

JEAN-LUC GROSSI  
HERVÉ COFFRE  
AND ROGER MARCIAU

# Conservation strategy for amphibians in the Rhône-Alpes region



76

*The year 2000 was probably the moment in France when people became aware of the amphibian tragedy currently taking place on a worldwide scale. An indication is the many newspaper articles expressing the growing concern about the extinction of many species and the decline of amphibians noted around the world.*



**Figure 1.**  
*The amphibian mortality while crossing roads is a great problem.*

An article in Le "Monde", one of the major daily newspapers in France, stated that "the decline of amphibians around the world has been confirmed". Similarly, many specialised reviews such as National Geographic published articles on environmental pollution that has led to the disappearance of a large number of amphibians, particularly in Europe. With photographic evidence, they drew attention to the discovery of a population of frogs that have suffered genetic damage (five legs), probably due to the combined effect of a number of factors. These factors included the pollution of humid zones, solar radiation made more aggressive due to the increase in greenhouse gasses and an overall increase in the fragility of amphibian populations rendering them more sensitive to a virus that had remained inoffensive until now.

## THE STATUS OF AMPHIBIANS IN FRANCE

All amphibians are protected by law in France. All species are fully protected, with the exception of *Rana temporaria* and the *Rana kl esculenta* group. These two species are partially protected to take into account French cultural and gastronomic specificities... and they may indeed be captured if they are to serve as food. In each part of the country, an official document sets the dates during which frog hunting is authorised.

NUMBER OF AMPHIBIAN SPECIES	per administrative sector
France	33
Rhône-Alpes region	19
Isère department	16

In addition to legal protection, the Muséum National d'Histoire Naturelle (M.N.H.N.) published in 1995 the Red book on fauna in France. On the basis of criteria established by the U.I.C.N., this document indicates the status of the various species with information on their degree of vulnerability.

## THE PROBLEM OF AMPHIBIAN MORTALITY

### WHILE CROSSING ROADS

### DURING PREMATING MIGRATION

This is the major cause of amphibian mortality as well as the most spectacular demonstration of their existence. Though very discreet during most of the year, the amphibians migrate in massive numbers in the spring and the resulting slaughter on the roads produces a considerable effect on public opinion and has incited an array of environmental-protection groups to launch concrete action to protect the frogs. However, though campaigns to protect migrating amphibians were initiated a number of years ago in certain European countries (Belgium, Germany, Switzerland), it is just barely starting in France, if one does not count the eastern regions (Alsace and Lorraine) where the first attempts were started at the end of the 1980s.

There are solutions!

Concerning the problem of roads, different solutions exist, depending on the local situation and the importance of the problem encountered. A few of these solutions are listed below.

**"Amphibian" road signs to reduce speeds.** The main sites may be equipped with "Amphibian" road signs to reduce the speed of cars. These signs may be the standard "!" sign (caution/danger) with a smaller "Frogs" sign placed just below. Another possibility would be to create a "Frog crossing" sign. It should be noted that high speeds result in disproportionately high mortality rates because the animals are sucked in by the air currents. These signs have already demonstrated their effectiveness in Switzerland and in Belgium and a further advantage is that they reduce the risk of accidents because roads can become very slippery on major migration nights.

**Detours during migration periods.** This solution is rarely feasible. The road is closed in those places and on those nights that migrations take place (approximately 15 nights per year). This is a highly effective solution, but requires the full backing of the appropriate local-government body and maximum support on the part of the local population which must accept a detour via a route less exposed to migrations.

**The creation of capture barriers.** It is not possible to create a great number of barriers due to limited human and financial resources. However, monitoring by capture is still necessary to acquire the basic data for a sustainable project.

**Toad tunnels.** These are tunnels created under roads. The amphibians are guided to the tunnel by an obstacle (wall, trench) positioned along the road. This type of installation is very expensive, but very effective if the necessary study and design work are put into the project. Monitoring by capture is therefore required in the initial stages of the project.

### ISÈRE: AN EXPERIMENTAL DEPARTMENT IN THE RHÔNE-ALPES REGION

It was in 1994 that Espace Naturel de France (a federation of all the nature conservation reserves in France) launched a campaign to alert and inform people about the decline of wetlands. The mascot selected for the campaign was, of course, an amphibian and this marked the start of the "Frog channel". At the same time, the Centre Ornithologique Rhône-Alpes continued its work on establishing the red list of land vertebrates in the Isère department. As a result, everything was in place in 1995 for the start of the first project in the Rhône-Alpes region in favour of amphibians.

