

THE AMERICAN BULLFROG CAPTURE TECHNIQUES

TECHNICAL SHEET

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This technical sheet was produced within the framework of the European LIFE CROAA program "Control strategies Of Alien invasive Amphibians - 2016-2022" (LIFE15 NAT/FR/000864) whose main objective is to contribute to the improvement of the state conservation of native amphibian species, notably by preserving them from the impact of invasive alien species.

This program was coordinated by the Société Herpétologique de France (SHF) and carried out in collaboration with seven partner structures.

Find out more: www.life-croaa.eu

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THE AMERICAN BULLFROG AN INVASIVE EXOTIC SPECIES IN FRANCE

An [invasive alien species](#) is defined as a species introduced by man outside its natural range (voluntarily or fortuitously) and whose establishment and spread threaten ecosystems, habitats or native species with ecological consequences. and/or economic and/or negative health ([IAS Resource Centre](#)).

Originally from United States and introduced into France in the wild several decades ago, the American bullfrog (*Lithobates catesbeianus*) is listed in [appendix 2 of the ministerial decree of February 14, 2018](#), prohibiting its introduction into the national territory and into the natural environment, its transport, peddling, use, exchange, its sale and sale or the purchase of live specimens. Used for ornamental purposes in the 1980s, this species has since colonized several territories in mainland France, such as Loir-et-Cher, Gironde and Dordogne and Bas-Rhin.

→ [Learn more about invasive alien species regulations](#)

Several legal texts address the issue of invasive alien species at national, European and international levels. In France, the [National Invasive Alien Species Strategy](#) was drafted in 2016. It aims to protect marine, freshwater and terrestrial ecosystems, as well as the animal and plant species they host, from the risks and effects associated with biological invasions. . Its general objective is to strengthen and structure collective action concerning prevention and awareness, the establishment of surveillance and rapid reaction systems, long-term management means, including the restoration of ecosystems, and the improvement of knowledge.

Guided by these European and national strategies, study and control actions against the bullfrog have been tested by professionals from local authorities and environmental associations ([LIFE CROAA project](#)), in order to identify the species, limit its dispersion and if possible to reduce its impact on the natural environment.

This sheet aims to list a series of capture techniques to be implemented in the field to control the bullfrog.

→ [Learn more about Species targeted by LIFE CROAA](#)



KNOW HOW TO RECOGNIZE THE BULLFROG

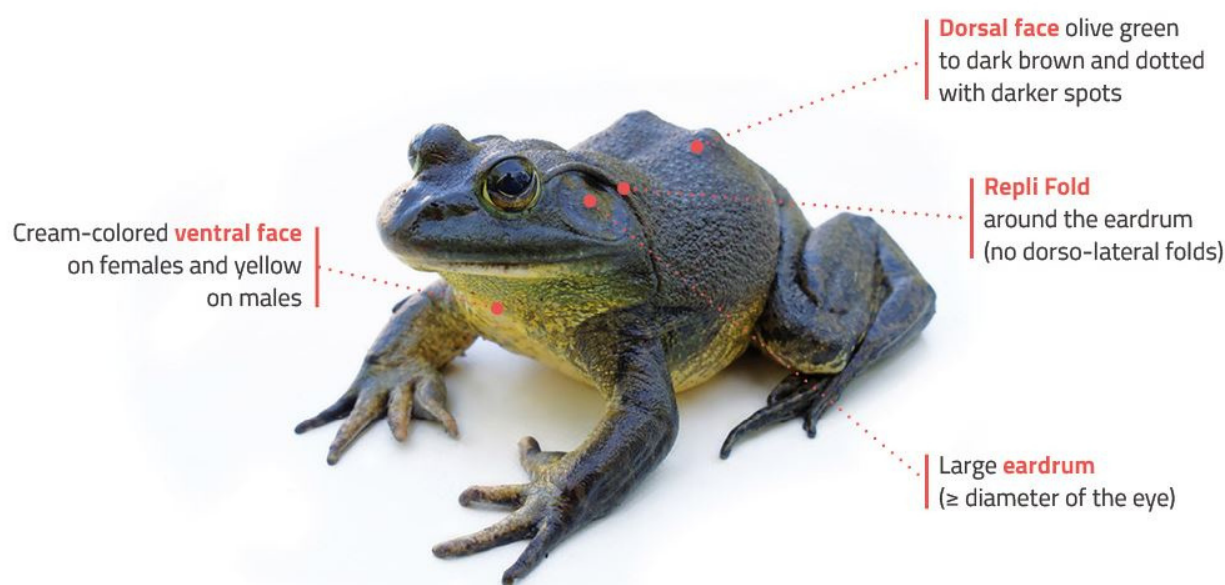
The bullfrog in adulthood is easily recognizable by its large size (on average 12 to 18 cm from snout to vent) and its song similar to a mooing of a cow.

It can nevertheless be easily confused at the larval stage (with the large tadpoles of other species of the genus *Pelobates* or *Pelophylax*) and at the juvenile stage (with the species of the genus *Pelophylax* known as "Green Frogs"). It is therefore essential to know how to identify it in order to declare an exact presence and to avoid any confusion.

Find the identification keys for this species on the SHF website:

lashf.org/fiches-techniques/ > Section "Management of invasive alien species" > "Inventory sheet of the Bullfrog (LIFE CROAA)".

The actors who will take charge of the bullfrog capture actions will have to carry out training, to be repeated each year. They will focus on the recognition of the different stages of the bullfrog and the differential diagnosis with the stages of other amphibian species, the behaviour of the species, its periods of activity, etc.



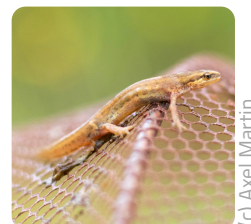
(c) Matthieu Berroneau



PREREQUISITES FOR CATCHING BULLFROGS

Obtaining prefectural waivers

Regardless of the stage of development, your actions to capture bullfrogs are likely to result in the accidental capture of other amphibian species. The latter are all protected in France according to the [decree of January 8, 2021 fixing the list of amphibians and reptiles represented on the metropolitan territory, protected on the whole of the national territory and the methods of their protection.](#)



(c) Axel Martin

Any capture and manipulation, even temporary, is therefore subject to obtaining a derogation which is the subject of a prefectural decree. This derogation request must be submitted to the [Regional Environment and Housing Development Departement](#) in your region. The lead times can be quite long, think about doing it in advance.

In addition, certain actions are particularly supervised if they present a risk to public safety. This is particularly the case for shooting actions on juvenile and adult bullfrogs, which are also subject to a prefectural decree and to the follow-up of shooting training provided by an approved body. For more information, refer to the "Shooting at individuals" section".

