LIFE CROAA

LAYMAN'S REPORT

LIFE15 NAT/FR/000864

LAYMAN'S REPORT

Project location: France
Starting date: September 1st 2016
Ending date: August 31th 2022
Total budget: 3,430,179 €
UE contribution: 2,058,107 €
Eligible costs (%): 60%

Financial partners:

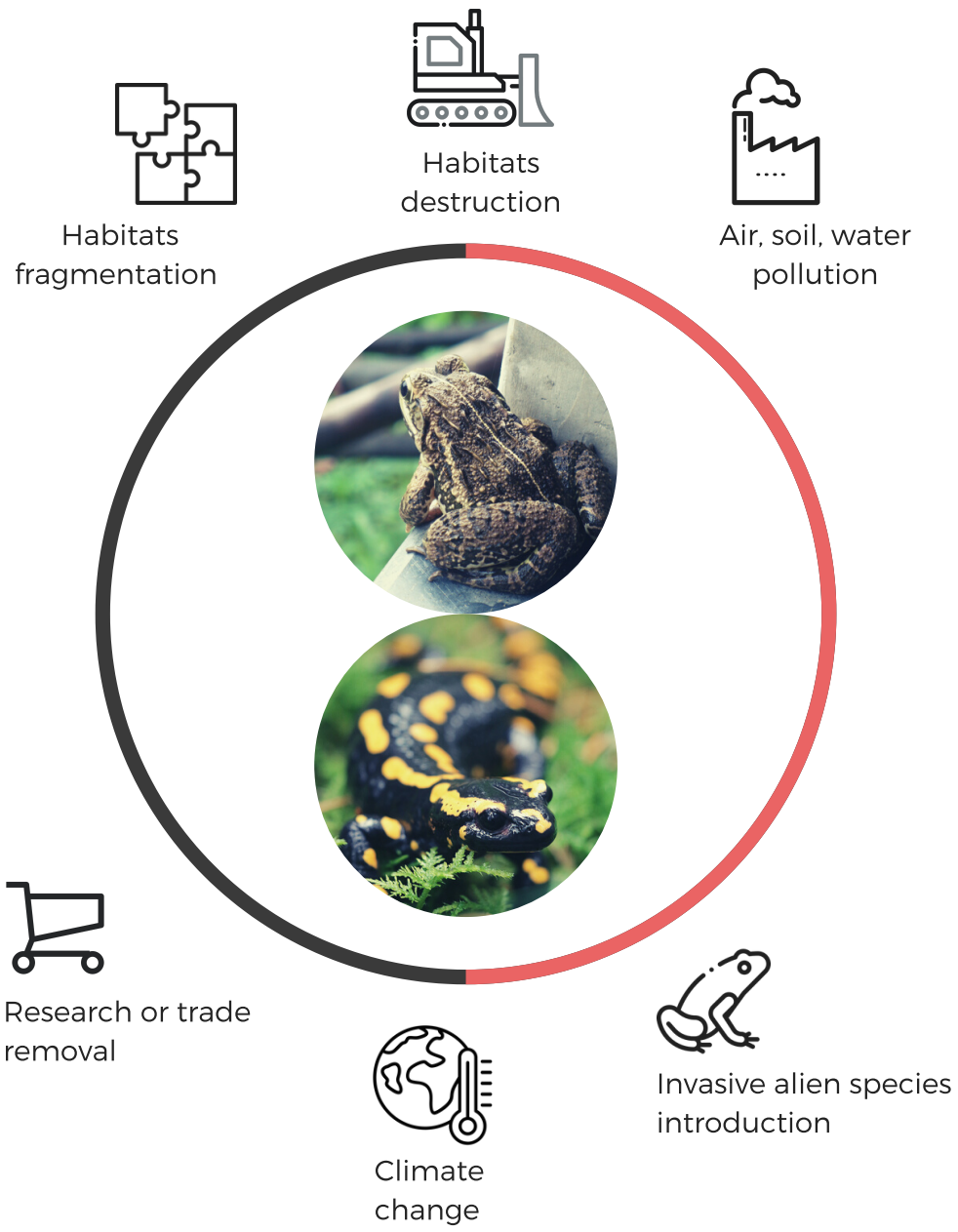
- LIFE - EU's funding instrument.
- Nouvelle-Aquitaine DREAL.
- Adour-Garonne Water Agency,
- Centre-Val de Loire Region,
- Nouvelle-Aquitaine Region,
- Beauval Nature association.

