Invasive Alien Species
National Committee

National action plan on priority pathways of unintentional introduction and spread of invasive alien species of the Union list in Belgium

June 2022

Developed by the National Scientific Secretariat on Invasive Alien Species under the supervision of the National Committee on Invasive Alien Species,

In cooperation with the relevant administrations of the regional and federal authorities: SPF Santé publique, sécurité de la chaîne alimentaire et environnement/FOD Volksgezondheid, Veiligheid van de voedselketen en Leefmilieu, Agentschap Natuur en Bos, SPW Agriculture, Ressources naturelles et Environnement, Bruxelles Environnement/Leefmilieu Brussel.

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Introduction

The most effective and cost-efficient approach to tackle Invasive Alien species (IAS) is to reduce their chances of introduction and spread. Article 7 of the "European Regulation N° 1143/2014 on the prevention and management of the introduction and spread of invasive alien species" outlines several restrictions for the invasive alien species of Union Concern, specifically aiming at curbing the intentional pathways of introduction and spread of these species. Additionally, article 13 of the Regulation requires all Member States to 1) conduct an analysis to identify and prioritize pathways of unintentional introduction and spread of IAS of Union Concern and 2) develop one single action plan or a set of action plans to tackle these prioritized pathways.

In 2018, Belgium completed this prioritization exercise of pathways of introduction and spread for the IAS of Union Concern that were listed at that time (49 species, listed in 2016 or 2017). This was done by identifying pathways of introduction and spread for each species of Union concern through reviewing pathway information contained in the EU risk assessments, using the definitions of the Convention on Biological Diversity classification framework (CBD 2014)[1] and the interpretation manual of Harrower *et al.* (2018)[2]. Second, a prioritization methodology was developed which considered the species impact and the frequency of introduction via the pathway. The description of the analysis as well as the results are available in the report of the National Scientific Secretariat on IAS (2018)[3].

Based on the results of the prioritization of pathways, a decision endorsed by ministers was made in 2018 to proceed with developing the following thematic action plans:

1) Thematic Action plan on the introduction and spread of invasive alien species through public or private possession;
2) Thematic Action plan on the introduction and spread of invasive alien species through recreational and commercial/professional use of freshwater;

[1] CBD. (2014). Pathways of introduction of invasive species, their prioritization and management. UNEP/CBD/SBSTTA/18/9/Add.

[2] Harrower, C. A., Scalera, R., Pagad, S., Schonrogge, K., & Roy, H. E. (2018). Guidance for interpretation of CBD categories on introduction pathways.European Commission. 100pp.

[3] National Scientific Secretariat on IAS (2018). Pathways of unintentional introduction and spread of IAS of Union Concern in Belgium. Report1 : Identification and prioritization.

3) Thematic Action plan on the introduction and spread of invasive alien species through transportation of habitat and nursery material and machinery.

Originally, these 3 thematic action plans tackled 9 pathways out of 12 most important pathways identified for Belgium. In 2020, an updated prioritization analysis was undertaken, now including the species of the 2nd update (3rd list, 2019)[4]. In order to assess the robustness of the selected thematic action plans towards the inclusion of the 14 new species, the results of a new prioritization analysis were compared with the results of the first prioritization report from 2018. Since all 12 pathways in the top 12 were retained in the new prioritization, and pathway ranks only changed marginally[4], it was decided that the three thematic action plans were fit for purpose, and that the pathway "contaminant nursery material" would be taken up under the thematic action plan on soil.

The current action plans described in this document thus addresses 10 of 12 prioritized pathways for the species of the list of Union Concern of list 1, 2 and 3. The pathway "escape - zoo and botanical gardens" - was not considered although it scored high in the prioritization ranking. However, the stakeholders involved in this pathway will be implicated in the thematic action plan on private and public use of species, mainly in awareness raising actions for the general public. Additionally, the pathway "natural dispersal" is not considered in this action plan since this specific pathway is tackled trough the management of the species as obliged by article 19 of the Regulation (EU) N° 1143/2014 on the prevention and management of the introduction and spread of invasive alien species.

This national action plan operates within the framework of the Regulation (EU) N° 1143/2014 on the prevention and management of the introduction and spread of invasive alien species. It is therefore primarily based on the obligations of the competent authorities responsible for nature conservation with the support of some other participating authorities. The plan has been developed by the National Scientific Secretariat on Invasive Alien Species according to the Cooperation Agreement of 30th of January between the Federal state, the Communities and the Regions concerning the prevention and management of the introduction and spread of invasive alien species (Chapter VI National Action Plan, Articles 39 and 40), in cooperation with the relevant administrations of the three regional authorities (Brussels Capital, Flanders, Wallonia) and federal authorities. The plans will be implemented by the competent regional or federal authority,

[4] National Scientific Secretariat on IAS (2020). Pathways of unintentional introduction and spread of 66 invasive alien species of Union concern in Belgium. Report 1 : Identification and prioritization.

within their respective competences, over a four years period after adoption (until 2026).

This document fulfils the obligation of the EU Regulation on Invasive Alien Species Article 13 paragraph 2 and will be delivered to the European Commission.

List of departments involved as actors or partners

The following administration departments will be involved in the implementation of the national action plan as actors and/or partners of the detailed actions:

- the actors are the departments in charge of leading and coordinating the specified actions, and providing the required budget if needed (unless mentioned otherwise).
- the partners are the departments which will be consulted by the actors to implement the specified actions. Mention of these partners should be understood as an obligation of means and not as an obligation of results.

FEDERAL

AFSCA/FAVV – Agence Fédérale de la sécurité de la chaîne alimentaire/Federaal Agentschap voor de veiligheid van de voedselketen

SPF/FOD – Service public fédéral Santé publique, Sécurité de la chaîne alimentaire et Environnement (DG environment)/Federale overheidsdienst Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu (DG leefmilieu)

Note: when referred to SPF, it refers to the environmental department competent for the implementation of the IAS Regulation. Other departments are always mentioned as partners.

BRUSSELS-CAPITAL

BE/LB – Bruxelles Environnement/Leefmilieu Brussel :

- Department of Green areas and biodiversity
- Department of Animal Welfare
- Department Water
- Department Soil

FLANDERS

ANB – Agentschap voor Natuur en Bos

DW – Dierenwelzijn Vlaanderen

OVAM – Openbare Vlaamse Afvalstoffenmaatschappij

VMM – Vlaamse Milieumaatschappij

INBO – Instituut voor Natuur en Bosonderzoek

WALLONIA

SPW – Service Public de Wallonie

SPW-ARNE – SPW Agriculture, Ressources naturelles et Environnement :

- DNF – Département de la Nature et des Forêts (SPW-ARNE)
- DEMNA - Département de l'Etude du milieu naturel et agricole (SPW-ARNE)
- DQBA – Direction de la Qualité et du Bien-être animal (SPW-ARNE)
- DSD – Département du Sol et des Déchets (SPW-ARNE)
- DCENN – Direction des cours d'eau non navigables (SPW-ARNE)

OTHER

NSSIAS – National Scientific Secretariat on Invasive Alien Species

List of acronyms

CN – Combined nomenclature

CREAVES – Wildlife rehabilitation centres (*Centres de Revalidation des Espèces Animales Vivant à l'Etat Sauvage*)

DNA – Deoxyribonucleic acid

EU – European Union

IAS – Invasive alien species

IUCN – International Union for Conservation of Nature

NVWA – Nederlandse Voedsel- en Warenautoriteit

CHAPTER 1
–
Thematic Action plan on the introduction and spread of invasive alien species through public or private possession

or

“Private and public possession action plan”

1. Introduction and scope

The “private and public possession action plan”, as described below, is the first of a series of three thematic national action plans to tackle the introduction and spread of invasive alien species.

The phenomenon of IAS spreading or being introduced into nature as a result of specimens either escaping enclosures, being released, or being allowed to spread outside of the private property or public domain where they were introduced (*i.e.* the pathways “pet, aquarium and terrarium species” and “ornamental other than horticulture”), have been identified as the most important pathways of spread and introduction for the current set of 66 animal and plant species[5]. Another important pathway that was identified – mainly for aquatic plants – was transportation as a contaminant of (ornamental) plants. These three pathways were grouped into a thematic action plan: “introduction and spread through the private and public use of species”.

These pathways mainly serve as pathways for new and independent introductions and are less important as pathways of spread. Preventing new releases, escapes and entry into nature through improper management of pets, gardens and aquarium plants is the first step of actions that should be considered as it is much more costly and less efficient to tackle (the spread of) populations once they are established in the wild than to prevent their entry into the wild via preventative actions. Additionally, once these invasive alien species are out in nature, they might already have caused harm to the native fauna and flora. Such negative impacts can occur through various mechanisms such as the introduction of new diseases, competition, predation and even (irreversible) changes in physical and chemical parameters of the habitat.

This action plan tackles 53 out of 66 species of Union Concern and includes legislative actions, actions to support enforcement and inspections, awareness raising for various stakeholders and mapping of baselines and research.

The collections of zoos, aquaria and botanical gardens are not directly targeted by this action plan but are considered as a partner in the awareness raising component of this action plan. Nevertheless, they are duly informed of their responsibilities and obligations following the Regulation on IAS with regard to their collection of specimens.

[5] National Scientific Secretariat on IAS (2020). Pathways of unintentional introduction and spread of 66 invasive alien species of Union concern in Belgium. Report 1 : Identification and prioritization.

2. Description of target pathways

This action plan intends to target the following pathways (definitions of the Convention on Biological Diversity classification framework (CBD, 2014)[6] and the interpretation manual of Harrower *et al.* (2018)[7]):

- **Pet/aquarium/terrarium species:** plant and animal species (including live food for those species) that have escaped confinement or controlled environments where they were kept by private keepers or hobbyists for recreation, enjoyment, companionship and/or trading.
- **Ornamental purposes other than horticulture:** plant species that have escaped confinement or controlled environments where they were introduced for decorative or ornamental reasons excluding commercial horticulture.
- **Contaminant on plants:** species that are not currently part of the commercial nursery trade, for instance plants being transported for non-commercial reasons or plants originally from the commercial nursery trade that have left the trade and been purchased by and used/planted by an end user.

3. State of Play

3.1. Competent authorities and legislative framework

In Belgium, in the framework of nature conservation, import and export of non-native plants and animals is a competence of the federal authority, in the framework of nature conservation, the Regions being competent of the import of native species.

The other competences related to this action plan represent competences of the Regions (each on his own territory). Several actions to reduce the risk of introducing or spreading IAS are already addressed by regional legislation and are described below.

White lists for pets

All three Regions have legislations in place that limit the animal species that private keepers are allowed to keep as pets. These lists are developed and adopted in the

[6] CBD. (2014). Pathways of introduction of invasive species, their prioritization and management. UNEP/CBD/SBSTTA/18/9/Add

[7] Harrower, C.A., Scalera, R., Pagad, S., Schonrogge, K. and Roy, H.E., 2018. Guidance 728 for interpretation of CBD categories on introduction pathways.

framework of animal welfare but are interesting instruments for nature conservation.