#### SUMMARY OF EVENTS IN SETTING UP THE PROJECT

##### 1992

- International Conference in RIO
- "Habitats" Directive 92/43/EEC

##### 1994

1st communication efforts via the "Frog channel"

##### 1995

- Publication of the Red book
- Publication of the Isère Red list
- Monitoring of road kills 1996

##### 1996

- Plan of action in favour of reptiles and amphibians
- 2 equipped sites in Isère Department
- 1st capture barrier for amphibians (250 meters)

##### 1997

- Road-kill study in 533 townships in Isère
- 2 equipped sites in Isère Department

- 2nd capture barrier for amphibians (600 meters)
- 1 site equipped (900 m) in Savoie Department

##### 1998

- Information and visits to sites
- 2 equipped sites in Isère Department
- 3rd capture barrier for amphibians (880 meters) in the RNGL
- CORA study
- CORA study
- 1 site equipped (500 m) in Savoie Department
- LPO study in Loire Department

##### 1999

- Decision on priorities
- 6 equipped sites in Isère Department
- 4th capture barrier for amphibians

(880 meters) in the RNGL

- Visit to sites in the Drôme, Rhône and Loire Departments
- Visit to sites
- 1 site equipped (400 m) in Savoie Department

##### 2000

- 8 equipped sites in Isère Department
- 5th capture barrier for amphibians (880 meters) in the RNGL
- 1 site equipped (400 m) in Rhône Department
- 1 site equipped (400 m) in Loire Department
- 1 site equipped (400 m) in Savoie Department

**RNGL:** *Grand-Lemps pond Nature Reserve*,  
**CORA:** *Centre Ornithologique Rhône-Alpes*,  
**LPO:** *Bird Protection League*

The work carried out in Isère since 1995 made it possible to expand the ENF campaign to most of the Rhône-Alpes region (in 1999, four other departments launched the campaign and a number of sites were equipped in 2000). The work on the methods employed and the monitoring of populations complemented the studies already carried out in Alsace and in Europe and serve as an example for the scientific community and associations in Rhône-Alpes.

### LIST OF PRIORITY SPECIES FOR CONSERVATION IN ISÈRE

Basing our efforts on over 30 years of observations in the department, an assessment of the various potential threats to species was drawn up. To establish the conservation priorities for the department, a number of different tools were used, notably the world (WCU-IUCN, 1996), European and national red lists.

In light of the national (or international) situation for certain species, Isère bears special responsibility that goes well beyond departmental considerations.

Four amphibian species would appear to be particularly threatened in Isère: • *Triturus cristatus* • *Bombina variegata* • *Hyla arborea* • *Pelodytes punctatus*



Figure 2.  
Triturus cristatus

Concerning amphibians, the rare *Triturus cristatus* is still to be found in Isère, but it is virtually absent in all the departments surrounding Isère. *Bombina variegata* is present over the entire department, which makes Isère the last true bastion for the species in the South of France. Concerning reptiles, *Emys orbicularis* is today still fairly numerous in the northern part of the department, but that population group is one of the last in the Rhône-Alpes region. As the above examples make clear, it is imperative to initiate conservation efforts for these species with high environmental value.

### THE GRAND-LEMPS POND NATURE RESERVE, A LABORATORY IN THE RHÔNE-ALPES REGION

This site, located between Lyons and Grenoble at an altitude of 500 meters, was declared a national nature reserve in 1993 due to the wealth of bird wildlife and the many fens and moors.

**Insufficiently evaluated amphibian populations.** Though less well known, the amphibian population stands out for the fact that all four species of the *Triturus* genus (*T. cristatus*, *vulgaris*, *helveticus* and *alpestris*) found in the region are present in this single zone. What is more, when questioned, elderly inhabitants in the area remembered that large numbers of *Bufo bufo* were killed on the road cutting through the wooded, western side of the reserve in the 1940s and 1950s. The reserve management organisation, the AVENIR agency, in conjunction with CORA Isère, quickly decided to initiate a program to evaluate and save the amphibians in the reserve.



Figure 3.  
Hyla arborea

### The plan to capture the amphibians

In 1995, an assessment of the number of animals killed on the local road and an examination of the rutted tracks near the main body of water confirmed that a rescue operation was necessary. The various observations provided further information on the relative numbers of the various species, on the exact position of the major crossing points along the road and the dates of migrations.

In 1996, on the basis of the assessment carried out one year earlier, a 200-meter barrier was set up. The barrier consisted of a sheet of plastic, 50 centimeters high, running along the embankment just above the road. On descending from the wooded hills where they spend the winter, the amphibians encounter the barrier and then fall into buckets sunk in the ground every ten meters, just at the foot of the barrier. Each morning, they are counted, identified and the number of the bucket is noted, then the animals are released on the other side of the road.

