

ENPARTS: A EUROPEAN WIDE INITIATIVE TO PROTECT HERPETOFAUNA FROM TRANSPORT SYSTEMS

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ABSTRACT

In Europe amphibians represent as much as 90% of road carcasses and several populations have recently become extinct due to unsustainable traffic mortality. Mitigation measures often suffer from badly designed or implemented solutions, exacerbated by insufficient monitoring or inadequate targets. In 2012 organisations from European countries including Denmark, France, Germany, Hungary, Lithuania, Netherlands, Poland, Portugal, Spain, Switzerland, UK have initiated the creation of a network that can bring together best scientific practice and advice named ENPARTS-European Network for the Protection of Amphibians and Roads from Transport Systems. It aims to “cooperate to carry out all possible measures to inform and to promote best practice in amphibian and reptile road ecology and conservation and to stimulate ways to minimise the negative impacts of transport systems on herpetofauna and their habitats in Europe.” The work includes promoting restoration and creation of new wetlands and clean freshwater areas.

Initial positive and negative themes coming from meetings and workshops are summarised as are initial findings from a UK project developing camera methodology for monitoring small tunnel use by amphibians and other small animals. Future programmes of work including one based in eastern Europe are being planned and new participants and correspondents are welcomed. ENPARTS has an aim to establish a web-based presence as soon as resources allow this to become sustainable in the medium term.

INTRODUCTION

With rapidly increasing human population and traffic volume over the last 30 years, the impacts upon wildlife habitats and species of road construction and from transport systems in general have grown accordingly. As elsewhere, in Europe the direct impacts (e.g. collision/pollution) and indirect impacts (e.g. population fragmentation and isolation/habitat alteration), may take decades to develop and are usually greatly overlooked by government authorities. While legislation and some research and mitigation/compensation activities have been started, the level of priority it has been given is at a low level or even completely absent for some taxonomical groups and at the community/landscape scale. Amphibians and reptiles are often the most impacted animal groups, with large percentages of carcasses represented by amphibians in many cases (Fahrig et al. 1995, Dewoody et al. 2010). The reasons for the high impacts of roads on amphibians are complex and are related to physiological and ecological characteristics.

Mitigation solutions aimed both at reducing road mortality and maintaining connectivity are often expensive and difficult to implement due to the complexity of the problem and insufficient knowledge. In addition, most mitigation solutions for herpetofauna and transport system impacts remain poorly evaluated with little or no monitoring post-implementation. This creates significant problems and delays in achieving progress in this area.

With respect to direct mortality as a result of vehicle collision, these often impact upon crepuscular and nocturnal species and at times at the end of the day when dispersal movements as well as traffic density may be intense. In Europe amphibians represent as much as 90% of total recorded road carcasses in some cases and several populations have been recorded as becoming extinct due to unsustainable traffic mortality (Gryz & Krauze, 2008; Cooke, 2011).

BACKGROUND

In 2012 organisations from 12 European countries (Denmark, France, Germany, Hungary, Lithuania, Netherlands, Poland, Portugal, Spain, Switzerland, Romania and the UK) met for a two-day workshop in Peterborough, United Kingdom to bring together current information on the levels of activity to improve the situation in each country (Figure 1.). At the end of the meeting it was decided to establish a new network as an informal association of interested nature conservation groups in Europe concerned with the impact of transport systems on amphibian and reptile populations. It has been called ENPARTS-European Network for the Protection of Amphibians and Roads from Transport Systems.



Figure 1. Participants at the first ENPARTS meeting in Peterborough UK in March 2012

ENPARTS has a Terms of Reference and Vision Statement (Appendix A.) to “cooperate to carry out all possible measures to inform and to promote best practice in amphibian and reptile road ecology and conservation and to stimulate ways to minimise the negative impacts of transport systems on herpetofauna and their habitats in Europe.”

One stated aim is to create and encourage Web-based information to provide information and guidance on ENPARTS as the initiative grows. The UK charity Froglife (Silviu Petrovan

www.froglife.org) keeps a note of membership and has agreed to provide a communication point in the initial phase.