Project beneficiaries:

- Herpetological Society of France (coordinator),
- Cistude Nature association,
- Departmental committee for the protection of nature and the environment,
- Thouarsais community of municipalities,
- Loire-Anjou-Touraine regional nature park,
- Landes de Gascogne regional nature park,
- Périgord-Limousin regional nature park,
- Angers University.

LIFE CROAA
Control stRategies Of Alien invasive Amphibians

TABLE OF CONTENT



01. THREATS TO AMPHIBIANS

Many factors (e.g., habitat loss, pollution, local consumption) currently threaten amphibian populations worldwide.
The introduction of exotic amphibians such as the American bullfrog and the African clawed frog puts additional stress on native species.

In the context of the LIFE CROAA, major issues related to the biological invasion of these two anuran species have been identified:

- Undermining of wetlands that are already weakened by global changes,
- Trophic disruption and altered functioning of lentic ecosystems,
- Health risk by transmission of infectious disease to native amphibians,
- Threat to species, community, and habitats with high heritage value,
- Lack of general strategy for the management of invasive amphibians in France.

WHAT IS AN INVASIVE ALIEN SPECIE (IAS)?

It designates a species introduced voluntarily or fortuitously by a human outside its natural range.
The introduction and spread of such species threaten the native ecosystems, habitats, and taxa. Alien species may cause important ecological, economic, and/or health issues in their introduction range (source: French IAS Resources Center).

THE AFRICAN CLAWED FROG

- **Latin name:** *Xenopus laevis.*
- **Origin:** Southern Africa.
- **Introduction in France:** In the 80s in the Deux-Sèvres department.
- **Occurence in France:** Deux-Sèvres, Maine-et-Loire, Vienne, Loire-Atlantique, Gironde, Nord, Haute-Garonne departments.
- **Adult height and weight:** snout-vent-length, 70-130 mm; maximum body mass, 220 g.
- **Characteristics:** Lives only in aquatic environment.