In 1996, 1997 and 1998, a number of different products and systems were tested and the length of the barrier was increased first to 500, then to 900 meters when it was noted that large numbers of animals were still killed at the high end of the barrier. By 1998, the final solution had been worked out, incorporating a number of improvements.

### THE RESULTS

The overall figures were 1 321 amphibians collected in 1996 (250 meters of barrier), 2 243 in 1997 (600 meters), 11 112 in 1998 (900 meters), 8 012 in 1999 and 8 160 in 2000.

Many lessons may be drawn from these six years of monitoring efforts.

- There are major fluctuations in the number of animals crossing the road each year and monitoring by capture must be carried out for at least three years to achieve a reliable count of the populations and accurately pinpoint the main crossing points.

- There is a vast population of *Triturus* which came as a surprise because very few were observed among the animals killed, probably due to their small size. In the future, the equipment used must take into account this factor.

- The number of animals captured would indicate that the remaining populations are viable and have the capacity to regenerate their numbers to the previous levels. This fact justifies further study on more expensive installations (toad tunnels) enabling the amphibians to cross the road. All the data already acquired will be put to use in designing and positioning the toad tunnels.

- Finally, the various experiments concerning the equipment used and the installation methods produced an effective technique that may be used on other sites in the region.

### INSTALLATION OF AMPHIBIAN BARRIERS ON PRIORITY SITES

In 1997, a study carried out in the 533 townships in Isère listed the sites where large number of amphibians are killed as well as a number of roads representing a risk for the migration of amphibians.

54 killing sites were noted and ranked by priority, depending on the species present and the number of animals killed. Since 1998, counts have been organised on as many sites as possible, where the objective was to ensure at least one visit per year to each site. These counts were used to verify and/or update the ranking and the operational priorities.

Among the 54 sites, eight were considered priorities and steps have now been taken to protect amphibians on these sites. The Isère General Council (local government) financed the equipment required for the sites within the framework of a departmental project. In the year 2000, over three kilometers of capture barriers were set up using the techniques developed in the Grand-Lemps pond Nature Reserve.

Figure 4.  
Amphibians counted in the buckets in 2000  
Bucket number (meter location along barrier)  
Number of animals

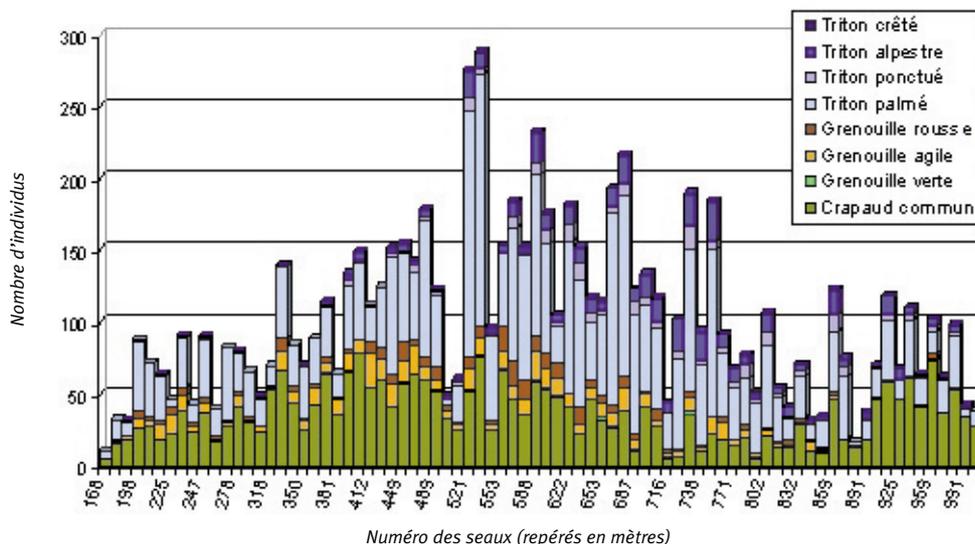


TABLE 1. CHRONOLOGY OF SITE INSTALLATIONS SINCE 1996

Townships	1996	1997	1998	1999	2000
Le Grand-Lemps	250 m	600 m	880 m	880 m	880 m
Villefontaine / Vaulx-Milieu	225 m	225 m	500 m	500 m	500 m
Allevard	250 m	250 m			
Bonnefamille	400 m	400 m			
Charavines	80 m	180 m			
Susville / Pierre-Châtel	240 m	240 m			
Notre-Dame-de-l'Osier	130 m				
Saint-Laurent-du-Pont	500 m				
<b>TOTAL</b>	<b>475 m</b>	<b>825 m</b>	<b>1 380 m</b>	<b>2 350 m</b>	<b>3 080 m</b>

TABLE 2.