ENPART has three main areas of concern and consideration at present:

- How to further expand the network across the whole of Europe and to help bring together or promote the identification of best scientific practice and advice in order to effectively mitigate the impacts of transport systems on amphibians and reptiles and their respective habitats.
- How to tackle a major problem which is that mitigation and compensation measures often suffer from badly designed or poorly implemented solutions most likely exacerbated by insufficient monitoring or inadequately defined targets in other comparable projects.
- How to act together as a network and individually as organisations in a manner that significantly and cost-effectively assists in reducing herpetofauna road mortality, habitat fragmentation and to promote restoration and creation of new wetlands and clean freshwater areas in association with areas damaged by transport corridors.

ACTIVITIES TO DATE

Coordination and Communication

In addition to the initial meeting in Peterborough, a sub- group of the membership met at the European Road Ecology conference in Potsdam, Berlin in October 2012. A business meeting concentrated on considering applications for funding of ENPARTS core coordinating activities. Tom Kirschey (NABU Germany) hosted the meeting and organised a short tour of three small wildlife tunnel systems constructed in recent years in the Berlin area.

The first was a 10-tunnel concrete stilt tunnel with metal permanent fence next to a flooded former sand extraction quarry, principally for common toad *Bufo bufo* but also four other amphibian species, located at Nudow. Two other smaller-scale surface tunnel and guide wall systems were visited at the Wasserweck Werderscher Damm and at Bornstedt Cemetery. A poster displaying ENPARTS aims was displayed at the Iberian Conference of Herpetology in 2012 (Figure 2.)

XII Congreso Luso-español de Herpetología / XVI Congreso Español de Herpetología
MURCIA 2012

The European Network for the Protection of Amphibians and Reptiles from Transport Systems - ENPARTS

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Transport systems are one of the biggest threats to herpetofauna survival across Europe.

Habitat fragmentation due to existing and developing road networks leads to massive amphibian and reptile mortalities, leading in turn to local population extinctions.

During the 7-8th of March 2012 the UK Froglife hosted the EU Workshop on Amphibian Mortality on Roads bringing together representatives from 12 European countries in order to:

- to discuss the current situation in different countries;
- to consider the possibility to create a network partnership.



ENPARTS Investigate, inform and promote best practices in amphibian and reptile road ecology and conservation

<p>NGO's Herp Societies Research centers Consulting companies Partnership</p>	<p>Priority areas</p> <ul style="list-style-type: none"> communication information surveillance and monitoring research training campaigns
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Join the network!

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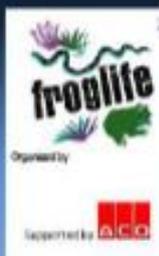



Figure 2. Poster (introducing the group ENPARTS group), presented at the Luso-Spanish Conference of Herpetology, held in Murcia (Spain) in October 2012.

Initial Findings in ENPARTS First Year

For the first two ENPARTS meetings a number of findings have been made in discussions between the national experts that relate to a number of countries, suggesting, not surprisingly, a commonality within Europe and probably elsewhere in the world in multiple aspects of road ecology and herpetofauna conservation.

Apart from country representatives recognising the common aspects of interest within a diverse range of voluntary organisations and research experts, the need to share experiences became obvious as soon as the ENPARTS members get together. For this reason the establishment of an internet presence as a focus to help link together access to information, fieldwork-related appeals and access to reports and publications has been an early ENPART aim. However the funding to do this and selection of a suitable host are vital consideration, as is making any new web location well maintained and sustainable. A further cost is assisting interested parties from countries with few resources for this kind of work such as Belarus and Bulgaria from participating so as to make the communication span the entire geographic area of interest.