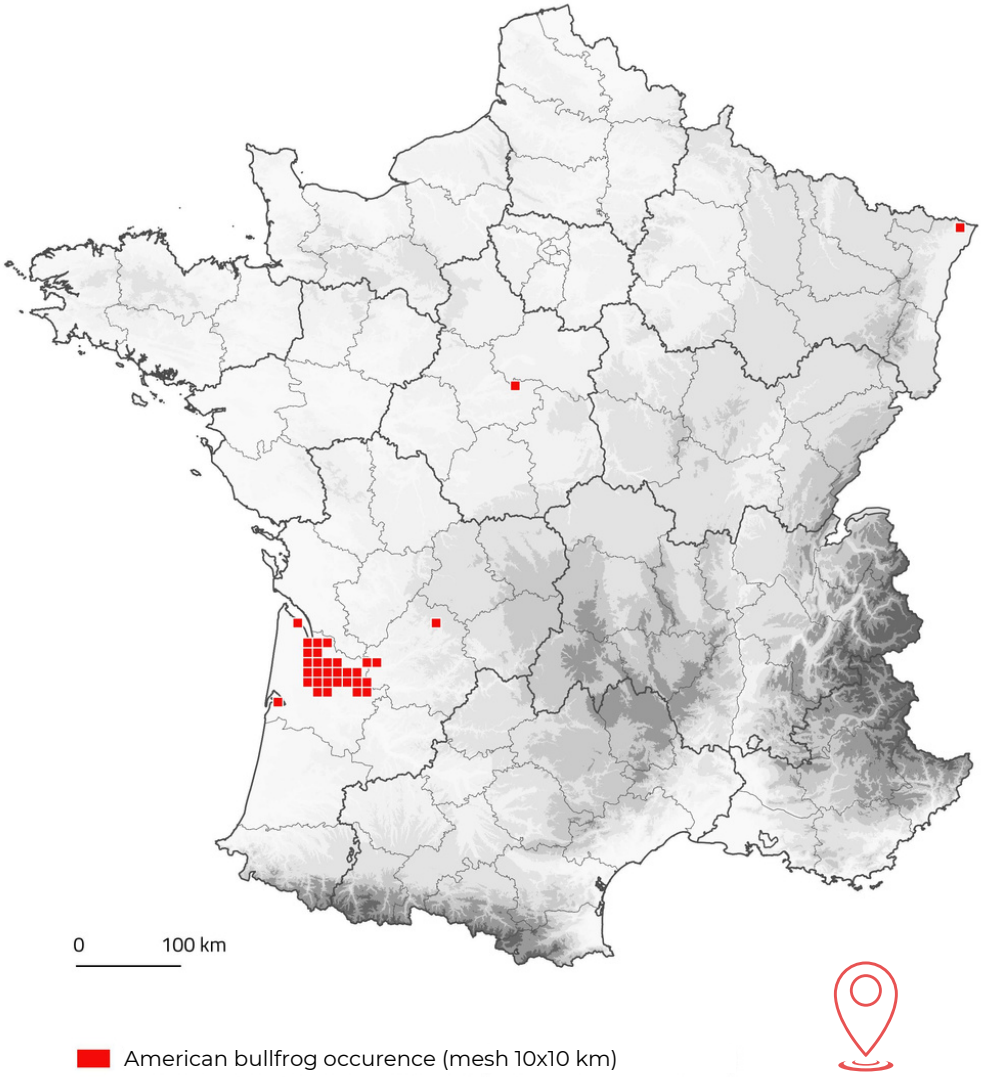
THE AMERICAN BULLFROG

- **Latin name:** *Lithobates catesbeianus.*
- **Origin:** North America.
- **Introduction in France:** In 1968 in Gironde department.
- **Occurence in France :** Gironde, Loir-et-Cher, Dordogne, Bas-Rhin.
- **Adult height and weight:** snout-vent-length, 120-180 mm; maximum body mass, ~1 kg.
- **Characteristics:** Song similar to a cow's moo, short and repeated, in short sequences. It is audible within a radius of 1 km. Substantial size.

IMPACTS ON LOCAL FAUNA

- **Predation:** These invasive amphibians feed on aquatic invertebrates, fish and amphibians (eggs, larvae, adults).
- **Competition:** They also feed on the same prey and use the same habitats as native amphibians.
- **Transmission of pathogens:** They are healthy carriers of ranavirus and chytrid, which may be deadly to native amphibians.

02. THE AREAS AFFECTED IN FRANCE



The first observation of the American bullfrog in France dates back to the 1990s. This species was released for the first time in 1968 by an individual for the ornamentation of his private pond. It is likely that only a few individuals (founders) have been initially introduced.

In the 2000s, a second population was found in the department of Sologne where American bullfrog individuals were released in the 1990s.

At the same period, additional populations were discovered in the department of Dordogne and in the Bay of Arcachon.

In 2021, a pond colonized by the American bullfrog in Alsace department was identified.

