

MANAGEMENT PLAN TO PREVENT INVASIVE ALIEN SPECIES – CONSOLIDATED PLAN



SEPARATE PUBLICATION 8 JUNE 2022

Consolidation of the management plans to prevent invasive alien species approved by the Ministry of Agriculture and Forestry on 13 March 2018, 23 May 2019, 27 October 2020 and 8 June 2021.

INTRODUCTION

The management plan to prevent invasive alien species lists the measures used to prevent the spread of such species and damage caused by them. The management plan is supplemented as new species are added to the list of invasive alien species, either at the EU level or nationally in Finland.

The plan is approved by the Ministry of Agriculture and Forestry in accordance with the Alien Species Act. As of August 2021, the Ministry of Agriculture and Forestry has taken decisions to approve the management plan and its supplements on 13 March 2018, 23 May 2019, 27 October 2020 and 8 June 2021.

In this publication, the above-mentioned sections of previously adopted management plans adopted have been compiled into a coherent presentation. This combined management plan corresponds to the plan approved for each respective species, but some sections have been revised in order to improve readability and ensure that the information is up-to-date. In addition, interconnected sections of previously adopted plans have been merged and consolidated.

Analyses and action programmes on unintentional release and spread contained in the previously adopted plans (Part III) have also been consolidated in this publication.

Contents

MANAGEMENT PLAN TO PREVENT INVASIVE ALIEN SPECIES.....	1
– CONSOLIDATED PLAN	1
INTRODUCTION.....	2
I BACKGROUND	5
Invasive (or introduced) species.....	5
Preparation and adoption of the management plan	7
Key content of the management plan	8
Examples from the consolidated plan:	8
Plant species	8
Animal species	9
General measures.....	10
Ban on cultivating invasive plant species; capturing and killing invasive animal species	11
Ban on cultivating invasive plant species	11
Cultivation ban	11
Raised populations must be eradicated	11
Transition period for the ban on cultivating the Japanese rose	12
Capturing and killing invasive animal species	12
Implementation of the management plan and funding for the measures	13
Pathways of unintentional release and spread.....	16
II MANAGEMENT PLAN – Consolidated plan	17
1 Classification of measures; species-specific measures and targeting.....	17
1.1 Established species	17
1.1.1 Flora	18
1.1.1.1 Japanese rose.....	18
1.1.1.2 Large-leaved lupine	20
1.1.1.3 Hogweeds (Sosnowsky’s hogweed, Persian hogweed, giant hogweed).....	23
1.1.1.4 Himalayan balsam.....	24
1.1.1.5 Japanese knotweed, giant knotweed, Himalayan knotweed	25
1.1.1.6 Canadian waterweed.....	26
1.1.1.7 Nootka lupine, Aleutian ragwort, orange jewelweed.....	28
1.1.1.8 American skunk cabbage.....	29
1.1.2 Animals	30
1.1.2.1 American mink	29
1.1.2.2 Raccoon dog.....	30
1.1.2.3 Spanish slug	31
1.1.2.4 Muskrat.....	32
1.1.2.5 Sand lizard, green frogs, alpine newt.....	33
1.1.2.6 Signal crayfish.....	33
1.1.2.7 Pumpkinseed.....	36
1.2 Pet animal and aquarium plant species found in Finland	38
Carolina fanwort, water hyacinth, chipmunks, raccoon, wolfdog from the taxonomic group carnivores, red-eared slider, red swamp crayfish, marbled crayfish, spiny-cheek crayfish, virile crayfish, topmouth gudgeon, Amur sleeper and Senegal tea plant.	
1.3 Species found occasionally or potentially surviving in Finland	39
crimson fountaingrass, common milkweed, Nuttall’s waterweed, African elodea, parrot’s feather, floating pennywort, Japanese hop, tree of heaven, grey squirrel, small Asian mon-goose, American bullfrog, yellow-bellied toad, Chinese mitten crab, ruddy duck, Egyptian goose, and alien falcon species and lesser white-fronted goose hybrids.	
1.4 Species with a low risk of spread	43
groundsel-bush, water-primrose, creeping water-primrose, parthenium weed, mile-a-minute weed, kudzu vine, broadleaf watermilfoil, Japanese stiltgrass, alligator weed, Chilean rhubarb, balloon vine, vine-like fern, perennial veldtgrass, Chinese bushclover, Chinese tallow, mesquite, broomsedge bluestem, salvinia moss, purple pampas grass, golden wreath wattle, New Zealand flatworm, striped eel catfish, common myna, Indian house crow, sacred ibis, alien birds of prey, alien owls, alien crows and jays, alien bats, Pallas’s squirrel, South American coati, coypu, Reeves’s muntjac, Eastern fox squirrel, European tree frog, Northern leopard frog, agile frog and Asian hornet.	
2 Recommended measures for the general management of alien species.....	44

III ANALYSIS AND ACTION PLAN CONCERNING THE PATHWAYS OF UNINTENTIONAL INTRODUCTION AND SPREADING – Consolidated analysis and action plan	50
1 Analysis of the pathways of unintentional introduction and spread	50
2 Results	51
2.1 Pathways of spreading of alien species analysed based on the EU-level (EASIN) classification.....	51
2.1.1 Spreading into Finland	51
2.1.2 Spreading within Finland.....	52
2.2 Pathways of spreading of invasive alien species analysed based on the international classification (CBD)	52
2.2.1 Detected pathways of spread	52
2.2.2 Potential pathways of spread.....	54
3 Goals for management of primary pathways and prevention of spread	55
3.1 Prevention of intentional spreading	55
3.2 Escape prevention.....	55
3.3 Spreading through contaminated products or through vectors	56
3.3.1 Prevention of spreading through land transport	57
3.3.2 Prevention of spreading through maritime transport.....	57
4 Primary measures	59
4.1 Targeted civic awareness and general communication:	59
4.2 Targeted communication related to contaminated plant material and vectors	58
4.3 Enforcement of measures targeted at transport.....	58
Annex 1	61
Annex 2	64
Annex 3	66
Annex 4	69
Annex 5	70
Annex 6	72

I BACKGROUND

Invasive (or introduced) species

Alien species are species that humans spread to new areas. Alien species and invasive alien species are defined in the EU Regulation on Invasive Alien Species¹. An alien species is considered invasive if its release or spread has been found to threaten or adversely impact biodiversity and related ecosystem services. Alien species may also have adverse social and economic impacts. Invasive alien species must not be brought into the territory of the European Union, transferred from one Member State to another, bred, grown, sold, kept or introduced into the environment.

Finland and the other EU Member States must seek to eradicate invasive alien species already found in their territories or prevent them from spreading. Eradicating invasive alien species and preventing them from spreading will hereinafter be referred to as the 'prevention of alien species'. The purpose of the prevention of alien species is to safeguard biodiversity and the function of ecosystems, as well as the benefits of these for human wellbeing.

The EU Regulation on Invasive Alien Species required that Member States implement effective management measures to prevent widely spread alien species included in the list of invasive alien species of Union concern. Each Member State decides on such measures independently. According to the Invasive Alien Species Regulation, these measures must not unreasonably burden the environment, and their benefits must outweigh their costs. In addition, the Member States must prioritise the measures according to the size of the risk caused by the target species and the cost-efficiency of the measures.

In accordance with the EU Regulation, management measures must not have adverse impacts on the environment or human health. The measures to eradicate invasive alien animal

¹ [Commission Implementing Regulation \(EU\) 2016/1141 of 13 July 2016 adopting a list of invasive alien species of Union concern pursuant to Regulation \(EU\) No 1143/2014 of the European Parliament and of the Council.](#)

species, control their populations, and limit their spreading must be implemented in a manner that will save the animals from any avoidable pain, distress or suffering.

Invasive alien species to be prevented in the EU are specified in the list of invasive alien species of Union concern, which is adopted by the European Commission. The first EU list of invasive alien species was adopted on 3 August 2016 (List of invasive alien species considered to be of Union concern, Annex 1)². The list was amended first with 12 species on 2 August 2017 (1st update of the Union list on 2 August 2017, Annex 1)³ and a second time with 17 species on 15 August 2019 (2nd update of the Union list on 15 August 2019, Annex 1)⁴.

Finland's national list of invasive alien species was adopted on 1 June 2019 by Government Decree ⁵ (List of invasive alien species of national concern, Annex 2). The rationale for the national list is explained in the explanatory memorandum to the Government Decree⁶. Although the EU Invasive Alien Species Regulation does not directly apply to the species included on the national list, its definitions, bans and prevention principles are nevertheless applied, as laid down in the national Alien Species Act ⁷.

The Alien Species Act has been amended to permit alien bird and mammal species to be hunted and killed using the same means permitted by the Hunting Act and Hunting Decree to be used on unprotected animals. Detailed provisions on permitted hunting equipment and methods and restrictions on their use in the case of certain alien bird and mammal species are given in Government Decree ⁵. The Alien Species Act also specifies the duties of the

² [Commission Implementing Regulation \(EU\) 2016/1141](#) on July 13th 2016 adopts the list of invasive alien species of Union concern.

³ [Commission Implementing Regulation \(EU\) 2017/1263](#) of 12 July 2017, updating the list of invasive alien species of Union concern established by Implementing Regulation (EU) 2016/1141 pursuant to Regulation (EU) No 2014/1143 of the European Parliament and of the Council.

⁴ [Commission Implementing Regulation \(EU\) 2019/1262](#) of 25 July 2019, amending Implementing Regulation (EU) 2016/1141 to update the list of invasive alien species of Union concern (link 4).

⁵ [Government Decree on Managing the Risk Caused by Alien Species \(704/2019\) and the annexed national list](#).

⁶ [Explanatory memorandum to Government Decree](#).

⁷ [Act on Managing the Risk Caused by Alien Species \(1709/2015, Alien Species Act\), Section 9](#).

Finnish Wildlife Agency in preventing the spread of alien species. The Hunting Act has been amended to remove the raccoon, muskrat, coypu, raccoon dog and American mink from game species and the scope of the related hunting limitations. Along with other predatory alien mammal species, the American mink is regarded by law as an invasive alien species in Finland. The other species mentioned above are included in the list of invasive alien species of Union concern.

