

Best Practice for trapping muskrat in Flanders

Implementation of the Agreement on International Humane Trapping Standards

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

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Abstract

This best practice for muskrat management is based on several decades of experience in managing the species in Flanders (North Belgium). It was drafted based on the best practice of Stuyck (2016), commissioned by the Flemish Environment Agency, and was edited and updated according to the latest developments in legislation. The applied procedures and trapping methods were assessed against the relevant European, Belgian and Flemish regulations and the provisions of the Agreement on International Humane Trapping Standards. In Flanders, a management regulation for muskrat was drafted in 2020 by the Agency for Nature and Forest which implements provisions of the EU Regulation on Invasive Alien Species (EU 1143/2014). This best practice was brought in line with this management regulation.

This code provides guidance to every control officer on permitted and recommended practices for trapping muskrats and the associated preconditions and requirements. It was communicated to the managerial community via the working group on muskrat control in Flanders, where various organisations including the Flemish Environment Agency, the Research Institute for Nature and Forest, the Agency for Nature and Forest, the Animal Welfare Service, RATO vzw, nature organisations, the provinces, cities and municipalities and the Polders and Water Boards Association are represented. This best practice should always be applied in concordance with the current regional legal provisions that apply.

Although any best practice for managing an invasive alien species should be considered in its local context 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. We therefore hope this best practice guide 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.

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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 indepth ecological information on muskrats and their impact.

2 HISTORY OF MUSKRAT AND ITS MANAGEMENT IN FLANDERS

Muskrats were introduced in 1928 in Belgium as a fur animal. As early as 1938, its eradication was ordered, making the muskrat control programme one of the longest standing control programmes for any organism in Belgium. Since then, there have been many different actors and control methods, and today the control is still spread over several management actors and public authorities.

As the control effort increased and rodenticides were applied, more muskrats were caught, with 100.000-150.000 captures reported annually in the seventies-eighties (Geeraerts-Bracops 1974). In Flanders, the numbers caught have decreased since 2000 (40.000-50.000 muskrats/year) and are currently relatively low (about 4.000 muskrats/year) (VMM 2010). Since 2000, Flanders has banned the use of rodenticides for muskrat control and the control is performed purely mechanical using various types of traps in a combination of passive control to protect the borders (i.e. traps laid out at fixed distances) and active control (i.e. only placing traps where traces of muskrat presence are reported) (Verbeylen & Stuyck 2002). At the level of the Flemish region, the muskrat control programme was performed by about 100 trappers and is nowadays reduced till 65 full time equivalents in public service for which pure muskrat work represents about 20 full time equivalents. It is coordinated centrally as well as at catchment level (3 coordinators each responsible for 3-4 basins). This is complemented with other management actors, such as provincial and municipal trappers, Rattenbestrijding Oost-Vlaanderen (RATO vzw) and Polders and Wateringen. To implement area-wide eradication, cooperation agreements were set up with landowners to gain access for trapping operations, for instance in nature reserves (Verbeylen et al. 2002).



Figure 1: Number of muskrats trapped per municipality in Flanders in 2019. Muskrats are mostly found in border areas with neighbouring countries and regions and Flanders is managed as a pest-free area.

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.

3 LEGAL FRAMEWORK

3.1 EUROPEAN

Council Regulation (EEC) No 3254/91 of 4 November 1991 prohibits the use of all leghold traps in the European Community and the introduction of pelts and manufactured goods of certain wild animal species originating from countries which catch them by means of leghold traps or trapping methods which do not meet international humane trapping standards.

