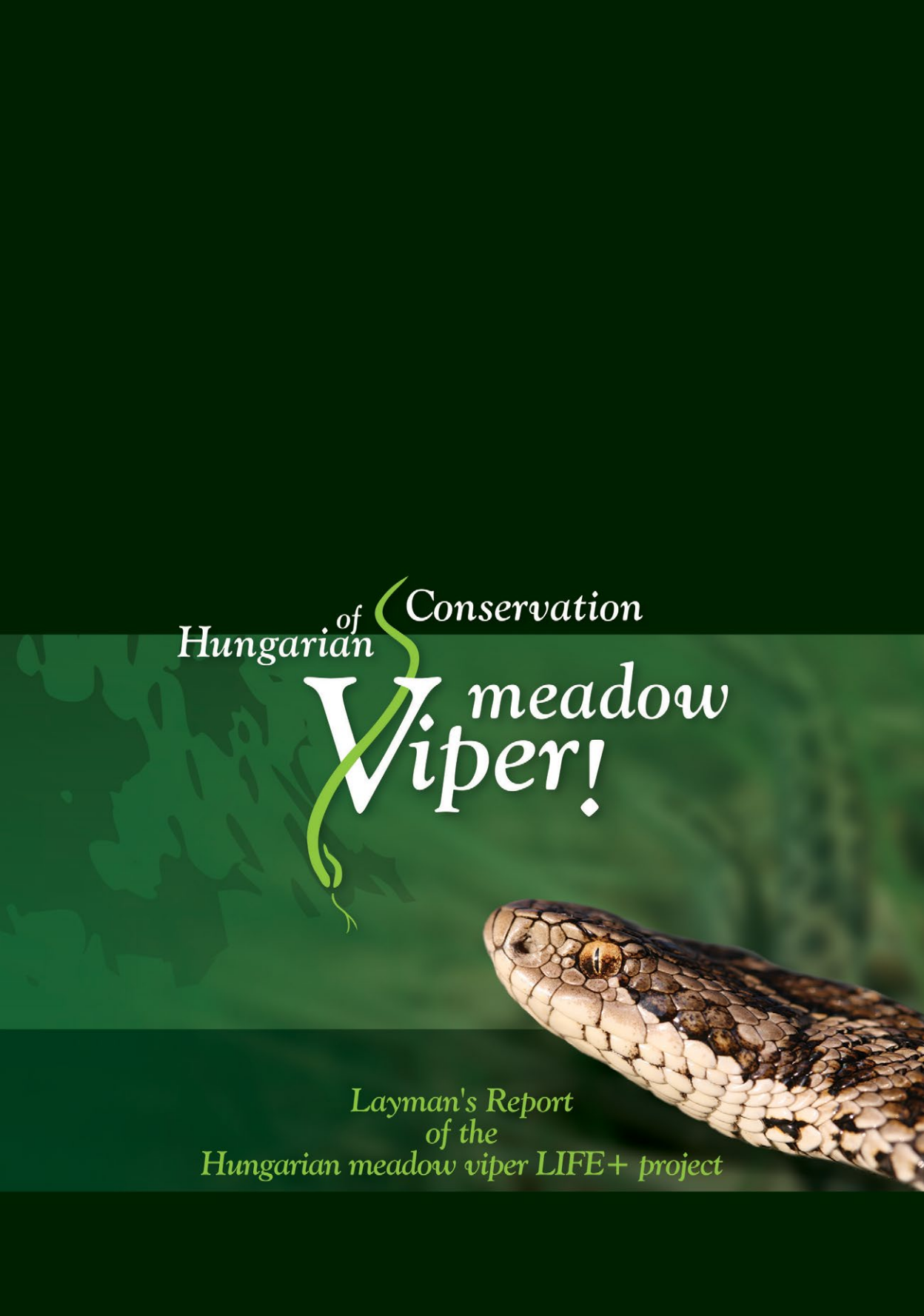
Conservation of Hungarian meadow Viper!