Preparation and adoption of the management plan

According to the Alien Species Act⁷, the Ministry of Agriculture and Forestry approves the plans to determine and control prevention measures, as referred to in the EU Invasive Alien Species Regulation. While not directly required in the Alien Species Act, it was also necessary to draw up corresponding plans – i.e. a plan on management measures and an analysis concerning the pathways of unintentional spread – to prevent invasive alien species of national concern.

The ministry carried out a study in 2016-2017 on how widely the invasive alien species listed by the EU are found in Finland and what the most cost-effective way to prevent them is. The ministry commissioned similar studies on invasive alien species included in the 1st update of the Union list in 2018, species included on the national list between 2019 and 2020, and species included on the 2nd update of the Union list in 2020.

The study and the resulting proposal for a plan to prevent invasive alien species were prepared as part of the EU-HAVI project (EU-HAVI – Distribution, pathways of spread and management measures of invasive alien species of Union concern) for species in the first list of Union concern and in the EU-HAVI2 project (Distribution, pathways of spread and management measures of invasive alien species of Union concern) for species in the first updated list of Union concern. The Ministry approved these management plans in March 2018 and May 2019. Implementation of the EU-HAVI project also involved the Southwest Finland Centre for Economic Development, Transport and the Environment, and several stakeholders were consulted in the preparation of other projects. The EU-HAVI2 project was carried out by the Natural resources institute Finland and the Finnish Environment Institute. With respect to the list of national concern, the study and proposal for a management plan were made as part of the FIN-HAVI project (Distribution,

pathways of spread and management measures of invasive alien species of national concern (FIN-HAVI). The project was carried out by the Natural Resources Institute Finland (coordinator) and the Finnish Environment Institute. The Ministry approved the management plan in October 2020. With respect to the 2nd update of the Union list, the Natural Resources Institute Finland carried out the study and the proposed plan for the prevention of invasive alien species submitted on its basis in the EU-HAVI3 project (Distribution, pathways of spread, risks and prioritisation of management measures of species in the 2nd update to the list of invasive alien species of Union concern). The Ministry approved this management plan in June 2021. All proposals for management plans were heard publicly via the electronic Lausuntopalvelut.fi system before their approval.

Key content of the management plan

The primary management measures in which Finland should invest were selected based on the risk arising from alien species and the costs and benefits of the prevention measures. The risk assessment is based on the characteristics, harmful effects, current distribution and current stage of spread of the species, their opportunities to spread and thrive in our climate, and the prevention measures available.

Invasive alien species at various stages of spread require varying prevention measures. The most effective option is to completely prevent a species from being introduced or spreading into a new area, if possible. If a species is widely spread and its prevention or eradication is not technically possible or financially sensible, minimising its harmful effects by controlling the population or preventing the species from spreading into new areas can be set as the goal.

Examples from the consolidated plan:

Plant species

- **Giant hogweed** and other hogweed should be eradicated from residential, recreational and conservation areas in particular. The most cost-effective option is to begin the prevention with occurrences from which hogweed can easily spread into the surrounding environment, and with new occurrences that have not yet developed seeds.

- The **rugosa** or **Japanese rose** will be eradicated most urgently from areas of highest biodiversity value and their vicinity, especially from coastal and archipelago areas. Prevention measures will also be carried out inland: Populations of Japanese rose will be eradicated and prevented from spreading on roadsides and in yards and gardens.
- Prevention of **Himalayan balsam** will be centralised in the most valuable sites: conservation areas and their surrounding areas as well as waterside areas, including waterside groves, brooks and rivers. Particular attention will be paid to the prevention of spread in areas where the species is still low in numbers.
- Measures to prevent **large-leaved lupine** will be concentrated in nature conservation areas, in the vicinity of threatened and near threatened species, as well as in roadside meadows with a diverse range of meadow species.
- The **Canadian waterweed** will be prevented from spreading into sites of highest conservation value, which will also be priority areas for eradication measures.
- The number of known occurrences of **American skunk cabbage** in Finland is still so low that its spread can be prevented by removing these occurrences and providing information about the harmfulness of the species.
- In particular, alien species used as ornamental plants must be prevented from being imported to Finland and being introduced into Finnish natural environments. The key measure here is the effective communication about the risks related to alien species.

Animal species

- The hunting of the **raccoon dog** must be prioritised in the most important bird wetlands and in the archipelago, where the species may be the most harmful for birds, as well as Lapland, to prevent the species from spreading into the neighbouring countries. Rabies vaccinations are also recommended to be continued.
- **Mink** culling will primarily be enhanced in archipelago areas, wetland areas important for birds, nesting areas of threatened and declining birds, and trout brooks.
- Prevention of the **Spanish slug** will pay special attention to populations and pathways through which the species can easily spread into the environment. The species will be prevented from spreading through seedlings, garden waste and earthmoving

operations. People will also be encouraged to remove the species when detected in yards, gardens and public areas and to organise prevention drives.

- The **muskrat** population in Finland has decreased naturally over the past few decades. It is recommended that its hunting continues, but there are no particular targeting needs at the moment. However, the current distribution of the muskrat needs more research.
- The introduction and farming of **signal crayfish** is prohibited, and the species may not be transferred within or between bodies of water.
- **Chinese mitten crab** is only found as an occasional guest species in Finland, so fishers and anyone else who come across specimens of this species are advised to remove specimens from natural bodies of water.
- **Pumpkinseed** has locally established populations in Southwest Finland. Efforts should be made to prevent further spread of the species and its eradication from ponds to which it has been stocked is recommended. In addition, efforts to raise awareness about the species' adverse impacts and risks and prohibitions related to the species will be increased. Messaging will be targeted especially at recreational fishers and aquarium enthusiasts.

General measures

- Active measures will be continued to raise awareness about the bans on importing, cultivating, breeding and releasing any invasive alien species. In particular, alien species used as ornamental plants, in aquariums and as pets must be prevented from being imported to Finland and being introduced into Finnish natural environments through effective communication about the risks of alien species. Pet owners are advised to ensure that the pets are not allowed to breed or escape. With respect to pathways of spread, special attention will be given to the appropriate treatment and disposal of garden waste.

Ban on cultivating invasive plant species; capturing and killing invasive animal species

Ban on cultivating invasive plant species

Cultivation ban

Cultivating invasive plant species is prohibited under Alien Species Act section 11. The Alien Species Act does not specify what is meant by the cultivation of an invasive alien species. Invasive plant species are characterised by the fact that they naturally spread quickly in the environment without seeding or planting. Cases where a plant population has spread onto a property from its surroundings have frequently raised the question of whether the cultivation ban is applicable.

Where an invasive plant species is found on a property that is being continuously used and managed by its owner or holder, the Ministry of Agriculture and Forestry considers that the presence of such species on the property can reasonably be equated with cultivation. In this case, the presence of an invasive alien plant species does not differ in practice from that of other species present on the property. This is the correct interpretation regardless of how the alien plant species originally spread to the property and whether the intention is to actively manage the species or merely to passively tolerate its presence.

Raised populations must be eradicated

As the cultivation of an invasive alien species is prohibited, the owner or holder of the property must eradicate the population of an invasive alien plant species that has grown on the property. However, according to the Alien Species Act, eradication may not be required provided that the further spread of the species is prevented effectively.

In other words, the obligation to eradicate raised populations may also apply to populations that have spread from neighbouring properties or from elsewhere in the environment, even if they are not actively raised. In neighbourhoods, for example, it would be prudent to take collective action in order to effectively prevent the re-spread of a species.

As the owner of public areas, the local authority is responsible for preventing the spread of invasive alien plant species in areas owned by the municipality. Particularly in municipal areas under regular care, such as roadside greenery, parks and beaches, any presence of an invasive alien plant species is generally justified to be considered an instance of cultivation from the point of view of the Alien Species Act.

The road manager is responsible for the management and maintenance of road areas. The land area covered by these is very large, and the need for maintenance and the measures taken vary significantly even within the same road section. This must be taken into account when assessing whether the presence of an invasive alien plant species in a roadside area can be considered an instance of cultivation.

Transition period for the ban on cultivating the Japanese rose

Japanese rose is widely used as an ornamental and useful plant in private yards, gardens and public spaces. As the species is widespread and popular, it has been necessary to adopt a transition period for property owners to comply with the ban on cultivation.

The transition period is also necessary to allow the supervisory authority, the ELY Centre, time to prepare for enforcement of the ban.

The cultivation of Japanese rose is banned from 1 June 2022 onwards. It is important to note that the ban on the sale of Japanese roses, like other bans with the exception of cultivation, entered into force on 1 June 2019 without a transition period.

Capturing and killing invasive animal species

Provisions on capturing and killing invasive alien birds and mammals are laid down in the Invasive Alien Species Act, the Hunting Act and the Animal Welfare Act, whilst the obligations arising from the Nature Conservation Act must also be taken into account. Likewise, the capturing and killing of any other invasive animal species must be performed in compliance with animal welfare legislation and the Nature Conservation Act.

Inflicting undue pain and distress on animals is prohibited under the Animal Welfare Act. The killing of animals must be performed as quickly and painlessly as possible and only by those with adequate knowledge about the killing methods and techniques appropriate for a specific

animal species, as well as adequate skills to perform the procedure (Animal Welfare Act, sections 3 and 32).

The provisions of the Hunting Act and the Hunting Decree on unprotected animals apply to capturing and killing invasive alien birds and mammals (Alien Species Act, section 16).

Provisions on permitted hunting devices and methods are included in both the Alien Species Act and hunting legislation.

Capturing or killing individuals of invasive alien species must not cause any disturbance to specimens of protected species prohibited under the Nature Conservation Act, particularly during breeding, in important resting places during migration, or in any other sites of significance to their life cycles. Species must be identified with certainty. If the intention is to capture or kill specimens of an alien species in a nature conservation area, this will either require the right to do so under the site's protection regulations or a derogation from such regulations.

Anyone who intends to capture or kill an invasive alien bird or mammal must be familiar with the provisions of the Invasive Alien Species Act, the Hunting Act, the Animal Welfare Act and the Nature Conservation Act. Mistake of law is punishable. If necessary, expert assistance should be sought from an experienced hunter or a local game management association or hunting club.

Contact details for local game management associations can be found through the [contact search on the Finnish Wildlife Agency website](#).

Information about hunting clubs is available in the [Hunting section of the Finnish Wildlife Agency website](#) and from the Finnish Hunters' Association (www.metsastajaliitto.fi, in Finnish and Swedish).

