



Flanders
State of the Art



Best Practice for trapping muskrat in Flanders

Implementation of the Agreement on
International Humane Trapping Standards

Emma Cartuyvels, Tim Adriaens, Kristof Baert,
Frank Huysentruyt, Jan Stuyck

INBO.be

Auteurs:

Emma Cartuyvels, Tim Adriaens, Kristof Baert, Frank Huysentruyt, Jan Stuyck
Research Institute for Nature and Forest (INBO)

Reviewers:

Paul Delcroix, Bram D'hondt, Jane Reniers, Dan Sloodmaeckers, Sofie Standaert, Jan Vandecavey, Peter Van Den Berghe, Marc Van der Weeën, Karel Van Moer, Bram Vlaeminck, Rollin Verlinde, Marjoleine Walewijns.

The Research Institute for Nature and Forest (INBO) is an independent research institute of the Flemish government. Through applied scientific research, open data and knowledge, integration and disclosure, it underpins and evaluates biodiversity policy and management.

Location:

INBO
Havenlaan 88 box 73, 1000 Brussels
www.inbo.be

e-mail:

emma.cartuyvels@inbo.be

Way of quoting:

Cartuyvels E., Adriaens T., Baert K., Huysentruyt F., Stuyck J. (2020). Best Practice for trapping muskrat, *Ondatra zibethicus*, in Flanders. Reports of the Research Institute for Nature and Forest 2020 (29). Research Institute for Nature and Forest, Brussels.
DOI: doi.org/10.21436/inbor.18446121

D/2020/3241/178

Rapporten van het Instituut voor Natuur- en Bosonderzoek 2020 (29)

ISSN: 1782-9054

Responsible publisher:

Maurice Hoffmann

Cover photograph:

VMM

This research was carried out :

as part of the Life MICA project. The MICA project has received funding from the LIFE Programme of the European Union.



BEST PRACTICE FOR TRAPPING MUSKRAT,
ONDATRA ZIBETHICUS, IN FLANDERS.

Implementation of the Agreement on International
Humane Trapping Standards.

Emma Cartuyvels, Tim Adriaens, Kristof Baert, Frank Huysentruyt, Jan Stuyck

doi.org/10.21436/inbor.18446121

1 INTRODUCTION

Muskrat (*Ondatra zibethicus*) is a rodent native to swamps and wetlands in North America and an invasive alien species (IAS) in Europe. The species was first introduced in Europe in 1905 for fur purposes (Nentwig et al. 2010) and has spread to suitable habitat in most EU countries. The species causes damage to dykes and agricultural crops and acts as a reservoir of several zoonoses. Because of its economic, human health and environmental impacts, it is managed in several European countries but most intensely in Belgium and The Netherlands. Management practice mostly consists of systematic trapping to reduce muskrat densities and hence the levels of muskrat damage.

In Belgium, muskrat commonly occupies wetlands, water courses, ponds and marshes (Stuyck 2003). The species is found in areas with abundant vegetation such as reedbeds, rushes and bulrush but also occurs in brackish and eutrophicated waters with almost no vegetation (Stuyck 2003). The species was especially numerous in the north of the country before numbers dropped within the Flemish part of Belgian Atlantic bioregion thanks to a high trapping intensity and a reorganised control campaign. In the continental bioregion of Belgium, muskrat is also widespread but is distributed more sparsely, presumably at lower densities which may be a consequence of different landscape characteristics (more forested, higher grounds) and, generally, a more natural setting which could harbour more natural predators of muskrat. Here, the species is also under management (Adriaens et al. 2019).

The best practice presented here is based on several decades of experience with managing the species in Flanders (North Belgium). It was drafted based on the best practice of Stuyck (2016) and edited according to the latest developments in legislation such as the Flemish management regulation which is in preparation.

Although any best practice for managing an invasive alien species should be considered in its local context (Adriaens et al. 2018), many of the underlying principles steering the choice and use of trapping devices (animal welfare, non-target impact) and trapping organisation are general to any eradication or control programme for the species. Updating Stuyck (2016) we adhered to the INBO guidance for drafting best practices (Adriaens et al. 2018) which was also followed for similar best practices such as Chinese muntjak (Casaer et al. 2015). First, we describe the local context of the species (invasion history, distribution, ecology) and its management. Second, we review policy, regulations and management objective. Lastly, we describe potential methods for muskrat trapping and their application. The document was brought in line with the contents of a management regulation for the Flemish region which is currently in preparation.

We hope this best practice can provide support to other countries and regions faced with a muskrat invasion, together with other available information on potential management options for prevention, rapid eradication and control that have recently become available (e.g. Bos 2017). A good additional resource is the European Best Practice (FACE 2014) which provides in-depth ecological information on muskrats and their impact.