3.1.1.1 EU Regulation on IAS

Regulation (EU) 1143/2014 on IAS entered into force on 1 January 2015. It provides for a set of measures (prevention, monitoring and management) to be taken across the EU applying to IAS included on a list of Invasive Alien Species of Union concern. Invasive alien species that are considered to be highly detrimental to the environment and whose impact can be mitigated through concerted action in Europe are potentially eligible. To date (2019), the list contains 66 species, it is dynamic and regularly supplemented by new alien species that prove to be problematic. The list may include species still absent from the EU, as well as more widespread species. Muskrat was added to the list of IAS of Union Concern with a first update of the list based on a European risk assessment process (Deputy Direction of Nature 2016), and the provisions of the Regulation are in force for the species since 2 August 2017. The following provisions apply to the species:

- **Prevention**: Prohibition measures. Muskrat can no longer be imported, transported, traded, used or exchanged anywhere in the EU. Commercial stocks must have been destroyed or disposed of within a maximum of two years after entry into force and they can no longer be sold to private individuals. Muskrats cannot be kept in situations where they can reproduce, be grown or cultivated, including in confinement and cannot be kept as pets, neither can they be intentionally released into the wild. Transport of muskrats is only allowed in the framework of an eradication programme.
- **Surveillance**: Member States are required to carry out a detailed dynamic mapping of the different species on the Union list present on their territory. A particular effort must be made to detect emerging species as soon as possible and thus enable their rapid elimination.
- **Management**: Populations of listed species must be subject to control measures based on their level of invasion. There are two possible courses of action: early eradication for emerging species, containment/mitigation/control to limit dispersal and reduce the local abundance of more widely distributed species. In Belgium, risk management options for muskrat were considered within a broader exercise for all listed IAS (Adriaens et al. 2019). For Flanders, the recommended strategy is to manage the territory as a pest-free area.
- **Reporting**: The EU IAS Regulation imposes reporting obligations (efficiency, non-target effects) on the Member States, hence the provisions in this best practice on reporting on trapping results and effort (see 5.1).

De EU IAS Regulation was implemented in regional environmental legislation through the Species Decree.

3.1.2 Agreement on International Humane Trapping Standards

In 1998, the European Community decided to conclude two international agreements to establish humane trapping standards at international level. These agreements were motivated by the desire to reach agreement on international humane trapping standards and to avoid trade disputes with the main international exporters of furs.

The first of these (hereinafter referred to as 'the Agreement' or AIHTS) was concluded with Canada and the Russian Federation and approved by Council Decision 98/142/EC of 26 January 1998.

The second agreement is with the United States of America and takes the form of approved minutes. This agreement was approved by Council Decision 98/487/EC of 13 July 1998. The agreement with the USA is similar in content to that concluded with the Russian Federation and Canada.

The Agreement on International Humane Trapping Standards comprises 17 articles and 4 annexes. Humane trapping standards aim to ensure an adequate level of welfare for trapped animals and to further improve that welfare.

The four annexes to the Agreement contain the humane trapping standards for animals, the list of species concerned, the timetable for implementation, guidelines for testing traps and research into the continuous development of trapping methods, research programmes aimed at refining the standards, provisions concerning an arbitration body and the declarations of the parties.

All European Union Member States were to implement the agreements at national level within the planned implementation period, which ended on the first of July 2016.

3.2 <u>NATIONAL</u>

3.2.1 Phytosanitary legislation

The Royal Decree of 10 August 2005 on *combating organisms harmful to plants and plant products* states that any responsible party (i.e. the owner, tenant or user, whether subject to private or public law who, in whatever capacity, exercises a right on cultivated soils, set-aside land, forests or woodland, or any other terrain, including the grounds of industrial establishments, buildings, storage sites, means of transport and any other object that may be a carrier of harmful organisms), is obliged to control harmful organisms as soon as the responsible party becomes aware or is notified of their presence by a government officials.

Muskrats are among those harmful organisms, for which the following special measures are laid out in the Royal Decree of 19 November 1987, amended by the Royal Decree of 14 August 1989:

- A responsible party that discovers the presence of muskrats for the first time, or discovers it again after an eradication campaign, is obliged to report this to the mayor.
- It is forbidden to breed, keep, transport or sell muskrats.
- The responsible party may entrust muskrat control to a third party, which must always be in possession of written permission with a legalised signature.
- Responsible parties are obliged to cooperate if an eradication campaign is organised by a government agency. Such cooperation includes the obligation to tolerate equipment on the party's land, and to assist in the placement and monitoring thereof by official muskrat exterminators or specialist companies designated by the government agency.
- Responsible parties are obliged to comply with any instructions from the government agency with regards to control measures.
- Muskrats, found to not comply with these provisions, are seized and destroyed at the expense of the offending party.