Implementation of the management plan and funding for the measures

In accordance with the Alien Species Act, the Centres for Economic Development, Transport and the Environment (ELY Centres) monitor compliance with the bans and obligations

included in the EU Regulation on Invasive Alien Species and national legislation.³ The bans and obligations as well as the statutory means to enhance compliance facilitate the prevention of invasive alien species. Bans and obligations may be used when the party responsible for the spread of an invasive alien species can be expressly identified. However, prevention of invasive alien species mostly concerns populations whose origin and method of spread are not known, and there is no party responsible for prevention. The management plan addresses the prevention of such populations of invasive alien species in particular.

The Alien Species Act does not impose the task of implementing the management plan on any specific party. The authorities are responsible for the prevention of alien species in accordance with their jurisdiction based on other laws. ELY Centres and local authorities are responsible for promoting environmental protection in their respective areas.⁴ Local authorities must monitor and promote environmental protection in their areas in order to ensure a healthy, pleasant, stimulating and ecologically sustainable living environment for municipal residents by protecting, maintaining and developing natural and other environments.⁵ For example, the Finnish Transport Infrastructure Agency is responsible, in addition to its other duties, for maintaining the state road and railway networks and co-ordinating measures related to these.⁶ The public administrative duties of Metsähallitus include, for example, the maintenance and use of the national network of nature reserves and the maintenance of other land and water areas and assets intended for the fulfilment of these duties.⁷ In 2019, the duties of the Finnish Wildlife Agency and their funding remained unchanged, even though the control of the raccoon dog and certain other previous game species was transferred from the Hunting Act to the Alien Species Act by an amendment to the latter.

The EU Regulation on Invasive Alien Species and the national legislation do not require the prevention of all occurrences of alien species. Management measures must be planned and

³ The embargo on import into the EU area is monitored by Finnish Customs. The Southern Finland Regional State Administrative Agency supervises compliance with the permits it grants for the use of invasive alien species.

⁴ [Nature Conservation Act \(1096/1996\), Section 6.](#)

⁵ [Act on the Administration of Municipal Environmental Protection \(64/1986\), Section 3.](#)

⁶ [Act on the Finnish Transport Infrastructure Agency \(862/2009\), Section 2.](#)

⁷ [Act on Metsähallitus \(234/2016\), Section 5.](#)

implemented paying attention to the damage caused by the invasive alien species and its likelihood, as well as to the costs of the measures relative to their benefits. Based on the studies carried out for the management plan, it can be said that the current prevention measures – such as the work carried out by the ELY Centres and local authorities, voluntary measures and provision of information and advice – also meet the requirements of the alien species legislation.

The management plan describes the responsible parties and co-operation partners for the implementation of the measures, as well as presenting a schedule for implementation. The management plan is intended for use by the authorities and other operators in their efforts to prevent invasive alien species, with a view to allocating the measures and the necessary resources as effectively as possible.

The Natural Resources Institute Finland co-ordinates the measures presented in the management plan and their monitoring. Under the supervision of the Natural Resources Institute Finland, a national network of experts in alien species supports the monitoring of alien species.

As noted above, the authorities carry out their respective measures to prevent invasive alien species as part of their statutory duties. In line with the 2019 Government Programme, the Ministry of Agriculture and Forestry was granted EUR 0.8 million in budget funding for 2020 in order to enhance the prevention of invasive alien species and EUR 0.5 million for 2021. This budget was used to allocate one additional person-year to the operating expense item for the Centres for Economic Development, Transport and the Environment in order to enhance the national co-ordination of management of alien species and another two additional person-years to the Natural Resources Institute Finland's budget item in order to enhance messaging on alien species and management of risks caused by such species. Parliament decides on the budget every year (incl. the 2019 Government Programme items during the period from 2020 to 2023). It is possible to apply for separate funding for research, analysis and development projects aiming to improve the management of alien species on a case-by-case needs basis; for example, through the Government's joint analysis, assessment and research programme (VN TEAS) or from the EU Life+ programme.

Pathways of unintentional release and spread

According to the Alien Species Act, the Ministry of Agriculture and Forestry also approves the action plan on the pathways of unintentional spread of invasive alien species. The plan is intended to help with the management and steering of measures to prevent invasive alien species from spreading in Finland unintentionally – on imported goods or vehicles, for example.

In 2015–2017, the ministry carried out a study for the plan as part of the VISAKE project (Development of surveillance and early warning system of invasive species and action plan to manage unintentional introduction pathways). The VISAKE project was implemented by the Finnish Museum of Natural History (coordinator), the Finnish Environment Institute and the Natural Resources Institute Finland. Based on the study, the pathways of unintentional release and spread of invasive alien species in the EU were analysed, and a proposal was prepared for primary measures to limit and prevent the spreading of invasive alien species through these pathways.

Also as part of the EU-HAVI, EU-HAVI2, EU-HAVI3 and FIN-HAVI projects, the pathways of unintentional release and spread of invasive alien species included in the above projects were analysed and plans were drawn up on the principal measures to prevent the spread of invasive alien species through these pathways.

The analysis of pathways of spread for the first management plan (EU-HAVI) used the classification developed by the European Alien Species Information Network (EASIN) and approved by the European Commission. The analyses for the subsequent three plans (EU-HAVI2, FIN-HAVI and EU-HAVI3) used the classification by the UN Convention on Biological Diversity (CBD) recommended by the EU at the time.

II MANAGEMENT PLAN

– Consolidated plan

1 Classification of measures; species-specific measures and targeting

Based on the risk analysis, the species included in the lists of invasive alien species can be divided into groups based on their current distribution, risk of spreading and the necessary management measures. The management measures are presented in their order of priority for each species. In some animal groups, the list highlights certain species considered to require more detailed analysis in Finland for species-specific discussion.

It is prohibited to import, cultivate, breed, sell, keep for any other purpose, and release into the environment any of the species included on the lists of invasive alien species of national or Union concern.⁸

By derogation, owners are allowed to keep animals included on the EU or national list of invasive alien species as pets until the end of the animal's natural life on condition that the animal was being kept as a pet before its inclusion in the list. The owner must also ensure that neither reproduction nor escape are possible.

1.1 Established species

Group 1.1 consists of the following species: **Japanese rose, large-leaved lupine, Sosnowsky's hogweed, Persian hogweed, Himalayan balsam, Japanese knotweed, giant knotweed, Himalayan knotweed, Canadian waterweed, Nootka lupine, Aleutian ragwort, orange jewelweed, American skunk cabbage, mink, raccoon dog, Spanish slug, muskrat, sand lizard, green frogs, alpine newt, signal crayfish, and pumpkinseed.**

⁸ Signal crayfish are permitted to be caught, stored and transported for personal use or sale in accordance with the management plan. Raccoon dogs and mink are permitted to be kept for fur farming.

This group includes all the species with growing populations in Finland.

The primary measure recommended for widely spread plant species (such as Canadian waterweed, large-leaved lupine, Japanese rose and Himalayan balsam) is containment from areas where they may cause major harm to biodiversity. For less prolific plant species (such as Aleutian ragwort, orange jewelweed, Nootka lupine and American skunk cabbage), the aim is to eradicate them and prevent their introduction into the country. Efforts will also be made to eradicate hogweeds from Finland entirely.

With respect to carnivores, it is recommended that the proliferation of mink be controlled by means of culling, particularly in areas where it can cause major harm. Although muskrat is known to be found everywhere in the country, the species has declined naturally in Finland in the past few decades. The recommendation for the sand lizard, green frogs, the alpine newt and the Spanish slug is eradication and containment of spread.

The primary management measures for these species are as follows:

1.1.1 Flora

1.1.1.1 Japanese rose

The rugosa or Japanese rose will be eradicated most urgently from areas of highest biodiversity value and their vicinity as follows:

- Populations found in or in the vicinity of nature conservation areas located in archipelagos or continental coasts and sites with threatened and near threatened species and habitats (such as seashore meadows, sand beaches, dunes, heaths and dry meadows).
- Populations found in the vicinity of coastal and archipelago areas with threatened habitats and species included in the Habitats Directive.
- Naturalised and planted populations in archipelagos outside conservation areas.
- Naturalised and planted populations found in or in the vicinity of inland conservation areas, shores, esker areas, and sites with threatened and near threatened species.
 - Responsible parties and co-operation partners: Metsähallitus, ELY Centre Environment and Natural Resources Departments, other landowners (incl. central government, local authorities, private landowners).
 - Schedule: continuous.

In support of the above-mentioned measure, regional action plans will be drawn up to prevent the Japanese rose in archipelago areas (in the Gulf of Finland, the Archipelago Sea, the Bothnian Sea, the Kvarken and the Bothnian Bay) outside conservation areas.

- Sites of high nature value and any populations of invasive species threatening these will be identified and inventoried.
- Other necessary additional investments will be made while assessing funding needs and securing adequate funds for operations, and recruiting coordinators and operators for prevention measures.
- The plans will indicate the parties responsible for monitoring the planned prevention measures and any follow-up measures determined in the plans.
 - Responsible parties and co-operation partners: Metsähallitus, ELY Centre Environment and Natural Resources Departments, other landowners (incl. central government, local authorities, private landowners).
 - Schedule: continuous.

The Japanese rose will be eradicated from road and street areas and other built environments in order of urgency as follows:

1. Sites of high nature value (those in the vicinity of populations of threatened species, roads crossing conservation areas, and valuable habitat types such as meadows and sun-exposed habitats).
2. Plantings in the vicinity of shores, incl. waterways (e.g. channels and ferry banks)
 - Responsible parties and co-operation partners: Finnish Transport Infrastructure Agency, ELY Centre Environment and Natural Resources and Transport and Infrastructure Departments, local authorities, Association of Finnish Local and Regional Authorities, private landowners.
 - Schedule: continuous.

In support of the above-mentioned measure, regional action plans will be drawn up to establish the details of Japanese rose populations in road and railway areas, valuable nature sites, and the measures and costs required for these.

- The plans will indicate the parties responsible for monitoring the planned prevention measures and any follow-up measures determined in the plans.
 - Responsible parties and co-operation partners: Finnish Transport Infrastructure Agency, ELY Centre Environment and Natural Resources and Transport and

Infrastructure Departments, local authorities, Association of Finnish Local and Regional Authorities.

- Schedule: continuous.

Populations of Japanese rose will be eradicated and prevented from spreading on roadsides, in parks, carparks and other public areas, as well as in yards and gardens with no significant nature values.