Muskrat control in Flanders was regionalised and strongly professionalised at the end of the 1990's. For-profit trapping and the fur trade of muskrats was banned. Most notably, scientific follow-up was implemented and from 2000 on a control scheme was developed to see whether trappers met certain predefined targets on Flemish watercourses (see 6.4). As a result, where muskrats once occurred in high numbers all over the territory, they are currently mainly caught in low numbers in municipalities along the Dutch, French and Walloon borders. Flanders is thus currently effectively managed as a pest-free area for muskrats (Figure 1). For example, in 2010, numbers were at an absolute low of 1.611 muskrats trapped. In recent years, however, some areas in the provinces of East Flanders and West Flanders noted an increase in the number trapped (Figure 2) coinciding with a decrease in the intensity of control actions and a lack of area-wide coverage. In these provinces muskrat management is scattered over several agencies, leading to different levels of control intensity. Less intensive control in one area can easily cause recolonization of neighbouring areas.

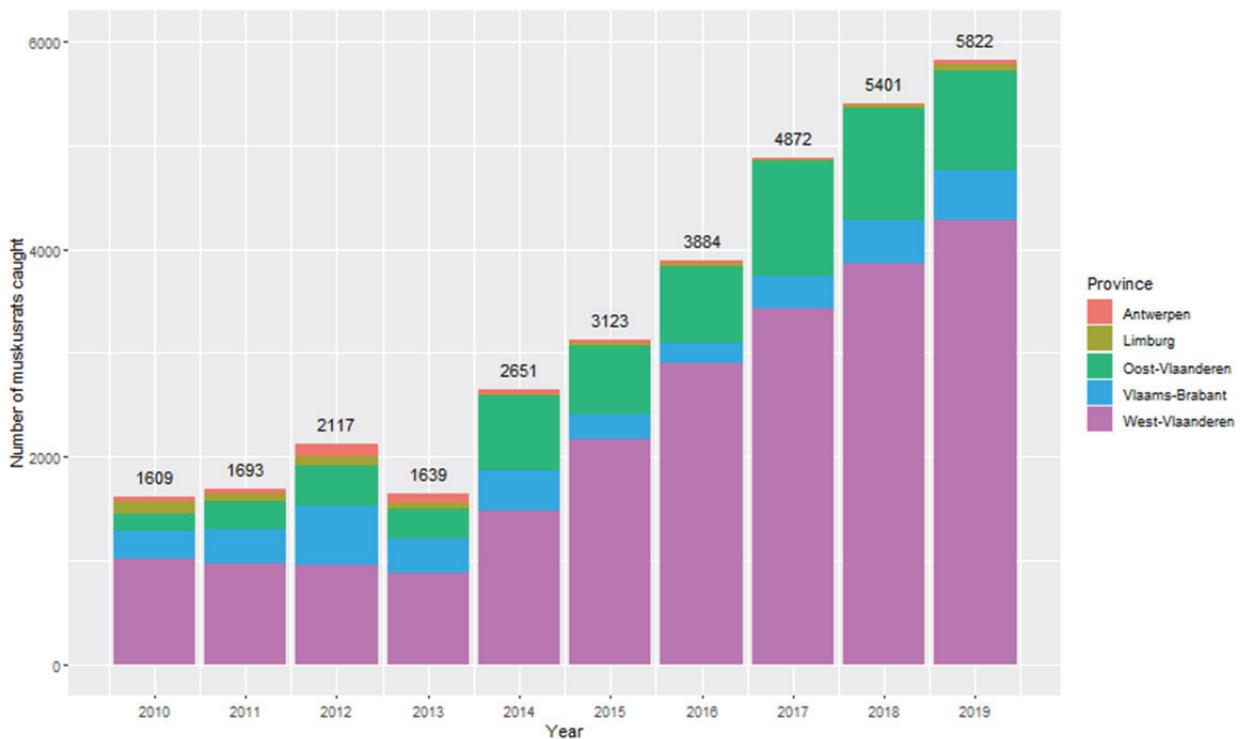


Figure 2: Number of muskrats trapped per year in Flanders since 2009 and the proportion of captured per province. There is a noticeable increase in numbers trapped in the two westernmost provinces (West Flanders and East Flanders) in recent years.

In 2019, in response to the EU Regulation (EU) 1143/2014 on the prevention and management of introduction and spread of invasive alien species (the IAS Regulation), in consultation with pest controllers and other stakeholders, a management regulation (a ministerial decision on the management of species that cause nuisance, risk or damage) for muskrat was drafted as an annex to the Decision on Species Protection and Species Management of 15 May 2009 (an implementing decision on the Nature Decree). Once in force, this management regulation will provide the juridical basis for a coherent management of muskrat in the Flemish region in line with European (IAS Regulation), federal (Plant Health Law), and regional (Species management, Animal welfare) legislation. This management regulation outlines management objectives, trapping methods, trapping organization (e.g. certified training for trappers, evaluation criteria) and reporting obligations.