Layman's Report
of the
Hungarian meadow viper LIFE+ project

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Motto: *'...I would say, there is considerable nobility in the nature of this creature, like it would reflect the tranquillity of the puszta and the observing calmness of the puszta people.'*
Lajos Méhely on native vipers (1912)

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LIFE+ project details:

Title: Conservation of the Hungarian meadow viper (Vipera ursinii rakosiensis) in the Carpathian-basin
Registration number: LIFE07NAT/H/000322
Co-financer: Ministry of Environmental and Water Affairs and its successor the Ministry of Rural Development
Total Budget: 2,260,886 €
EU contribution: 73,86%
Duration: 5 years (01.01.2009 – 12.31.2013)

Coordinating beneficiary: Hungarian Ornithological and Nature Conservation Society (MME)
Partners:
- Kiskunság National Park Directorate (KNPI)
- Fertő-Hanság National Park Directorate (FHNPI)
- Budapest Zoo & Botanical Garden (FÁNK)
- Filmjungle.eu (T.HU)
- Neusiedler See – Seewinkel National Park (NNSS)
- Schönbrunn Zoo (TSV)
- Research Institute of Wildlife Ecology (FIWI)

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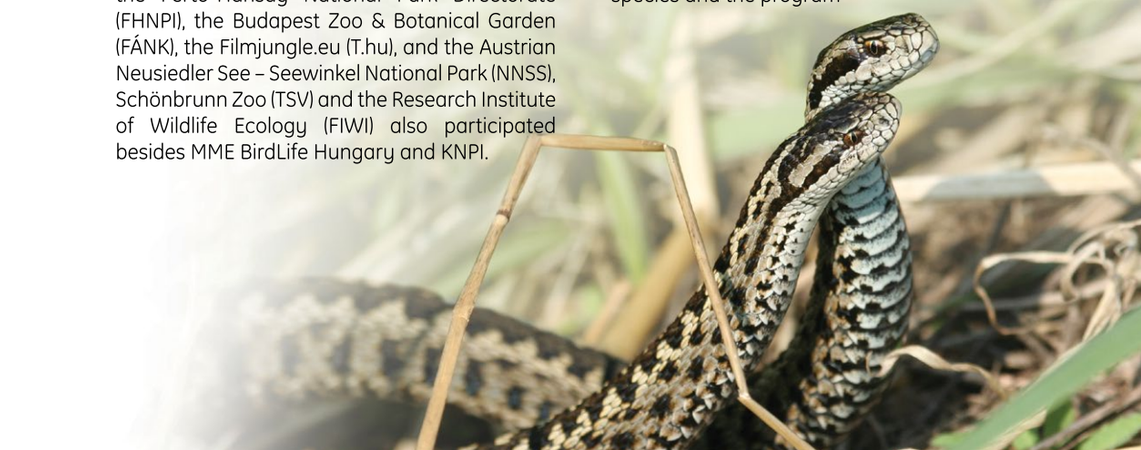
Objectives of the Hungarian meadow viper LIFE+ project

Our primary goal was to prepare a long-term program to ensure the survival of this species. Based on the success of the LIFE program 'Establishing the background of saving the Hungarian meadow viper (Vipera ursinii rakosiensis) from extinction' with the participation of the Hungarian Ornithological and Nature Conservation Society (MME BirdLife Hungary), Directorate of Kiskunság National Park (KNPI) and Directorate of Duna-Ipoly National Park (DINPI) we submitted our request for further funding to the European Council. In the program 'Conservation of Hungarian meadow viper (Vipera ursinii rakosiensis) in the Carpathian-basin' between 2009 and 2013, which was supported by the LIFE+ framework, the Fertő-Hanság National Park Directorate (FHNPI), the Budapest Zoo & Botanical Garden (FÁNK), the Filmjungle.eu (T.hu), and the Austrian Neusiedler See – Seewinkel National Park (NNSS), Schönbrunn Zoo (TSV) and the Research Institute of Wildlife Ecology (FIWI) also participated besides MME BirdLife Hungary and KNPI.

The project consisted of the following parts:

- Land purchases on and around viper habitats;
- Expanding habitats via grassland reconstruction;
- Establishing and operating the Hungarian Meadow Viper Conservation and Exhibition Centre;
- Releasing specimens born in the breeding program into natural habitats;
- Monitoring of habitats, releasing individuals and performing the related scientific studies.
- Launching a public awareness campaign about the conservation status of the species and the project
- Performing surveys in the public about the species and the program



The Hungarian meadow viper

According to the most accepted taxonomical classification, the Hungarian meadow viper is a subspecies of the meadow viper species-complex, only found in the Carpathian basin. This small sized venomous snake had lost the majority of its distribution during the 20th century and by now it can be found only in island-like populations in some areas of the Hanság and the Kiskunság. Outside of Hungary, only a few small populations remained inTransylvania. It is considered extinct form its other known habitats which were located in the Wien-basin in Austria.