- **Flanders**:
    - Mammals: Besluit van de Vlaamse Regering (13/07/2018) houdende wijziging van het koninklijk besluit van 16 juli 2009 tot vaststelling van de lijst van niet voor productiedoeleinden gehouden zoogdieren die gehouden mogen worden, gewijzigd bij het koninklijk besluit van 24 november 2009.
    - Reptiles: Besluit van de Vlaamse Regering tot vaststelling van de lijst van reptielen die gehouden mogen worden (22/03/2019).
- **Wallonia**:
    - Mammals: Arrêté du Gouvernement wallon du 24 juillet 2018 fixant la liste des mammifères qui peuvent être détenus (MB 25/09/2018)
    - Reptiles: Arrêté du Gouvernement wallon du 10 décembre 2020 encadrant la commercialisation et la détention de reptiles (MB 28/01/2021) (Avec les listes des espèces de reptiles qui peuvent être détenues.)
    - The "Arrêté du Gouvernement wallon du 4 juillet 2002 arrêtant la liste des projets soumis à étude d'incidences, des installations et activités classées ou des installations ou des activités présentant un risque pour le sol" also fixes a list of exotic animals requiring a permit for detention.
    - A legal proposal on the establishment of a positive list for birds is currently being prepared.
- **Brussels Capital Region:**
    - Mammals: Arrêté Royal du 16 juillet 2009 fixant la liste des mammifères non détenus à des fins de production qui peuvent être détenus/Koninklijk besluit van 16 juli 2009 tot vaststelling van de lijst van niet voor productiedoeleinden gehouden zoogdieren die gehouden mogen worden.
    - Reptiles: Arrêté du 26 novembre 2020 du Gouvernement de la Région de Bruxelles-Capitale fixant la liste des reptiles pouvant être détenus et les normes minimales de leur détention/ Besluit van de Brusselse Hoofdstedelijke Regering van 26 november 2020 betreffende de lijst van reptielen die gehouden mogen worden en de minimumnormen voor het houden ervan.

<u>Prohibition on release</u>

A general prohibition on the release of (native and non-native) animals and plants into the environment has also been included in the nature legislation in the three Regions:

- **Flanders**: Soortenbesluit, Article 17.
- **Wallonia**: For invasive alien species: Décret relatif à la prévention et à la gestion de l'introduction et de la propagation des espèces exotiques envahissantes, Articles 6, 11 et 12; For other species: Loi sur la conservation de la nature, Article 5.
- **Brussels Capital Region**: Ordonnance nature, Article 75.

Disposal of green waste

Next to a prohibition on the intentional release of species, the three regions have also implemented legislation that forbid the improper disposal of green waste.

- **Flanders**: Vlaams Reglement voor duurzaam beheer van Materialenkringlopen en Afvalstoffen (VLAREMA) Art. 4.3.1 – 4.3.2.
- **Wallonia**: Décret du 27 juin 1996 relatif aux déchets, including Article 7, and upcoming Arrêté du Gouvernement Wallon sur les espèces exotiques envahissantes, which will specifically mention green waste of invasive alien species.
- **Brussels Capital Region**: Ordonnance relative aux déchets, Article 18.

Management of populations of IAS on private properties

- **Flanders**: in the case of invasive alien species that are targeted by an approved management reguation (sensu Soortenbesluit Article 28), access to populations on private property is ensured through the Nature decree, Article 51 §3. Alternatively, if no access is granted, the nature decree includes a provision that management costs stemming from a population on private property can be recovered from the owner of the land.
- **Wallonia**: Access to private property for the management and eradication of IAS by qualified agents is assured through the "Décret relatif à la prévention et à la gestion de l'introduction et de la propagation des espèces exotiques envahissantes", Article 24.

3.2. Non-legislative Initiatives on IAS

Apart from legislative initiatives, a number of non-legislative initiatives which support the curbing of introductions and spread of invasive alien species through the public and private use of species, have already been executed:

- **Joint Action**: the **ALTERIAS** – **Life project** (2010-2013) raised awareness in the professional horticultural sector in Belgium on the problems of invasive alien plants and the role of the horticultural sector. Apart from awareness raising within the sector, the project led to the creation of code of conduct, a list of alternatives to ornamental invasive alien species and a consensus list of invasive alien species that will not be sold or planted anymore – in cooperation with the main horticultural federations and associations in Belgium.
- **Flanders**:
    - A well-developed online information portal **Huisdierinfo.be** on the keeping of pets was created in order to properly inform people before they buy a pet. This exemplifies a proactive approach that not only increases animal welfare but also decreases impulse-buys that eventually lead to dumping or surrendering. The website contains information on the needs, proper care and yearly costs for more delineated groups of species (*e.g.* aquatic turtles, *Xenopus* species, freshwater crayfish, scorpions…) and even single species (*e.g. Lampropeltis getula*). This website was promoted by online campaigns and tv-spots.
    - A joint Life project with the Netherlands "INVEXO – minder invasieve planten en dieren (2008-2012)". The final report of the Communication package included recommendations for clear communication with stakeholders.
    - European Life project DUNIAS (start 2021-2026), which aims amongst others at preventing of the new arrival or reintroduction of IAS in coastal dune ecosystems. Sources of IAS should be reduced significantly thanks to increased awareness among the project's target groups. These include garden owners, landscape architects, plant nurseries, garden centres, and visitors to nature sites.

4. Species targeted by the action plan

The species of Union concern that are concerned by the pathways of introduction and spread considered in this action plan are listed below (Table 1.1).

Table 1.1 Species of Union Concern concerned by the pathways under consideration in the Action Plan - private and public possession. Three frequency-categories of introduction in Belgium are distinguished: Black: species commonly observed using this pathway for BE ; Dark grey: species sometimes observed using this pathway for BE; Light grey: species potentially using the pathway but not yet been observed for this pathway in BE. Species that cannot establish in Belgium are indicated with "", species that can only marginally establish in Belgium are indicated with "**".*

↓ Species	→ Pathways	Pet / Aquarium / Terrarium	Ornamental purposes other than horticulture	Contaminant on plants
Mammals				
Callosciurus erythraeus	Pallas' squirrel			
*Herpestes javanicus***	Small Asian mongoose			
Muntiacus reevesii	Muntjac deer			
*Nasua nasua***	Coati			
Nyctereutes procyonoides	Racoon dog			
Procyon lotor	Raccoon			
Sciurus carolinensis	Grey squirrel			
Sciurus niger	Fox squirrel			
Tamias sibiricus	Siberian chipmunk			
Birds				
*Acridotheres tristis***	Common myna			
Alopochen aegyptiacus	Egyptian goose			
Oxyura jamaicensis	Ruddy duck			
Threskiornis aethiopicus	Sacred ibis			
Amphibians and reptiles				
Lithobates catesbeianus	American bullfrog			
Trachemys scripta	Red-eared, yellow-bellied and Cumberland sliders			
Inverterbrates				
Orconectes limosus	Spiny-cheek crayfish			
Orconectes virilis	Virile crayfish			
Pacifastacus leniusculus	Signal crayfish			
Procambarus cf fallax	Red swamp crayfish			
Procambarus clarkii	Marbled crayfish			
Fishes				
Lepomis gibbosus	Pumpkinseed			
Perccottus glenii	Amur sleeper			
*Plotosus lineatus**	Striped eel catfish			
Pseudorasbora parva	Topmouth gudgeon			
Number of animal IAS	**TOT = 24**	**24**	**0**	**0**

↓ Species	→ Pathways	Pet / Aquarium / Terrarium	Ornamental purposes other than horticulture	Contaminant on plants
Aquatic plants				
*Alternanthera philoxeroides**	Alligator weed			
Cabomba caroliniana	Fanwort			
*Eichhornia crassipes**	Water hyacinth			
Elodea nuttallii	Nuttall's waterweed			
*Gymnocoronis spilanthoides***	Senegal tea plant			
Hydrocotyle ranunculoides	Floating pennywort			
Lagarosiphon major	Curly waterweed			
Ludwigia grandiflora	Water-primrose			
Ludwigia peploides	Floating primrose-willow			
Lysichiton americanus	American skunk cabbage			
Myriophyllum aquaticum	Parrot's feather			
Myriophyllum heterophyllum	Broadleaf watermilfoil			
*Salvinia molesta**	Kariba weed			
Terrestrial plants				
Trees				
*Acacia saligna**	Coojong			
Ailanthus altissima	Tree of heaven			
Baccharis halimifolia	Eastern baccharis			
*Prosopis juliflora**	Mesquite			
*Triadica sebifera**	Chinese tallow tree			
Grasses				
*Pennisetum setaceum**	Crimson fountaingrass			
Climbers				
*Cardiospermum grandiflorum**	Balloon vine			
*Humulus scandens**	Japanese hop			
*Lygodium japonicum**	Japanese climbing fern			
*Pueraria montana var. lobata**	Kudzu vine			
Others				
Asclepias syriaca	Common milkweed			
*Gunnera tinctoria**	Chilean rhubarb			
Heracleum mantegazzianum	Giant hogweed			
Impatiens glandulifera	Himalayan balsam			
Lespedeza cuneatea	Chinese bushclover			
*Parthenium hysterophorus**	Whitetop weed			
Number of plant IAS	**TOT = 29**	**11**	**27**	**11**

Additionally, other invasive alien species that are able to establish in Belgium under current climate are also concerned by these pathways (Table 1.2).

Table 1.2 Alien Species of concern for Belgium, not listed (yet) by EU regulation 1143/2014, that are also implicated in the pathways of the Action plan on public or private possession. Non-exhaustive list of examples.

Pet / aquarium/ terrarium	Ornamental purposes other than horticulture	Contaminant on plants
Ameiurus melas	*Aponogeton distachyos*	*Crassula helmsii*
Ameiurus nebulosus	*Celastrus orbiculatus*	*Egeria densa*
Axis axis	*(Cotula coronopifolia)*	*Hydrilla verticillata*
Callosciurus finlaysonii	*Erythranthe guttata*	*Limnoperna fortunei*
Channa argus	*Houttuynia cordata*	
Cherax destructor	*Koenigia polystachia*	
Crassula helmsii	*Petasites japonicus*	
Creaserinus fodiens	*Phytolacca americana*	
Egeria densa	*Pontederia cordata*	
Faxionus immunis	*Saururus cernuus*	
Faxionus rusticus	*Zizania latifolia*	
Gambusia affinis		
Gambusia holbrookii		
Hydrilla verticillata		
Lampropeltis getula		
Procambarus acutus		
Pycnonotus cafer		
Fundulus heteroclitus		

5. Aims and objectives

The overall aim of this pathway action plan is to reduce the risk of the establishment and spread of invasive non-native species that were initially acquired via commercial circuits by reducing their release and escape.

The specific objectives are:

- **OBJ 1** – Prevent the active release of pets into nature *(ACTIONS 1, 4, 5)*
- **OBJ 2** – Decrease the possibility that IAS (non-listed) species are kept/sold/bought (un)intentionally by private owners *(ACTIONS 1, 2, 3, 5)*

- **OBJ 3** – Prevent unintentional spread of invasive garden and aquarium plants by reducing their improper disposal and management. *(ACTIONS 1, 2)*
- **OBJ 4** – Collect baseline information on the supply chain and presence of listed IAS in trade (or increase baseline knowledge on the presence in commerce) *(ACTIONS 3, 5)*
- **OBJ 5** – Improve knowledge, coordination and cooperation between governmental agencies on the topic of IAS *(ACTIONS 2, 5)*

6. Actions

6.1. General description

ACTION 1 – Awareness raising for the general public

The competent authorities will continue, revitalize or launch initiatives for the awareness raising on **invasive alien animals as pets** and on **invasive alien plants in gardens, ponds and aquaria.** The general public, buyers and holders are informed of which species you can legally keep and made aware to be responsible with IAS in their possession:

- **PETS**: never release pets into nature, as (1) it is cruel for the animals, and (2) invasive species can harm the environment and native species.