4 FROM COMPLEX REGULATIONS TO PRACTICAL GUIDELINES ON TRAPPING MUSKRATS

On top of the legal provisions mentioned above, this code is based on the following considerations, and attempts to strike a compromise between them:

- Achieving a high degree of selectivity so as to minimise bycatch (with the exception of brown rat (*Rattus norvegicus*)).
- The use of trapping methods in which animal welfare is maximised by killing the animals as quickly and painlessly as possible. The frame of reference here is the provisions of the AIHTS (see 3.1.2).
- Achieving maximum management efficiency aimed at keeping the muskrat population at the current low levels and further reducing it, so that the number of muskrats that have to be trapped in Flanders every year can be minimised.
- Ensuring the health and safety of the trappers handling the trapping equipment and minimizing the risk for third parties arising from the improper handling of body-grip traps.
- Keeping the number of objects that are alien to nature and that jeopardise its landscape value; that may hinder fish migration; and that may impede the natural drainage of water in watercourses and irrigation channels to a minimum.



6.1.1 The Conibear trap type

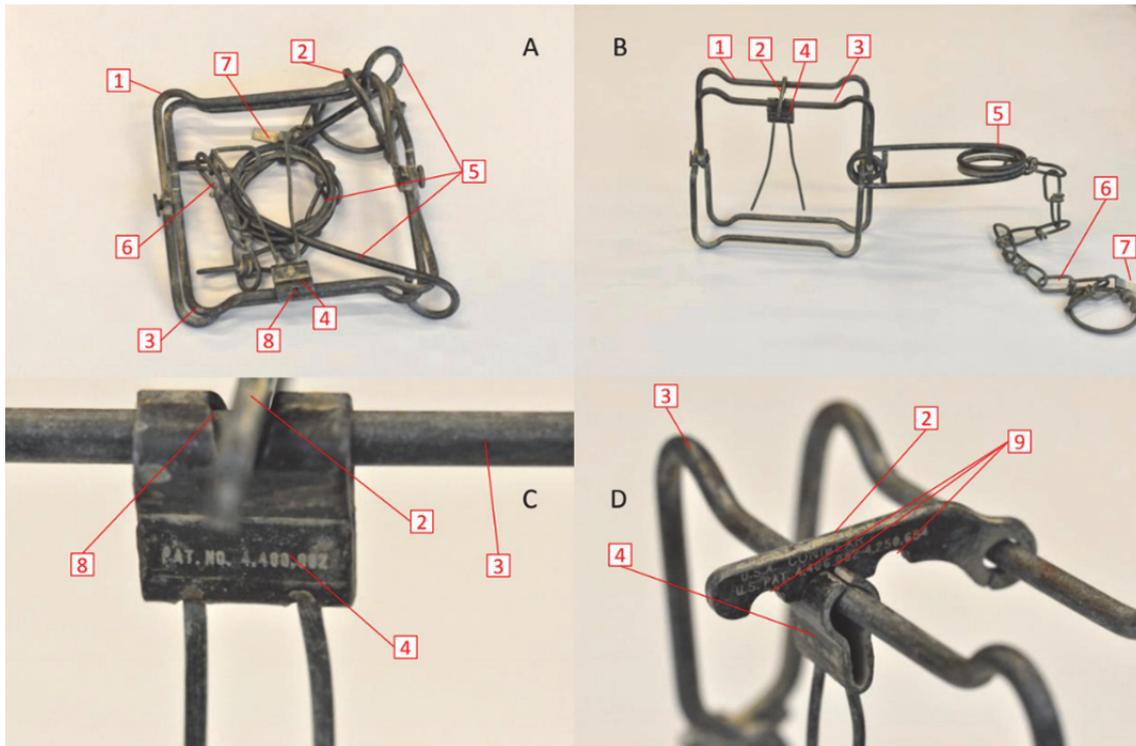


Figure 3: The Conibear trap type. A. Closed trap. B. Set trap. C and D. Detail of trigger mechanism. 1. Moving trap jaw with 2. Dog. 3. Moving trap jaw with 4. Trigger mechanism. 5. Spring. 6. Chain. 7. Identification plate. 8. Opening in trigger mechanism. 9. Notches in dog.

Description of the trap type:

The Conibear trap is an iron or stainless steel trap consisting of two frames or 'jaws', which can rotate relative to each other around common pivots (Figure 3). The trigger mechanism can operate forwards, backwards or sideways. This is a body-grip trap with one or two powerful main springs. The patent mark and/or certification code are on the catch or 'dog'. Due to the specific construction of these traps, their main characteristics are their impact force and the power with which they grip the trapped animal. The Conibear is a very widely used type of trap which is produced by several manufacturers in many designs and in different sizes depending on the target species.