3.2.2 Animal Welfare Law

Article 15 of the Law of 14 August 1986 concerning the protection and welfare of animals states that: If the killing of a vertebrate animal is permitted without anesthesia or stunning in accordance with hunting, fishing or other legal provisions, or if this is done under legislation to control harmful organisms, the killing may only be carried out according to the most selective, the fastest and the least painful method for the animal.

3.3 <u>REGIONAL</u>

3.3.1 Species Decree

The Flemish Government's Species Decree aims to protect species in the Flemish Region. The Decree determines which species of animals and plants are protected in the Flemish Region and which legal consequences are associated with that protected status.

An update of the Species Decree (17 june 2016) transposed the provisions of the EU IAS Regulation for Flemish competences, including the prohibition on keeping, transporting and rearing of muskrat and other Union List IAS.

The Species Decree also provides the legal basis for taking measures on species management (Articles 28-31) through a dedicated Management Plan. It is within this framework that the measures mentioned in this best practice are legally bound. Currently, the Flemish Management Regulation for muskrat was drafted and is pending a Ministerial decision.

3.3.2 Decree on Integrated Water Policy

The Decree on Integrated Water Policy of 18 July 2003:

- defines the objectives and principles of an integrated water policy, with a strong emphasis on the multifunctionality of water systems;
- provides a number of instruments to better implement the integrated water policy;
- determines how the water systems are divided into river basins and river basin districts, basins and sub basins;
- uses this classification as the basis for the organizational structure and planning of the integrated water policy.

In the Decree of 7 May 2004, amended by the Decree of 23 December 2005, the Flemish Environment Agency was assigned the task of contributing to the integrated water management policy referred to in Article 4 of the Decree on Integrated Water Policy. The Flemish Environment Agency carries out this task by, among other things, organising, conducting checks of, monitoring and acting in an official capacity in relation to rat control in the Flemish Region, and by effectively performing rat control operations in or near surface waters that fall under the competence of the Flemish Region or in areas where an agreement with the relative authorities has been made.

3.3.3 Positive List of Mammals

Muskrat does not occur on the positive list of mammals which can be kept as pets by private people for non-commercial purposes. As a result, muskrats cannot be kept as pets unless the owner can prove that he already owned the animals before entry into force (1/10/2009) of the positive list and has a permit. This animal welfare legislation also prohibits offering muskrats for sale and making publicity around this. In Flanders, the Department of Environment, Nature and Energy (Animal Welfare Inspectorate) is responsible for compliance of the positive list.

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.