- Responsible parties and co-operation partners: Finnish Transport Infrastructure Agency, ELY Centre Transport and Infrastructure Departments, local authorities, parishes, landscaping operators and gardening enthusiasts, housing companies and other private landowners.
- Schedule: continuous.

Options will be developed for preventing extensive plantings of Japanese rose along motorways and other dual-carriageway roads while linking removal of invasive alien species to other road improvement works. Prevention measures will be put in place on the road network no later than as part of competitive tendering procedures for new area maintenance contracts.

- Responsible parties and co-operation partners: Finnish Transport Infrastructure Agency, ELY Centre Transport and Infrastructure Departments.
- Schedule: continuous.

Prevention methods

It is recommended to primarily use mechanical prevention methods. Chemical prevention methods may also be used professionally and carefully for extensive, mostly monospecific perennial populations, as well as for remote and less accessible sites, in particular, such as archipelago areas. See regularly updated information on prevention methods in the [species card for Japanese rose](#) on the Invasive Alien Species Portal.

1.1.1.2 Large-leaved lupine

The large-leaved lupine will be eradicated most urgently from areas of highest biodiversity value and their vicinity as follows:

- Nature conservation areas.
- Populations found in and in the vicinity of sites with threatened species and habitats (e.g. traditional biotopes, esker forests, sun-exposed habitats, herb-rich forests).

- Responsible parties and co-operation partners: Metsähallitus, ELY Centre Environment and Natural Resources Departments, private landowners.
- Schedule: continuous.

The large-leaved lupine will be eradicated from road and street areas and other built environments in order of urgency as follows:

1. Roadside sites of high nature value, including those in the vicinity of populations of threatened or near threatened species, roads crossing conservation areas, and valuable habitat types such as meadows and sun-exposed habitats.
2. Stretches of roads and streets and other areas into which the large-leaved lupine is only just spreading.
 - Responsible parties and co-operation partners: Finnish Transport Infrastructure Agency, ELY Centre Transport and Infrastructure and Environment and Natural Resources Departments, local authorities, local associations, private landowners.
 - Schedule: continuous.

At least 50-metre lupine-free buffer zones will be created to protect valuable nature sites, which will be kept permanently free of lupines.

- Responsible parties and co-operation partners: Finnish Transport Infrastructure Agency, ELY Centre Environment and Natural Resources and Transport and Infrastructure Departments, local authorities, local associations, private landowners.
- Schedule: continuous.

In support of the above-mentioned measures, regional action plans will be drawn up to establish the details of the presence of large-leaved lupine populations on the road network in the vicinity of valuable nature sites and the measures and costs required for these. Sites overrun with lupine where no nature values are threatened and prevention is currently less cost-effective will also be identified and treated in keeping with normal mowing practices.

- The plans will indicate the parties responsible for monitoring the planned prevention measures and any follow-up measures determined in the plans.
 - Responsible parties and co-operation partners: Finnish Transport Infrastructure Agency, ELY Centre Environment and Natural Resources and Transport and Infrastructure Departments, local authorities, parishes, local associations,

landscaping operators and gardening enthusiasts, housing companies and other private landowners.

- Schedule: continuous.

The spread of large-leaved lupine in road and railway environments and other public areas will be slowed down while preventing its spread into previously lupine-free road sections. Prevention measures will be put in place on the road network no later than as part of competitive tendering procedures for new area maintenance contracts.

- Roadside mowing practices and methods will be developed and put in place to slow down the spread of large-leaved lupine, in terms such as mowing schedules and minimisation of other risks of spread.
- Road sections that are still completely free of lupine will be identified in order to prevent its spread at the earliest possible stage.
- Possibilities for cleaning roadside mowing machines before moving into lupine-free road sections will be examined.
- Ways of organising the collection of mowed plant matter as part of roadside mowing operations will be examined, including situations where mowing needs to be performed in a less than ideal stage of flowering.
- More training will be provided in prevention work on road and railway sections.
 - Responsible parties and co-operation partners: Finnish Transport Infrastructure Agency, ELY Centre Transport and Infrastructure and Environment and Natural Resources Departments, local authorities, landscaping operators and gardening enthusiasts, private landowners, contractors.
 - Schedule: continuous.

The level of awareness about roadside sites of high nature value will be raised to be able to focus prevention measures cost-effectively in the right areas. Research and development into prevention measures will be launched with a view to drawing up clear general prevention guidelines for road areas.

- Roadside sites of high nature value and the presence of large-leaved lupine in their vicinity will be determined and inventoried.
- Site-specific prevention measures will be planned for the most valuable sites.

- Responsible parties and co-operation partners: Finnish Transport Infrastructure Agency, ELY Centre Environment and Natural Resources and Transport and Infrastructure Departments, local authorities, Finnish Environment Institute.
- Schedule: continuous.

The large-leaved lupine will be prevented from spreading into forests while also launching prevention measures in forest environments.

- Methods will be developed to identify sites relevant to the spread of large-leaved lupine and to prevent its spread in regeneration areas, for example. Prevention is most effective when lupines are still seedlings.
- Attention will be paid to forest machine movements to prevent seeds from being carried from populations of the invasive alien species into felling areas, while developing efficient methods to prevent the species from spreading in this manner.
 - Responsible parties and co-operation partners: Metsähallitus, forest owners, contractors, forest management associations, Finnish Forestry Centre.
 - Schedule: continuous.

The large-leaved lupine will be prevented from spreading in other public areas, as well as in yards and gardens with no significant nature values.

- Responsible parties and cooperation partners: ELY Centres, local authorities, parishes, landscaping operators and gardening enthusiasts, local associations, housing companies and other private landowners.
- Schedule: continuous

Prevention methods

It is recommended to primarily use mechanical prevention methods. Chemical prevention methods may also be used professionally and carefully for extensive, mostly monospecific perennial populations. See regularly updated information on prevention methods in the [species card for large-leaved lupine](#) on the Invasive Alien Species Portal.

1.1.1.3 Hogweeds (Sosnowsky's hogweed, Persian hogweed, giant hogweed)

Hogweeds will be eradicated from Finland within 20 years, taking into account the order of priority of the occurrences of hogweed to be removed (below).

1. Occurrences in residential and recreational areas

2. New occurrences
3. Occurrences from which hogweed easily spreads into the surrounding environment
4. Occurrences threatening endangered species and habitat types
5. Occurrences in conservation or landscape conservation areas
6. Occurrences in valuable cultural environments and biotopes
7. Occurrences further away from residential areas and access routes
8. Occurrences whose spreading into the surrounding environment is not probable due to an obstacle
 - Responsible parties and co-operation partners: ELY Centres, local authorities, Finnish Transport Agency, Senate Properties, Metsähallitus, landowners, interest groups and NGOs.
 - Schedule: hogweed will be eradicated from Finland by 2038.

The most effective use of chemical, mechanical and physical⁹ prevention methods will be planned specific to each occurrence. Herbicides and control methods that replace glyphosate will be investigated. Guidelines on the use of the above methods will be prepared to facilitate prevention.

- Responsible parties and co-operation partners: Natural Resources Institute Finland, ELY Centres, local authorities, Finnish Transport Infrastructure Agency, Finnish Safety and Chemicals Agency Tukes, Metsähallitus, Senate Properties, landowners, interest groups and NGOs, companies, research institutes, higher education institutions.
- Schedule: 2018.

Hogweed waste and soil containing hogweed will be disposed of appropriately; the processing of alien species waste and soil will be developed further; and the number of reception sites will be increased, and information about the reception sites will be provided actively.

- Responsible parties and co-operation partners: ELY Centres, local authorities, Finnish Transport Agency, Senate Properties, Metsähallitus, waste management plants, landowners, Finnish Association of Landscape Industries and other organisations, companies.
- Schedule: continuous.

⁹ In this context, physical prevention includes hot water treatment and torching, for example.

Monitoring will continue for several years after the occurrence seems to have disappeared.

- Responsible parties and co-operation partners: ELY Centres, local authorities, Finnish Transport Infrastructure Agency, Senate Properties, Metsähallitus, landowners, interest groups and advisory organisations in the agriculture, forestry and horticulture sectors, other interest groups and NGOs, companies.
- Schedule: monitoring will begin as occurrences are eradicated.

1.1.1.4 Himalayan balsam

Prevention measures in conservation areas and their surrounding areas will be prioritised.

- Prevention in southern Finland, the area with highest number of occurrences, will be centralised in the most valuable sites: conservation areas and their surrounding areas, waterside areas and waterside groves in particular, as well as along brooks and rivers.
- Prevention measures will be implemented more actively near residential areas, particularly in population centres with the highest numbers of occurrences.
- Attention will also be paid to the prevention and slowing of spreading in areas where Himalayan balsam is still low in numbers, such as Lapland and Kainuu.
 - Responsible parties and co-operation partners: ELY Centres, local authorities, Metsähallitus.
 - Schedule: continuous.

Cost-effective prevention.

- Occurrences will be removed one by one by means of weeding: during the first summer, measures will be implemented several times to ensure that no specimen can produce seeds. After this, the areas will be monitored and maintained for several years.
- The prevention measures will be started along watercourses, from the first occurrence in the upper reaches. The locations of any populations in channels and sub-channels in the upper reaches of natural bodies of water will be established first.
- Combinations of areas with multiple occurrences will be treated at the same time (e.g. villages, residential areas, riverside areas, islands).
- Cost-effective prevention methods, as well as primary prevention sites and areas in road and railway areas, will be studied.
 - Responsible parties and co-operation partners: local authorities, ELY Centres, Metsähallitus, Finnish Transport Infrastructure Agency, interest groups and NGOs.

- Schedule: continuous.

1.1.1.5 Japanese knotweed, giant knotweed, Himalayan knotweed

Any populations of large knotweed species that have spread into the wild will be eradicated in order of urgency as follows:

1. Nature conservation areas and their immediate vicinity.
2. Areas in the vicinity of observation sites of threatened species or otherwise valuable nature sites.
3. Other natural environments.
 - Responsible parties and co-operation partners: Metsähallitus, landowners.
 - Schedule: continuous.

Populations of large knotweed species will be eradicated from residential areas and the road network.