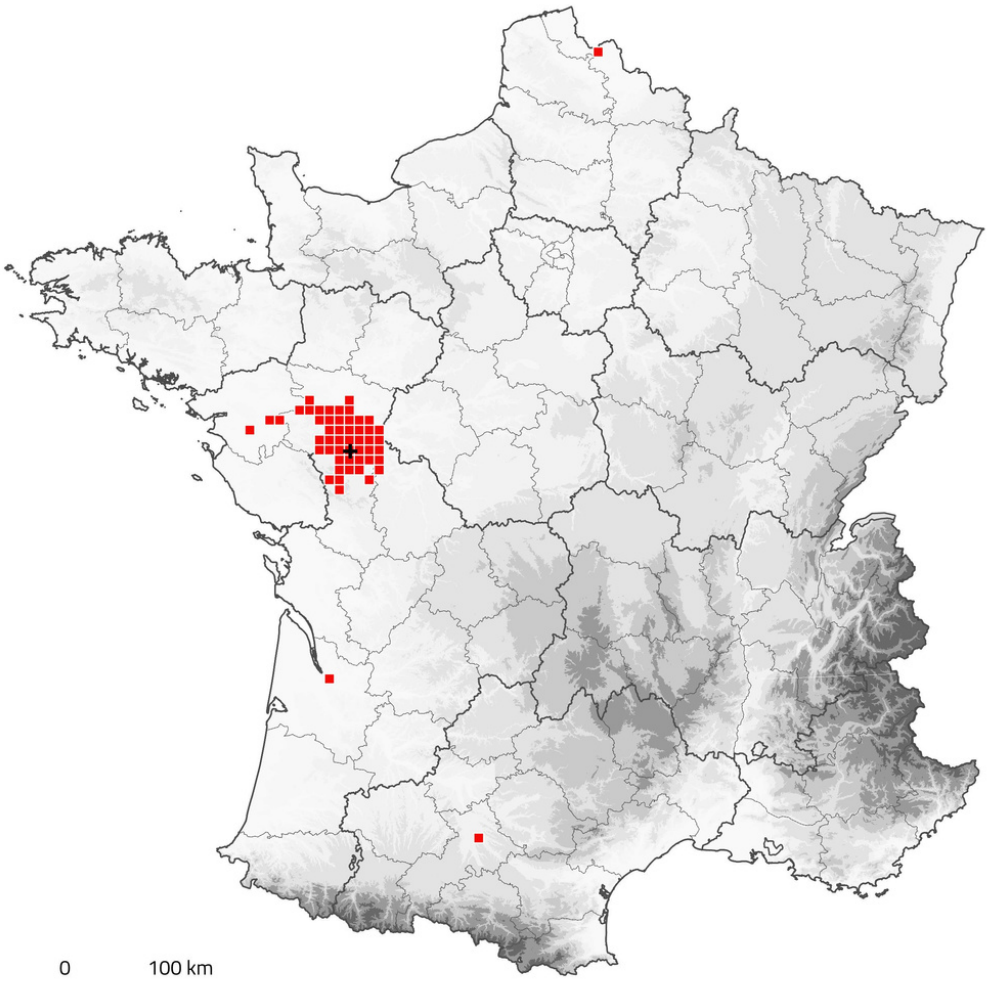
Currently, based on available data, the American bullfrog would have colonized nearly 4700 km² in France.

ORIGIN OF INDIVIDUALS

American bullfrogs from Florida were introduced in the department of Gironde, leading to the establishment of the largest population currently known in France. Further, dispersing individuals from this initial population colonized neighboring areas, resulting in the emergence of new populations in the department of Dordogne and in the Bay of Arcachon.

Two other populations have been discovered in Alsace and Sologne. Genetic data revealed that the population located in Sologne is divergent from those occurring in the region of Nouvelle- Aquitaine, suggesting repeated, independent introduction events. To date, the geographic origin and the introduction history of these additional populations are still poorly documented.

02. THE AREAS AFFECTED IN FRANCE



+ Historical introduction point

African clawed frog occurence (mesh 10x10 km)

Following the closure of a breeding center of African clawed frogs in the 1980s in the department of Deux-Sèvres, several individuals were released into the natural environment and formed a population that is now spread over four departments: Deux-Sèvres Sèvres, Vienne, Maine-et-Loire, and Loire-Atlantique.

Several decades later, a second population was identified in Gironde department in 2015.

A third site colonized by this species was then discovered in the North department in 2018.

In 2019, a fourth population was identified near Toulouse.

Currently, the African clawed frog could have colonized nearly 4 800 km² in France.

ORIGIN OF INDIVIDUALS

The oldest population of African clawed frogs introduced into France is located in the department of Deux-Sèvres. The founder individuals were released from a breeding center supplying biomedical research. Dispersing individuals from this initial population led to the emergence of a large set of populations (metapopulation) in the northwest of France.