Examples of Conibear traps for muskrat:

A number of versions for muskrat have been tested by the Fur Institute of Canada; they comply with the standards defined in the AIHTS and are certified accordingly. These traps have a jaw size of $\pm 13 \times 13$ cm. The best-known in Flanders are the BMI 120 Body Gripper, the Sauvageau C120 and the Woodstream Oneide Victor Conibear. They are almost identical in construction and operation.

Setting the Conibear trap (e.g. Woodstream):

The two bars of the trigger mechanism are spread apart in the opening of the frame. Bait should not be used. With one hand, the spring is strongly compressed, allowing the two jaws to rotate relative to each other. With the other hand, the two jaws are turned so that the dog can be placed in the opening at the top of the trigger mechanism. The underlying jaw is fitted into the dog in one of the notches. The pressure on the spring can then be relaxed and the trap is set. This trap should be secured, for instance with pickets: to position the frame correctly, and to put through (the ring on) the chain to anchor the trap to the river bed or bank.

////////////////////////////////////

Use of the Conibear trap:

This trap is placed underwater in front of or in an active den entrance (i.e. one where there are traces of muskrat activity), or on an actively swum trail, preferably with the spring horizontal. It should be checked at least once a week and may stay in the same place for a maximum of three weeks. This is the standard method for trapping muskrats; all other trapping methods are subject to additional conditions of use.

It may only be placed partially (i.e. max. one-third) above-water if this is done in front of a clearly active den entrance; placement in this case should be intended to trap an animal that is present in the den. Measures should be taken where possible to prevent animals from approaching the traps from outside. To this end, the trap can be screened off with wire, branches, stakes, pickets or other material that prevents access to it.

Rationale:

The Conibear trap has already been tested in Canada according to the procedures provided for in the AIHTS and then certified. It kills muskrats quickly and therefore scores well in terms of animal welfare. Placing the trap with the spring positioned horizontally increases the chance of the impact being on the neck of the animal and thus killing it quicker. It can be used in most field conditions and is quite easy for an experienced trapper to set up. On the other hand, the functioning of the trap is completely non-selective, with a trigger mechanism that works in four directions. In principle it can be used to catch virtually any animal that is small enough to fit in the trap. However, the code imposes restrictions on the way in which this type of trap is used, in order to minimise bycatch. The trap is therefore generally placed underwater in front of the entrances of inhabited muskrat dens. Although these traps will be checked more frequently in practice, a maximum period of one week is specified in order to cover a long weekend or an unplanned absence of a control officer.