- Any populations unintentionally introduced by rhizome fragments transported with soil will be eradicated.
- Knotweed populations will be mowed off from roadsides and removed as part of road improvement projects.
- Knotweed populations will be removed from yards, gardens and parks and their immediate vicinity.
 - Responsible parties and co-operation partners: local authorities, private landowners and housing companies, landscaping operators and gardening enthusiasts, Finnish Transport Infrastructure Agency, ELY Centre Transport and Infrastructure and Environment and Natural Resources Departments.
 - Schedule: continuous.

Prevention methods

It is recommended to primarily use mechanical prevention methods. Chemical prevention methods may also be used professionally and carefully for extensive, mostly monospecific perennial populations. See regularly updated information on prevention methods in the following species cards on the Invasive Alien Species Portal:

- [Japanese knotweed](#)
- [giant knotweed](#)
- [Himalayan knotweed](#)

1.1.1.6 Canadian waterweed

The species will be prevented from spreading.

- Information will be provided on the importance of carefully cleaning boats, gear and other fishing equipment as part of containment.
- Spread will be prevented in areas where waterweed is only found infrequently and outside its current range.
- Transfer of water vessels into small water bodies of high conservation value (e.g. calcareous ponds and small lakes) will be prohibited in carefully considered cases. Parties such as local authorities and ELY Centres may apply for restrictions on water transport in keeping with the [environmental administration guidelines](#) (in Finnish).
 - Responsible parties and co-operation partners: ELY Centres, Finnish Environment Institute, Metsähallitus, Finnish Transport and Communications Agency (Traficom), local authorities, commercial and recreational fishers, owners of water areas.
 - Schedule: continuous.

The current status will be surveyed.

- The current status of waterweed will be surveyed in conservation areas and threatened habitats, in particular, in order to prioritise boating ban areas and removal measures.
- Guidance and technical means will be provided to ensure that abundance estimates of waterweed are produced in a consistent manner for the Invasive Alien Species Portal.
 - Responsible parties and co-operation partners: ELY Centres, Metsähallitus, Finnish Environment Institute, Finnish Museum of Natural History.
 - Schedule: 2020–2030.

Removal methods will be developed.

- Removal methods and their effects on different types of lakes will be studied and details of the results and experiences obtained will be communicated to the public.
 - Responsible parties and co-operation partners: Finnish Environment Institute, Natural Resources Institute Finland, ProAgria.
 - Schedule: 2020–2030.

Sites of highest conservation value will be prioritised in removal measures and the species will be removed in order of urgency as follows:

1. Conservation areas where removal is necessary to safeguard valuable species and habitats while, however, carefully considering any potential risks involved in removal and minimising these when selecting the removal method
 2. Threatened habitat types, such as
 - a. Naturally eutrophic lakes
 - b. Eutrophic ponds and small lakes
 - c. Calcareous lakes in Northern Finland
 - d. Calcareous ponds and small lakes in Southern and Northern Finland
 3. Areas where waterweed causes significant harm to recreational use, with frequent dense masses, or with no signs of decline
 4. Recreational areas that can function as potential pathways of spread into sites of high conservation value
 - a. Fishing sites (lure fishing, net fishing, seine fishing)
 - b. Beaches
 - c. Marinas prioritised on grounds such as population density
- Responsible parties and co-operation partners: ELY Centres, Finnish Environment Institute, local authorities.
 - Schedule: continuous.

Cost-effective prevention.

- Waterweed will be removed from head waters before downstream waters to contain spread.
- The removed plant matter will be put to effective use, where possible, in order to increase the cost-effectiveness of removal measures.
 - Responsible parties and co-operation partners: ELY Centres, owners of water areas, remediation companies.
 - Schedule: continuous.

Prevention methods

See regularly updated information on prevention methods in the [species card for Canadian waterweed](#) on the Invasive Alien Species Portal.

1.1.1.7 Nootka lupine, Aleutian ragwort, orange jewelweed

Any populations of the species will be eradicated.

- Responsible parties and co-operation partners: ELY Centres, local authorities, landscaping operators, gardening enthusiasts, landowners.
- Schedule: continuous.

The Nootka lupine will be prevented from spreading into the country by communicating on the species to the public.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Natural Resources Institute Finland, Finnish Environment Institute, ELY Centres, Customs, Finnish Food Authority, garden stores, landscaping operators, interest groups and NGOs.
- Schedule: continuous.

Gardening enthusiasts will be informed about the species import ban.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Natural Resources Institute Finland, Finnish Environment Institute, ELY Centres, Customs, Finnish Food Authority, garden stores, landscaping operators, interest groups and NGOs.
- Schedule: continuous.

Prevention methods

It is recommended to primarily use mechanical prevention methods. Chemical prevention methods may also be used professionally and carefully for extensive, mostly monospecific perennial populations. See regularly updated information on prevention methods in the following species cards on the Invasive Alien Species Portal:

- [Nootka lupine](#)
- [Aleutian ragwort](#)
- [Orange jewelweed](#)

1.1.1.8 American skunk cabbage

Occurrences will be removed, and an occurrence-specific prevention plan will be prepared, if necessary.

- Responsible parties and co-operation partners: ELY Centres, local authorities, Metsähallitus, landowners.

- Schedule: continuous.

The monitoring of removed occurrences will continue for three years after the removal for small occurrences, and for 10 years for extensive occurrences.

- Responsible parties and co-operation partners: ELY Centres, local authorities, Metsähallitus, landowners, interest groups and advisory organisations in the agriculture, forestry and horticulture sectors.
- Schedule: 3–10 years after removal.

The provision of information and education on the harmful effects of the species will continue.

- Responsible parties and co-operation partners: ELY Centres, local authorities, research institutes, higher education institutions, Finnish Association of Landscape Industries, other organisations.
- Schedule: continuous.

1.1.2 Animals

1.1.2.1 American mink

Enhancing mink culling primarily in archipelagos, wetland areas important for birds and nesting areas of threatened and declining birds (incl. game birds). Minks will also be hunted on trout brooks.

- Responsible parties and co-operation partners: Finnish Wildlife Agency, Metsähallitus, ELY Centres, local authorities, hunters, interest groups and NGOs.
- Schedule: continuous.

Mink hunting will be enhanced in late winter and spring in particular to ensure that the mink population is as small as possible during birds' nesting period.

- Responsible parties and co-operation partners: Finnish Wildlife Agency, Metsähallitus, ELY Centres, hunters, interest groups and NGOs.
- Schedule: continuous.

Communications will be increased to ensure the effective and appropriate hunting of the mink, also covering areas other than its primary hunting grounds. Communications will also be especially increased for summer residents in archipelagos and in the vicinity of other bird waters.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Natural Resources Institute Finland, Finnish Wildlife Agency, Finnish Food Authority, ELY Centres, Finnish Environment Institute, Finnish Hunters' Association, hunting clubs, local authorities, interest groups and NGOs.
- Schedule: continuous.

A Decree will be issued on the protection of fur animals, laying down a fencing obligation to prevent minks from escaping.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry.
- Schedule: 2022.

1.1.2.2 Raccoon dog

The hunting of the raccoon dog will be enhanced primarily in wetland areas important for birds¹⁰; in the archipelago; in the nesting areas and sites of endangered birds that are important for the protection of species; in the nesting habitats of game birds with declined populations; and in Lapland.

- Responsible parties and co-operation partners: Finnish Wildlife Agency, Metsähallitus, ELY Centres, local authorities, hunters, interest groups and NGOs.
- Schedule: continuous.

The hunting of the raccoon dog will be enhanced in late winter and spring in particular to ensure that the raccoon dog population is as small as possible during bird nesting periods.

- Responsible parties and co-operation partners: Finnish Wildlife Agency, Metsähallitus, ELY Centres, hunters, interest groups and NGOs.
- Schedule: continuous.

The spread of the raccoon dog into Sweden and Norway will be prevented as far as possible in co-operation with these countries.

- The export of Judas raccoon dogs¹¹ to Sweden will be enabled if the recipient so wishes.

¹⁰ Including: Special protection areas (SPA) within the Natura network for the conservation of birds and areas covered by the protection programme for bird waters.

¹¹ The [Judas technique](#) has been tested successfully in Sweden. In areas with sparse raccoon dog populations, individual raccoon dogs will be equipped with GPS transmitters, and these individuals make it possible to locate other raccoon dogs.

- Responsible parties and co-operation partners: Finnish Wildlife Agency, Metsähallitus, hunters, interest groups and NGOs.
- Schedule: continuous.

The provision of information will be increased to ensure the effective and appropriate hunting of the raccoon dog.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Natural Resources Institute Finland, Finnish Wildlife Agency, Finnish Food Authority, Metsähallitus, ELY Centres, Finnish Environment Institute, hunting clubs, local authorities, interest groups and NGOs.
- Schedule: continuous.

Rabies vaccinations will be continued along the south-eastern border of Finland.

- Responsible parties and co-operation partners: Finnish Food Authority, Finnish Wildlife Agency, hunters.
- Schedule: continuous (once a year).

1.1.2.3 Spanish slug

Specimens of the species will be removed when detected. Special attention will be paid to populations and contexts (nurseries, wasteland, garden waste, earthmoving operations) in which the species can easily spread into the environment.

- Responsible parties and co-operation partners: local authorities, ELY Centres, landowners, interest groups and NGOs, private citizens.
- Schedule: continuous.

The species will be prevented from spreading and proliferating by means of communication measures.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Natural Resources Institute Finland, Finnish Environment Institute, Finnish Museum of Natural History, ELY Centres, Finnish Food Authority, landscaping operators, interest groups and NGOs.
- Schedule: continuous.

Local prevention drives will be organised while encouraging people to remove the species from public areas.

- Responsible parties and co-operation partners: local authorities, ELY Centres, landowners, interest groups and NGOs.
- Schedule: continuous.

Prevention methods

See regularly updated information on prevention methods in the [species card for Spanish slug](#) on the Invasive Alien Species Portal.

It should be noted that professional operators are obliged to prevent the Spanish slug from spreading outside the land area managed by them through mould, soil or plants, for example (Invasive Alien Species Act section 5: Obligation of an operator).

1.1.2.4 Muskrat

The distribution of the population will continue to be studied by means of calls for observations and other observation efficiency measures, such as more active observation by citizens. Suitable monitoring methods will be developed.

- Responsible parties and co-operation partners: Natural Resources Institute Finland, Finnish Wildlife Agency, Finnish Museum of Natural History, universities.
- Schedule: continuous.

The hunting of the species will continue. The growth of the population will be addressed, if necessary.

