 field season collected in the RSG project on important aquatic sites for amphibian reproduction were made in the form of a report and are included in the Park Management Plan and used by the park administration to declare three areas with major importance for amphibian species reproduction. This means that special care will be taken to ensure that these areas remain in their present natural state and also that it will be periodically monitored by the park rangers. Our team is currently helping these park rangers by teaching the monitoring techniques used in herpetology and land management techniques that benefits amphibians.

Table no 1. Semenic – Caras Gorges National Park amphibian species list, as identified during the 2003-2005 field seasons, Caras-Severin, Romania

No. Crt.	Species	Relative abundance in the park area	Type of aquatic habitat occupied and location	Altitude (m)
1	<i>Salamandra salamandra</i>	Very frequent	Springs and small vernal pools with cold and clean water covering almost the entire park area	330-1300
2	<i>Triturus (Mesotriton) alpestris</i>	Frequent	Vernal pools near roads at Gozna and Trei Ape Lake, Poiana Betii and Poneasca	330-850
3	<i>Triturus vulgaris</i>	Frequent	Small vernal pools and ditches near Poneasca, Gozna and Trei Ape Lake	330-750
4	<i>Triturus cristatus</i>	Rare	Only one important population in vernal pools near Iabalcea	330-340
5	<i>Hyla arborea</i>	Small frequency	Tail of Trei Ape Lake and vernal pools near Poneasca	330-750
6	<i>Bombina variegata</i>	Frequent	Small vernal pools and ditches near Poneasca, Gozna, Marghitas, Buhui and Trei Ape Lake	330-750
7	<i>Bufo bufo</i>	Frequent	Vernal pools near roads, and in the Gozna, Poneasca, Marghitas, Buhui and especially the tail of Trei Ape Lake	330-1300
8	<i>Bufo viridis</i>	Rare	Tail of Gozna Lake and small vernal pools near Poneasca and Caras Gorges	330-600
9	<i>Rana temporaria</i>	Very frequent	Small vernal pools and ditches near Poneasca, Buhui, Marghitas, and tails of Trei Ape and Gozna Lake as well as depression wetlands on Semenic Mts plateau	330-1400
10	<i>Rana dalmatina</i>	Small frequency	Vernal pools near Poneasca, Buhui and Caras Gorges	330-450
11	<i>Rana ridibunda</i>	Small frequency	Tail of Trei Ape and Buhui Lake and Poneasca dam	330-750
12	<i>Rana kl. esculenta</i>	Frequent	Tail of Trei Ape, Buhui and Gozna Lake, big vernal pools near rivers at Crivaia, Caras Gorges and Poneasca	330-750

Recomendations

Recomendations for herpetofauna species conservation in the Semenik-Caras Gorges National Park were discussed and elaborated with the help of the Park Administration in order to be able to realise a practical set of measures to be taken by the authorities and the other interested structures in biodiversity conservation in the region.

- We strongly recomend that all the necessary efforts are taken in order to stop the unauthorised collection of frog species for human consumption because of the severe impact that this activity is likely to have on amphibian populations and consequentlly on other species in the food chain. These efforts should include a closer collaboration of the Park's Administration with Environmental Protection Agency (which has the authority to relise permits regarding natural resources use, collection and management of wildlife) and Environment Guard (which has the right to controll and apply regulations ont the environmental sector).
- We recomend that the monitoring plan for amphibian species that SHR following the results of this project should be implemented and that it should be continued for at least three years in order to ases the populations trend and to be able to spot new problems regarding amphibian conservation at an early stage. This monitoring plan states the most important amphibian reproductive sites in this park and the essential moments during 12 months when these sites should be visited by the park rangers.
- We also recomend that a plan is created by the park administration in view of minimising the road traffic impact on migrating amphibians, especially for the common toad. This plan should try to discourage the creation of new roads near amphibian reproductive sites and also the possibility to limit the access or/and the speed during night time on sensitive roads in early spring when migration occurs.
- -We advise a much more skeptical approach when discussing the possibility for new species introduction in previously uninhabited sites, such as the zander introduction in Trei Ape Lake. Such introductions could have a very important effect on the local species diversity and number and should be completely avoided.
- Finally, we recommend that the possibility to preserve all the important habitats in by elaboration of a network area which must include both breeding sites, hibernation sites and migration routes and buffers area. For each of this type guidelines for management should be included. The ponds preservation should be considered on land management for all the park area and park administration must collaborate with other interested structures in order to assure life conditions to several species, especially newts that are affected by habitat destruction consequent to road construction and tourism.

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Financial Statement

Category	Sum £
Field materials (equipments strictly needed in the field work: 3 pairs of rubber boots, waterproof case for the photo camera, 2 nets, 4 mantles, 2 flash lights)	440,-
Travel allowance (train tickets, gas for local travel)	950,-
Accommodation (12 £/day x 20 days x 4 persons)	960,-
Field rations (4 £ x 65 days x 4 persons)	1040,-
Consumable materials (paper, cartridges, printing photos)	465,-
External assistance (designing and producing leaflets about the species, printing 5 posters for raising awareness)	675,-
Other costs (communications – phone, internet, bank operating costs)	285,-
TOTAL COSTS	4815,-