As head of the French national network, the SHF coordinates control actions for this species, so we invite you to contact us before any trapping operation in order to:

- Be accompanied for the implementation of a procedure respecting the regulations;
- Know the methods of taking care of individuals;
- Upload your observation and capture data.

>> Contact us: contact@lashf.org

Protect yourself and the environment

Hygiene protocol

Before and after any handling of amphibians, a hygiene protocol must be respected to prevent the transmission of diseases specific to these species, such as ranavirose or chytridiomycosis, responsible for the death of many species of amphibians, reptiles or even of fish (see access to the protocol on page 7).

Appropriate clothing in the field

Clothing covering **at least the legs and thighs, with boots or hiking shoes** is recommended in the field.

Over-trousers such as a fishing raincoat can be used and will be easy to disinfect with a disinfectant such as Virkon®.



The **outfits of the agents carrying out the capture actions should ideally be washed every week** and between each change of water points to avoid storing any pathogens on the clothes. This disinfection step must be carried out at a certain distance from water points to prevent any release of the product into the aquatic environment.

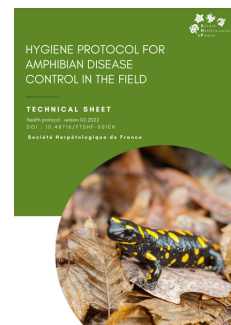
Rubber gloves are essential for handling individuals in order to avoid contact with their mucus, but also contact with water contaminated by the possible presence of nutria (leptospirosis). In the context of eDNA sampling, prefer the use of sterile laboratory-type rubber gloves.

We recommend that you wear a light lifejacket during field operations near deep water bodies. As a safety measure, it is also advisable to work in pairs on most actions.

Find the protocol for disinfection and use of Virkon® on the SHF website:

lashf.org/fiches-techniques/ > Section "Our other technical sheets"

> "Hygiene protocol for amphibian disease control in the field".



- The capture techniques presented below have been tested as part of the LIFE CROAA program in several departments in western France. A certain amount of information is provided to you in order to maximize your chances of capture (periodicity, climatic and geographical conditions, type of body of water, etc.) and is based on field observations. It will therefore be necessary to adapt your control plan to your territory and its geographical and climatic specificities.

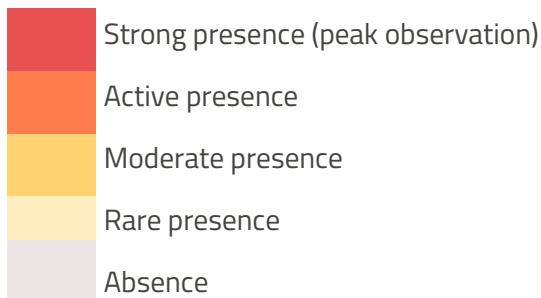
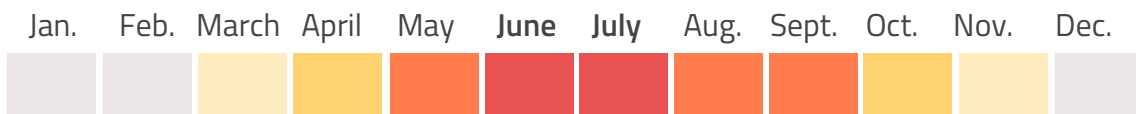


COLLECTION OF SPAWNINGS



Observation and sampling periods

Bullfrog egg laying is generally observed from **mid-May to September** with peak detection in June and July. Exceptional observations can take place in April or October with particularly mild air/water temperatures. Spawning is most often found when the water temperature approaches 20°C, the optimum temperature being 26°C. Particular attention must therefore be paid to the temperature of the water in order to maximize your chances of sampling.



The female bullfrog can lay 10,000 to 25,000 eggs in clusters. The eggs are dark brown above, lighter below, with a diameter of 1.5 to 2.5 mm for the embryo and 5 to 6 mm for the gangue.

The eggs are only visible for a few days, generally on the surface, attached to a submerged support (branch, vegetation). They can also be camouflaged in vegetation or deep under water. Note that the surface of a laying can sometimes reach 1 m². They are therefore observable with the naked eye (easier to spot with polarizing glasses) or using binoculars (opportunistic observations).

Find the identification keys for bullfrog eggs and spawnings on the SHF website:

lashf.org/fiches-techniques/ > Section "Management of invasive alien species" > "Bullfrog inventory sheet (LIFE CROAA)".



(c) Matthieu Berroneau



(c) Matthieu Berroneau



Sampling methods

> NET SAMPLING

[MATERIAL AND COST]

- **Water thermometer:** Choose a professional model. **From €60 per unit depending on the model.**
- **Fine-mesh landing net:** Standard professional landing net with 3 mm mesh and 200 mm frame (for recovering eggs). They will have to be cleaned systematically from one water point to another (see hygiene measures). **Around €100 per unit depending on the model.**
- **Secateurs:** For clearing the vegetation around the eggs. **From 15 to 90 € per unit depending on the model.**
- **Fishing Boots:** All-terrain rubber boots. They will have to be cleaned systematically from one water point to another (see hygiene measures). **From 40 to 100 € per pair depending on the model.**
- **Waders:** Neoprene material for fishing (entering the water). They must be cleaned systematically from one water point to another (see disinfection and use protocol for Virkon® on page 7). **From 65 to 140 € per unit depending on the model.**
- **Polarized glasses [optional]:** Reduces reverberation and increases contrast to better spot spawning in the water. **From €100 per unit depending on the model.**



(c) CDPNE: Thierry Moreau

[IMPLEMENTATION]

After having checked the temperature of the water using your thermometer (in order to know if it is conducive to the discovery of eggs), visually survey the favourable areas (banks of bodies of water, aquatic vegetation, tail ponds, etc.). In case of proven identification of a bullfrog egg laying, recover it using the landing net:

- Be sure to clear the area around the egg laying, using your pruning shears, before taking the sample (cutting the vegetation serving as a support for the egg laying, without disintegrating the latter).
- Place your landing net in the water under the spawn and make slow movements from bottom to top going up towards the spawn. Do not hesitate to use your hands to fold down the laying or any debris of vegetation to which the eggs would have clung;
- Once the egg has been collected, place it on the banks at a good distance from the water point (minimum 3 m) in order to dry it out. Every precaution must be taken to promote rapid drying (hot, dry days and times; if there is a risk of rain, bury the eggs). A drying check is carried out one hour after the eggs have been taken out of the water, then four days later. Several dip nets will be necessary to recover all the eggs.