- **PLANTS**: (1) how to properly dispose of (aquarium) plants, (2) prevent spread from your garden to nature, (3) what to do when you own an invasive plant, and to (4) be cautious when trading or exchanging plants.

Additionally, public authorities will ensure that online information on IAS is easy to find, easily navigable, easy to understand, but first and foremost correct.

Objectives: **OBJ 1, OBJ 2, OBJ 3**

Target pathways: Pet/aquarium/terrarium species; Ornamental purposes other than horticulture.

ACTION 2 – Increasing knowledge among professional stakeholders

The competent authorities will increase knowledge of the topic amongst professional animal and plant stakeholders (veterinarians, pet and aquarium shops, horticultural shops and federations, administrations, students): concept and issues of IAS in general, the EU IAS Regulation, the specifics of the Belgian implementation of the regulation pertaining to their sector and best practices on preventing the introduction of IAS in their sector. Professionals will be encouraged to act as amplifiers of knowledge for the transfer of information on IAS towards the general public (through the promotion of the campaigning material developed by the responsible authorities). Professional traders are also engaged through working groups in the creation of codes of conduct. Lastly, public authorities will ensure that employees from relevant departments that may come into contact with IAS in their line of duty receive relevant information on IAS.

Objectives: **OBJ 2, OBJ 3, OBJ 5**

Target pathways: Pet/aquarium/terrarium species; Ornamental purposes other than horticulture; Contaminant on plants.

ACTION 3 – Framework to keep track of species in commerce

For certain species – especially reptiles, amphibians and fish, there is only scattered information on their commercial importance and popularity as pets. Similarly, apart from anecdotical information given by stakeholders from the horticultural sector, it is very difficult to estimate the Belgian cultivated plant population. This makes it difficult to assess the number of specimens in private possession and the risk of secondary spread into nature.

A framework will therefore be created to allow to keep track of IAS in commerce by collecting baseline information on import, export and stocks of invasive alien animals and plants. The actions that will be undertaken for the mapping of the animal market fit into the framework of the upcoming national "*Plan towards a sustainable trade in exotic animals*" which is currently being detailed.

The primary purpose of this action would be nature conservation, although the implementation also implicates animal welfare services.

Objectives: **OBJ 2, OBJ 4**

Target pathways: Pet/aquarium/terrarium species; Ornamental purposes other than horticulture.

ACTION 4 – Create capacity for hosting IAS animals

Even though animals of Union Concern are now forbidden in commerce, some specimens are still legally kept as pets by private people, according to Article 31 of the Regulation. If owners are unable or unwilling to care for their animal until their natural death, they often have no other legal option besides euthanasia. This increases the risk that specimens would be released into nature by their previous owner. Alternatives to euthanasia should be explored for (1) owners wanting to surrender their pet and for (2) certain specimens of publicly sensitive species that are captured in nature to guarantee public support for the management of these species. Moreover, there should be capacity to host animals (3) in the framework of confiscations by policial services. A legal framework already exists in the three regions but suitable facilities still need to be identified in Brussels and Wallonia in order to guarantee a swift solution when holding capacity is needed for (1), (2) or (3). The primary purpose of the action would be nature conservation, although the implementation also implicates animal welfare services.

Objectives: **OBJ 1**

Target pathways: Pet/aquarium/terrarium species.

ACTION 5 – Support enforcement

In order to adhere to the prohibitions and obligations following from the Regulation and to be able to implement proper and effective controls to verify that listed species are not sold in Belgium, nor brought into the Union via Belgium (as contaminants), DNA barcoding and morphological tools will be developed to aid in the detection and identification of invasive alien species of Union Concern.

The competent authorities will formulate a coordinated strategic approach to implement increased controls in shops (horticultural and/or aquatic gardening) and border control points. The aim is to check for the presence of listed species (*e.g.* ornamental and oxygenating plants, crayfish) due to mislabelling or lack of management. The strategic approach will also help the creation of a coordinated information flow between competent authorities.

Finally, the e-commerce supply chain will be characterized in the framework of the upcoming national "*Plan towards a sustainable trade in exotic animals*".

Objectives: **OBJ 1, OBJ 2, OBJ 4, OBJ 5**

Target pathways: Pet/aquarium/terrarium species; Ornamental purposes other than horticulture; Contaminant on plants.

6.2.Details by authorities

ACTION 1 – *Awareness raising for the general public* **FEDERAL**	
Description of the action	Federal authority will launch a national campaign to raise awareness on the risks posed by the introduction of non-native invasive plants for native ecosystems at national airports.
Actors and partners	Actor: SPF/FOD administration Partner: NSSIAS, SPF/FOD (Plant Health Dpt), AFSCA/FAVV, customs
Timeline	Start: 2023 - End: 2024
Budget	SPF/FOD

ACTION 1 – *Awareness raising for the general public* **BRUSSELS CAPITAL REGION, FLANDERS, WALLONIA**	
Description of the action	(1) Coordinated inter-regional communication campaign to raise awareness on the risks of non-native species as pets or ornamentals, which could include amongst other: jointly timed press release in May (peak of gardening); awareness papers in journals of key professional federations; TV spot. The campaign will be envisioned in coordination meetings. (2) Revise respective species pages of Wikipedia.org to briefly include restrictions and a link to the regulation. Revise the general pages on IAS on Wikipedia. Revision will be done in NL, FR, ENG. Representatives of other German speaking member states will be informed of this action.
Actors and partners	(1) Actor: ANB, BE/LB (Dept Biodiversity and Dept Communication), DNF (SPW), Partner: NSSIAS (2) Actor: NSSIAS
Timeline	(1) Start: 2023 - End: 2026 (2) End: 2022
Budget	(1) Joint budget between actors (2) Non applicable

ACTION 1 – *Awareness raising for the general public* **BRUSSELS CAPITAL REGION**	
Description of the action	(1) Develop a standardized pictogram on the prohibition of release of plants and animals, to be included in online information material and/or to be displayed at selected public parks, ponds and the Soignes/Zonïen forest entrances. (2) Develop a poster and leaflet on the release of IAS pets, to be added to the animal welfare campaigning material. (3) Develop content on responsible gardening with IAS to be added to the relevant regional websites and brochures (e.g. "Natuurlijke en gezellige tuin: 100 tips om je tuin en biodiversiteit te respecteren"/ Un jardin naturel et convivial - 100 conseils pour respecter l'environnement et favoriser la biodiversité). (4) Organize a mailing to stakeholders to promote the campaigns (in (2) and (3)) to their buyers and how to obtain the posters and leaflets (through e-mails and newsletters). (5) Identify websites and online publications of public authorities where information on IAS is relevant. Revise the content of identified websites and publications of public authorities to ensure the information for (prospective) pet or plant owners is correct and up-to-date and synergies between administrations are mentioned where appropriate.
Actors and partners	(1) Actor: BE/LB (Dept Biodiversity and Dept Communication) (2) Actor: BE/LB (Dept Biodiversity and Dept Communication); Partner: Animal welfare (3) Actor: BE/LB (Dept Biodiversity and Dept Communication) (4) Actor: BE/LB (Dept Biodiversity and Dept Communication) (5) Actor: BE/LB (Dept Biodiversity and Dept Communication); Partner: NSSIAS
Timeline	(1) Start: 2023 (2) Start: 2023 (3) End: 2023 (4) End: Spring 2024 (5) End: 2022

Budget	(1) BE/LB (pictogram development) (2) BE/LB (folder development) (3) BE/LB (content development) (4) Not applicable (5) Not applicable

ACTION 1 - Awareness raising for the general public **FLANDERS**	
Description of the action	(1) Develop a standardized pictogram on the prohibition of release of plants and animals, particularly targeted for ponds, to be included in selected recreational infrastructure (provincial domains and parks) and added to the online information material. (2) Develop a poster and leaflet on the release of pets, to be added to the animal welfare campaigning material. (3) Develop content on responsible gardening with IAS to be added to the relevant regional websites (Ecopedia, "Plant van hier", Ovam). Look for synergies in the existing citizen science campaigns (such as mijn tuinlab, Tuinrangers). (4) Organize a mailing to stakeholders to promote the campaigns (in (2) and (3)) to their buyers and how to obtain the posters and leaflets (through e-mails, newsletters and ANB website). (5) Initiate discussions with zoos to implement awareness raising on IAS in zoos and botanical gardens on a voluntary basis, in the framework of their responsibility for education and conservation – for example by including IAS status on the informational boards at the enclosures or dedicated information campaigns. (6) Identify websites, publications of public authorities where information on IAS is relevant. Revise the content of identified websites and publications of public authorities to ensure the information for (prospective) pet or plant owners is correct and up-to-date and synergies between administrations are mentioned where appropriate.

Actors and partners	(1) Actor: ANB (2) Actor: ANB + DW (3) Actor: ANB + partner: OVAM (4) Actor: ANB (5) Actor: ANB + DW (6) Actor: ANB ; Partner: NSSIAS
Timeline	(1) Start: 2023 (2) Start: 2023 (3) Start: 2023 (4) End: Spring 2024 (5) Start: 2023 (6) End 2022
Budget	(1) ANB (Pictogram development and printing) (2) ANB + DW (Folder development and printing) (3) ANB (Folder development and printing) (4) Not applicable (5) Not applicable (6) Not applicable

ACTION 1 – *Awareness raising for the general public* **WALLONIA**	
Description of the action	(1) Develop a standardized pictogram on the prohibition of release of plants and animals to be included in online information material and/or to be displayed at selected recreational infrastructure (provincial domains, natural reserves and urban parks). (2) Develop a poster and leaflet on the release of pets, to be added to the animal welfare campaigning material. (3) Develop content on responsible gardening to be added to a dedicated section on the regional website (biodiversité Wallonie) and other websites to be identified. (4) Organize a mailing to stakeholders to promote the campaigns (in (2) and (3)) to their buyers and how to obtain the posters and leaflets. (5) Initiate discussions with zoos and botanical gardens to implement awareness raising on IAS in zoos and botanical

	gardens on a voluntary basis, in the framework of their responsibility for education and conservation. (6) Identify websites and publications of public authorities where information on IAS is relevant. Revise the content of identified websites and publications of public authorities to ensure the information for (prospective) pet or plant owners is correct and up-to-date and synergies between administrations are mentioned where appropriate
Actors and partners	(1) Actor: DNF (2) Actor: DNF + DQBA (3) Actor: DNF (4) Actor: DNF (5) Actor: DNF + DQBA (6) Actor: DNF ; Partner: NSSIAS
Timeline	(1) Start: 2023 (2) Start: 2023 (3) Start: 2023 (4) End: Spring 2024 (5) Start: 2023 (6) End 2022
Budget	(1) DNF (Pictogram development and printing) (2) DNF + DQBA (Folder development and printing) (3) DNF (Folder development and printing) (4) Not applicable (5) DNF (6) Not applicable

ACTION 2 – *Increasing knowledge among professional stakeholders* **FEDERAL, BRUSSELS CAPITAL REGION, FLANDERS, WALLONIA**	
Description of the action	(1) Engage with professional stakeholders to translate European codes of conducts in operational guidelines on different formats (synthesis, flyer, poster) for animals (pets) and plants (horticulture and invasive alien trees) and assess the interest of implementing label or certificates of good practices amongst others. Promote and disseminate the codes of conducts. (2) Update and disseminate awareness poster developed by NSSIAS on IAS plants and animals of Union Concern. (3) Pilot project at the level of the competent authorities to increase awareness of and attention for biosecurity amongst managers of aquatic systems (see *Action Plan on Freshwater*, *ACTION 4*).
Actors and partners	(1) Actor: NSSIAS; Partners: SPF/FOD, ANB, BE/LB, DNF (2) Actor: NSSIAS (3) Actor: NSSIAS, SPF/FOD, ANB, BE/LB, DNF
Timeline	(1) Start: 2023 - End: 2025 (2) Start: 2022 - End: 2023 (3) Start: 2022 - End: 2024
Budget	(1) NSSIAS, SPF/FOD, ANB, BE/LB, DNF (2) NSSIAS (3) NSSIAS