6.1.2 The ground trap type

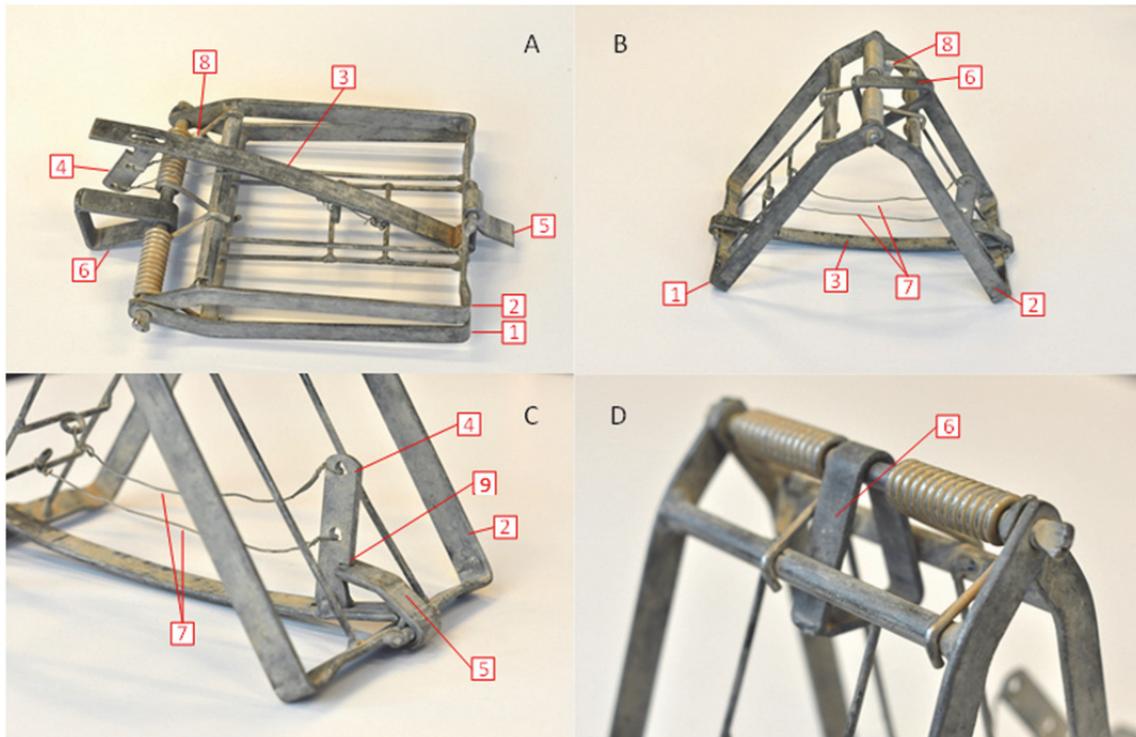


Figure 4: The ground trap type. A. Closed trap. B. Set trap. C. Trigger mechanism detail. D. Sprung trap with safety catch on. 1. Fixed jaw. 2. Moving jaw. 3. Trigger mechanism on fixed jaw. 4. Dog. 5. Blade. 6. Safety catch. 7. Iron or copper wires. 8. Identification tag. 9. Notches in dog.

Description of the trap type:

An iron trap consisting of two jaws, without teeth, which rotate on one side relative to a common axis (Figure 4). The two jaws are forced together by means of two or more coil springs. One or more iron or copper wires are stretched between the moving jaw and the dog on the trigger mechanism, which is attached to the other jaw. When these wires are touched, the trigger mechanism is activated. This is a trap that grips the body with great impact.

Examples of ground traps for muskrat:

There are various ground trap models on the market, but they are all constructed to the same design as the Hausmann Bisam-Haargreiffalle - Bügelweite 15 x 15 cm, which has been taken here as a typical example.

Setting the ground trap:

The two jaws are pulled apart until the moving part on the trigger mechanism is opposite the moving jaw. The short moving plate on this moving jaw, the blade, is rotated over the end of the long bent bar of the trigger mechanism and placed in the notch on the moving part, the dog. The dog is retracted until the blade extends neatly into the notch and the wires are tightened between the two jaws. This type of trap is used without further securing by means of pickets.



6.1.3 The bait trap type

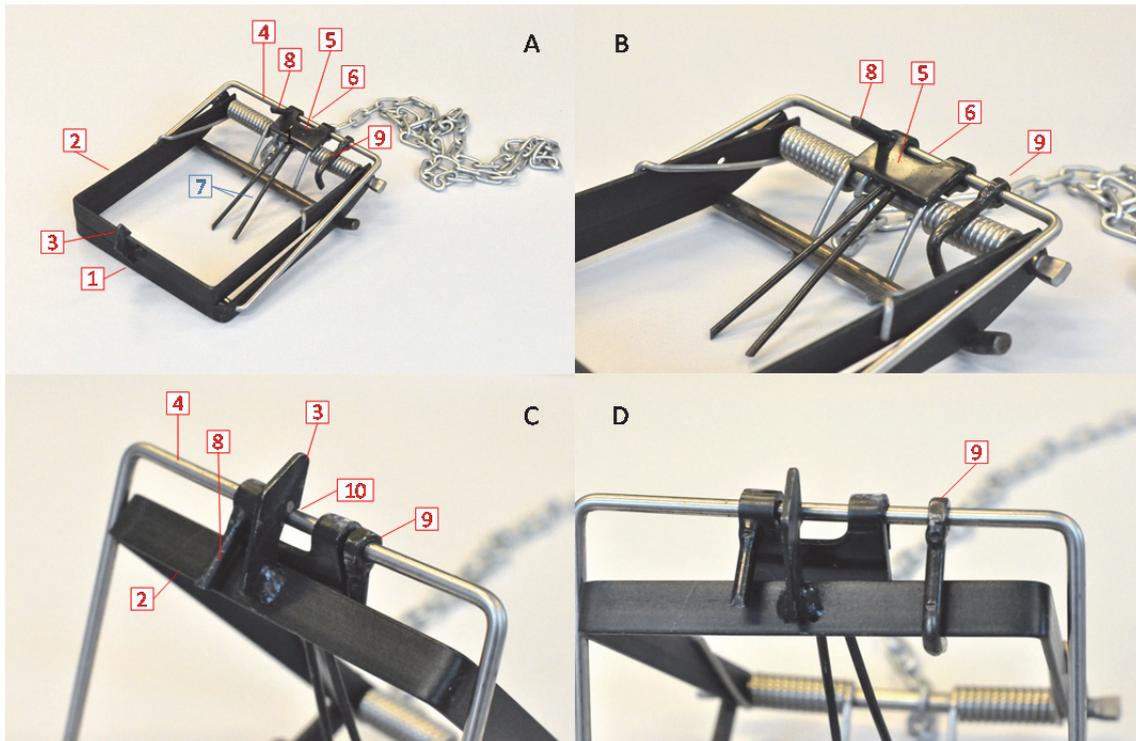


Figure 6: The bait trap type. A. & B. Closed trap. C. Set trap. D. Trap on safety setting. 1. Fixed jaw. 2. Moving jaw. 3. Hook on moving jaw. 4. Bracket. 5. Trigger mechanism. 6. Opening between fastening points. 7. Rods for bait. 8. Pecking protection. 9. Safety catch. 10. Notch in hook on moving jaw.