The introduction history of the populations located in the departments of Gironde and Haute-Garonne remains poorly documented so far. Although introductions from research laboratories are likely, it is also not possible to rule out the possibility that some populations were formed (or reinforced) from individuals from the pet trade.

Genetic data appear necessary to clearly establish the geographical origin of the lineages and attempt to reconstruct the history of the biological invasion of the African clawed frog in France.

03. THE LIFE CROAA OBJECTIVES

- **Eradicate small American bullfrog population** in France by improving capture methods;
- **Develop a control strategy for invasive amphibians** when the size of the introduced populations and the extent of the colonized area prevent full eradication, implement in to weaken populations and prevent the spread of individuals;
- **Prevent the introduction of new exotic species of amphibians** by raising the awarenessof a multiplicity of actors;
- **Create a system for early detection and assessment** of invasive alien amphibian introductions;
- **Communicate, inform and train** stakeholders on the issues of invasive alien species in order to facilitate the acceptance of control operations, limit the risk of dissemination and set up an alert network;
- **Promote the project,** disseminate its results and share knowledge.








04. THE MAIN MEASURES

MONITORING AND MANAGEMENT OF POPULATIONS IN THE FIELD

The LIFE CROAA staff has first documented the distribution and updated the geographic position of the colonization front for the two frog species, using various detection methods including environmental DNA* (eDNA).

Trapping actions of American bullfrog and African clawed frog individuals at different stages have been carried out. Different methods have been tested to improve catching rates.

Lastly, a reflection on a **protection system** for areas with priorities issues and the installation of specific devices **limiting the dispersal** of the American bullfrog and the African clawed frog has been carried out.

292
CONTROLLED SITES

47
PEOPLE INVOLVED

71 750
CAPTURED INDIVIDUALS
(among all stages)

*Molecular technique that aims to identify the presence of a species through the detection of specific DNA present in the environment.

INFORM AND RAISE AWARENESS

The program has enabled the development of media **to raise awareness of invasive alien species and the risks associated with their release and spread into the natural environment:** articles and regular publications on the internet and social networks, flyers, posters, videos, have thus been created and disseminated to a wide audience. Meeting with the general public was also a key action of the awareness programme.

The creation of an Amphibian educational kit (physical and digital) was also a priority action to educate young. Intended for teachers and environmental facilitators, it has already been consulted and/or used almost 200 times.

CHANGING REGULATIONS AND MOBILIZING PUBLIC AUTHORITIES

The LIFE CROAA team has also intended to change the legislation supervising the shareholding, buying and selling of the African clawed frog in Europe and France. Furthermore, the partners have maintained contacts with national (Ministry of ecological Transition, French biodiversity agency) and local public actors throughout the project, to maintain a level of critical attention around these two species.

05. THE ENVIRONMENTAL BENEFITS

CHARACTERISTICS OF COLONIZED SITES

Scientific studies have highlighted a link between the presence of exotic species and the degradation of the habitats where they occur. Deteriorated habitats seem to be favorable to the development of the American bullfrog or African clawed frog populations, which have easier access to their prey in these environments with limited vegetation, minerals or substrate.
In the context of the LIFE CROAA project, it has also been observed that sites colonized by the American bullfrog and the African clawed frog also host other invasive species (e.g., fishes and crayfishes).

The impact of exotic species seems to be exacerbated in environments that already suffer from multiple threats, (e.g., habitat fragmentation or water pollution), which most often provide unsuitable conditions for native amphibians.

The American bullfrog and the African clawed frog are species that are also able to settle in healthy environments. It is therefore essential to foster the protection and restoration of these habitats, which could allow mitigating the potential impact of such invasive species and protect the local species that live there.

AN IMPROVED SPECIES RICHNESS

Monitoring carried out during LIFE CROAA have shown that the species richness* of aquatic invertebrates and local amphibians is higher in sites that are not occupied by American bullfrog and African clawed frog.
In some cases, the species richness in colonized and managed sites (ie. where trapping actions are performed) was better than that of the unmanaged sites, suggesting that management efforts have a significant effect on biodiversity conservation.
This result highlights the value of management measures to protect local biodiversity, however, additional monitoring is necessary to confirm the trends observed.