- Responsible parties and co-operation partners: Finnish Wildlife Agency, Metsähallitus, hunters, interest groups and NGOs.
- Schedule: continuous.

1.1.2.5 Sand lizard, green frogs, alpine newt

The presence of the species in Finland will be established and appropriate management measures will be identified and implemented.

- Responsible parties and co-operation partners: ELY Centres, Finnish Environment Institute, Natural Resources Institute Finland, Finnish Museum of Natural History.
- Schedule: continuous.

Awareness-raising measures will be carried out about the bans on import, breeding and release. Pet owners are advised to ensure that the pets are not allowed to breed or escape.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Natural Resources Institute Finland, Finnish Environment Institute, ELY Centres, hobby organisations.
- Schedule: continuous.

1.1.2.6 Signal crayfish

Compliance with prohibitions will be monitored:

- The planting and farming of signal crayfish is prohibited.
- The import of **live** signal crayfish is prohibited.
 - However, live signal crayfish may be imported into Finland from another EU Member State in order to be processed into food, provided that the breeding of the imported specimens and their introduction into the natural environment is prevented effectively. These requirements are met when live signal crayfish is processed in accordance with the operational requirements presented in section 4.2 of Guideline 16030/1 of the Finnish Food Authority ('Monitoring of the processing and sale of crayfish intended to be used as food'). More information about the content of the requirements is available via email from ensisaapumisvalvonta@ruokavirasto.fi.
- Signal crayfish may not be transferred outside the catching area within the natural body of water in which they are found.
- Holding signal crayfish in a keep net is prohibited in other areas of the natural body of water than the part in which they were caught.
 - Responsible parties and co-operation partners: ELY Centres, local authorities, police, Customs, Metsähallitus, fishery regions, owners of water areas, crayfishers.
 - Schedule: continuous.

Information will be provided more effectively about the prohibition on planting, spreading and farming of signal crayfish and holding signal crayfish in a keep net, and about the reasons behind these prohibitions.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, ELY Centres, Natural Resources Institute Finland, owners of water areas, Finnish Federation for Recreational Fishing, other organisations.
- Schedule: continuous.

The responsible catching, use and retail of signal crayfish will be facilitated.

- Responsible parties and co-operation partners: ELY Centres, fishery regions, owners of water areas, retail, crayfishers, organisations.
- Schedule: continuous.

The following will be ensured in co-operation with owners of water areas in the protection and management areas of signal crayfish:

- New occurrences of signal crayfish will be removed as soon as possible to prevent them from spreading further.
- The growth and spreading of the signal crayfish stock will be prevented systematically and effectively.
 - Responsible parties and co-operation partners: ELY Centres, local authorities, Metsähallitus, fishery regions, owners of water areas, organisations.
 - Schedule: continuous.

A plan on the management of signal crayfish and the prevention of their spreading will be included in new usage and management plans for fishery regions.

- Responsible parties and co-operation partners: ELY Centres, fishery regions.
- Schedule: as of 2019, once the fishery regions have been established and the preparation of their usage and management plans has begun.

Opportunities and methods to eradicate signal crayfish from natural bodies of water will be examined.

- Responsible parties and co-operation partners: ELY Centres, local authorities, Metsähallitus, fishery regions, owners of water areas, research institutes, higher education institutions, organisations.
- Schedule: 2018–2022.

Relevant methods for managing signal crayfish stocks, as well as factors affecting stock development, will be examined.

- Responsible parties and co-operation partners: Natural Resources Institute Finland, owners of water areas, organisations.
- Schedule: 2018–2022.

The distribution of signal crayfish will be monitored in accordance with the EU Regulation on Invasive Alien Species and alien species strategy.

- Responsible parties and co-operation partners: ELY Centres, Natural Resources Institute Finland, fishery regions, owners of water areas.
- Schedule: continuous collection of information, review of the situation every three years.

The more efficient use, processing and productisation of signal crayfish hauls will be examined and promoted to make the large-scale catching of signal crayfish more profitable.

- Responsible parties and co-operation partners: ELY Centres, local authorities, fishery regions, owners of water areas, research institutes, higher education institutions, processing companies.
- Schedule: continuous.

Opportunities to reduce the transport of live signal crayfish will be examined and promoted. Crayfishing methods, storage techniques, collection and logistics will be developed further.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, ELY Centres, research institutes, higher education institutions, companies.
- Schedule: 2018–2020.

Crayfishing opportunities will be increased, the controlled availability of crayfishing permits will be promoted, and commercial crayfishing will be made possible.

- Responsible parties and co-operation partners: ELY Centres, fishery regions, owners of water areas, organisations.
- Schedule: continuous.

1.1.2.7 Pumpkinseed

Pumpkinseed has locally established populations in Southwest Finland, where it has been introduced into ponds in at least nine municipalities.

Primary measures for pumpkinseed are as follows:

Known populations of pumpkinseed will be eradicated wherever possible.

- Pond-specific management measures and the feasibility of their implementation will be planned.
- *Lepomis gibbosus* and other invasive alien species will be eradicated in accordance with pond-specific plans using methods that ensure that no harm is caused to other species.
- Co-operation with owners of the water areas will be ensured in the prevention work.
 - Responsible parties and co-operation partners: ELY Centres, Natural resources institute Finland, Finnish Environment Institute, local authorities in Southwest Finland, recreational fishing and water protection associations, nature conservation associations, fisheries areas, owners of water areas.
 - Schedule: continuous.

Ensuring that pumpkinseed populations which cannot be eradicated do not cause adverse impacts.

- Pumpkinseed habitats and populations will be monitored and a plan to limit their stocks will be prepared before adverse impacts emerge.
- Stocking density in pumpkinseed populations is kept sufficiently low through means such as fishing in order to minimise adverse impacts.
- co-operation with owners of the water areas will be ensured in the prevention work.
 - Responsible parties and co-operation partners: ELY Centres, Natural resources institute Finland, Finnish Environment Institute, local authorities in Southwest Finland, recreational fishing and water protection associations, nature conservation associations, fisheries areas, owners of water areas.
 - Schedule: continuous.

**Informing the public about all bans concerning the species, particularly the ban on release.
Raising awareness about threats and adverse impacts of pumpkinseed in order to stop the spread of the species.**

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, ELY Centres, fisheries areas, local authorities in Southwest Finland, Natural Resources Institute Finland, Finnish Environment Institute, fisheries-based education institutions, Finnish Federation for Recreational Fishing, Federation of Finnish Fisheries Associations and other associations, including recreational fishing and water protection associations, nature conservation associations and media representatives.
- Schedule: continuous.

1.2 Pet animal and aquarium plant species found in Finland

Group 1.2 consists of the following species: **Carolina fanwort, water hyacinth, chipmunks, raccoon, wolfdog from the taxonomic group carnivores, red-eared slider, red swamp crayfish, marbled crayfish, spiny-cheek crayfish, virile crayfish, topmouth gudgeon, Amur sleeper and Senegal tea plant.**

The group includes the Carolina fanwort, water hyacinth and red-eared slider, which do not survive in Finland in the wild, and the red swamp crayfish, marbled crayfish, spiny-cheek crayfish, virile crayfish, topmouth gudgeon and Amur sleeper, which presumably survive in Finland in the wild, as well as the mammals Siberian chipmunk and other chipmunks, raccoon and wolfdog. Animal species belonging to this group have been and are occasionally kept as pets in Finland. Of these species, the red-eared slider, Siberian chipmunk and wolfdog have occasionally been found as individual escapees in Finnish nature. Human action plays a key role in the spreading of these species into Finland. Only the Amur sleeper is capable of spreading naturally here, but human action further facilitates its spread. For this reason, key management measures for species in this group include communication about the bans on import, breeding and release into nature. Specimens found in nature will be eradicated after identification.

Information will be provided on the bans on imports, breeding and release into nature, as well as on the proper disposal of aquarium plants. Pet owners are advised to ensure that the pets are not allowed to breed or escape.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Natural Resources Institute Finland, Finnish Environment Institute, ELY Centres, Finnish Food Authority, Finnish Wildlife Agency,

Finnish Association of Landscape Industries, Taimistoviljelijät ry, veterinarians, Finnish Federation for Recreational Fishing, other organisations, aquarium, pet and fishing supply retailers and hobbyists.

- Schedule: continuous.

In the event that a specific set of circumstances or some other information obtained by the authorities gives rise to reasonable suspicion that the exemption for pets is not applicable to keeping an animal, its owner will be asked to account for its origin and grounds for its keeping.

- Responsible parties and co-operation partners: ELY Centres, police, Customs, provincial and municipal veterinary officers.
- Schedule: continuous.

The presence of hybrids of dogs and wild wolves in the wild will be tracked as part of the DNA monitoring of the wolf population.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Natural Resources Institute Finland, Finnish Wildlife Agency.
- Schedule: continuous.

Escaped pets and populations of aquarium plants will be removed from nature.

- Responsible parties and co-operation partners: ELY Centres, local authorities, Natural resources institute Finland, Finnish Environment Institute, Finnish Wildlife Agency, game management associations, landowners.
- Schedule: continuous.

1.3 Species found occasionally or potentially surviving in Finland

Group 1.3 consists of the following species: **crimson fountaingrass, common milkweed, Nuttall's waterweed¹², African elodea, parrot's feather, floating pennywort, Japanese hop, tree of heaven, grey squirrel, small Asian mongoose, American bullfrog, yellow-bellied toad, Chinese mitten crab, ruddy duck, Egyptian goose, and alien falcon species and lesser white-fronted goose hybrids.**

¹² After the approval of the original management plan, Nuttall's waterweed has been found in a few places in Finland (see bulletin, footnote 13), where it is being eradicated. The targets will be updated after the fight, when their success can be assessed.

The species in this group have a varied risk of spreading into Finland. The grey squirrel and small Asian mongoose might survive in the Finnish climate, but they do not have a probable pathway of spreading into Finland. Floating pennywort, African elodea, parrot's feather, the American bullfrog, the ruddy duck and the Chinese mitten crab do not survive in the Finnish climate. The ruddy duck and Chinese mitten crab are also capable of spreading naturally into Finland. Both species have been found occasionally in Finland, and specimens of the Chinese mitten crab have been found annually. Due to effective eradication outside Finland, there is now less pressure with regard to the ruddy duck spreading into Finland. Specimens of the Chinese mitten crab arrive in Finland not only naturally, but also as stowaways on ships. As the transition period for the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention) ends in 2024, the spread of the species on ships is expected to decrease. Crimson fountaingrass and common milkweed have both been used as ornamental plants in Finland. Crimson fountaingrass will not overwinter in the Finnish climate, unlike common milkweed. Tree of heaven and Japanese hop have been occasionally used in Finland as garden plants. Nuttall's waterweed¹³ has an established and extensive population in Sweden, which is why there is a high risk of this species spreading into Finland, a country with similar climate conditions.