Description of the trap type:

An iron or steel trap consisting of two jaws which rotate on one side relative to a common axis. The trigger mechanism is baited: only fresh carrot is used for this. When the jaws are pulled apart, two or more coil springs are placed under tension (Figure 6). The trigger mechanism is positioned so that the trap is only activated when the bait is touched. In Flanders, bait traps may only be used if they are fitted with bird pecking protection. This ensures that the trap is only activated when the bait is pulled (a piece is bitten off it) and not when it is pushed (when it is pecked at). The traps must also be equipped with a hand protection (the loose hook on the bracket) with which the trap can be temporarily locked to protect the hands when positioning it.

Examples of bait traps for muskrats:

The traps described above are sometimes referred to as Kerschls traps. In addition, there are several other models of bait traps, also known as river bank traps (Figure 7). These may differ in design, but they work according to the same basic principle. Some traps are designed for the use of apple as bait and are less suitable for carrots; some have more moving parts and are therefore more susceptible to rust or jamming, while others lack bird pecking protection or hand protection.





Figure 7: Some other models of bait traps: the Hausmann river bank trap, the Lepprich trap and the Geissler trap.

Setting the bait trap:

The bracket is rotated over the moving jaw and the trigger mechanism is slid into the centre of the bracket. Only a piece of carrot may be attached as bait to the rods of the trigger mechanism. The two jaws are now pulled apart until the bracket fits into the notch in the hook on the moving jaw. The hook must also fit in the opening between the fastening points of the trigger mechanism, and the rod for the pecking protection must be at the top of the moving jaw.



Figure 8: Use of the bait trap at the waterline.

Use of the bait trap:

May only be used in places where the pipes or the bed of the watercourse are inaccessible or where placing equipment underwater is not recommended due to the current. The trap is placed on the bank in the vicinity of active muskrat trails, max. 1 m from the waterline. The trap is positioned with the springs away from the water (Figure 8). Measures must be taken to hinder/prevent the trap from being approached from behind, for example by installing a wire cover or by digging the trap into the bank. The traps may also be mounted on a raft (Figure 9). This must be properly anchored to the bed or bank of the watercourse. The raft must be fitted with a wire mesh cover or an individual screen for each trap that sufficiently restricts access to the traps. Traps should be checked each week and may stay in the same place for a maximum of three weeks. Bait traps may also be placed during the spring migration (1st February - April 15th) of muskrats in the border zone with France, Wallonia and the Netherlands where an important influx of muskrats is observed. In this case it is not necessary to place the traps in the vicinity of active muskrat trails. During this period, the bait traps may be placed in this border zone up to 1km from the border and a maximum of 1 m from the waterline or on rafts.





Figure 9: Use of the bait trap on a floating raft.

Rationale:

The bait trap is the only type of trap that can still be used above water for catching muskrats. It can be used when it is not possible to set traps underwater, or during the muskrats' spring migration in the border zone. The traps are equipped with pecking protection, and only carrots may be used as bait. Excluding apples makes the bait less attractive to many waterfowl such as moorhen (*Gallinula chloropus*), coot (*Fulica atra*) and mallard (*Anas platyrhynchos*).

Restricting access to the trap from the rear prevents it from being triggered in unexpected circumstances, involving non-lethal injury in some cases. These traps are placed at locations where there are signs of the presence of muskrats. Given the temporary nature of tracks, they should be checked frequently so that the situation can be monitored and traps do not remain in place longer than necessary. A check each week is stipulated for this, for a maximum of three weeks. Only at very specific locations in Flanders, i.e. cross-border watercourses during the migration periods, will traces of muskrat remain present for a longer period.