The major reason for the drastic decline in their numbers was the transformation of their habitats. What were once pastures became plough-fields and the intensive agricultural techniques on the remaining meadows were also detrimental for them. Their numbers were further dwindled by commercial collecting and intentional slaughter.

The Hungarian meadow viper is an inhabitant of the steppe remnants. Meadows and pastures forming a mosaic of wet and dry grass habitats are favoured by the species, because of the high microclimatic diversity and the abundance of prey. They use rodents' burrows as hiding places and for winter hibernation. The most probable time spot a viper is during the mating season, in spring, when males tend to move much more.

Females give birth to 6-14 young vipers, with lengths of 13-18 cm, in late summer, early September. They reach maturity at age 3-4 years. Males are about 50 cm long while females can reach 60 cm. Young feed mainly on orthopterans (grasshoppers, crickets) while adults consume vertebrates as well, e.g. lizards and nestlings.

Tendency for hiding behaviour is not by chance, as the species is predated by many other species, especially during its first few years. The list of its predators mainly consists of birds, such as storks, herons, harriers, rollers, pheasants and even the rare great bustards. Wild boars, badgers and foxes can even dig them out from their burrows.

The venom of the species is practically harmless to humans. In the case of a bite, although it is extremely rare due to the rareness and shyness of the species, the symptoms are usually slight and quick.

The conservation status of the species

Due to the drastic decline in their number, the Hungarian meadow viper was declared protected in 1974. It is strictly protected since 1988, and from 1992 its conservation value was raised to the highest category, currently at 1.000.000 HUF (3250 €).

The Bern Convention listed the species in Annex II., and an action plan for the conservation of the Vipera ursinii species complex in Europe was developed in 2006. In addition, there are two more recommendations for Hungary regarding the species. The IUCN classified the species as "threatened" and CITES listed it in Appendix I. It is listed in Annex II. of the Habitat Directive, therefore being a selection criteria in Natura2000 and all its habitat were included in the Natura2000 Network. Management of these grasslands has to be subordinated to the vipers needs.

The minister of Environmental and Water Affairs ratified the Species Conservation Plan of the Hungarian meadow viper in 2004. According to said plan, the Hungarian meadow viper has priority with respect to every conservation action within all of the species' known habitats.

It is still considered as Hungary's most endangered vertebrate, with its total count at only 500 strong at the start of the program.

Grassland reconstruction:

reconquer the viper habitats

Habitat reconstruction works had taken place in the Kiskunság and the Hanság. We intended to increase the size of meadows occupied by vipers by purchasing land. After buying the fields adjacent to the known habitats at Peszéradacs, we transformed them with sowing seed mixture and maintained its quality by extensive grazing. During the project, more than 61.7 hectares of land became government property with National Park management in the region.

Near the habitats in the Hanság, large scale landscape reconstruction was accomplished on more than 1,600 hectares. Our goal was to prevent forestation of existing meadows, reduction of invasive plants and facilitate the spread of the associations favoured by vipers.

We reconstructed 392.5 hectares of meadows, and completely eradicated the invasive milkweed and tree of heaven from the area. By sewing appropriate seed mixture on 20.5 ha we started the reconstruction of two hillocks which are important as safe overwintering territories. By purchasing an additional 19.1 ha of forested hillside it was possible to significantly enlarge a viper-occupied habitat which shrank to less than 3 ha in the past.

In viable habitats in Austria, the National Park (in agreement with the owners) had reduced the intensity of land use. Hopefully within a few years these areas will become suitable for vipers, and reintroducing the species which is extinct from Austria can be reconsidered.
Grassland reconstructions were managed by national park professionals in accordance with the protocols and guidelines developed by the Hungarian meadow viper project.

Hungarian Meadow Viper Conservation and Exhibition Centre

The need to establish a conservation and exhibition centre was raised years ago, as the continuous decline of wild populations projected the grim picture of the extinction of the species. The primary objective of the centre is the breeding of vipers collected from threatened populations. The Hungarian meadow viper Conservation Centre started operating in 2004 on a farm owned by the Kiskunság National Park Directorate.

In order to better promote the work of the Centre - giving lectures and receiving visiting groups - a seminar room and the connecting facilities were constructed within the LIFE+ project in 2009. With the education trail and the exhibition terrariums, the centre was transformed into a place to showcase conservation and exhibit vipers.

The KNPI hired a staff member dedicated to giving lectures and other educational programmes mostly for primary school children at the Centre and on other locations as well.