Diversity of the species captured along the barriers of the eight sites equipped in 2000	<i>Rana temporaria</i>	<i>Rana dalmatina</i>	<i>Rana ssk.</i>	<i>Bufo bufo</i>	<i>Bombina variegata</i>	<i>Pelodytes punctatus</i>	<i>Triturus cristatus</i>	<i>Triturus vulgaris</i>	<i>Triturus helveticus</i>	<i>Triturus alpestris</i>
Le Grand-Lemps	•	•	•	•			•	•	•	•
Villefontaine / Vaulx-Milieu	•	•	•	•			•	•	•	•
Allevard				•						
Bonnefamille	•	•	•	•					•	•
Charavines	•	•	•	•					•	•
Susville / Pierre-Châtel		•	•	•						
Notre-Dame-de-l'Osier	•	•	•	•	•	•			•	•
Saint-Laurent-du-Pont	•	•	•	•					•	•

**INCLUDING AMPHIBIANS AND THEIR HABITATS IN TERRITORIAL PLANNING POLICIES**

Our ignorance concerning the requirements of amphibians and the lack of interest on the part of developers has often led to accelerated damage to their habitats. Though long ignored or insufficiently taken into account, they are today granted more attention in impact studies for major projects. For example, following the creation of road and transportation infrastructures, spawning sites have been rehabilitated or created, biological continuums have been maintained, etc., in the framework of the compensation measures included in major projects.

Once the monitoring systems set up on the eight priority sites in Isère (most likely after three years) have provided the necessary information, similar to that obtained in the Grand-Lemps pond Nature Reserve, the study required for toad tunnels may be initiated. The barriers on the eight sites may then be used for other sites. The impact of the road network in dividing animal populations will thus be reduced, which will serve as a positive factor for ecosystems in general.

The long-term solution selected to maintain local amphibian populations must imperatively be based on: • in-depth knowledge on the status of the local amphibian populations (a realistic assessment of the numbers) • identification of crossing points and the angles at which the animals approach the road • the number and frequency of vehicles on the road and the configuration of the road • the number of animals killed on the road • the long-term existence of the ecosystems required by amphibians (hibernation, hunting, migration and reproduction zones).



Figure 5. Amphibian barriers next to the road which run alongside the Grand-Lemps pond



Figure 6. The most numerous species is by far Bufo bufo which represents 63% of all the amphibians counted. This species is one of the most likely to be killed due to its slow movements and because it is large enough to be easily noted among the killed animals on roads.

**SHARING OF EXPERIENCE AND COMMUNICATION**

Aware of the need to share management experience acquired in the field of conservation of habitats and endangered species, the Conservatoire Rhône Alpes des Espaces Naturels (Rhône-Alpes Nature Land Conservatory) decided with other management entities in the region to publish technical manuals on the experience acquired in the field by the various partners. The manuals are intended for conservation professionals, i.e. for wide distribution. One of these manuals is presented in the next article and a number of the projects carried out in the various departments are presented in a "project database" •

**BIBLIOGRAPHY**

COLLECTIF (1994) Le Livre Rouge : Inventaire de la faune menacée en France. Muséum national d'histoire naturelle / Nathan / WWF. 176 p.

Langton, T. & Burton J. A. (1997) Amphibiens et reptiles : assurer la sauvegarde des espèces et des habitats par la gestion. Édition du conseil de l'Europe (série aménagement et gestion n°4). 100 p.

Loose, D. & Deliry, C. (1995) Guide des espèces animales menacées en Isère. Conseil général de l'Isère. 23 p.

Loose, D. & Deliry, C. (1996) Les listes Rouges des vertébrés du département de l'Isère : présentation de la méthodologie et des résultats. CORA Isère. 14 p. + annexes

Ministère de l'Environnement (1996) Plan d'actions pour les reptiles et les amphibiens. Sous direction de la chasse et de la faune sauvage. 43 p. + annexes

JEAN-LUC GROSSI  
HERVÉ COFFRE

Centre Ornithologique Rhône-Alpes - section Isère  
5, place Bir Hakeim F-38000 Grenoble, France  
E-mail: grossi.avenir@wanadoo.fr

ROGER MARCIAU <sup>1</sup>

Association pour la Valorisation des Espaces Naturels Isérois  
Remarquable - 10, rue Raspail F-38000 Grenoble, France  
E-mail: marciau.avenir@wanadoo.fr