ACTION 2 – *Increasing knowledge among professional stakeholders* **BRUSSELS CAPITAL REGION**	
Description of the action	(1) Identify relevant fields of study/formations and promote the inclusion of the topic of IAS (non-exhaustive examples: animal care studies, veterinary studies, green studies, architecture, garden architecture). Incorporate the topic in the mandatory trainings for the approved establishments. Provide green space managers with guidelines on how to

	deal with listed IAS plants on their ground/green spaces/natural reserves (e.g. through the coordinator of Natura 2000 field management and the use of the geodata portal). (2) Identify relevant trainings for administration employees and include the topic of IAS.
Actors and partners	(1) Actor: BE/LB (Biodiversity and Animal Welfare); Partner: NSSIAS (2) Actor: BE/LB (Biodiversity); Partner: NSSIAS (3) Actor: BE/LB (Biodiversity); Partner: NSSIAS
Timeline	(1) End: 2024 (2) End: 2024 (3) End: 2024
Budget	(1) BE/LB (creation of material if applicable) (2) BE/LB (layout if applicable) (3) Not applicable

ACTION 2 – *Increasing knowledge among professional stakeholders* **FLANDERS**	
Description of the action	(1) Identify relevant courses in the INVERDE packages to include information on IAS and identify the need for new courses (*e.g*. management methods of IAS species). Promote the material made by NVWA on IAS (Linvexo) through online means (internal and external such as https://www.klascement.net). Assess the feasibility to incorporate the topic in the specifications for the obligatory trainings in the animal sector. (2) Provide green space (*e.g.* park) managers with guidelines on how to deal with listed IAS plants on their ground / green spaces (*e.g.* communal parks, ….). This could include an actualisation of the "Technisch vademecum beheer invasieve uitheemse planten". (3) Identify relevant trainings for administration employees and include the topic of IAS.

Actors and partners	(1) Actor: ANB en DW; Partner: NSSIAS (2) Actor: ANB; Partner: NSSIAS (3) Actor: ANB; Partner: NSSIAS
Timeline	(1) End: 2024 (2) End: 2024 (3) End: 2024
Budget	(1) ANB (creation of material if applicable) (2) ANB (layout if applicable) (3) Not applicable

ACTION 2 – *Increasing knowledge among professional stakeholders* **WALLONIA**	
Description of the action	(1) Identify relevant fields of study/formations and promote the inclusion of the topic of IAS (non-exhaustive examples: animal care studies, veterinary studies, green studies, architecture, garden architecture). Assess the feasibility to incorporate the topic in the specifications for the obligatory trainings in the animal sector. (2) Development of green space (*e.g.* park) managers with guidelines on how to deal with listed IAS plants on their ground / green spaces (e.g. communal parks, ….). (3) Identify relevant trainings for administration employees and include the topic of IAS
Actors and partners	(1) Actor: DNF + DQBA; Partner: NSSIAS (2) Actor: DNF ; Partner: NSSIAS (3) Actor: DNF ; Partner: NSSIAS
Timeline	(1) End: 2024 (2) End: 2024 (3) End: 2024
Budget	(1) DNF (creation of material if applicable) (2) DNF (layout if applicable) (3) Not applicable
ACTION 3 – *Framework to keep track of IAS in commerce* **FEDERAL**	

Description of the action	(1) Assess the need and feasibility for initiating relevant European and (international) opportunities to increase traceability and transparency of import and export of invasive alien species in order to support the implementation of Article 15 of the IAS Regulation. (2) Support the strategic objective 1 of the upcoming national *Plan towards a sustainable trade in exotic animals* that will increase the knowledge on legal and illegal trade in exotic species, including invasive alien species in Belgium with the following actions: o Inventory of the importation of exotic animals as pets in Belgium; o Set up a data monitoring system for exotic animal species imported in Belgium. (3) Analyse data available in the database of the European Union (cf. EUROPHYT, TRACES) to Identify the supply chain of ornamental plants, develop a method to detect and control a set of prioritized species of flatworms (in potted plants - see *Action Plan on Soil*, *ACTION 4).*
Actors and partners	(1) Actor: SPF/FOD; Partner: AFSCA/FAVV, NSSIAS (2) Actor: SPF/FOD; Partner: AFSCA/FAVV, NSSIAS (3) Actor: NSSIAS, SPF/FOD; Partner: AFSCA/FAVV
Timeline	(1) Start: 2024 (2) Start 2023 (3) Start: 2022 – End: 2023
Budget	(1) Not applicable (2) SPF/FOD (3) Not applicable

ACTION 3 – *Framework to keep track of IAS in commerce* **WALLONIA, BRUSSELS CAPITAL REGION, FLANDERS**	
Description of the action	Assess together with the federations how insights in commercial pet stocklists can be gained, for example by voluntary transmission of stocklists when species get added to the list of Union Concern.
Actors and partners	Actor: DNF, DQBA, ANB, DW, BE/LB, BAB Partner: NSSIAS
Timeline	End: 2026
Budget	Not applicable

ACTION 4 – *Framework for hosting IAS animals* **WALLONIA**	
Description of the action	The Walloon decree on IAS already fixes the legal base for facilities acting as IAS hosting facilities. Further steps will be taken to identify suitable facilities and evaluate the feasibility of including more facilities (complementary to the existing refuges and CREAVES).
Actors and partners	Actor: DNF; Partner: DQBA
Timeline	End: 2024
Budget	DNF

ACTION 4 – *Framework for hosting IAS animals* **BRUSSELS CAPITAL REGION**	
Description of the action	The regional legislation already fixes the legal base for facilities acting as IAS hosting facilities. One facility has already received a permit, further steps will be taken to identify supplementary facilities that could receive a permit, if feasible.
Actors and partners	Actor: BE/LB
Timeline	End: 2024
Budget	Not Applicable

ACTION 5 – *SUPPORT ENFORCEMENT* **FEDERAL, WALLONIA, BRUSSELS CAPITAL REGION, FLANDERS**	
Description of the action	(1) Develop a list of morphological experts for listed species and a list of ID morphological characteristics for some species. (2) Develop DNA database for a selection of prioritized IAS (of Union Concern). (3) Formulate a coordinated strategic approach to increase identity controls in shops and border control points and information flow between competent authorities. The first implemented case study of the strategic approach is envisioned for controlling mislabelled plants. (4) Provide trainings on IAS identification for increased inspectors capacity. (5) Support the action on e-commerce of the upcoming national *Plan towards a sustainable trade in exotic animals.* This action will aim at defining the main actors and ways of functioning, the most important species, their volume and their supply chain. This will serve increased coordinated inspections on e-commerce of IAS.
Actors and partners	(1) Actor: NSSIAS; Partner: SPF/FOD, AFSCA/FAVV, DNF, ANB and BE/LB (2) Actor: NSSIAS; Partner: SPF/FOD, AFSCA/FAVV, DNF, ANB and BE/LB (3) Actor: SPF/FOD, AFSCA/FAVV, DNF, ANB and BE/LB; Partner: NSSIAS (4) Actor: NSSIAS (5) Actor: SPF/FOD, AFSCA/FAVV, DNF, ANB, BE/LB; Partner: NSSIAS
Timeline	(1) Start: 2022 – End: 2023 (2) Start: 2023 – Continuous (3) Start 2022 – End: 2024 (4) Start: 2022 – Continuous (5) Start: 2023 – End: 2026
Budget	(1) Not applicable (2) NSSIAS

	(3) SPF/FOD, AFSCA/FAVV, DNF, ANB and BE/LB (Case study: genetic verification + selected experts + increased inspector capacity) (4) NSSIAS (5) SPF/FOD, AFSCA/FAVV, DNF, ANB and BE/LB

CHAPTER 2
–
Thematic Action plan on the introduction and spread of invasive alien species through recreational and commercial/professional use of freshwater

or

“**Freshwater action plan**”

1. Introduction and scope

The “freshwater action plan” is the second in a series of three thematic national action plans, which will be implemented by the competent regional or federal authority.

The pathways of introduction and spread that are considered in this action plan are all linked to freshwater ecosystems, encompassing introductions of plants and animals through recreational angling, fish breeding and recreational boating. They were identified as priority pathways for action (NSSIAS 2020[8]). The pathway “angling and fishing equipment” – a vector for both aquatic plants and animals – ranked as the sixth most important pathway for Belgium. The three other pathways targeted in the action plan are among the 12 highest ranking pathways for the spread and introduction of invasive alien species of Union concern, some being more relevant for the aquatic animals and others mainly pertaining to the aquatic plants of Union concern.

Freshwater ecosystems are known to be major recipients of introduction of IAS and are particularly vulnerable to subsequent spread of IAS due to the “open” nature of these systems. The most efficient measures to tackle IAS in these systems are prevention of introduction and establishment as well as early detection and eradication. Eradication or even mere prevention of (downstream) spread of established species in aquatic systems proves to be very challenging.

The environmental impacts of IAS on freshwater ecosystems are numerous: outcompetition of native species, habitat structure alteration, depletion of available oxygen in the water, destabilization of river banks,… These can in turn lead to negative consequences for water users by blocking water intakes, affecting navigation and recreational access to waterbodies, increasing maintenance costs or hindering angling activity. Many aquatic IAS can also play a role in disease transmission, including crayfish plague, chytrid fungus and ranavirus which can lead to severe environmental and economic impacts.

This action plan defines general national objectives and outlines specific actions to address the 4 pathways for each competent authority. Different sets of instruments and measures are considered in this action plan: baseline studies to better characterize the sector, campaigns for awareness raising, implementation of codes of conducts, a project on biosecurity and various research projects.

[8] National Scientific Secretariat on IAS (2020). Pathways of unintentional introduction and spread of 66 invasive alien species of Union concern in Belgium. Report 1 : Identification and prioritization.

2. Description of target pathways

The Freshwater action plan aims to tackle four specific pathways of introduction and spread (definitions of the Convention on Biological Diversity classification framework (CBD, 2014)[9] and the interpretation manual of Harrower *et al.* (2018)[10]) :

- **Angling / fishing equipment**: Species introduced unintentionally as stowaways on equipment used by recreational anglers or commercial / professional fishermen. For Belgium, in the context of this action plan, commercial and professional fishermen are not included as this sector is very marginal if not almost nonexistent for freshwater.
- **Live food and live bait**: Species that have escaped from confinement or controlled environments where they were kept and/or transported as live food or live bait.
- **Hitchhikers on ship/boats**: Species that have been introduced unintentionally by being a hitchhiker in or on ships, boats or other watercrafts (in this context, only in freshwater).
- **Contaminant on animals**: Species introduced unintentionally as contaminants on animals transported through human related activities (in the context of this action plan, only through fish stocking activities).

An additional pathway – also included in Action Plan 3 on Soil – is also considered in this action plan, for the specific case of management of freshwater systems:

- **Machinery:** Species that have been introduced unintentionally by being a hitchhiker in or on machinery or equipment being transported between locations.

3. State of play

The sectors involved in this action plan are regulated by various regional legislations. A number of legislative and non-legislative initiatives are already in place which support the curbing of introductions and spread of invasive alien species through the four pathways that are tackled by this action plan. Below, the competent authorities and existing or past initiatives are grouped according to the sector involved and the pathway they tackle.