(c) Gabriel Michelin



(c) Gabriel Michelin



Sampling methods

> WATER CALL WITH BUCKET

[MATERIAL AND COST]

- **Water thermometer:** Choose a professional model. From €60 per unit depending on the model.
- **Bucket:** Fishing bucket of 20 L minimum with handle (for recovering eggs). From €10 per unit depending on the model.
- **Fine Mesh Landing Net:** Standard professional 3mm mesh landing net with 200mm frame (for spawn recovery). Around €100 per unit depending on the model.
- **Secateurs:** For clearing the vegetation around the eggs. From 15 to 90 € per unit depending on the model.
- **Fishing Boots:** All-terrain rubber boots. They will have to be cleaned systematically from one water point to another (see hygiene measures). From 40 to 100 € per pair depending on the model.
- **Waders:** Neoprene material for fishing (entering the water). They must be cleaned systematically from one water point to another (see disinfection and use protocol for Virkon® on page 7). From 65 to 140 € per unit depending on the model.
- **Polarized glasses [optional]:** Reduces reverberation and increases contrast to better spot spawning in the water. From €100 per unit depending on the model.



(c) CDPNE

[IMPLEMENTATION]

After having checked the temperature of the water using your thermometer (in order to know if it is conducive to the discovery of eggs), visually survey the favourable areas (banks of bodies of water, aquatic vegetation, tail ponds, etc.). In the event of proven identification of a bullfrog egg laying, proceed to sample it using the bucket:

- Be sure to clear the location of the egg laying well beforehand, using your pruning shears, before taking the sample (cutting the vegetation without disintegrating the egg laying). NB: If the egg laying is completely entangled in the vegetation, cut the root ball and try to recover all the vegetation in order to collect all the egg laying without disintegrating it (to be placed directly in the bucket);
- Use your fishing bucket to make a call for water and if possible recover the spawn in one piece: place the bucket at an angle (angle of about 30°, with the bottom of the bucket in the water and the top edge of the bucket at the edge of the water line) then run a steady stream of water into the container while moving it in the direction of the spawn (suction phenomenon). Do not hesitate to use your hands to fold down the laying or any debris of vegetation to which the eggs would have clung.



(c) Gabriel Michelin



- Once the egg has been collected, place it on the banks at a good distance from the water point (minimum 3 m) in order to dry it out. Every precaution must be taken to promote rapid drying (hot, dry days and times; if there is a risk of rain, bury the eggs). A drying check is carried out one hour after the eggs have been taken out of the water, then four days later.
- Once the egg has been extracted, pass it through the landing net to make sure that no eggs have been forgotten.



(c) Gabriel Michelin

If your equipment is used on several sites, remember to systematically disinfect your outfit and your equipment from one place to another, so as not to spread pathogens harmful to native amphibians.

Find the protocol for disinfection and use of Virkon® on the SHF website:

lashf.org/fiches-techniques/ > Section "Our other technical sheets" > "Hygiene protocol for the control of amphibian diseases on the ground".



TADPOLES CAPTURE

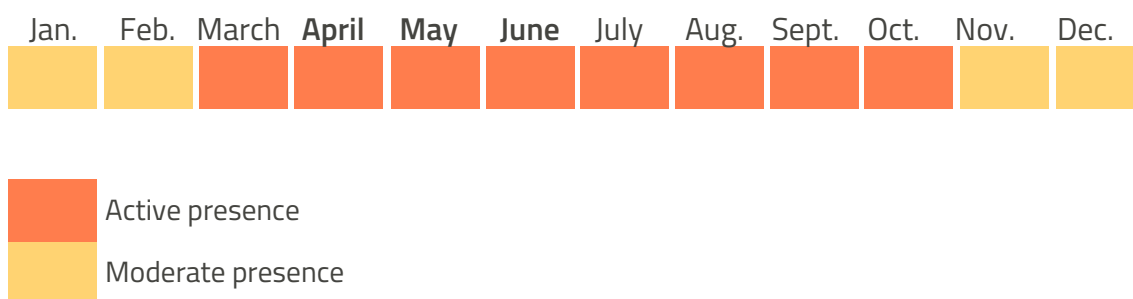


Observation and capture periods

Bullfrog tadpoles can be observed throughout the year, especially during a period extending from **mid-March to October**.

If winter corresponds to a period of lower activity for individuals, they are on the other hand **easily detectable in spring and more active at night**, where they are concentrated in the warm and shallow waters of bodies of water (mainly banks).

Since warming water increases bank/bottom movements, the trapping session should begin when the tadpoles are mobile, i.e. mid-April or early May (or earlier if weather conditions permit). Shallow areas where vegetation is abundant should be favoured for searching for individuals.



In the bullfrog, the tadpole stage can last two years, so it is possible to encounter all sizes and stages of development of the tadpole during your trapping sessions.

In order to better control the populations that occupy your body(ies) of water, it is recommended to catch tadpoles at least two consecutive years. To check the presence of tadpoles, intervene for 1 to 2 weeks (mid-April at the earliest) with passages every morning.

If tadpoles are spotted, it is advisable to first set traps until the end of July, to be completed by setting up a dispersion barrier to prevent the movement of juveniles.

If the traps are not empty after the end of July, a longer trapping period will have to be implemented with emptying of the pond, if the context allows it (see section "Emptying the pond and purse seine fishing").



(c) Jean Muratet

Find the identification keys for bullfrog tadpoles on the SHF website:

lashf.org/fiches-techniques/ > Section "Management of invasive alien species" > "Inventory sheet of the African clawed frog (LIFE CROAA)".



Capture method

> NET CATCHING

[MATERIAL AND COST]

- **Landing net:** Choose a model with a mesh size (from 1 to 5 mm) adapted to the size of the tadpoles to be captured. **From 50 to 120 € per unit depending on the model.**
- **Plastic tubs or buckets:** For packing captured tadpoles. Fishing bucket of 20 L minimum with handle. **From €10-15 per unit depending on the model.**
- **Headlamp** [if actions are performed at night]: 100 lumens max. Minimum **€50 per unit depending on the model.**
- **Flashlight** [if actions are performed at night]: 1000-1200 lumens max. Minimum **€100-150 per unit depending on the model.**
- **Fishing Boots:** All-terrain rubber boots. They will have to be cleaned systematically from one water point to another (see hygiene measures). **From 40 to 100 € per pair depending on the model.**
- **Waders:** Neoprene material for fishing (entering the water). They must be cleaned systematically from one water point to another (see disinfection and use protocol for Virkon® on page 7). **From 65 to 140 € per unit depending on the model.**
- **Binoculars** [optional]: For occasional detection of daytime individuals. From **150 € per unit to benefit from a good model.**



(c) CDPNE



(c) Axel Martin

[IMPLEMENTATION]

After having visually prospected the areas favourable to tadpoles (banks of bodies of water, aquatic vegetation, tail of ponds, etc.) and in the event of proven identification of Bullfrog tadpoles, proceed to capture the individuals:

- Several shots of the landing net are to be made in areas with individuals, from the bank or in the water in shallow areas (wearing waders necessary).
- Take care not to damage the aquatic vegetation or the bottom of the body of water when using your landing net: make slow movements, passing close to the bottom without removing the substrate or the sediment.