Yellow-bellied toads have been found occasionally in the wild in Finland, but the current status of the species is unknown. It is necessary to establish the status and presence of the yellow-bellied toad in Finland. Any populations that may be found must be prevented from spreading and the individuals in these populations must be eradicated, whenever possible, as long as their presence is still localised.

The nearest Egyptian goose population is probably in Denmark. In Sweden, based on individual observations, this species is concentrated in the southern coast, but observations have also been made north of Stockholm. Two observations of the Egyptian goose have been made in Finland (in 1968 and 1977), and individual birds may also fly to Finland in the future.

Specimens of this species must be eradicated when detected to avoid the species from becoming established in Finland.

¹³ See bulletin (in Finnish) <https://vieraslajit.fi/ajankohtaista/i-5319>

Some falcon species alien to Finland are bred for hunting purposes in Russia, Central Europe and the United Kingdom. In 2018, Denmark also allowed the use of hunting falcons, which may increase incidents of captive-bred falcons straying into Finland in the future. The challenge is to distinguish alien peregrine falcons and gyrfalcons straying from aviary populations and falcon hybrids from wild specimens nesting in Northern Finland. Any confirmed hybrid or captive-bred bird found nesting with a wild gyrfalcon or peregrine should be removed.

Hybrids of lesser white-fronted goose mostly come from Sweden, where lesser white-fronted geese have been farmed and introduced to Northern Sweden. In order to protect the original Fennoscandian population of the species, it is justified to capture (to confirm genetic origin) and, where necessary, remove any confirmed or suspected hybrids, colour-ringed or unringed, originating in aviaries or from introduced Swedish populations of lesser white-fronted goose, it is imperative to urgently determine the party that will take action, where necessary, to establish the needs for and chances of removal and, where the conditions are satisfied, to implement removal measures. Any measures must be carried out in compliance with the Nature Conservation Act. The Finnish working group for Lesser White-fronted Goose keeps close track of the presence of the species in Finland and serves as a species expert body, informing public authorities of the need to launch measures to target individuals meeting the definition of an invasive alien species.

Measures must be taken in the event that any individuals meeting the above-mentioned criteria are found in Finland. Any observations and measures must be reported in the Invasive Alien Species Portal. Aquarium hobbyists and pet owners will be educated on the import ban on species in this group.

Occurrences of common milkweed must be removed mechanically when detected.

- Responsible parties and co-operation partners: ELY Centres, local authorities, landowners.
- Schedule: continuous.

Landscaping professionals, garden retailers and aquarium, pet and garden enthusiasts will be informed about the ban on imports and release into nature.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Natural Resources Institute Finland, Finnish

Environment Institute, ELY Centres, Finnish Customs, Finnish Food Authority, Finnish Wildlife Agency, Finnish Association of Landscape Industries, Taimistoviljelijät ry, Finnish Glasshouse Growers' Association, Hedelmän- ja marjanviljelijäin liitto ry, Dendrologian seura ry, other interest groups and NGOs, garden, aquarium and pet retailers and enthusiasts.

- Schedule: continuous.

Information will be provided about the spreading opportunities and harmful effects of Nuttall's waterweed¹⁴, and guidance will be provided on recognising the species and eradicating it immediately when detected.

- Responsible parties and co-operation partners: ELY Centres, interest groups and NGOs.
- Schedule: continuous.

Populations of tree of heaven and Japanese hop will be eradicated when detected.

- Responsible parties and co-operation partners: ELY Centres, local authorities, landowners.
- Schedule: continuous.

The Egyptian goose will be prevented from creating established populations in Finland.

- Responsible parties and cooperation partners: Finnish Wildlife Agency, ELY Centres, BirdLife Finland, other interest groups and non-governmental organisations.
- Schedule: continuous.

Immediate measures will be taken to remove other alien bird species mentioned above when detected.

- Responsible parties and co-operation partners: ELY Centres, local authorities, landowners, Finnish Wildlife Agency, Metsähallitus, Finnish working group for Lesser White-fronted Goose, BirdLife Finland, other interest groups and NGOs, fishers (Chinese mitten crab).
- Schedule: continuous.

The presence of the yellow-bellied toad in Finland will be established.

¹⁴ After the approval of the original management plan, Nuttall's waterweed has been found in a few places in Finland (see bulletin, footnote 13), where it is being eradicated. The targets will be updated after the fight, when their success can be assessed.

- Responsible parties and co-operation partners: Finnish Environment Institute, Natural resources institute Finland, ELY Centres.
- Schedule: continuous.

1.4 Species with a low risk of spread

Alien species with a low risk of spread include **groundsel-bush, water-primrose, creeping water-primrose, parthenium weed, mile-a-minute weed, kudzu vine, broadleaf watermilfoil, Japanese stiltgrass, alligator weed, Chilean rhubarb, balloon vine, vine-like fern, perennial veldtgrass, Chinese bushclover, Chinese tallow, mesquite, broomsedge bluestem, salvinia moss, purple pampas grass, golden wreath wattle, New Zealand flatworm, striped eel catfish, common myna, Indian house crow, sacred ibis, alien birds of prey, alien owls, alien crows and jays, alien bats, Pallas's squirrel, South American coati, coypu, Reeves's muntjac, Eastern fox squirrel, European tree frog, Northern leopard frog, agile frog and Asian hornet.**

As a rule, invasive alien species in this group have not been found in Finland and do not survive in the Finnish climate. Of the species belonging to this group, only the common myna has been encountered in Finland on one occasion, and striped eel catfish has been used occasionally as an aquarium fish in Finland and in nearby countries. All of the species in the group have a non-existent or low probability of surviving in the Finnish climate, with the exception of certain species of bats, broadleaf watermilfoil and Japanese stiltgrass. Of the ornamental plants, alligator weed is unlikely to be imported into Finland. In contrast, Chilean rhubarb is an ornamental plant with potential for import into Finland in the future as climate becomes more favourable for the species. For these species, monitoring their distribution outside Finland and providing information about the prohibition on importing them to Finland are currently sufficient management methods.

Monitoring the development of the species' distribution outside Finland with the help of the EU information support system, among other means.

- Ministry of Agriculture and Forestry, Natural Resources Institute Finland, Finnish Environment Institute, Finnish Museum of Natural History, ELY Centres, Birdlife Finland.
- Schedule: continuous.

Informing the public about the ban on import of the species.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Natural Resources Institute Finland, Finnish Environment Institute, ELY Centres, Finnish Customs, Birdlife Finland, Finnish Food Authority, Finnish Association of Landscape Industries, Taimistoviljelijät ry, Finnish Glasshouse Growers' Association, Hedelmän- ja marjanviljelijäin liitto ry, Dendrologian seura ry, other interest groups and NGOs, garden retailers and enthusiasts, aquarium retailers and enthusiasts, recreational fishers.
- Schedule: continuous.

2 Recommended measures for the general management of alien species

The measures listed below are needed for the general management of invasive alien species.

Awareness about alien species will be raised through multichannel communication:

- Enhancing targeted messaging to local authorities, citizens and various interested parties, including aquarium retailers and enthusiasts, garden retailers, horticulture professionals, garden enthusiasts, pet retailers and enthusiasts, recreational and professional fishers, hunters and tourists.
 - Activating citizens through messaging to report observations in the Invasive Alien Species Portal and participate in prevention and voluntary work. Encouraging education institutions to use materials on the vieraslajit.fi website and participate in projects on alien species.
 - Messaging will be used to encourage landowners and local authorities to be aware of their obligations concerning the prevention of invasive alien species found on their lands.
 - Landowners will be informed early and extensively enough of inventories of invasive alien species to be eradicated and planned prevention work with a view to ensuring cooperation and coordination.
- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Transport and Communications, research institutes, higher education institutions, ELY Centres, local authorities, parishes, Finnish Food Authority, Metsähallitus, National

Resource Institute Finland, Finnish Environment Institute, Finnish Advisory Board for Invasive Alien Species, Finnish Game Centre, game management associations, Association of Finnish Local and Regional Authorities, Federation of Finnish Fisheries Associations, Finnish Federation for Recreational Fishing, Finnish Hunters' Association, agricultural, forestry and horticulture interest groups, advisory organisations and education institutions, horticulture and nature conservation associations, local associations (including local history, sports, outdoors, nature and youth associations), aquarium and pet retailers, other companies.

- Schedule: continuous.

Measures and observations concerning all invasive alien species will be consistently reported via the Invasive Alien Species Portal (vieraslajit.fi). The monitoring system for prevention methods will be developed further while expanding its introduction. Efforts will be made to ensure that all observation data on invasive alien species is available for use via the Finnish Biodiversity Info Facility.

- Responsible parties and co-operation partners: Natural Resources Institute Finland; Finnish Environment Institute; Finnish Museum of Natural History; ELY Centres; local authorities, Finnish Wildlife Agency; Metsähallitus; Federation of Finnish Fisheries Associations; interest groups and advisory organisations in the agriculture, forestry and horticultural sectors; groups of enthusiasts (e.g. hunters, fishers, nature enthusiasts).
- Schedule: continuous.

Efforts to inventory the populations of invasive alien species will be enhanced and continued for the purpose of planning and prioritising prevention measures.

- Responsible parties and cooperation partners: ELY Centres, Metsähallitus, local authorities, research institutes.
- Schedule: continuous

The utilisation of projects supported through rural development funds (Leader) in prevention of invasive alien species will be enhanced by means such as improving communications.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry/National Rural Network, ELY Centres, local Leader action groups.
- Schedule: continuous.

Efforts will be made to ensure the monitoring of already prevented invasive plant species and the necessary after-care measures.

- Responsible parties and co-operation partners: parties performing and purchasing prevention measures, landowners.
- Schedule: continuous.

New non-chemical prevention measures will be developed to prevent invasive plant species (burying, covering, crushed rock fines, etc.).