Positive aspects

- There has recently been an increase in practitioner communication via the IENE (Infra Eco Network Europe) network established following the COST 341 exercise (Luell et. al. 2003) in the 2000's. This effort is mirrored in North America by ICOET giving added potential for technological advances.
- Some governments such as the Netherlands, Germany, Austria and Switzerland have begun planning green corridors and constructing wildlife crossing structures at a rate that is more realistic in terms of moving towards a significant contribution, including experimental green bridges and well-constructed small animal underpasses.
- Many countries such as Poland and Romania with less developed countryside and diverse wildlife but with major road building programmes are at least beginning to better organise and have begun to install wildlife mitigation measures to counter fragmentation in new road construction programmes rather than retrofitting of mitigation solutions to existing roads as is very often the need in Western Europe.
- Defragmentation planning is underway in an increasing number of countries and ecological networks are being better conceived and developed in most countries.
- Still and video camera recording technology for monitoring animal passage through wildlife crossings is becoming better developed and more affordable, assisting with measurement of effectiveness of systems (e.g. Pagnucco et. al. 2011, 2012).
- Awareness of the lack of monitoring and maintenance of wildlife crossing structures in almost every country is becoming identified as an immediate problem and urgent challenge.
- The pointlessness of wildlife crossing structures without them being linked to protection of habitat linkages that are a part of a secure network of appropriate habitats on both sides of the transport corridor is better understood.

- New books on road ecology with world-wide scope are being prepared reflecting that amphibians and reptiles have been species groups of greatest focus in respect of small and micro tunnel systems. These publications have summarised wildlife crossing issues and solutions for herpetofauna and wildlife in general. (Andrews et.al and van der Ree, R et.al in prep.)
- Some excellent amphibian and reptile websites developing with aspects of road ecology, for example those by RAVON/Padden.nu (Netherlands), NABU, (Germany) and Froglife (UK).

Negative aspects

- Since the worldwide recession started in 2007 there has been tremendous pressure within some administrations districts/provinces etc. to speed up housing programmes, roads and industry and to sacrifice nature in order to try to rapidly stimulate economic recovery.
- Ecological consultants are sometimes cutting corners and providing inadequate advice and inappropriate specifications. This can include breaching guidelines approved by government for best practice in survey and appraisal. This is often but not always under pressure from development organisations and commercial interests or even nature agencies told by government bodies to find solutions at all costs.
- Road builders are using inexperienced companies to carry out the ecological work.
- Construction companies are using inferior or inappropriate materials, often those that are the cheapest in order to fulfil road contracts without care for the quality of the finished system. Construction is sometimes insufficient or in the wrong place and/or badly completed with few quality standards.
- Unrepaired systems have led to suspected declines of populations that were supposed to be protected but because it is unmeasured this goes unreported.
- There is a chronic lack of populations monitoring in advance of, during and after construction bringing vital feedback into the design process.
- Safeguards during constructions are inadequate even totally lacking with thousands of animals needlessly and often illegally crushed under machinery and in earthworks.
- Repair and maintenance of crossing systems is almost non-existent within the road authorities that manage the side of the road/verge areas.
- Bad practice and corruption in local planning bodies that give permissions, often with the government nature advisors powerless to influence decisions or even assisting with the acceptance of damaging proposals that should not have been allowed.

Monitoring Techniques

System for wildlife tunnels using automated camera traps - Froglife (UK) are currently testing a custom made automated camera trap system and data logger for small amphibian road tunnels. This system could very significantly improve the understanding and monitoring effort for such structures not just in the UK but throughout Europe. Initial findings in spring 2013 from a fence and tunnel system has shown extensive use of the tunnel by two species of amphibians (common toad *Bufo bufo* and common frog *Rana temporaria*) as well as shrews and large number of invertebrates, especially earthworms and snails. Future analysis will include comparisons of temperature and humidity inside and outside the tunnel, heat retention of the tunnel and equally, the preferred migratory conditions for amphibians at this site. It is hoped that several more camera traps can be prepared for autumn 2013 and spring 2014 ready for installation in several locations in order to test crossing rates, behaviour inside the tunnel, energy expenditure, etc. If funding will be available Froglife, with ENPARTS participation, hopes to build more camera systems in 2013 to be deployed in continental Europe (Germany, Netherlands, Hungary, etc.). This work is also joining up with camera projects for ACO tunnels in Canada and Australia, helping to cement a group of researchers around the world all working on measuring tunnel systems