Trapped bullfrog tadpoles are counted in plastic tubs or buckets. They must be quantified and separated by date and by body of water.

As head of the French national network, the SHF coordinates control actions for this species, so we invite you to contact us before any trapping operation to find out how individuals are taken care of:

contact@lashf.org



Capture method

> CAPTURE BY TRAP

[MATERIAL AND COST]

- **Net traps with double entrances**, retractable, round or square. Catfish trap type. Fine stitches from 2 to 10 mm maximum. Average dimensions of 30 x 60 cm. **From 10 to 20 € per unit depending on the model.**
- **NB:** the trap must be equipped with a surface holding device (empty plastic bottle or swimming pool rope float). This device allows the captured species to come and breathe on the surface while waiting to be released during your trap surveys. It will be necessary to carry out surveys every 24 hours in order to recover bullfrog individuals and to release accidentally captured species.
- Advantage: floatation possible, easily transportable (foldable) and inexpensive.
- **Bait [optional]** : Dog food or sardines can be used to bait your traps and try to improve your catch rate. Be careful however, the baits are to be used only if your body of water does not shelter other invasive exotic species (crayfish, catfish, etc...) in which case your traps could be ineffective because filled with undesirable individuals [knowing that these invasive species must never be returned to the water. For more information visit the French [Invasive Species Resource Centre](#)].
- **Plastic tubs or buckets:** For packing captured tadpoles. Fishing bucket of 20 L minimum with handle. **From €10-15 per unit depending on the model.**
- **Twine or cord:** To attach traps with double-entry nets to a fixed element placed on the bank (tree, fence post or concrete iron to be laid out yourself), in order to facilitate their recovery during surveys. Ref: Corderie Mesnard, 200 m spool, standard halyard, Ø 2 mm. **€10.50 per spool.**
- **Fishing Boots:** All-terrain rubber boots. They must be cleaned systematically from one water point to another (see disinfection and use protocol for Virkon® on page 7). **From 40 to 100 € per pair depending on the model.**
- **Waders:** Neoprene material for fishing (entering the water). They must be cleaned systematically from one water point to another (see disinfection and use protocol for Virkon® on page 7). **From 65 to 140 € per unit depending on the model.**
- **Binoculars [optional]:** for occasional detection of individuals from dawn to dusk. **From 30 to 100 € per unit depending on the model.**



(c) PNRLAT



Choose a trap adapted to the biodiversity in the field

Two types of foldable double-entry traps can be used in the field:

- Trap with 10 mm mesh.
- Trap with finer mesh of 1 to 5 mm maximum.

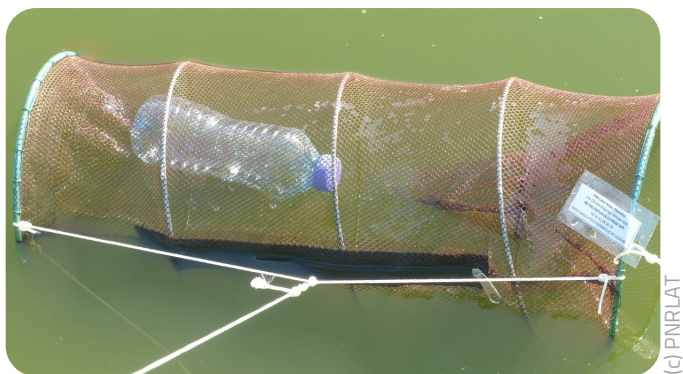
The use of one or the other will depend on the biodiversity found in your body of water and more particularly on the presence or absence of newts.

In fact, the use of fine-mesh pots quickly became essential for all water points that could accommodate newts. Indeed, a high risk of mortality by drowning has been observed for these species with traps with meshes that are too wide (the heads of individuals trying to escape remaining stuck in the meshes of the trap).

Traps with a mesh of less than 5 mm are therefore very strongly recommended for sites rich in amphibians, in particular as soon as the presence of newts is possible.

Traps with 10 mm mesh are recommended for bodies of water occupied by fish, or purification lagoons, where no newts are likely to be present. These traps have the advantage of being stronger and less expensive.

Fine mesh traps (less than 5 mm)

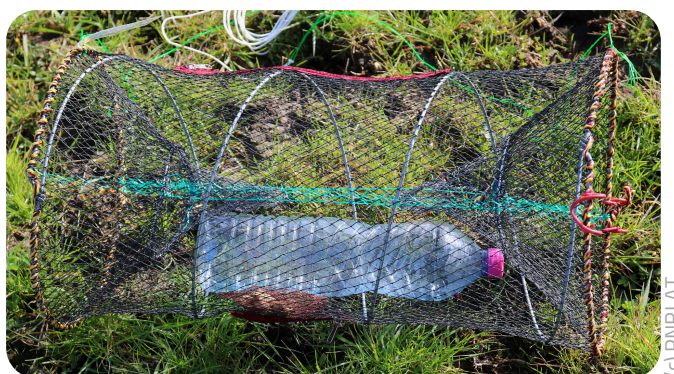


(c) PNRLAT



(c) Axel Martin

Large mesh pots (10 mm)



(c) PNRLAT



(c) CDPNE



[IMPLEMENTATION]

For an optimal capture rate, count 2 to 3 traps for 100 m². If the surface area of your water point is greater, plan a number of traps proportional to the aforementioned indication for 100 m². For bodies of water from 800 m², it will be necessary to cap the number of traps at 10 maximum, in order to optimize your capture sessions (logistics and time spent).

The recommended capture plan is as follows: one week of capture per pond during the months of May to August, with a survey of traps every 24 hours. The set time for the traps must be a full night to ensure the capture of the individuals, with a survey the next morning (24 hours maximum set). This daily passage is necessary in order to recover the bullfrog tadpoles and to release the other species caught accidentally.