[9] CBD. (2014). Pathways of introduction of invasive species, their prioritization and management. UNEP/CBD/SBSTTA/18/9/Add

[10] Harrower, C.A., Scalera, R., Pagad, S., Schonrogge, K. and Roy, H.E., 2018. Guidance 728 for interpretation of CBD categories on introduction pathways.

3.1. Competent authorities and legislative framework

Angling

In Belgium, freshwater angling is practiced by individuals who use rods, hooks and lines. It represents approximately 70 000 individuals in Flanders, 60 000 in Wallonia, and 1000 in Brussels. The three regions are individually competent for inland fisheries management and the import of native species. Flanders and Wallonia have implemented a legal framework to prevent the use of IAS as live bait trough positive lists of bait.

- In **Flanders**, the legal framework for inland fisheries is the fisheries royal decree of 1st July 1954 and its regional execution decree (1st february 2013). The Nature and Forests Agency of the Flemish Authorities ('*Agentschap voor Natuur en Bos van de Vlaamse Overheid*') is the competent administration. A positive list of 10 native fish is included in the "Reglement openbare visserij (no framework for crayfish included).
- In **Wallonia**, most of the royal decree has been replaced by the "Décret relatif à la pêche fluviale, à la gestion piscicole et aux structures halieutiques" of 27th March 2014 which now regulates the sector. The competent administration is the *Direction de la Chasse et de la Pêche* from the Nature and Forest Department (DNF), SPW-ARNE. 16 species of live bait are included in the positive list of bait that can be used by fishermen. Crayfish and IAS are not on this list. Finally, fishing and management of IAS are regulated by the "Arrêté du Gouvernement wallon modifiant différents arrêtés exécutant le décret du 27 mars 2014 relatif à la pêche fluviale, à la gestion piscicole et aux structures halieutiques » of 18th February 2021.
- In **Brussels Capital Region**, fisheries management is also regulated by the law of 1st July 1954 and by the regional ordinance on nature conservation of 1st March 2012 (Art 79-81) and this sector is administrated by Brussels Environment in the regional ponds. Municipalities are responsible in local ponds based on their local legislations. No specific regulation exists for the moment on bait (*i.e.* all bait is allowed). In the framework of the Fisheries Decree preparation, Bruxelles Environnement will define the practice and material that are allowed within Brussels Capital region.

Recreational and commercial boating

In Belgium, recreational boating is practiced by individuals who use boats, sailboats, jetskies, canoes, kayaks and all different types of boards on waterways, rivers and lakes.

For boating on waterways and lakes, the regional authorities are responsible for the infrastructure and their use, which is regulated by the following legislations:

- In **Wallonia**, the circulation on rivers (except waterways) is regulated by the decree of the 19th March 2009 (Arrêté du Gouvernement wallon réglementant la circulation sur et dans les cours d'eau).
- In **Flanders**, there are general legislations regulation the circulation on waterways: “Algemeen Politiereglement voor de Scheepvaart op de Binnenwateren (APSB)”, “Algemeen reglement der scheepvaartwegen van het koninkrijk (ARSK)” and the “Algemene tijdelijke voorschriften voor de waterweggebruiker”. Additionally, there are regulations specific to certain waterways: “Scheepvaartreglement voor het kanaal van Gent naar Terneuzen”, “Politiereglement van de Beneden-Zeeschelde", “Scheepvaartreglement van de Beneden-Schelde", “Scheepvaartreglement voor het kanaal Brussel-Schelde", “Scheepvaartreglement Gemeenschappelijke Maas” and “Bijzondere reglementen van sommige scheepvaartwegen” .
- In **Brussels Capital Region**, the circulation is allowed only on the canal Antwerp-Brussels-Charleroi and managed by the Port of Brussels.

<u>Fish stocking and breeding</u>

For all type of aquacultural installations, there is a European Regulation (708/2007) on aquaculture and alien or locally absent species. The federal authority is responsible for importation and exportation of non-native species at points of entry (borders) as well as within the EU (intra-communautaries), the Regions are responsible for the importation of native species.

A legal framework allows only the competent authorities from the three regions to stock fish in public waters.

- In **Flanders**, the sector is regulated by the “riviervisserijwetgeving” from the 1st July 1954 and the “soortenbesluit”. A framework is in place to ensure IAS are absent from the restocking:
    - Endangered species are bred in a controlled facility owned by the Flemish government (Linkebeek) that ensures the stock is free of IAS.

    - Breeding of non-endangered species is done by commercial players that have to adhere to conditions in the tender, one of which is the absence of IAS that are not widespread yet in Flemish waters. Inspectors visually check the presence of exotic fish at the point of release.

- In **Wallonia**, the sector is regulated by the "Décret relatif à la pêche fluviale, à la gestion piscicole et aux structures halieutiques" of 27th March 2014. Art. 14 §1er of the decree obliges an authorization for fish or crayfish restocking in waters submitted to the law. The Fisheries Service delivers these authorisations and controls stocking at reception of the fish, just before they are put into the waters, especially when the Fisheries Fund is paying for the animals. According to the decree, the Walloon Government has still to fix the conditions of delivery of these restocking authorisations. Moreover, the Walloon legislation considers the action of fishstocking in a pond that is connected with natural surface waters as an introduction in the wild – which is not allowed for non-native species.
- In **Brussels Capital Region**, the sector is regulated by articles 79 to 81 of the regional ordonnance on nature conservation of 1st March 2012, and by "het koninklijk besluit van 13 december 1954 houdende de uitvoering van de wet van 1954 op de riviervisserij".

<u>Management of aquatic ecosystems</u>

The management of aquatic systems and waterways is a regional responsibility. Within the regions, responsibilities are dependent on the type of waterway (navigable or not navigable, size of the non-navigable waterways) and the location.

- **Flanders:**
    - Navigable: VMM (non-maritime access)
    - Non-navigable: VMM (category 1), Provinces (category 2), township (category 3, ditches), Agentschap wegen en verkeer (ditches along highways), polders en wateringen (category 2, 3 and ditches)
- **Wallonia**:
    - Navigable: SPW Mobilité et Infrastructures (Direction des Voies Hydrauliques)
    - Non-navigable: SPW ARNE Direction des cours d'eau non navigables (category 1), Provinces (category 2), township (category 3, ditches), Wateringues (ditches), shoreline property owners (unclassified)
- **Brussels Capital Region**:

- Navigable: Bruxelles Environnement/Leefmilieu Brussel (department water)
- Non-navigable: Mainly managed by Leefmilieu Brussel, a minority of small waterways are managed by the townships

3.2. Non-legislative initiatives on IAS

Wallonia – Awareness raising initiatives to engage with the anglers and divers:

- Surveillance initiative from the administration shared by the angling sector to involve fishermen in IAS aquatic plants surveillance.
- Specific communication on exotic crayfish fishing [11].
- Development of a poster on IAS dedicated to frogmen in quarries.

Brussels Capital Region: an action on prevention measures against spread of IAS along waterways (respect biosecurity guidelines for earthworks, soil excavation, construction sites,...) is included in the measure M1.4 of the regional Water Management Plan (PGE) 2022-2027.

LIFE project RIPARIAS (2021-2026) : This project – implicating the three regional authorities and other actors – aims at developing an innovative evidence-based workflow for decision making on IAS management in aquatic and riparian ecosystems. The main objectives are to:

I. Improve data flows from surveillance systems to regional IAS managers ;
II. Develop clear guidelines and objective criteria for prioritising management actions for aquatic and riparian IAS and apply priority actions in pilot river basins ;
III. Improve data flows from management actions to policy-makers by monitoring and assessing IAS management effectiveness ;
IV. Promote the replication of the evidence-based workflow for IAS management decision making in Europe.

[11] https://www.maisondelapeche.be/telechargements/2017_PecheEcrevisse_web.pdf

4. Species targeted by the action plan

The species of Union concern that are concerned by the pathways of introduction and spread considered in this action plan are listed below are crayfish, fish, aquatic and riparian plants and a frog. A total of 23 species of the Union List can potentially be tackled (Table 2.1). *Sciurus carolinensis*, *Acridotheres tristis* and *Corvus splendens* are not targeted by the action plan, because they are currently not established in Belgium and would only use the pathway "*Hitchhikers on ships and boats*" as an introduction pathway on marine water.

Table 2.3. Species of Union Concern concerned *by the pathways under consideration in the Action Plan - Freshwater. Three frequency-categories of introduction in Belgium are distinguished: Black: species commonly observed using this pathway for BE ; Dark grey: species sometimes observed using this pathway for BE; Light grey: species potentially using the pathway but not yet been observed for this pathway in BE. Species that cannot establish in Belgium are indicated with "*", species that can only marginally establish in Belgium are indicated with "**". Species in light grey are not considered in the actions of the action plan, because they would only use the introduction pathway "Hitchhikers on ships and boats" on marine waters.*

↓ Species	→ Pathways	Angling and fishing	Live food and live bait	Hitchikers on ship/boats	Contaminant on animals	Machinery
Mammals						
Sciurus carolinensis	Grey squirrel					
Birds						
*Acridotheres tristis***	Common myna					
Corvus splendens	Indian house crow					
Amphibians and reptiles						
Lithobates catesbeianus	American bullfrog					
Inverterbrates						
Eriocheir sinensis	Chinese mittencrab					
Orconectes limosus	Spiny-cheek crayfish					
Orconectes virilis	Virile crayfish					
Pacifastacus leniusculus	Signal crayfish					
Procambarus cf *fallax*	Red swamp crayfish					
Procambarus clarkii	Marbled crayfish					
Fishes						
Lepomis gibbosus	Pumpkinseed					
Perccottus glenii	Amur sleeper					
*Plotosus lineatus**	Striped eel catfish					
Pseudorasbora parva	Topmouth gudgeon					
Number of animal IAS	**TOT = 11**	**7**	**8**	**3**	**9**	**0**

↓ Species	→ Pathways	Angling and fishing	Live food and live bait	Hitchikers on ship/boats	Contaminant on animals	Machinery
Aquatic plants						
*Alternanthera philoxeroides**	Alligator weed					
Cabomba caroliniana	Fanwort					
Elodea nuttallii	Nuttall's waterweed					
*Gymnocoronis spilanthoides***	Senegal tea plant					
Hydrocotyle ranunculoides	Floating pennywort					
Lagarosiphon major	Curly waterweed					
Ludwigia grandiflora	Water-primrose					
Ludwigia peploides	Floating primrose-willow					
Myriophyllum aquaticum	Parrot's feather					
Myriophyllum heterophyllum	Broadleaf watermilfoil					
*Salvinia molesta**	Kariba weed					
Terrestrial plants						
Grasses						
*Microstegium vimineum***	Nepalese browntop					
*Pennisetum setaceum**	Crimson fountaingrass					
Others						
Impatiens glandulifera	Himalayan balsam					
*Heracleum persicum***	Persian hogweed					
*Heracleum sosnowskyi***	Sosnowsky's hogweed					
*Parthenium hysterophorus**	Whitetop weed					
Number of plant IAS	**TOT = 17**	**12**	**0**	**9**	**0**	**15**

Additionally, other invasive alien species that are able to establish in Belgium under current climate are also concerned by these pathways (Table 2.2).