MME-BirdLife Hungary is operating the Centre in close collaboration with the KNPI, and responsible for the implementation of the breeding protocol, following the Species Conservation Plan. The work of the Centre, along with the results of the monitoring is supervised by Hungarian Meadow Viper Conservation Council, formed by conservation and herpetology experts. The associated genetic studies are performed in the Laboratory of Molecular Taxonomy of the Hungarian Natural History Museum, while veterinary support is provided by the Budapest Zoo.

Education

With the improvements of the Conservation and Exhibition Centre we were able to represent the most important part of our work to the public. We tried to inform and involve local schools and civil societies as much as possible. During the five years of the project, almost 4,000 people have visited the Centre; furthermore, we have given over 100 educational lectures throughout the country.

Breeding

To begin the process of breeding, we collected 16 individuals from 6 populations. Breeding has been successful in every year since then. Until 2013 more than 1,700 vipers were born in the Centre. Since 2008, vipers born in captivity were also included in the breeding program. There are 700 specimens are kept in outdoor enclosures.

All individuals are registered in a database-management software which was explicitly developed for that purpose by one of our volunteers. Identification of the vipers is possible by photographs made on their heads and bodies, since their scale-patterns show unique characteristics and remain stable throughout their life.

Concerning secure food-sources for the vipers, the Budapest Zoo has established a cricket-breeding facility that can provide more than 100,000 crickets annually. A quarantine for use during veterinary treatment was also created.

Genetic screening

One of the main goals of the planned breeding process was to avoid inbreeding in the population. Hence, genetic screening is essential. We collect tissue sample from all individuals born or bred in the Centre. We used parallel methods to monitor their genetics and all came to the same assumption that offspring tend to show higher genetic variance than their parents. These methods also give us the possibility to identify the parents when the ancestry is not evident.

Release and monitoring of the vipers

Prior to their release, all individuals must pass bacteriology and parasitology tests. When choosing the future locations for the vipers we always consider their ancestry. After careful preparations we started releasing vipers into suitable habitats in 2010. Following the Release Protocol developed by the program we use groups of 50 individuals in each release. Until now 240 young vipers had been released into three (two in the Kiskunság, one in the Hanság) previously reconstructed and enlarged habitats.

Radio-telemetry devices designed by FIWI give invaluable help in monitoring the vipers. With them we are able to follow their movement much more precisely. In the last 5 years we have observed vipers 404 times in the monitored fields, among which 59 individuals were proven to be previously released by the program, and in an additional 109 cases we can presume that.

In parallel with the Hungarian population, we also monitored vipers in Transylvania. We conducted regular visits to known habitats with Romanian colleagues, and we even found three more locations where the species was not previously observed. During the last five years we have documented 46 Hungarian meadow viper sightings in Romania. We have also participated in the monitoring of closely related sub-species of the Hungarian meadow viper in order to have a better understanding of the preferred habitat characteristics and threatening factors. We repeatedly visited the habitats of the Moldavian meadow viper *(Vipera ursinii moldavica)* in Moldavia and the Danube Delta. With Ukrainian professionals, we explored the Crimea for the steppe viper *(Vipera renardi)*. We collaborated in conservation projects for the carst viper *(Vipera ursinii macrops)* in the Paklenica National Park (Croatia) and for the vipera Ursinii *(Vipera ursinii ursinii)* in France. We visited other important viper habitats in Italy and Turkey as well.

Field research

In addition to monitoring vipers and other reptiles in the territories of the KNPI and the FHNPI, regular botanical surveys and inspection of potential hiding places (burrows) are also necessary. Research was conducted on orthopterans and small mammals, since these groups represent the main food source for the vipers.

These works were carried out by university researchers, national park professionals and colleagues of the MME-BirdLife Hungary. The aim of the monitoring is to have a precise insight on the quality of present and future snake habitats and also to learn more about the success of the released vipers. Thanks to the habitat reconstruction activities, there were significant improvements in the treated fields.
The size of the area with bushy vegetation shrank while the size of the grasslands grew. With the eradication of the goldenrod, degree of naturality increased in all areas. The formerly very rare summer snowflake *(Leucojum aestivum)* became more abundant and stabile populations of the marsh gentian *(Gentiana pneumonanthe)* had been formed.

Our habitat-preference studies have shown that un-mowed stripes are favoured by orthopterans and small mammals alike. The presence of these untreated spots enhances the diversity and survivability of the communities which is good for the vipers as well. As a faunistical attraction, the strictly protected tundra vole *(Microtus oeconomus)* was found in the Northern Hanság for the first time ever during one of our studies.