5 GENERAL GUIDELINES

- 1. The use of rodenticides is prohibited for the control of muskrats. This guideline implements the decree of 21/12/2001 on the reduction of the use of pesticides by government agencies, in particular Article 3b.
- 2. The quantity and the location of the trapping material set out in the field is proportional to the number and nature of muskrat traces and the risk of bycatch.
- 3. Active control, in which trapping material is only placed where there are clear indications of the presence of muskrat, is the current standard method of control. In addition to the known traces (food remains, faeces, burrows, etc.), detection by means of eDNA is also a sufficiently clear indication of the presence of muskrat. Passive control can only be carried out under exceptional circumstances, specified per trap type.
- 4. Anyone wishing to trap muskrats in Flanders using either lethal or life traps must have a permit to do so. This permit can only be obtained after taking a certified training organised by the Flemish government.
- 5. Catching muskrats may only be carried out by employees of a government-associated authority that carries out professional control of muskrats: Flemish Environment Agency, provincial and municipal services.
- 6. Only traps described in this code may be used for muskrat trapping. All body-grip traps that are used must be designed for trapping muskrats and must satisfy the requirements of the AIHTS and be certified for this purpose.
- 7. All traps must carry a clear identification of the organisation carrying out the control measure. As it must be possible to check compliance with the code, identification of the trapper is necessary. As the trapping equipment must remain interchangeable within the same organisation depending on requirements, the designation of the permit holder that committed a violation is left to the relevant authority.
- 8. Guidelines from this code for the specific permitted use of each trap type must be strictly followed.
- 9. Trapped muskrats must not be left on the bank or in the water, but should be disposed of in accordance with the current regulations. For muskrats, the current standard procedure in Flanders is to bury on site. Art. 89, 2° of the Field Code of 7/10/1886 penalises anyone who, other than in the circumstances referred to in the Law of 11 March 1950 on the protection of waters against pollution, throws a dead animal on the public highway, on a property adjoining the highway or in a watercourse, pond or canal.
- 10. The police and the Agency for Nature and Forest (ANB) are competent for enforcement of this code. If a violation is discovered, a police report will be drawn up, the permit may be withdrawn and the trapping equipment that is used may be seized and offences will be punished in accordance with the legal provisions.

5.1 REPORTING ON TRAPPING RESULTS AND EFFORT

All catches (both muskrats and bycatch) should be recorded. The following data must be recorded:

- Trapping date, i.e. the date on which the animal is removed from the trap.
- Trapping location. This location should be indicated with an accuracy of 20 m, preferably using GPS coordinates. If only a description of the catch location can be given, at least the name of the (sub)municipality and the watercourse should be mentioned, as well as approximate coordinates. If another web application is used to approximate the coordinates, this must also be indicated.
- The trapper's organisation.
- The type of trap with which the animal was caught.
- In addition to this trappers in Flanders also report weight and sex of trapped muskrats.

The trapping data are ideally registered with an app by the trappers. This also allows the data to be processed digitally and to a higher quality.

The trapping data are processed and communicated by the INBO, to support and optimise the organisation of control measures. The data is needed in the context of mandatory European reporting (EU Regulation 1143/2014) on the management of alien invasive alien species (IAS). Articles 19 and 24 in particular require appropriate registration and reporting of data on muskrat control. Reporting is required on migratory or reproductive patterns, action plans, management measures implemented, their effectiveness and their impact on non-target species. This can only happen if the control information that it necessitates is already collected during monitoring and administrative follow-up of control measures.

6 TRAPPING EQUIPMENT AND TRAPPING METHODS FOR MUSKRATS

Hereafter we present an overview of potential traps for muskrat with a description of their mechanism, set-up and recommended use. This selection is based on permitted practice in Flanders (management regulation on muskrat) in concordance with the current regional legislation and the agreement on international humane trapping standards (AIHTS).

The evaluation of the various traps used to control muskrats has taken into account not just the characteristics of the traps themselves, but the way in which they are used in the field. The design and trigger mechanism of a trap may be completely non-selective, yet its prescribed use according to the code makes bycatch fairly unlikely. Conversely, the trapping equipment with the best results in terms of selectivity may score poorly in terms of animal welfare; its use is only permitted in specific, exceptional situations.

The code states that trapping material may only be set up in places where there are clear indications of the presence of muskrats (i.e. active control). This requires muskrat tracks to be actively searched for.

For each type of trap a period is specified within which the equipment must be checked. This also means that captured animals must be removed from the trap within that period. A period is also specified, expressed as a maximum number of days or weeks, during which a trap may be set up at the same location. If the equipment is checked frequently enough, this period is sufficient to catch all the muskrats present at that specific location. Trapping equipment should therefore only be set where necessary and only for the time required to catch the muskrats present as leaving traps beyond this period of time will increase bycatch risk.