As head of the French national network, the SHF coordinates control actions for this species, so we invite you to contact us before any trapping operation to find out how individuals are taken care of: contact@lashf.org

- Bait your traps with dog food or sardines if necessary (make small piles of about 5 cm per trap);
- Provide your traps with a float and tie them firmly with a string to a fixed element (stake, tree) positioned on the bank so that they do not drift;
- Position them in the evening, close to the banks, at the edge of the seagrass and at a short distance from the edge (1 or 2 m) so that they touch the bottom a little. If the pond is very shallow (< 30 - 40 cm), they can also be placed in the middle of the pond.
- All the traps must be checked every morning, the bullfrog tadpoles captured daily must be counted (see sheet proposed in appendix 1) and placed in the buckets provided for this purpose (pour a background of water into the receptacles before placing individuals therein;



(c) Axel Martin

Notes and tips [feedbacks]

- If you use bait, it is recommended to alternate them during the trapping process (dog food or sardines) in order to observe which is the most effective with tadpoles in your body of water.

If your traps are used on several water points, remember to systematically disinfect your outfit as well as the equipment used between each place, so as not to spread pathogens harmful to native amphibians.

Find the protocol for disinfection and use of Virkon® on the SHF website:

lashf.org/fiches-techniques/ > Section "Our other technical sheets" > "Hygiene protocol for the control of amphibian diseases in the field".



Capture method

> POND DRAINING AND SEINE FISHING

[PREREQUISITES FOR IMPLEMENTATION IN FRANCE]

The combination of pond emptying and the seine fishing technique is very effective for catching bullfrog tadpoles, but it can have a strong impact on the fauna and flora of your body of water. Therefore, it is advisable to use this technique only on fish farming or artificial ponds that are already severely degraded.

Despite its remarkable efficiency, this operation can be costly and time-consuming. Here are some prerequisites for its implementation:

- If the pool is located on private land, obtain the agreement of the owner for the installation of such a system.
- Apply for an exemption for the (involuntary) capture of protected species from your DREAL (Regional Directorate for the Environment and Housing Planning in France), indicating the capture system used. Please note that the DREAL reserves the right to refuse your request if the impacts on biodiversity are deemed too significant.
- Depending on the type and location of your body of water, other administrative procedures may be necessary, such as filing a declaration or authorization file under the French Water Act. We invite you to get closer to your Departmental Directorate of Territories (DDT) or the French Office for Biodiversity (OFB) locally.
- Contact a fish farmer upstream to carry out the fishing so that any fish caught in the water point are kept and returned to the water once the operation is complete.
- Provide for the establishment of a dispersal barrier throughout the duration of the operation in order to capture juvenile and adult bullfrogs that try to escape.
- Declare the emptying of ponds 15 days before the operations, with prior agreement or at the request of the owner, to the DDT of your territory.
- For the sake of communication and partnership, you can also notify the OFB agent in your sector of the date of the pond emptying.

Human resources:

If the fishing is carried out by the fish farmer, the number of people involved in the operation may be limited (only 1 to 2 people present during the sorting of the catch, in order to identify the tadpoles or bullfrog individuals).

If the fishing is not carried out by a fish farmer, it will take 5 to 10 people mobilized regardless of the size of the pond.

This technique requires on the one hand the installation of a dispersion barrier [1], on the other hand the emptying of the pond [2] and finally several purse seine fishing passages [3].



[1] LAYING THE DISPERSION BARRIER

[MATERIAL AND COST]

- **Tarpaulin or mulching fabric:** For building the enclosure around the site. Provide a tarpaulin for wood or mulch, 1 to 1.5 m high. Roll of 1 to 1.5 x 100 m, 140g/m² (around €100/tax incl. per roll). Example of supplier in France: Brico Dépôt, Leroy Merlin, Jardiland.
- **Jumpers:** Steel crampons, necessary to secure the tarpaulin to the ground and prevent any access or escape. 3 to 5 € per batch of 100. Provide a sufficient number to process your entire site.
- **Rebars:** For the construction of the enclosure around the site: installation of a rebar or a stake every 2 m, for the rigid maintenance of the tarpaulin. If the removable barrier is located in the wind or in an area with a high density of game, prefer an installation every 1 m. Concrete reinforcing bars are generally sold, depending on the supplier, in 6 m bars. It will be necessary to cut 1.50 m stakes using a hacksaw or a bolt cutter. Notched iron, Diameter 12 mm, length 6 m. 10 € each for a 6 m bar.
- **Hacksaw or bolt cutter:** To cut 1.50 m rebar stakes for making the structure of the enclosure (with 1 rebar of 6 m, you get 4). Quantity: 1. Hacksaw from €15 to €20 per unit on average and bolt cutter from €50 to €100 per unit approximately depending on the model.
- **Mass or mallet:** For anchoring the stakes in the ground. Quantity: 1 to 2. From 7 to 15 € per unit depending on the model.
- **Galvanized iron wire:** To make the attachment between the tarpaulin and the stakes. Wear protective goggles when cutting the wire to avoid the risk of injury due to projections. 3 € the roll of 50 meters long and 0.9 mm in diameter.
- **Manual cutting pliers:** To cut the wire and make the fasteners. Quantity: 1. From €25 per unit for a quality model.
- **Earth auger or thermal wheelbarrow auger:** To dig the holes that form the traps. Recommended dimensions: Diameter: 25 cm and 50 cm deep. The size will have to be adapted according to the receptacles chosen below. Rental recommended for this equipment. Count around 100€/day.
- **PVC tubes or buckets:** For making traps, place them approximately every 5 m. Provide a container with a diameter equivalent to the holes dug. Depth of 30 to 50 cm recommended. Bucket: From €10-15 per unit depending on the model. Tube of 2 m by 30 cm in diameter: around €2 each.
- **Brushcutter** [optional]: to clear the location of your site. Recommended rental: 2-stroke petrol backpack brushcutter, around €60 per day.



[1] LAYING THE DISPERSION BARRIER

[IMPLEMENTATION]

After obtaining agreement from the owner of the area, install the dispersal barrier as soon as the first bullfrog tadpoles are detected on the site and leave it until the pond has been emptied and the fishing operation has taken place.

If the tadpoles are observed only at the beginning of the season (May), it is recommended that the installation only be carried out from the month of June, in order to allow time for the native species to arrive on the site of breeding and letting early species go.

Step 1: Clear a Location

If necessary, carry out brush cutting using a thermal brush cutter around the site instead of the removable barrier in order to facilitate its installation.