During the Orthoptera monitoring in the 10 Kiskunság habitats more than 50 species were detected, which is 41% of the total Hungarian Orthoptera fauna. Among them, 4 were protected. The high orthopteran diversity is a good indicator of habitat quality in general. There are stable high densities of prey species in the open sandy meadows of the grassland reconstruction areas, providing abundant food resources for the vipers.

Moths are also good indicators of habitat quality. During the monitoring we were happy to notice that the false ringlet *(Coenonympha oedipus)* has returned to the treated areas, and many important Lepidoptera populations *(Lycaena dispar, Maculinea teleius, Maculinea nausithous)* became stable. It must be noted however, that these species are very vulnerable to mowing, therefore maintaining a patchy habitat structure and using extensive grazing is essential in future environment management practices.

Information gathered on the viper's movement patterns can be used in future recommendations for "viper friendly" habitat management plans. With the installed camera traps we were able to get a much clearer picture on the potential dangers vipers face.

We called upon the Austrian Herpetological Society (ÖGH) to assess the state of the former Austrian habitats of the Hungarian meadow viper and prepare recommendations for a management plan.

Public awareness activities

Since conservation activities for a reptile, especially a venomous snake, can be very divisive, we put great effort to inform the public. We used brochures, posters, information boards, mobile exhibitions, regular press releases, websites (www.rakosivipera.hu, www.mme.hu), social media (Facebook), National and international conferences, and public forums to reach the widest possible audience.

First in the line were the leaflets introducing the LIFE+ project which were published in Hungarian in two forms, targeting children and adults. The version for adults was translated to English and German as well. We republished a booklet introducing the species for the public. We provided posters and CDs containing vital information about the program and the Hungarian meadow viper to schools and to decision-makers. These publications were updated and republished at the end of the project. We also published our achievements in the Boróka journal of the KNP and in this final report.

In the Hungarian meadow viper Conservation and Exhibition Centre it was possible to get first-hand experience on the conservation work. More than 20,000 people attended our lectures and guided tours, our mobile exhibition was visited by an additional 20,000 people from all around the country.

We established information points at major Hungarian Zoos and created permanent exhibitions with live specimens in the Budapest and Schönbrunn Zoos. The 'Venom House' of the Budapest Zoo, where our installations are, have been visited by more than half of the total guests of the Zoo, which means half a million people annually. On dedicated days and during other programs at Zoos, especially on the 'Viper Day' initiated by the Hungarian meadow viper project, visitors could meet professionals and volunteers working in the program. During the more than 80 occasions, more than 540,000 people had visited our information stands altogether.

Our partner, the T.hu has made numerous short films, two documentaries and one natural history movie about the program. Some of these motion pictures were aired even on national Television. We estimate that the total number of viewers exceeded 320,000 people.

The public awareness surveys made by FIWI, which helped us prepare the communications campaign, also showed its fruitfulness, so we are intended to keep it on going. Perhaps one of the most positive results is that most people are not hostile toward the species and the acceptance of the Hungarian meadow viper and our program is even higher among those who met with us personally.

Volunteers

Our program received support from more than 200 volunteers. They helped us in the deforestations, in the installations of artificial burrows, and even in preparing and maintaining the outdoor enclosures. We organized courses for them on 13 occasions, when employees and other professional gave talks and presented the program's main actions. All volunteers received a plastic card as the helper of the Hungarian meadow viper conservation program, and, depending on their contribution, they received PR gifts from the projects.

PR gifts and donation program

We always have constantly wanted to show our gratitude toward our volunteers and those who have helped our cause with donations. We have designed and produced gifts, such as viper shaped pins, pens, fridge magnets, mugs hats, wool shopping bags with the logo of the Hungarian meadow viper conservation program. We have given these gifts depending on the contribution made. To facilitate donations we have prepared 'donation-boxes' which we placed in the MME-BirdLife Hungary's shop and at partner institutions. Donations can be sent via wire transfer to the following bank account number 11712004-20011215. Please put 'Meadow viper program – donations' in the notice section. Thank you for supporting the conservation of the Hungarian meadow viper.

Acknowledgment

We would like to thank for the moral and financial support to the European Union LIFE framework (LIFE07NAT/H/000322).
To the Ministry of Environmental and Water Affairs and its successor the Ministry of Rural Development, to our partners and all collaborating colleagues and last but not least, to our volunteers.

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