Table 2.4 - *Alien Species of concern for Belgium, not listed (yet) by EU regulation 1143/2014, that are also implicated in the pathways of the Action plan on freshwater. Non-exhaustive list of examples.*

Angling and fishing	Live food and live bait	Hitchhikers on ships and boats	Contaminant on animals
Aponogeton distachyos	*Channa argus*	*Aponogeton distachyos*	*Astacus leptodactylus*
(Cotula coronopifolia)		*(Cotula coronopifolia)*	*Cherax destructor*
Crassula helmsii		*Crassula helmsii*	*Creaserinus fodiens*
Egeria densa		*Egeria densa*	*Faxionus immunis*
Erythranthe guttata		*Erythranthe guttata*	*Faxionus rusticus*
Houttuynia cordata		*Houttuynia cordata*	*Gambusia affinis*
Hydrilla verticillata		*Hydrilla verticillata*	*Gambusia holbrookii*
Koenigia polystachia		*Koenigia polystachia*	*Limnoperna fortunei*
Petasites japonicus		*Neogobius melanostomus*	*Linderia dubia*
Pontederia cordata		*Petasites japonicus*	*Neogobius melanostomus*
Saururus cernuus		*Pontederia cordata*	*Procambarus acutus*
Zizania latifolia		*Saururus cernuus*	
Xenopus laevis		*Zizania latifolia*	
Pistia stratiotes		*Pistia stratiotes*	

5. Aims and objectives

The aim of this action plan is to reduce the risk of freshwater invasive species entering and/or spreading in Belgium.

The specific objectives are:

- **OBJ 1** – Improve knowledge of the sectors' (angling, boating, stocking) practices and awareness, in order to formulate concrete and effective biosecurity measures (*ACTIONS 1, 4*)
- **OBJ 2** – Develop methods for identification of aquatic IAS to improve early detection (*ACTION 2)*
- **OBJ 3** – Prevent the introduction of aquatic IAS from abroad with fishing gear, boats and fish stocks transport (*ACTIONS 2, 3, 4*)

- **OBJ 4** – Prevent the spread of aquatic IAS in the country by supporting the use of biosecurity guidelines for angling, boating, fish rearing, fish stocking and water systems management (*ACTIONS 2, 3, 4, 5*)

6. Actions

6.1. General description

ACTION 1 – Baseline study

The competent authorities will carry out surveys targeting a wide spectrum of water users such as anglers, boaters, divers and fish stockers and make an analysis of their attitudes, knowledge and behavior in relation to their activities and especially in relation to IAS.

For anglers, such a survey could gain insight on their awareness on IAS threats and spread capacities but also on their motivations and habits such as gear cleaning routine, information channels, the number of locations visited, competitions and trips abroad etc. For fish stockers, such a survey could gain insight on the species that are stocked and their origin, the biosecurity measures already in place, their awareness on IAS threats and spread capacities.

Information on imported fish stocks and their contaminants are in certain cases poorly known. Some targeted studies and surveys will be launched in order to map the playing field, address knowledge gaps, and improve the potential responses to this issue.

The objective of the baseline studies is to improve knowledge on the sectors practices and challenges in order to design more efficient and relevant actions such as awareness raising, creation of codes of conducts and monitoring. The baseline study is thus a first step which will feed into different follow-ups, and which will also help increase awareness of the subject of IAS in the different recreational sectors as a side outcome.

Objectives : **OBJ 1**

Target pathways: Angling / fishing equipment; Live food and live bait; Hitchhikers on ship/boats; Contaminant on animals.

ACTION 2 – Awareness raising for angling

The regional authorities will launch initiatives for awareness raising on the risk of IAS introduction and spread through angling. Awareness campaigns on biosecurity to prevent unintentional spread of IAS will give a straightforward message to their audience: water users can take simple measures in order to avoid the spread of IAS and associated pathogens, between sites and by doing so they will preserve their activity in the long term. Successful experiences from the United Kingdom and Ireland can help design impacting campaigns. Additionally, this action will also contribute to an improvement of the early warning on IAS in freshwater ecosystems by improving knowledge of people on the frontline.

Objectives : **OBJ 3, OBJ 4**

Target pathways: Angling / fishing equipment; Live food and live bait.

ACTION 3 – Creation and adoption of codes of conducts

The regional authorities will initiate contact with sectors stakeholders such as fishing federations, boating federations and fish stocking federations, water body owners and municipalities to create guidelines and codes of conducts. European Codes of Conducts on recreational fishing[12] and on recreational boating[13] and invasive alien species made by the Council of Europe will serve as the starting point for the discussions. Moreover, the process will be informed by the results of the baseline study as the latter will provide a better understanding of the playing field as well as the activities and the behavior increasing the risk of introduction and spread of IAS

[12] Recommendation No. 170 (2014) on the European Code of Conduct on Recreational Fishing and Invasive Alien Species.
[13] European Code of Conduct on Recreational Boating and Invasive Alien Species.

in the wild. The discussions should be centered on if and how the sector can improve biosecurity. This work would end up on agreed biosecurity code of conducts for each sector. The code of conducts on water systems management for the regional administrations should be one of the outcomes of the biosecurity pilot project described in Action 4. In a later stage, specific awareness raising material will be developed based on the outcome of the discussions with the federations. As a minimum, all water users are encouraged to clean and dry their gear (e.g bags, boots, boats, diving equipment, kayaks…), sometimes disinfect them, before and after use and preferably on the spot when possible.

Objectives : **OBJ 3, OBJ 4**

Target pathways: Angling / fishing equipment; Live food and live bait; Hitchhikers on ship/boats; Contaminant on animals.

ACTION 4 – Biosecurity best-practice pilot project at the regional administrations level

In Belgium, many different types of institutions, organisations and administrations are involved in field work near or even in water systems (water managers, fisheries managers, inspectors working in nature reserves or sites vulnerable to invasions, scientists, …). Since biosecurity relating to the spread of invasive alien species is rather new in Belgium, a good starting point is to analyse the behavior of all the management and monitoring related actors in the aquatic systems through a national survey. This survey will aim at identifying all type of users and their type of tasks, the number of sites visited per day, clothing, equipment and vehicles used, as well as an evaluation of the general awareness on biosecurity.

Based on the results of this survey, a few simple best-practices will be implemented at the level of the administrations in a pilot project. Teams can exchange their experiences and more awareness can be raised within the administrations via internal communication channels. The result of this pilot project will support the drafting of the code of conduct for the regional administrations as mentioned in *ACTION 3*.

Objectives : **OBJ 1, OBJ 3, OBJ 4**

Target pathways: Angling / fishing equipment; Hitchhikers on ship/boats; Machinery.

ACTION 5 – Monitoring of fish production and stocking

Following the information collected in the baseline study (*ACTION 1*), appropriate measures will be identified to tackle the most relevant threats from the fish stocking activities in Belgium. This will include the increase of controls for the presence of IAS contaminants and the development of the protocol on how controls should be performed.
Potential adaptations of the regional administrative and regulatory frameworks will be investigated. These adaptations will serve to help implement regular controls on fish importation, transport and introduction in public and private waters. They will also aid in enforcing the use of solutions against escape in the natural environment. The implementation of the new frameworks will be supported by preliminary monitoring and scientific research

Objectives : **OBJ 2, OBJ 3, OBJ 4**

Target pathways: Contaminant on animals

6.2.Details by authorities

ACTION 1 – *Baseline study* **FEDERAL, BRUSSELS CAPITAL REGION, FLANDERS, WALLONIA**	
Description of the action	Initiation of the collection of data (volume, origin, destination) on fish importation and transport and/or identify the gaps in available data. Identify shipments that are at risk of contamination (*e.g.* by comparing the distribution of IAS fish to origin of stocks)
Actors and partners	Actor: NSSIAS Partner: SPF/FOD, AFSCA, ANB, SPF, BE/BL
Timeline	Start: 2023 – End: 2024
Budget	Not applicable

ACTION 1 – *Baseline study* **BRUSSELS CAPITAL REGION, FLANDERS, WALLONIA**	
Description of the action	Completion of surveys targeting a wide spectrum of water sectors (Recreational fishing, Recreational and commercial boating, Fish stocking, Water systems management) to analyse the stakeholders practices, knowledge and behavior especially in relation to IAS, and to establish baseline data on the fish supply chain and transport within Belgium.
Actors and partners	Actor: NSSIAS Partners: ANB, BE/LB, Port of Brussels, DNF, DCENN
Timeline	Start: 2022 – End: 2024
Budget	NSSIAS

ACTION 2 – *Awareness raising for angling* **BRUSSELS CAPITAL REGION**	
Description of the action	(1) Key prevention messages on IAS sent together with the fishing permits. (2) Develop awareness material in cooperation with relevant federations and organisations on the best practices for angling and IAS, as well as information on upcoming invasive species and where to report sightings. The material can be hosted online and could be placed at key fishing spots, sent to the townships, and promoted at fishing competition, events and fairs. (3) Train park rangers of Brussels Environment and municipal agents for awareness on best practices for angling and IAS.
Actors and partners	(1) - (3) Actor: BE/LB (2) - (3) Partner: NSSIAS
Timeline	(1) Start: 2022 – End: 2023 (2) Start: 2023 – Continuous (3) Start: 2023 – Continuous
Budget	(1) - (3): BE/LB

ACTION 2 – *Awareness raising for angling* **FLANDERS**	
Description of the action	(1) Add key prevention messages on IAS in the "Reglement openbare visserij" that anglers receive together their permit. It will be made available in 6 languages in order to also inform the foreign anglers. Additionally, occasional articles on the subject will be included in the magazine "Vislijn" of the Flemisch government. (2) Develop signs and/or awareness material (posters and leaflets) on best practices for angling and IAS, as well as information on upcoming invasive species and where to

	report sightings. This will be done in cooperation with the relevant federations to be hosted online, disseminated through their media channels and placed at key fishing spots to raise awareness on the best practices for angling, and promoted at fishing competition, events and fairs. Pictograms developed in *Action Plan on Freshwater*, *ACTION 1.1* could be placed near fishing ponds. (3) Train "visserijstewards" to raise awareness on the best practices for angling.
Actors and partners	(1) - (3) Actor: ANB (2) - (3) Partners: NSSIAS
Timeline	(1) Start: 2022 – End: 2023 (Included in the publication of 2023) Start: 2023 – Continuous (2) Start: 2023 – Continuous
Budget	(1)-(3): ANB

ACTION 2 – *Awareness raising for angling* **WALLONIA**	
Description of the action	(1) Key prevention messages on IAS sent together with the fishing permits. (2) Develop awareness material on the best practices for angling and IAS and on upcoming invasive species and where to report sightings. This will be done in cooperation with relevant federations and organisations on the best practices for angling and IAS that will be put in online information material and promoted via the fishery federations and the "Maison wallonne de la pêche". (3) Specific communication actions at fishing competition, events and fairs (production of posters and leaflets)
Actors and partners	(1) - (3) Actor: DNF (2) - (3) Partner: NSSIAS

Timeline	(1) Start: 2022 – End: 2023 (2) Start: 2023 – Continuous (3) Start: 2023 – Continuous
Budget	(1)-(3): DNF

ACTION 3 – *Codes of conduct* **BRUSSELS CAPITAL REGION, FLANDERS, WALLONIA**	
Description of the action	Engage with professional stakeholders to create and support the adoption of five codes of conducts: (1) Code of conduct on recreational fishing (2) Code of conduct on biosecurity and IAS for diving (3) Code of conduct on recreational and commercial boating (4) Code of conduct on fish stocking (5) Code of conduct on biosecurity for water systems management
Actors and partners	(1)-(5) Actor: NSSIAS (1)-(5) Partners: BE, ANB and SPW administrations, fishing and boating associations/federations and fish stocking federation
Timeline	(1) Start: 2023 – End: 2024 (2) Start: 2023 – End: 2024 (3) Start: 2023 – End: 2024 (4) Start: 2024 – End: 2025 (5) Start: 2024 – End: 2025
Budget	NSSIAS (Communication: layout, translation, printing)