6.1 <u>LETHAL TRAPS</u>

These are traps that are designed and set up with the objective to kill the trapped animal as humanely as possible. We make a distinction here between body-grip traps – mechanical traps that kill the animal by the impact and clamping force of a moving jaw on the body – and drowning traps (funnel traps and underwater cages), which are permitted in exceptional circumstances on the basis of Art. 10 of the AIHTS. However, extra conditions are associated with this, such as due justification and data demonstrating the exceptional nature of this use.

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 x 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.



Figure 5: Setting the ground trap in shallow water as an alternative to the Conibear trap. In a situation such as the photo on the right, extra measures should be taken to prevent bycatch.

Use of the ground trap:

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 the Conibear is inadvisable (Figure 5). The use of bait is not permitted. It is placed like a roof over the trail with the trigger mechanism at the bottom, so that the wires are stretched horizontally across the trail. On a soft river bed, the trap can also be placed on one side with the moving jaw at the bottom and the dog at the top. This reduces sinkage in the mud.

Only in exceptional cases may the trap be placed partially above water, and only when it is not technically possible to place a Conibear trap (e.g. because the river bed or bank has been hard-surfaced). Placement should be aimed at trapping an animal that is present in the den. Measures should be taken to prevent animals or passers-by 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.

Ground traps should be checked within one week and may stay in the same place for a maximum of three weeks.

Rationale:

The use of the ground trap is limited to exceptional circumstances where it is inappropriate or technically impossible to place a Conibear trap. If a Conibear trap were used in these situations, the animal would not be gripped properly, and a short killing time could not be guaranteed.

This heavier trap type has a very high impact force but a somewhat lower grip force than a Conibear trap. As a result, it causes more severe injury, but grasps the animal less firmly than a Conibear trap. The Fur Institute of Canada, which takes the lead in certifying traps for fur animals, certifies all body-grip traps for catching muskrat underwater without further specification.

The restrictions on the use of the ground trap are aimed at minimising bycatch, in particular the somewhat larger land animals such as polecat (*Mustela putorius*) and stone marten (*Martes foina*), and shortening the killing time of trapped animals. The same checking frequency and duration of use are stipulated as for the Conibear trap.

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 Kerschl 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. \pm 25 mm x \pm 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 \pm 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 (1^{*} February - April 15^{*}) 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. \pm 25 mm x \pm 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 \pm 50 mm x 25 mm and a wire thickness of \pm 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.

6.3 <u>SUMMARY</u>

Table 1: Summary of trapping devices and their conditions of use.

Түре	WHEN	Снескінд	Period
Conibear	Standard	Every week	3 weeks
Ground trap	Under water: standard	Every week	3 weeks
	Above water: Exceptionally	Every week	3 weeks
Bait trap	Exceptionally + during spring migration	Every week	3 weeks
Funnel trap	Exceptionally + during spring migration	2 x per week	2 weeks
Cage trap	Under water: Exceptionally + during spring migration	2 x per week	2 weeks
	As life trap: exceptionally	Every 24h	3 nights
Artificial burrow	During spring migration	2 x per week	

6.4 CHECKING EFFICIENCY

All provinces and teams working per river catchment are controlled at least once a year to locate any populations remaining after control measures. A control team consisting of other trappers than those active in the region carries out the control. This is done as follows:

- The control team picks the 1 km of waterway (both banks) where they suspect most muskrats are still present based on visual prospection (feces, burrows, gnawed off plant material, ...)
- The process takes 3 days: on the first day traps are put in place, on the second day captured muskrats are taken out of the traps and traps are put in place again, on the third day captured muskrats and traps are removed.
- During this period local trappers are not allowed in the area.
- The area contains the waterway, the banks and any tributaries up until 200 m.
- Juvenile muskrats are not counted. A juvenile is seen as any muskrat under 400 g or with a tail shorter than 18 cm.
- To diminish the muskrat population in time there should not be more animals caught during control than following standard:
 - 3 muskrats (control between 1/1-31/3)
 - 5 muskrats (control between 1/4-30/6)
 - 6 muskrats (control between 1/7-30/9)
 - 5 muskrats (control between 1/10-31/12)

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