Funding from the UK government nature agency Natural England enabled in spring 2013, the start of a 3 year PhD research funding looking into road tunnel use and long term impacts on great crested newt *Triturus cristatus* at Hampton Nature Reserve, home to the largest population of this protected and declining species. The investigations will focus on a complex tunnel and fence system that includes an existing large scale 3 tunnel system already in use for 5 years as well as a new 8 tunnel system of varying size that is currently being installed. Both environmental, spatial and temporary conditions will be investigated in relation to migratory movements through the tunnels with a view of understanding not just use but long term impacts on the viability of the local population.

Froglife has undertaken an important study funded by Natural England into modelling of road mortality hotspots for common toad in 12 large Nature Improvement Areas in the UK. The results of this work will hopefully be used to undertake road transects and surveys and to push forward the effective conservation of amphibians, in particular common toad in these areas using replacement ponds and tunnel and fence systems. As part of the project habitat data (land cover maps, topographical maps and freshwater habitat maps) as well as species presence data for common toads and road crossing sites ('Toads on Roads' volunteer crossing sites) were modelled to produce potential road mortality hotspots. The results of this work will hopefully be used to undertake road transects and to push forward the effective conservation of amphibians. In particular we are focussing on common toad in these areas using replacement ponds and tunnel and fence systems so this should help move ACO projects forward. This is the first such study ever done in UK. A scientific publication in a peer-reviewed journal will be prepared for summer-autumn 2013.

FUTURE AIMS AND ACTIVITIES

There will be an ENPARTS symposium at the 17th European Congress of Herpetology at Veszprém, Hungary, 22-27 August 2013 (SEH 2013). New research in relation to amphibians and reptile road mortality and mitigation will be discussed and presented to an international audience at that time. This will also help raise the profile for ENPARTS as well as for specific areas of research and collaboration in this field.

If the first area of activity is catered for through conferences and workshops, two of the remaining three areas of attention require greater activity. The problem that mitigation and compensation measures often suffer from badly designed or implemented solutions is one that is probably best addressed by government bodies working with the consultancy market. Often the free market principles mean that government leaves the market to adjust itself. However the ecological world is so complex and systems can fail in so many ways that these principles really do not apply well to nature conservation. Greater attention to guidelines and policies are urgently needed, including their update on a regular basis and a way to regularly check that they are being adhered to.

Significantly and cost-effectively assisting in the reduction of road mortality and habitat fragmentation and promoting restoration and creation of new wetlands and clean freshwater areas in association with transport corridors is a considerable challenge.

Activities are progressing in SW Romania to develop a substantial funded project to address the most urgent issues in relation to amphibian and reptile protection from road networks, both existing and proposed. The Environmental Protection Agency and University of Bucharest (Centre for Environmental Research and Impact Studies-CCMESI) will define and initiate a EU project that can focus on this issue with a particular focus in Romania. This country was selected due to the very large scale of construction projects in this country involving roads, motorways, etc. and the huge biodiversity levels present there. As such there are numerous human-wildlife conflicts in relation to roads and development which need adequate and long term mitigating solutions such as wildlife passages.

Many of the habitat creation and management skills are available from nature conservation contexts and it appears that many of the problems rest within the highly competitive arena of road construction management that is based upon large scale expenditure where it is hard for government bodies to regulate detail without strong policing powers. This is often available in theory for strictly protected species, but in practice can be lacking due to lack of political will and application of good ecological expertise in the right way at the right moment. There is a need to better regulate quality approval systems in order to better achieve the kind of results that have been shown are possible in special initiatives by local and national governments. However the demonstration projects need to become the norm and not remain exceptional examples. ENPARTS hopes to become a part of this process and welcomes contacts from all over Europe and outside to help progress this objective.