ACTION 4 – *Biosecurity best-practice pilot project* **BRUSSELS CAPITAL REGION, FLANDERS, WALLONIA**	
Description of the action	A biosecurity pilot project will be led with the regional authorities in charge of the management of waterbodies. The results will lead to the creation of codes of conduct on biosecurity (Action 3). (1) A survey will be conducted to gather information on current management practices and awareness on biosecurity and IAS among relevant actors working in or near water systems. (2) The pilot project itself will be led with selected teams of the three regional administrations in order to test biosecurity guidelines, exchange experiences and raise awareness via internal communication channels. (3) Assess the need and feasibility of producing species-specific biosecurity guidelines in the management of aquatic systems.
Actors and partners	(1) - (3) Actor: NSSIAS (1) - (3) Partners: VMM, ANB, INBO, BE/LB (Dept Biodiversity and Nature Management), DNF, DCENN, DEMNA
Timeline	(1) - (3) Start: 2022 – End: 2023
Budget	NSSIAS (Material)

ACTION 5 – *Monitoring of fish production and stocking* **FEDERAL, BRUSSELS CAPITAL REGION, FLANDERS, WALLONIA**	
Description of the action	Development of protocol on how to check (visually or through other means) for selected IAS contaminants in non-native and native fish importations, transports and stocks. Identification of adequate control points in the chain of the stocking process. Generalize and formalize controls on contaminants in fish stocking.
Actors and partners	Actor: SPF/FOD, ANB, DNF , BE/LB Partners: NSSIAS, AFSCA/FAVV, customs
Timeline	Start: 2023 – End: 2025
Budget	NSSIAS

ACTION 5 – *Monitoring of fish production and stocking* **BRUSSELS CAPITAL REGION**	
Description of the action	(1) Stricter regulation of fish stocking by private people will enter into force by obliging anti-escape systems for ponds (*e.g.* fine mesh grids at inlet and outlet) and/or by copying the Walloon stance on introductions of non-native species in connected systems into Brussels legislation. (2) For fish stocking in public waters, detailed order specifications to prevent the spread of non-indigenous species will be inserted in the order documents towards fish suppliers. (3) Awareness raising on IAS as contaminants in fish production and fish stocking, and on the biodiversity issues related to stocking of private waters with exotic species.
Actors and partners	(1) Actor: BE/LB (2) Actor: BE/LB (3) Actor: BE/LB
Timeline	(1) 2023 (2) 2023

	(3) 2024
Budget	(1) Not applicable (2) Not applicable (3) BE/LB

ACTION 5 – *Monitoring of fish production and stocking* **FLANDERS**	
Description of the action	(1) Awareness raising on the legislation that precautions should be taken to prevent (non-native) fish from escaping from private and commercial (breeding) ponds. Awareness raising on IAS as contaminants in fish production and fish stocking, and on the biodiversity issues related to stocking of private waters with exotic species.
Actors and partners	(1) Actor: ANB
Timeline	(1) 2025
Budget	(1) ANB, DNF, BE/LB

ACTION 5 - *Monitoring of fish production and stocking* **WALLONIA**	
Description of the action	(1) Awareness raising on the Walloon IAS legislation (article 11) that forbids introduction of exotic species in nature and on precautions that should be taken to prevent (non-native) fish from escaping from private and commercial (breeding) ponds. Awareness raising on IAS as contaminants in fish production and fish stocking, and on the biodiversity issues related to stocking of private waters with exotic species. (2) Assess the feasibility of including some prevention measures in the upcoming Arrêté du Gouvernement Wallon on fish stocking.
Actors and partners	(1) Actor: DNF (2) Actor: DNF

Timeline	(1) 2024 (2) 2023
Budget	(1) DNF (2) Not applicable

CHAPTER 3
–
Thematic Action plan on the introduction and spread of invasive alien species through transportation of habitat and nursery material and machinery

or

“Soil Action Plan”

1. Introduction and scope

The "soil action plan" is the last of a series of three thematic national action plans and will be implemented by the competent regional or federal authority, with the aid of the parties specifically mentioned under the section "Actions". It aims at preventing transportation of propagules of plants and animals with habitat material, machinery and a selection of nursery material associated invasive alien species. These three pathways were ranked 4th, 7th and 8th respectively in the prioritization analysis of pathways of introduction and spread of 66 invasive alien species of Union Concern (NSSIAS 2020)[14].

The risks posed by the movement of soil and associated machinery as a potential pathway for the introduction and spread of IAS have been largely recognized in literature and in practice. Nevertheless, conditions and restrictions on soil movement in international, regional and national legislation, and in several codes of conducts. are generally missing information on IAS. Unchecked movement of soil and other habitat material as well as nursery material across borders poses a real possibility for long distance dispersal of IAS and can lead to a sudden and unexpected introduction of new species. Additionally, transport of materials (soil, nursery material or machinery) from infected areas to non-infected areas within Belgium can cause rapid spread of IAS populations.

This action plan addresses these pathways by defining some objectives and outlining specific actions to reach these objectives.

2. Description of target pathways

This action plan intends to target the three following pathways (definitions of the Convention on Biological Diversity classification framework (CBD, 2014)[15] and the interpretation manual of Harrower *et al.* (2018)[16]); with the pathway "contaminant nursery material" being added after the update of the prioritization (NSSIAS, 2020) to integrate *Arthurdendyus triangulatus*:

[14] National Scientific Secretariat on IAS (2020). Pathways of unintentional introduction and spread of 66 invasive alien species of Union concern in Belgium. Report 1 : Identification and prioritization.
[15] CBD. (2014). Pathways of introduction of invasive species, their prioritization and management. UNEP/CBD/SBSTTA/18/9/Add
[16] Harrower, C.A., Scalera, R., Pagad, S., Schonrogge, K. and Roy, H.E., 2018. Guidance 728 for interpretation of CBD categories on introduction pathways.

- **Transportation of habitat material**: Species unintentionally introduced as contaminants of habitat materials such as soil, vegetation, wood chips, mulch and straw, when these products are transported in large quantities and are the commodity in focus of the trade activity (and not associated to plant transport).

- **Machinery:** Species that have been introduced unintentionally by being a hitchhiker in or on machinery or equipment being transported between locations.

- **Contaminant nursery material:** Species released unintentionally as a contaminant on plants or plant material associated with the commercial nursery trade excluding contaminants transported by seeds or contaminants that are parasites.

3. State of play

In a study that analysed trade codes (GN codes) as a proxy for soil importation, Belgium was identified as the largest extra-EU importer of mineral substances (IUCN, 2019). For extra-EU peat importation, Belgium ranks in the top 5. Additionally, Belgium was ranked third concerning importation of polluted soil. However, the importation of soil from other countries appears to mainly deal with soil excavated in large quantities and in large depths (personal communication grondbank vzw), which is less relevant for the spread of invasive alien species.

Excavations of soil within Belgium is also an important sector, with 10 million ton of excavated soil for Wallonia, and approximately double in Flanders. For the Brussels Capital Region, the numbers are not known yet but a legal framework that would regulate traceability is currently being worked out. Additionally, 30% of excavated soil is re-used on site, whereas 50% is directly transported to other sites for use. The rest is used to in road construction (20%), filling of grooves (10%), making concrete or reorganizing dumps (1-2%). In the past, excavated soil was also heavily used in agricultural land, but this practice seems to be outdated in Flanders.

Since seeds and small invertebrates are readily transported with topsoil, and topsoil movement represents a large sector in Belgium, the movement of IAS through habitat material is a real danger.

Belgian regional legislation already provides a framework that can be used for managing the spread and introduction trough soil transport: traceability of soil, codes that indicate contaminated soil and accompanying restrictions on how it can be valorised, terrain risk surveys, management and remediation proposals. Whereas there are good practices concerning the displacement of excavated soils and dredging material, their sanitation and their valorisation, invasive alien species are still scarcely taken into account in these documents.

3.1. Competent authorities and legislative framework

- In **Brussels Capital region**: The "bodemordonnantie" (2004, 2009 and adapted on 23 June 2017) offers the legislative framework for the identification and treatment of contaminated soils. Leefmilieu Brussel Soil Division is the administration in charge.
- In **Flanders**: The VLAREBO (2008, updated in 2019) provides the Flemish regulations on the sanitization and protection of soilmaterials (including soil and dredging material from driveable and non driveable). The Flemish administration OVAM collects all the relevant information on the quality of soils . vzw Grondbank and Grondwijzer play a key role in the re-use of excavated soils.
- In **Wallonia**: the "Décret relatif à la gestion et à l'assainissement des sols" (1st March 2018) offers the legislative framework for the identification and treatment of contaminated soils while the "AGW relatif à la gestion et à la traçabilité des terres" regulates the use and movements of excavated soils. SPW Département du Sol et des Déchets is the administration in charge. The asbl Walterre is in charge of ensuring the traceability.
- **Federal**: importation of habitat material, soil and potted plants is controlled by AFSCA from a sanitary view.

3.2. Non-legislative initiatives on IAS

- **Flanders** – Good practice documents
    - The Flemish research institute INBO has produced an advice on the movement of soil that is contaminated with invasive exotic knotweeds[17]

[17] Thoonen, M. (2019). *Advies over verzet van grondmateriaal besmet met invasieve uitheemse duizendknoopsoorten*. (Adviezen van het Instituut voor Natuur- en Bosonderzoek; Nr. INBO.A.3760). Instituut voor Natuur- en Bosonderzoek.

- The vzw Grondbank has produced a factsheet “Japanse duizendknoop en grondverzet”[18].

- **Brussels Capital region** - The Soil Division of Leefmilieu Brussel has produced a series of codes of good practices and awareness raising material on soil treatment and re-use:
  - The code of good practices on the execution of soil treatment[19] ask soil experts to proceed to visual checks for IAS and advises them on prevention measures to prevent the dispersal of IAS to other areas.
  - The code of good practices on the reuse of excavated soils[20] puts restriction for the use of excavated soils infected with IAS.
  - In the framework of the Brussels Good Soil strategy, an info sheet[21] was produced on the good practices for residents and professional stakeholders when confronted with IAS.

- **Wallonia**
  - The region has produced a supporting document for its soil legislation, the ‘Guide de référence relatif à la gestion des terres’[22], which includes recommendations on IAS plants (invasive exotic knotweeds and hogweed) for soil excavation and movement.

[18] Grondbank, Bouwen op/aan Gezonde Bodem, Factsheet Grondverzet en Japanse Duizendknoop, december 2020 - https://www.grondbank.be/content/documents/vakinformatie/FACTSHEET_duizendknoop_v201223.pdf
[19] http://agora.ibgebim.be/share/s/cWCv1xrdTEaCfcApa1XOEg
[20] https://environnement.brussels/sites/default/files/user_files/cbp_sol_conditionsterresgranulats_fr.pdf
[21] https://document.environnement.brussels/opac_css/elecfile/FLORE%20EXOTIQUE%20ENVAHISSANTE?_ga=2.98536732.2005210919.1634292621-933123379.1634292621
[22] Guide de référence relatif à la gestion des terres (GRGT), Département du sol et des déchets (SPW ARNE). Rapport n°1811/2018. https://sol.environnement.wallonie.be/files/Document/Guides/20190528_GRGT_1.12.pdf

4. Species targeted by the action plan

The species of Union concern that are concerned by the pathways of introduction and spread considered in this action plan are listed below (Table 3.1).