Step 2: Set up the removable barrier and the trapping system

Position the stakes all around the pool (every 1 to 2 m depending on the specifics of your site) at a distance of approximately 1 to 1.50 m from the bank.

At the same time as the installation of the stakes, place the tarpaulin as you go around the edge of the pond:

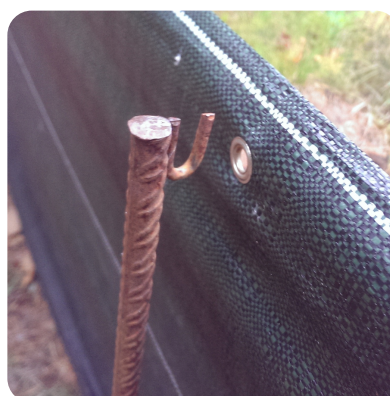
- Provide sufficient height for the tarpaulin to be properly fixed to the ground (a flap of about 20 cm on the ground will be necessary and on the stakes or concrete irons).
- Using several people, tie the tarp directly to the stakes or rebars. Use iron wire to attach the tarpaulin to the supports: cross the tarpaulin with a wire of sufficient length and tie a tight knot on the back of the concrete iron (passing the wire from the inside to the outside of the confined area).
- Position the 20 cm flap over the outside of the confined area and stretch the tarp before planting the jumpers. Fixing the tarpaulin to the ground must be done using the riders at the level of the fold of the flap. Use these fasteners until there is no longer any possible opening between the tarpaulin and the ground.
- It will be necessary to regularly check the condition of the tarpaulin and repair any holes using large tape and/or tarpaulin scraps.



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NB: To solidify your device, you can add tension bars at the level of the stakes or at the level of the perimeter of the pool by fixing them to the tarpaulin using iron wire.



And make the holes for laying the traps:

- These must be made inside the confined area to capture dispersing individuals, and possibly outside the confined area to capture any alien species on the move.
- Using an auger, inside and outside the tarpaulined area, make holes about 5 m apart (dimensions adapted to the size of your receptacles).
- Arrange the buckets or dedicated PVC tubes in the slots all around the barrier. Add to the inside of these traps, strong enough sticks allowing the micromammals to get out.

A passage every 24 hours and preferably in the morning (before 10 a.m.) is essential for the relief of these traps in order to avoid any mortality of individuals of native species. It will allow the capture of captured individuals and the release of other native species on your site.



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[2] POND DRAIN

[MATERIAL AND COST]

If the water feature is fitted with a drain:

- No equipment is needed for emptying. Its opening will be carried out by the owner of the zone. On the other hand, it will be necessary to install a mesh at the beginning and at the exit of the water drain to avoid any dispersion of tadpoles. The condition of the mesh should be checked every day to avoid any leaks or clogging (leaves, waste).
- **Wire mesh:** Chicken wire mesh with a maximum mesh size of 10 mm. Around €15 for 3m.
- **Cavalier:** Steel clamps, necessary to properly fix the fence to the ground and prevent any escape. 3 to 5 € the batch of 100.



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If the body of water does not have a drain:

- **Rental of a thermal water pump** (also called a motor pump):

Example of a model already tested in the field: motor pump with capacity of 72m³/h (GE5L + WP3LB) and delivery pipes supplied. Rental from the supplier AEB Branger for 60€/day (total rental of 7 days).

NB: The price may vary depending on the model and supplier chosen.

- **Fuel:** Consider including fuel in your costs. This will depend on the capacity of the pump acquired and your round trips to fill it.

NB: If the pump stops due to a lack of fuel, it is very difficult to reprime it. A knowledge of heat engines is essential for the handling of this equipment.



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[2]POND DRAIN

[IMPLEMENTATION]

Before the fishing operation, it is necessary to lower the level of the pond (up to about 80 - 100 cm), either by opening the drain or by using the thermal water pump. The water level should be low enough to allow the seine to pass in one go.

This operation can take several days (eg 7 days for a 5.22-hectare pond with the heat pump mentioned above in the "Material and cost" section).



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[3] SEINE FISHING

[MATERIAL AND COST]

- **Purse seine net:** Net 50m long x 1.2m to 1.5m high. Mesh of 10 mm maximum to prevent tadpoles from slipping through. Polyamide nylon net without knots to avoid hurting the fish during fishing, with leaded braid on the bottom. **Between €500 and €1,500 for a straight fillet depending on the suppliers.**

[IMPLEMENTATION]

Place one person every 10 m around the net to ensure efficient fishing, as well as at least two people on the bank to retrieve and sort the catch.

1. Take the net and tie two strong sticks to its two ends. The upper part of the seine is mounted on ropes and floats, while the lower part immersed in the water is mounted with a weighted braid;
2. One person stays on the bank holding one end of the net (grasped by the stick), while a second person pulls the other end of the net to form an arc to the bank;
3. The people holding the net by its centre are placed outside this arc and follow the movement while advancing to tighten the trap;
4. Once the arc is complete, the people positioned on the banks then catch the fish manually or using dip nets, while looking for Bullfrog individuals (tadpoles, juveniles, adults).
5. On average, we recommend that you perform the operation at least 3 times until there is no more plug. This whole operation can be done in half a day.



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(c) Gabriel Michelin



(c) CDPNE



(c) CDPNE



Any species captured during these operations, excluding invasive alien species, must be referenced and then released into the wild (see observation sheet proposed in annex 1).

It will also be advisable to check the state of the dispersion barrier daily so that no individual bullfrog (juveniles, adults) escapes from the area.

Once the operations have been completed, it is possible to leave the pond dry throughout the winter and let it fill gradually depending on the weather conditions. Impoundment is to be discussed with the owner of the area.



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CAPTURE OF JUVENILES AND ADULTS



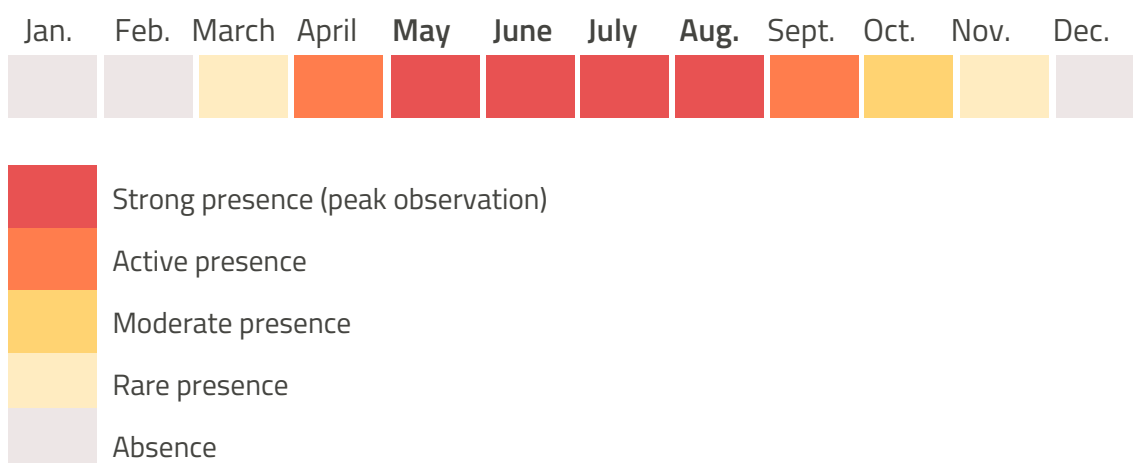
Observation and capture periods

Observations of juvenile and adult bullfrogs are **highly dependent on weather conditions**.