*Refers to the number of species present in a given environment and thus allows the measurement of the biodiversity of all or part of an ecosystem.

06. DISSEMINATE

Throughout the six years of the project, the LIFE CROAA team has undertaken to communicate on its actions and to promote the tools designed to meet the challenges of raising awareness. Several project's dissemination activities were thus carried out:

- Regular communication on the life-croaa.eu website and on the associated Facebook page,
- Information panels installed on managed sites,
- Participation in the National Congress of Herpetology from the French Herpetological Society, the International Ornithological Film Festival of Ménigoute and other local events,
- Presence in the media: press articles, radio broadcasts, television broadcasts,
- Promoting the Amphibians educational kit and videos media to public authorities, local associations and the educational world,
- Organisation of the programme restitution symposium in Bordeaux.

07. PERSPECTIVES

Significant advances have been made to control the populations of American bullfrog and African clawed frog established in France and to improve our knowledge about these two invasive amphibians.
Yet, these species remain a threat to the conservation of native amphibians. Although the small populations of American bullfrog are exposed to high risk of extinction, the current impossibility to limit species expansion from heavily colonized areas and the discovery of new sites colonized by isolated individuals in France demonstrate that conservation efforts must be continued. In this context, potential management actions have been identified.

MAINTAIN PRESSURE ON BOTH SPECIES

- Maintaining management actions for small populations,
- Monitoring the colonization front and detecting early the presence of the two species in new colonized sites,
- Implementing management actions as soon as new colonization is detected.

RESTORE ENVIRONMENTS

Relying on Nature-Based Solutions to restore degraded ecosystems and promote the natural regulation of the American bullfrog and the African clawed frog is a promising solution. These solutions will make it possible to compensate for the damage caused by these invasive alien species.

A NATIONAL PLAN TO COMBAT INVASIVE ALIEN AMPHIBIANS

A reflection is underway to fight on a national scale against all invasive alien amphibians in France (multi-specific vision). This will result in the drafting of a National Plan for the fight against invasive alien amphibians (considering additional species such as the Italian Crested newt and the Mediterranean painted frog) on the French territory.

MORE INFORMATION ON:

contact@life-croaa.eu

Life-croaa.eu

@LifeCroaa

LIFE CROAA PROGRAMME
LIFE15 NAT/FR/000864

LIFE CROAA
Control stRategies Of Alien invasive Amphibians

A project co-financed by the LIFE programme of the European Commission and french public authorities.

A project implemented by:

CREDITS

pictures:
Cover: American bullfrog ©M.Berroneau, African clawed frog ©D.Troquereau.
p.2: African clawed frog ©A.Martin
p.3: Solognot lake ©CDPNE
p.4: Toad ©Pixabay - maheshshinde, Salamander ©Pixabay -onkelglockge.
p.5: African clawed frog ©D.Troquereau, American bullfrog ©M.Berroneau, Smooth newt ©E.Sansault.
p.7: *from up to bottom*. Seine fishing technique ©G.Michelin, Containment of a lagoon basin ©PNRLAT, Trap retrieval ©PNRPL.
p.8: *from left to right*. Water sampling ©L.Clément, African clawed frog's eggs ©A.Martin, trap ©A.Martin, Marking a young American bullfrog ©A.Ribas, African clawed frog caught ©B.Martin, Trap retrieval ©PNRLAT, American bullfrog shots by night ©PNRPL, trap pot ©A.Martin.
p.10: Educational animation ©M.Le Brishoual
p.11: European tree frog ©M.Berroneau
p.12: LIFE CROAA exhibit ©A.Merlet
p.13: Lake ©CDPNE
p.14: Common midwife toad ©M.Berroneau
p.15: Marbled newt ©M.Berroneau

pictograms (p.4):
backhoe: Rudez studio.
puzzle: mynamepong. Licence C.C.
pollution: Paola Moreira. Licence C.C.
Climate change: imaginationlol. Flaticon.
Trade: Alexander Madyankin, Roman Shamin. MIT License.
IAS: Freepik. Flaticon.