6.1.4 The cage trap type

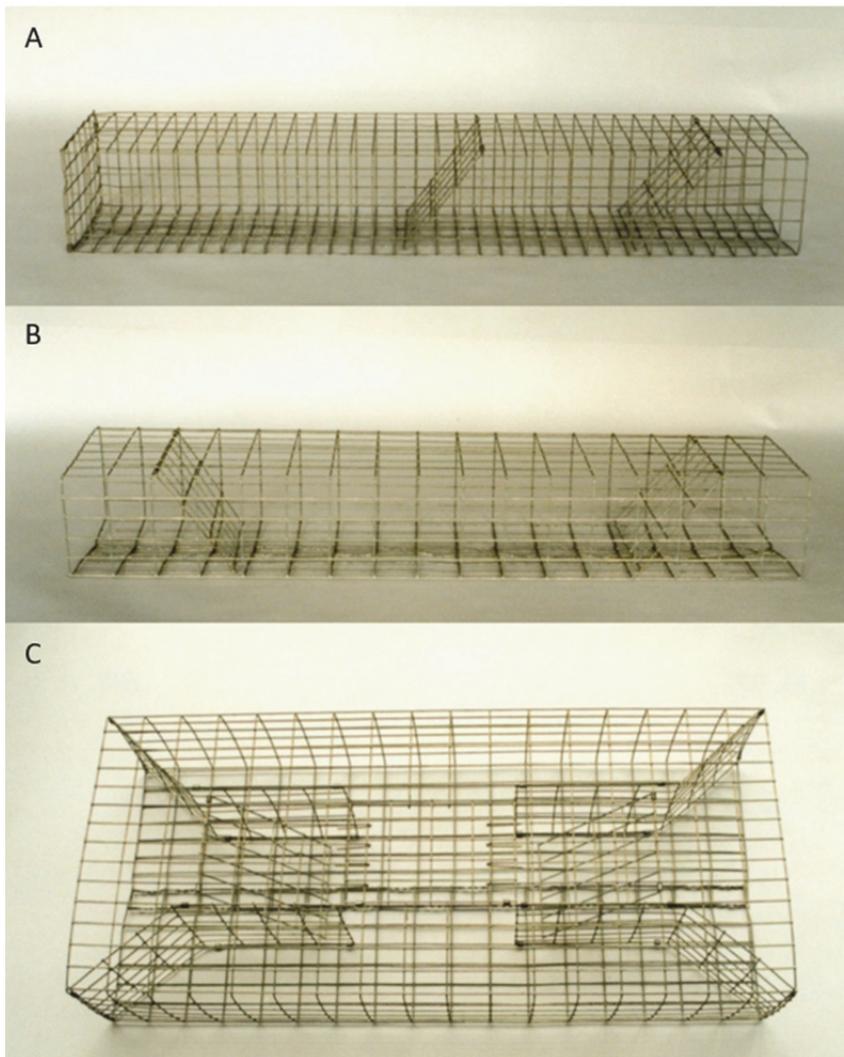


Figure 10: The cage trap type. A. One walk-in opening closed with a double door. B. Two walk-in openings. C. Flat cage trap with two narrowed openings.

Description of the trap type:

A cuboid-shaped trap made from wire. It consists of a cage made of wire with a mesh size of min. ± 25 mm x ± 25 mm and a wire thickness of 1.75 mm. One or two openings of max. 12 cm x 12 cm are closed with 1 or 2 doors, in wire with a mesh size of ± 50 mm x 25 mm and a wire thickness of 2 mm (Figure 10). These traps can be made by the control officers. They are similar in use to funnel traps.

Set-up:

A check should be made to ensure that the doors can move freely and close quickly.



Use:

This trap is only placed underwater in front of or in an active den entrance (i.e. one where there are traces of muskrat activity), or on a trail actively swum by muskrats where use of a body-grip trap is not feasible. The top of the cage must always be at least 5 cm below the waterline. Users must take account of changing water levels. The (combined) width of the cage trap(s) should never exceed half of the width of the stream. Cage traps should be checked twice per week and may be left in the same location for up to two weeks.

Cage traps may also be placed during the spring migration (1st February - April 15th) of muskrats in the border zone with France, Wallonia and the Netherlands where an important influx of muskrats is observed. In this case it is not necessary to place the traps in the vicinity of active muskrat trails. During this period, the cage traps may be placed in this border zone up to 1 km from the border.

6.1.5 The funnel trap type

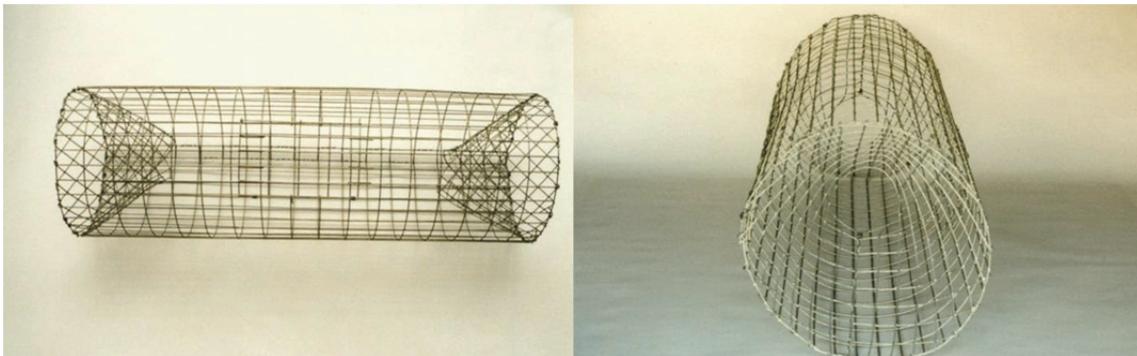


Figure 11: The funnel trap type. Wire with different mesh sizes is used for the cylinder and funnels.