They can be detected **as early as March**, when air temperature reaches 14 °C and water temperature reaches 15 °C (Harding, 1997).

The peak of activity of individuals extends over the months of **May to August** during the breeding period (optimal water temperature between 20 and 26 °C), but the species can easily be encountered until October or even November if the temperatures are mild. Individuals are **more active at night** for these two stages.

A clear break in individuals has been observed during the winter (hibernation) and a phenomenon of aestivation during periods of heat wave and dryness of the water bodies, during which they shelter in the crevices or faults of the banks.



Find the identification keys for juvenile and adult bullfrogs on the SHF website:

lashf.org/fiches-techniques/ > Section "Management of invasive alien species" > "Inventory sheet of the Bullfrog (LIFE CROAA)".



(c) CDPNE



(c) Damien Troquereau



Capture method

> SHOOTING ON INDIVIDUALS

It is recommended to carry out shooting actions during the period of adult activity (from April to October), concentrating the sessions between the months of May and August, ideally during the breeding period.

[PREREQUISITES FOR IMPLEMENTATION IN FRANCE]

In order to maximize their effectiveness, shooting actions are generally carried out at night (between 9 p.m. and 4 a.m.), where individuals are most active. They are particularly supervised and require obligatorily:

- Obtaining **the agreement of the owner of the body of water** in advance if the operation is carried out on private land.
- A **nominative prefectural decree** in respect of invasive alien species, to be obtained from the Departmental Directorate of Territories (and the Sea) (DDT/DDTM) of your territory, for authorization to fire and transport weapons. You must have this order with you as part of your shooting actions on the ground, because you will be asked for it in the event of a control.
- **Shooting training** to be carried out with the French Office for Biodiversity to learn about the safety rules when handling weapons. This training is to be carried out by any person in charge of shooting actions and/or as a referent for the pair.
- **The purchase and possession of a category C weapon** (power greater than 20 joules) requires either the carrying of a shooting license (framework for sports shooting) or a hunting license for use in the wild. Holders of a sporting license, authorized to possess a weapon, may be involved in shooting operations.
- **Insurance:** The annual validation of the hunting license gives access to individual insurance within the framework of the use of weapons requiring such a licence. Civil liability covers the person provided that they are authorized to participate in the actions and that they also have additional insurance such as hunting insurance (specify that the actions carried out are not hunting or destruction within the meaning of the code of the environment, on species not classified as likely to cause damage).

[MATERIAL AND COST]

Weapons:

- **For juveniles:** use a 4.5 compressed air rifle (**€130 to €150 per unit depending on the model**) with tungsten cartridges (**€5 for 500 units**).
- **For adults:** shotgun calibre 410 magnum (12 mm) for adults (**minimum €250 per unit**) with tungsten cartridges (**approximately €55 for 20 units**). Ref: Mary ARM.
- The weapons can be equipped with silencers and we also recommend the use of a scope for more precision.
- It is essential to use lead-free cartridges in wet areas in order to preserve these environments.
- **Soft or rigid case:** for transporting your weapon. **From €15 each.**



(c) Luc Clément



OWNERSHIP OF A WEAPON IN FRANCE:

- **Overhaul:** It is necessary to have your gun overhauled by a gunsmith every year before use.
- **Storage:** Your weapon can be stored safely at your gunsmith during the winter and retrieved for the shooting season. You can also purchase a secure cabinet for storing your weapons on your premises. Under no circumstances should these weapons be kept without safe storage. In addition, weapons and cartridges should not be stored in the same secure cabinet.
- **Transport :** Rifle-type weapons must be transported only in the trunk of your vehicle and must not be "immediately usable": they are either unloaded and stored in a sheath (soft case) or hard case, or transported disassembled (valid for only for rifles). Learn more.
- **Declaration:** Rifles acquired before 2012 must be declared to the prefecture.
- If you do not wish to acquire weapons or handle these tools, you can consider a partnership with agents of the OFB, the federation of hunters, the association of trappers or private guards in your territory, in order to perform these operations. It will be necessary to train these third parties individually and to have their names appear on the prefectural decree. This decree must include a line indicating your structure as responsible for the action to eradicate bullfrogs: it will keep an up-to-date register of stakeholders and will inform its prefecture of any changes in the number of stakeholders (additional or fewer). If third parties carry out the shooting, you also remain responsible for the identification of individuals before their elimination and their post-mortem biometric tracking.
- **Plastic bag:** for packaging captured juveniles and adults.
- **Landing net** [optional]: Kick net for amphibians with aluminium handle. Mesh size: approx. 300 - 400 µm. From 50 to 120 € per unit depending on the model. Ex brand: Agility. Binoculars: For observing individuals from dawn to dusk. 10x42 lens. **From 150 € per unit to benefit from a good model.**
- **Headlamp:** 100 lumens max. For night observations. **Minimum €50 per unit depending on the model.**
- **Flashlight:** 1000-1200 lumens max. For night detection. **Minimum €100/€150 per unit depending on the model** (or 2000 lumens LED projector - **from €90 per unit**). Provide rechargeable Lithium batteries with a spare set for each flashlight in your possession.
- **Fishing Boots:** All-terrain rubber boots. They must be cleaned systematically from one water point to another (see disinfection and use protocol for Virkon® on page 7). **From 40 to 100 € per pair depending on the model.**
- **Waders:** Neoprene material for fishing (entering the water). They must be cleaned systematically from one water point to another (see disinfection and use protocol for Virkon® on page 7). **From 65 to 140 € per unit depending on the model.**



> SHOOTING ON INDIVIDUALS

[IMPLEMENTATION]

Shooting actions must be carried out in pairs. The pair is made up of a person qualified in shooting (pair referent) and another person (e.g. volunteer). The pair will carry out the identification of amphibians and the lighting of the areas surveyed.