Table 3.5 *Species of Union Concern* concerned *by the pathways under consideration in the Soil Action Plan. Three frequency-categories of introduction in Belgium are distinguished: Black: species commonly observed using this pathway for BE ; Dark grey: species sometimes observed using this pathway for BE; Light grey: species potentially using the pathway but not yet been observed for this pathway in BE. Species that cannot establish in Belgium are indicated with "*", species that can only marginally establish in Belgium are indicated with "**". The pathway contaminant nursery material will not be considered for aquatic plants.*

↓ Species	→ Pathways	Transportation of habitat material	Machinery	Contaminant nursery material
Inverterbrates				
Arthurdendyus triangulatus	New Zealand flatworm			
Vespa velutina nigrithorax	Asian hornet			
Aquatic plants				
*Alternanthera philoxeroides**	Alligator weed			
Cabomba caroliniana	Fanwort			
Elodea nuttallii	Nuttall's waterweed			
*Gymnocoronis spilanthoides***	Senegal tea plant			
Hydrocotyle ranunculoides	Floating pennywort			
Lagarosiphon major	Curly waterweed			
Ludwigia grandiflora	Water-primrose			
Ludwigia peploides	Floating primrose-willow			
Myriophyllum aquaticum	Parrot's feather			
Myriophyllum heterophyllum	Broadleaf watermilfoil			
Terrestrial plants				
Trees				
*Acacia saligna**	Coojong			
Grasses				
*Andropogon virginicus**	Broomsedge bluestem			
Cortaderia jubata	Purple pampas grass			
*Ehrharta calycina**	Perennial veldtgrass			
*Microstegium vimineum***	Nepalese browntop			
*Pennisetum setaceum**	Crimson fountaingrass			
Climbers				
*Lygodium japonicum**	Japanese climbing fern			
Persicaria perfoliata	Asiatic tearthumb			
Others				
Asclepias syriaca	Common milkweed			
Heracleum mantegazzianum	Giant hogweed			
*Heracleum persicum***	Persian hogweed			
*Heracleum sosnowskyi***	Sosnowsky's hogweed			
Impatiens glandulifera	Himalayan balsam			
Lespedeza cuneatea	Chinese bushclover			
*Parthenium hysterophorus**	Whitetop weed			
Number of IAS	**TOT = 27**	**23**	**19**	**15**

Additionally, other invasive alien species that are able to establish in Belgium under current climate are also concerned by these pathways (Table 3.2).

Table 3.6 *Alien Species of concern for Belgium, not listed (yet) by EU regulation 1143/2014, that are also implicated in the pathways of the Soil Action Plan. Non-exhaustive list of examples.*

Transportation of habitat material	Machinery	Contaminant nursery material
Fallopia japonica	*Fallopia japonica*	*Obama nungara*
Fallopia x bohemica	*Fallopia x bohemica*	*Platydemus manokwari*
Fallopia sachalinensis	*Fallopia sachalinensis*	*Australoplana sanguinea alba*
		Caenoplana variegata
		Kontikia cf. ventrolineata

5. Aims and objectives

The overall aim of this pathway action plan is to reduce the risk of the introduction and spread of invasive non-native species via the import and transport of habitat material, nursery material and the use of machinery.

Specific objectives are:

- **OBJ 1** – Gain information on importation and transportation of habitat material, nursery material and soil movement in Belgium in order to identify high risk practices (*ACTION 1*)
- **OBJ 2** – Enable a discussion platform where the sector can discuss how to deal with IAS in their daily operations (*ACTION 2*)
- **OBJ 3** – Create best management practices for (machinery used in) excavation work, transportation of soil, dredging and earthwork in sites contaminated with IAS (*ACTIONS 2, 3*)
- **OBJ 4** – Provide identification tools to check for flatworms and seedlings of terrestrial plants in nursery material (*ACTION 4*)

6. Actions

6.1. General description

ACTION 1 – Baseline study

Information on movement of habitat and nursery material is scarce, yet of outmost importance to develop efficient management measures, biosecurity protocols and assess potential risks associated with the transportation and importation of these products. In order to address these knowledge gaps, and be able to identify and prioritize risks, a baseline study will be completed to improve the knowledge on soil, habitat and nursery material (vegetation, wood chips, mulch and straw, soil associated with potted plants) movements into Belgium. Additionally, an analysis of soil movement and associated practices within Belgium will be undertaken.

Objectives: **OBJ 1**

Target pathways: Transportation of habitat material; Machinery; Contaminant nursery material.

ACTION 2 – Creation and adoption of codes of conducts

Competent authorities will increase knowledge on IAS and on the specifics of this issue pertaining to soil transport and valorisation amongst professional stakeholders (soil sector, dredging, construction work and landscaping). The authorities will facilitate discussions by setting up interregional working groups with the final aim of creating codes of conduct, in cooperation with the sector. These best practice documents will address the different activities at risk, biosecurity for machinery and include best practices for selected species.

Objectives: **OBJ 2, OBJ 3**

Target pathways: Transportation of habitat material; Machinery.

ACTION 3 – Adaptation of the existing regulatory framework

In order to prevent the spread of IAS trough movement of soil and associated machinery, regional authorities will analyze the feasibility of adapting the existing regulatory framework and/or assess if measures to prevent the spread of IAS should be integrated in standard procedures of technical specifications for construction and earthwork or merely included in the existing best practice documents.

Objectives: **OBJ 3**

Target pathways: Transportation of habitat material; Machinery.

ACTION 4 – Support to inspection of contaminants of potted plants

While flatworms are being shipped around the world inadvertently as contaminants of several consignments associated to nursery materia, there are no known methods to detect invasive alien flatworms in nursery material associated with potted plants to date. The general objective of this action is to help the border agents to determine which consignments of potted plants to target to prevent the introduction of flatworms and to identify the presence of a set of IAS (flatworms and plant seedlings) associated with nursery material.

Objectives: **OBJ 4**

Target pathways: Contaminant nursery material.

6.2. Details by authorities

ACTION 1 – *Baseline study* **FEDERAL**	
Description of the action	Take appropriate actions at federal level to: (1) Collect information on the volume, origin (and depth if relevant) and destination of habitat material (soil, slib, mulch, hay, straw). (2) Collect information on the supply chain of potted plants (nursery material) (see *Action plan on Private and public use*, *ACTION 3*). (3) Prioritize high risk shipments of such materials based on the outcome of (1) and (2) and a cross reference with the distribution of selected IAS.
Actors and partners	Actor: NSSIAS, SPF/FOD Partners: AFSCA/FAVV, SPF/FOD (Plant Health Dpt)
Timeline	(1) Start: 2023 – End: 2024 (2) Start: 2022 – End: 2023 (3) Start: 2023 – End: 2024
Budget	Not applicable

ACTION 1 – *Baseline study* **BRUSSELS CAPITAL REGION, FLANDERS, WALLONIA**	
Description of the action	Information on movement of soil and dredging material within Belgium will be collected (origin, amount, storage locations, destination, valorization, analysis of legislative framework) as well as information on the sectors practices and awareness.
Actors and partners	Actor: NSSIAS, BE/LB (Dept. Biodiversity and Dept. Soil), ANB, OVAM, DNF (SPW), DSD (SPW)
Timeline	End: 2023
Budget	Not applicable

ACTION 2 – *Creation and adoption of codes of conducts* **FEDERAL, BRUSSELS CAPITAL REGION, FLANDERS, WALLONIA**	
Description of the action	Three working groups (soil movement, dredging, and construction) will be created and animated in order to: • Supplement information on the sectors practices and awareness (see *ACTION 1*); • Prioritization of IAS that could be targeted by biosecurity measures and the development of these measures; • Set up guidelines for good practices with the final aim of creating and adopting of codes of conducts on soil movement, on dredging on construction and earthwork and on soil valorization.
Actors and partners	Actor: NSSIAS Partners: SPF/FOD, AFSCA-FAVV, BE/LB, ANB, OVAM, DNF (SPW), DSD (SPW)
Timeline	Start: 2023 – End: 2026
Budget	NSSIAS (Workshops)

ACTION 3 – Adaptation of the existing regulatory framework FEDERAL	
Description of the action	Take appropriate action at federal level to analyze the feasibility of adapting the existing regulatory framework for soil and habitat material importation by adding prevention measures.
Actors and partners	Actor: SPF-FOD Partner: NSSIAS, SPF-FOD (Plant Health Dpt), AFSCA/FAVV
Timeline	Start: 2024 – End: 2026
Budget	Not applicable

ACTION 3 – Adaptation of the existing regulatory framework BRUSSELS CAPITAL REGION	
Description of the action	Analyze the feasibility of improving prevention measures such as the survey of IAS at the sites, guidelines on movement of machinery, cleaning of machinery, the creation of a specific label for soil when it is contaminated with IAS by (1) adapting the existing legislation for soil movement or (2) integrating IAS in standard procedure of technical specifications and/or (3) updating existing codes of good practice documents with more detailed information on IAS.
Actors and partners	Actor: BE/LB (Dept. Biodiversity and Dept. Soil)
Timeline	Start: 2024 – End: 2026
Budget	Not applicable

ACTION 3 – Adaptation of the existing regulatory framework FLANDERS	
Description of the action	Analyse the feasibility of improving prevention measures such as the survey of IAS at the sites, guidelines on movement of machinery, cleaning of machinery, the creation of a specific label for soil when it is contaminated with IAS by (1) adapting the existing

	legislation for soil movement or (2) integrating IAS in standard procedure of technical specifications or (3) adding an addendum to the cooperation agreement between OVAM and ANB and/or (4) updating existing codes of good practice documents with more detailed information on IAS.
Actors and partners	Actor: ANB, OVAM Partners: Grondbank
Timeline	Start: 2024 – End: 2026
Budget	Not applicable

ACTION 3 – Adaptation of the existing regulatory framework WALLONIA	
Description of the action	Analyse the feasibility of improving prevention measures such as the survey of IAS at the sites, guidelines on movement of machinery, cleaning of machinery, the creation of a specific label for soil when it is contaminated with IAS by (1) adapting the existing legislation for soil movement or (2) integrating IAS in standard procedure of technical specifications (*e.g.* DNF permits) or (3) updating existing codes of good practice documents with more detailed information on IAS.
Actors and partners	Actor: DNF (SPW), DSD (SPW) Partner: Walterre
Timeline	Start: 2024 – End: 2026
Budget	Not applicable

ACTION 4 – Support to inspection of contaminants of potted plants FEDERAL, BRUSSELS CAPITAL REGION, FLANDERS, WALLONIA	
Description of the action	(1) Completion of a research project on flatworm detection in potted plants: literature study on species and protocols, identification of markers to allow for reliable genetic identification of flatworms, development of method for the detection of selected flatworms in potted plants and appropriate protocol to help control at the borders. (2) Prioritization of consignments to check for listed species based on the analysis of plant supply chain (see *ACTION 3*), species distribution and establishment potential. (3) Provide inspection services with guidelines for visual check of terrestrial IAS plants seedlings as contaminant in potted plants.
Actors and partners	(1): Actor: NSSIAS, Partner : SPF/FOD, FAVV & customs (2) - (3) Actor: NSSIAS, Partner: SPF/FOD, ANB, BE/LB, DNF
Timeline	(1) - (2) Start: 2022 – End: 2025 (3) Start: 2022
Budget	(1) NSSIAS + SPF/FOD (2) NSSIAS (3) NSSIAS