BIOGRAPHICAL SKETCHES

Tom Langton has a Bachelor's degree in Ecology from the University of East Anglia and worked as staff herpetologist for Fauna and Flora Preservation Society (now FFI) before helping to develop and manage a range of not-for-profit organisations. He has been an independent ecological consultant, owning and managing Herpetofauna Consultants International for 25 years, specialising in habitat management, restoration and reconstruction together with small vertebrate management in temperate regions, particularly for grassland wetlands and woodlands in the UK. Work has focused on endangered herpetofauna for which he is a specialist but also for a wider range of other plant, animal and wildlife community management in general within transport corridor and related infrastructure development projects mainly in Europe and North America. Work has included many aspects of developing wildlife ecopassages and he is a member of IENE and ENPARTS.

Silviu Petrovan is a qualified veterinary doctor with a degree from University of Veterinary Medicine Bucharest, Romania and has worked as a veterinarian in Romania and France. His interests for wildlife led him to participation in several research projects, in particular a Life project on long-nosed viper and captive breeding of Hermann's Tortoise before completing a Masters in Conservation and Taxonomy at University of Bucharest in 2007. He moved and obtained a PhD in wildlife ecology at University of Hull (UK) looking at the landscape ecology of brown hares and rabbits and did a postdoctoral contract investigating impacts of biomass crops on agricultural biodiversity. Since October 2011 he is Conservation Coordinator at Froglife, an amphibian and reptile charity in UK where his work focuses on habitat creation and restoration as well as investigations of road impacts on herpetofauna. He is an Honorary Research Associate at the University of Hull, UK and at Froglife he co-supervises both masters and PhD students. He is developing research and information projects primarily in the UK but also in his native Romania and in Sulawesi, Indonesia where he has been actively involved in research with Operation Wallacea since 2008. In 2012 he has helped establish the European Network for Protection of Amphibians and Reptiles from Transport Systems (ENPARTS) and is currently the network secretary.

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APPENDIX A

ENPARTS Terms of Reference and Vision Statement 2012

Terms of Reference

- ENPARTS is a simple cooperative partnership of voluntary bodies established on 8th March 2012 in Peterborough, United Kingdom.
- *Its formal title is **European Network for the Protection of Amphibians and Reptiles from Transport Systems (ENPARTS)**.*
- It is an informal association of interested nature conservation groups in Europe concerned with the impact of transport systems on amphibian and reptile populations. Any future transition into a more formal body shall be decided by interested parties should the initiative grow to require this. There will normally be one but no more than three member-bodies per country.
- It will cooperate to carry out all possible measures to inform and to promote best practice in amphibian and reptile road ecology and conservation and to stimulate ways to minimise the negative impacts of transport systems on herpetofauna and their habitats in Europe.
- Each organisation shall have an equal vote. A quorum shall be 60% of member organisations or fewer by agreement of non-attending members prior to any meeting.
- It will agree responsibilities and priorities at its meetings when roles and responsibilities will be determined.
- Members will involve and inform other members in undertake in agreed duties on behalf ENPARTS.
- Web-based information will provide information and guidance on ENPARTS as the initiative grows.
- The UK charity Froglife (Silviu Petrovan www.froglife.org) shall keep a note of membership and has agreed to provide a communication point for the first 12 months and prior to any appointment of officials or additional structure/s.

VISION STATEMENT

ENPARTS members aim for a world where humans live in harmony with amphibians and reptiles without transportation systems damaging or destroying them and their habitats. This will be achieved through better care in the siting, construction and maintenance of new and upgraded road and rail and in many aspects of wildlife protection measures associated with them. Measures to assist include bridges and underpasses, small and micro-tunnels, signage, road closures and a range of additional measures (such as rescue from being trapped in drains) undertaken by volunteers and professionals. We aim to promote the defragmentation of damaged landscapes where road or rail cause a part of that disharmony and via the protection, restoration and creation of new wetlands and clean freshwater areas. We will do this by research, education, campaigning, lobbying, seeking enforcement of legislation, publicising new findings and developing opportunities as well as alerting all sectors to new problems that are discovered. We will work with pan-European, National and regional government bodies, conventions and conferences, voluntary networks and with universities and research bodies to achieve our aims.