For security reasons, the referent of the pair having followed the shooting training will be equipped with the following equipment: weapon, binoculars, flashlight. The second person in the pair will be equipped with the following equipment: tungsten cartridges, binoculars and flashlight.

- Once night falls (9 p.m. to 10 p.m.), notify the local gendarmerie that the shooting actions are beginning. They usually take place between 9 p.m. and 4 a.m.
- The pairs go around the pond, lighting the banks and vegetated areas suitable for sheltering the Bullfrogs. It is recommended to make passages from inside the pond in order to control the banks (equipment: waders or boat if deep water). This technique is more discreet and will also allow a better determination of the species.



(c) PNRPL

It is easier to first detect singing males during the breeding season and then spot nearby females. When a singing male seems to be well located, it is best to reconnoitre the site in search of other males or females responding to his calls, before proceeding to eliminate him. Indeed, too early an eradication of the singing male could lead to the cessation of the activities of other individuals and therefore to the impossibility of detecting them. This strategy will improve your collection rate.

NB: It has also been observed that a male taken from a preferential singing area could be quickly replaced by another individual in the same place. We therefore recommend that you identify these spots and go back to them several times (in the same evening or during another session) in order to sample as many individuals as possible.

- Once an individual has been identified, it is necessary to act quickly and precisely. One of the two members of the pair illuminates the individual in order to immobilize it (glare), checks the species and gives its validation for the shot.
- Once the shot has been made, the neutralized Bullfrog is placed in a plastic bag until it can be examined. Thereafter the individual will be sent to the rendering or left on the spot if the owner of the places gives his agreement.
- It is advisable to carry out a post-mortem analysis to monitor captured individuals (sexing, size and weight measurements, verification of the presence of eggs in the female) when the situation allows.



Recommended action plan: In order to best control the populations that occupy your body of water, it is therefore recommended to carry out regular shooting sessions: 1 to 2 times per week and per body of water, from May to September.

For small nuclei with few individuals, it is possible to carry out these shots according to the contacts made and not according to a periodic schedule.

This technique is also applicable on juveniles but it is however more complicated to perform. It is therefore advisable to make opportunistic catches with a landing net in addition to shooting sessions at night. The presence of juveniles can be detected by listening to their characteristic flight song ("queek"). In addition, the landing net can be used for adults, day and night. Bullfrogs have very good eyesight, so adopt a discreet approach and act quickly.

If your equipment is used at several water points, disinfection of your clothing and your equipment must be carried out systematically from one place to another, so as not to spread pathogens harmful to native amphibians.

Find the protocol for disinfection and use of Virkon® on the SHF website:

lashf.org/fiches-techniques/ > Section "Our other technical sheets" > "Hygiene protocol for the control of amphibian diseases in the field".



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Notes and tips [feedbacks]

- In particularly colonized ponds, it is advisable to supplement shooting actions with the installation of traps to reduce the pressure of populations on the local ecosystem. For the installation of the traps, refer to the part relating to the capture of tadpoles. The use of bait remains optional but the placement of the traps can be extended (not only the banks but on the whole of the pond).
- The use of a portable loudspeaker broadcasting the songs of bullfrog males can be useful, in an attempt to identify and locate males reacting to these fictitious calls on the site. It may also help to wake up some females if the site is poorly colonized. [Access a Bullfrog sound [here](#) (c) CDPNE. Clément Fauconnier]



Capture method

> DISPERSION BARRIER

Dispersal barriers are effective devices in the fight against the dispersal of juveniles. As with all the other actions, this technique requires obtaining a derogation for the capture of protected species (see section "Prerequisites for the capture of bullfrogs").

In addition, it will be necessary to raise your traps daily in order to recover the captured individuals and to release the non-targeted individuals (passage every 24 hours).

We recommend that you use this technique on small surrounding bodies of water, which are little or not infested with bullfrogs, to prevent their spread.

In order to best control the populations that occupy your body(s) of water, it is recommended that you leave your dispersal barriers in place from April to September. On sites particularly rich in biodiversity, it is advisable to carry out the installation only from the month of June, in order to allow time for the native species to arrive at the breeding site and to let the early species leave.

This device can be coupled with the installation of traps in your body of water which will be checked daily (see section "capture of tadpoles with the trap"), at the same time as the reading of the buckets installed with the barrier of dispersion.

To find out about the equipment to acquire and the steps for implementing this device, refer to the section "Capturing tadpoles > Draining the pond and fishing with a seine > Dispersal barrier".



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Preserving the environment

To compensate for the disturbance caused by the confinement of a natural environment, it is advisable to implement the following actions to promote biodiversity:

- Creation of refuges conducive to the reception of reptiles and amphibians;
- Differentiated management of the space in your pool;
- Creation of a pond in an uninfected area.



ACCOMPANIMENT AND FOLLOW-UP

As head of the French national network, the SHF coordinates control actions for this species, so we invite you to contact us before any trapping operation in order to:

- Be accompanied for the implementation of a procedure respecting the regulations;
- Know the methods of taking care of individuals;
- Escalate your observation and capture data:
 - For each capture technique and during your trap readings, record your observations of American bullfrogs in a field sheet (see an example in appendix 1). Any observation of other amphibian species (by visual, auditory observation, or capture) must also be mentioned in your field sheet.
 - Enter all your data respecting the elementary exchange data of the SINP (DEE) (French network). If you do not have a suitable tool, the SHF makes its own available to you to enter your amphibian and reptile data by creating a dataset adapted to your structure and your program (metadata): geonature.lashf.org

>> Contact us: contact@lashf.org



(c)Matthieu Berroneau



LAND SHEET		
Observation of bullfrog - Passage n° ...		
Observer name:		Date:
Geographical coordinates, name and description of the environment:		
Air (°C) and water (°C) temperature		
Weather report	Rainy / cloudy / sunny	
Rains		
Bull frog	Observation method	Quantity
Spawning	Visual observation / landing net	
Tadpoles	Visual observation / landing net / trap	
Juvenile.s	Visual observation / landing net / trap	
Adult.s Female.s	Visual observation / landing net / trap	
Adult.s Male.s	Visual observation / landing net / trap	
TOTAL		
Other species (specify species, stage and sex):	Observation method	Quantity
	Visual observation / landing net / trap	
	Visual observation / landing net / trap	
	Visual observation / landing net / trap	
	Visual observation / landing net / trap	
	Visual observation / landing net / trap	
TOTAL		





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