Description of the trap type:

A trap consisting of a cylindrical cage made of wire with a mesh size of min. 25 mm x 50 mm and a wire thickness of ± 2 mm, in which two funnels are mounted. The wire for the funnels has a mesh of min. 25 mm x 25 mm and a wire thickness of ± 1.75 mm. The openings in the funnels are ± 8 cm (min. 7 cm and max. 9 cm). Moving parts are not used to close the openings in the funnels. These traps can be made by the control officers.

Use:

This trap may only be used for catching muskrat underwater, and exclusively in circumstances where the use of the previously listed traps is impossible, for example in watercourses that are too deep or on river banks that are too concave, making den entrances inaccessible. The top of the trap must always be at least 5 cm below the waterline. Users must take account of changing water levels. The (combined) width of the funnel trap(s) should never exceed half of the width of the stream. Funnel traps should be checked twice per week and may be left in the same location for up to two weeks.

Funnel traps may also be placed during the spring migration (1st February - April 15th) of muskrats in the border zone with France, Wallonia and the Netherlands where an important influx of muskrats is observed. In this case it is not necessary to place the traps in the vicinity of clear muskrat traces. During this period, the funnel traps may be placed in this border zone up to 1 km from the border.



Artificial burrows or stovepipe traps consist of cage traps placed into PVC pipes. The cage trap inside the pipe must always be at least 5 cm below the waterline. Users must take account of changing water levels. They may only be placed during the spring migration (1st February - April 15th) of muskrats in the border zone with France, Wallonia and the Netherlands up to 1 km from the border. They should also be checked twice per week.

Rationale:

Killing an animal by drowning is highly controversial. Muskrats, which are anatomically and physiologically adapted to life in and around the water, may in some circumstances spontaneously remain underwater in cage and funnel traps for longer than the 300-second time limit such as specified in the AIHTS for the disappearance of the corneal and palpebral reflexes. The use of cage and funnel traps is therefore contrary to Art.7b of the AIHTS, which states that the parties (i.e. Europe) will ensure that the trapping methods applied in their territory comply with the standards.

The use of funnel and cage traps in which the muskrats are killed by drowning is only permitted by the code in exceptional situations where the use of body-grip traps is excluded, in accordance with Art.10 of the AIHTS. Moreover, checking is required within five days, i.e. twice a week, for two weeks at the same location. For the sake of animal welfare, it is explicitly stipulated that funnel traps must be positioned at least 5 cm under water. This excludes situations where muskrats can still breathe and have to keep swimming around until they die of exhaustion and deprivation.

The characteristics of the wire to be used ensure that smaller bycatch can escape but that the trap is still strong enough to work properly. The specified dimensions exclude the trapping of larger animals.



6.2 LIVE TRAPS.

6.2.1 The live cage trap type

Description:

A cuboid-shaped trap made from wire mesh. It consists of a cage made of wire with a mesh size of min. ± 25 mm x ± 25 mm and a wire thickness of 1.75 mm. One or two openings of max. 12 cm x 12 cm are closed with 1 or 2 doors, in wire with a mesh size of ± 50 mm x 25 mm and a wire thickness of ± 2 mm. These traps can be made by the control officers. They are thus identical to lethal cage traps, but are used differently.

Setting:

A check should be made to ensure that the doors can move freely and close.



Figure 12: The cage trap type, used in an above-water set-up. Must be checked within 24 hours.

Use:

This trap is only used above water to catch muskrats in the period from the first of May until the 30th of September, when there are indications that young are present in the lodge or burrow. They are only set up in front of a lodge or in front of a burrow whose entrance is above the waterline due to drought (Figure 12). No bait is used. They should be checked within 24 hours of set-up and removed after a maximum of 3 nights. If max. daytime temperatures above 20°C are forecast, the traps should be protected from the sun and checked in the morning. If an animal other than a muskrat or brown rat is caught, it must be released immediately. Muskrats or rats that are caught are killed immediately using the most humane method: body-grip traps such as the Conibear or the ground trap can be used for this.

Rationale:

Live-cage traps are usually assessed as highly selective, as live bycatch can be released by the trapper. However, the trapper must always ensure that adequate quality of life is ensured for the captured animal during its time in the trap. The trap must therefore be checked sufficiently frequent – within 24 hours – and measures must be taken in the event of foreseeable threats such as heat or cold stress. Cold stress is avoided by only allowing usage in the summer months. In addition, the traps must be constructed in such a way that the trapped animal is not injured, as stipulated in the AIHTS. The mesh size allows small bycatch to escape and the indicated use ensures a highly targeted application.