- Responsible parties and co-operation partners: research institutes, higher education institutions, companies.
- Schedule: continuous.

Efforts will be made to ensure that any soil to be transported is free of alien species. Efforts will be made to ensure that transported soil and machinery and equipment used in earthmoving are free of alien species.

- Responsible parties and co-operation partners: landscaping operator, earthmoving and construction operators, INFRA – Infra Contractors Association in Finland, landowners.
- Schedule: continuous.

Efforts will be made to develop more effective reception and appropriate treatment of waste and soil containing invasive plant material as well as cost-effective disposal methods 31 for these. Effective solutions will be sought for treating large amounts of invasive plant waste. Guidance will be provided on timing prevention of invasive alien species in order to minimise the amount of invasive plant waste. The number of reception sites will be increased and information about these will be actively provided, while also exploring opportunities for organising reception free of charge. Guidance and communications on treatment of invasive species waste will be harmonised in different locations.

- Responsible parties and co-operation partners: Ministry of the Environment, ELY Centres, Finnish Transport Infrastructure Agency, Natural Resources Institute Finland, Senate Properties, Metsähallitus, waste management plants, landowners, Finnish Association of Landscape Industries and other organisations, INFRA – Infra Contractors Association in Finland, companies, research institutes.
- Schedule: continuous.

Local authorities will be encouraged to create opportunities for preventing the spread of invasive alien species through voluntary work by means such as giving and lending the necessary equipment.

- Responsible parties and co-operation partners: local authorities.
- Schedule: continuous.

The topic of alien species will be added to curricula in the field of natural resources, particularly in vocational education.

- Responsible parties and co-operation partners: Ministry of Education and Culture, Finnish National Agency for Education, universities of applied sciences providing education in the field of natural resources.
- Schedule: in connection with the renewal of national curricula and the curricula of universities of applied sciences.

Co-operation with various operators will be increased by organising, for example, seminars and workshops on alien species on a regular basis for sharing experiences and updating knowledge.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Transport and Communications, ELY Centres, local authorities, Finnish Advisory Board for Invasive Alien Species, Natural Resources Institute Finland, Finnish Environment Institute, Finnish Wildlife Agency, interest groups and advisory organisations in the agricultural, forestry and horticultural sectors, other interest groups and NGOs, companies.
- Schedule: continuous.

The role of each operator and the division of responsibilities between various operators will be further specified as needed.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Transport and Communications, ELY Centres, local authorities, Natural Resources Institute Finland, Finnish Environment Institute, Finnish Wildlife Agency.
- Schedule: continuous.

Sufficient resources will be ensured to secure the continuity of alien species work.

Opportunities to prevent alien species through employment projects will be examined. The prevention of alien species as voluntary work will be supported.

- As far as possible, the resources available for prevention work will be improved, and funding will be arranged for alien species prevention projects and the coordinators of voluntary work.
- The resources of Metsähallitus for nature management services will be safeguarded to ensure that the work to prevent alien species in conservation areas is not jeopardised.
- Local authorities will be encouraged to target funding at the prevention of alien species. Local authorities will be encouraged to participate in prevention and in supporting voluntary work. Local authorities will be encouraged to appoint a person in charge of the prevention of alien species, implement prevention measures through employment projects, support voluntary activities, organise waste management and provide tools.
- The prevention of alien species will be enhanced in road areas.
- Additional funding will be sought for alien species work (Life projects and other projects covered by EU funding, as well as projects channelled through various organisations).
- An operating model will be developed to create business operations specialising in prevention, as well as association activities and workshops.
 - Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Transport and Communications, ELY Centres, Finnish Wildlife Agency, local authorities, Metsähallitus, Finnish Transport Infrastructure Agency, interest groups and NGOs, associations.
 - Schedule: continuous.

Studies will be produced to improve predictability in the prevention of invasive alien species, addressing at minimum the following information needs:

- Financial losses caused by alien species, the effects of alien species on biodiversity, the function of ecosystems and habitats (valuation), as well as their effects on the sustainable use of natural resources and the users of natural resources.
- More detailed information about distribution, concerning the number of specimens of alien species kept as pets in particular.
- Factors affecting the population development of alien species in terms of management and other prerequisites for survival in the conditions of Finland, including the effects of climate change (concerning species intended to be added to the list of invasive alien

species of Union concern in particular), as well as species with the highest potential to spread into Finland in the near future.

- New management methods, such as prevention methods to replace the use of glyphosate and opportunities and methods to eradicate signal crayfish from natural bodies of water.
- The most effective prevention methods in terms of alien animal species welfare will be examined.
 - Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, research institutes, higher education institutions, operators providing funding for research.
 - Schedule: continuous.

III ANALYSIS AND ACTION PLAN CONCERNING THE PATHWAYS OF UNINTENTIONAL INTRODUCTION AND SPREADING

– Consolidated analysis and action plan

1 Analysis of the pathways of unintentional introduction and spread

Article 13¹⁵ of the EU Regulation on Invasive Alien Species requires that Member States analysis the pathways of unintentional introduction and spread of invasive alien species. With respect to the 37 species on the first list of Union concern (3 August 2016), the analysis of pathways of unintentional introduction and spreading was carried out based on the classification by the EU-level European Alien Species Information Network (EASIN), which was compliant with EU requirements at the time. Alien species were classified according to their habitats and pathways and ways of spreading (spreading through contaminated organisms, pathways, vectors and escape). The classification showed which pathways have the highest number of invasive alien species on the first list of Union concern arriving in Finland and through which pathways these species spread within Finland – that is, in which pathways measures should be focused. The results of the analysis are presented in detail in the table in Annex 3.

The pathways of spreading of invasive alien species of national concern, the 12 species added to the list of invasive alien species of Union concern on 2 August 2018 (1st updated list) and the 17 species added to the list of Union concern on 15 August 2019 (2nd updated list) were investigated by classifying them according to the categories of the UN Convention on Biological Diversity (CBD) (Harrower et al. 2018). The CBD divides pathways of spread into six categories, which are further divided into 44 subcategories. The six categories are further divided into intentional (release into nature or escape from confinement) and unintentional (transport by contaminated organisms or by vectors) pathways, and into categories that

¹⁵ Regulation (EU) No 1143/2014 of the European Parliament and of the Council on the prevention and management of the release and spread of invasive alien species

describe both the pathway and spread (corridor or unaided dispersal). A species may have several pathways of spread. The study distinguished the pathways of spread detected in Finland from the potential pathways of spread of the species. The results of the analysis for the 1st update to the Union list are presented in Annex 4 and for invasive alien species of national concern in Annex 5. The results of the analysis for the 2nd update to the Union list are presented in Annex 6.

2 Results

2.1 Pathways of spreading of alien species analysed based on the EU-level (EASIN) classification

The following species' pathways of spreading were analysed based on the EASIN classification: Sosnowsky's hogweed, Himalayan balsam, common milkweed, Persian hogweed, parthenium weed, groundsel-bush, kudzu vine, mile-a-minute weed, African elodea, parrot's feather, Carolina fanwort, water hyacinth, American skunk cabbage, water primrose, creeping water primrose, floating pennywort, Indian house crow, ruddy duck, sacred ibis, Amur sleeper, topmouth gudgeon, grey squirrel, South American coati, coypu, Pallas's squirrel, raccoon, Siberian chipmunk, American bull frog, red-eared slider, Asian hornet, spiny-cheek crayfish, American virile crayfish, marbled crayfish, red swamp crayfish, signal crayfish and Chinese mitten crab.

2.1.1 Spreading into Finland

Spreading through a contaminated product:

Floating pennywort, curly waterweed, water primrose, creeping water primrose, parrot's feather, mile-a-minute weed, kudzu vine, parthenium weed, Asian hornet and topmouth gudgeon are known to spread with other ornamental plant material, packaging material and aquacultured fish, meaning that they fall into the category 'spreading through contaminated products'.

Transport:

Sosnowsky's hogweed and Persian hogweed have spread or are spreading through land transport on railways or roads. Chinese mitten crab, small Asian mongoose, raccoon and Indian house crow are known to be capable of spreading as stowaways on ships.

2.1.2 Spreading within Finland

Escapees

Most of the total of 30 species analysed based on the EASIN classification are spreading or have spread into the environment by escaping. Of these, 12 species that are acquired as ornamental plants may escape from gardens, seven are pets that may escape, five species (four species of crayfish and the American bullfrog) may escape from aquariums, five from aquaculture and four from farms. Five of the species analysed based on the EASIN classification are also used as live food-bait, which increases their opportunities of escaping into the environment.

2.2 Pathways of spreading of invasive alien species analysed based on the international classification (CBD)

The pathways of spreading of the following alien species were analysed using the CBD classification: Nootka lupine, large-leaved lupine, Aleutian ragwort, Himalayan knotweed, Japanese knotweed, giant knotweed, Japanese rose, orange jewelweed, Himalayan balsam, crimson fountaingrass, giant hogweed, common milkweed, Japanese stiltgrass, Chilean rhubarb, broadleaf watermilfoil, Nuttall's waterweed, alligator weed, Canadian waterweed, muskrat, raccoon dog, predators, bats, chipmunks, birds of prey and their hybrids, falcons and their hybrids, owls, crows and jays, hybrids of lesser white-fronted goose and other geese, Egyptian goose, sand lizard, green frogs, European tree frog, yellow-bellied toad, Northern leopard frog, agile frog, alpine newt and Spanish slug.

2.2.1 Detected pathways of spread

Some of the species may have spread through several routes. Release in nature' was identified as a pathway of spread for the Japanese rose (erosion control) as well as for the orange jewelweed (flora 'improvement' with alien species). Release into the environment was also a pathway of spreading for muskrats, which were released intentionally into the environment when the species was brought to Finland. Other intentional release was found to be a pathway of spread for the yellow-bellied toad, alpine newt and pumpkinseed, which has been released intentionally by planting it in ponds in Southwest Finland.

Escape from confinement was a pathway of spreading for the large-leaved lupine, Japanese rose, Himalayan balsam, Aleutian ragwort, Nootka lupine, Himalayan knotweed, Japanese

knotweed, giant knotweed, Canadian waterweed, crimson fountaingrass, giant hogweed, common milkweed, Senegal tea plant, tree of heaven and Japanese hop.

Within this category, usage as an ornamental plant was one of the pathways of spreading detected in Finland (crimson fountaingrass, Himalayan balsam, giant hogweed, common milkweed and Japanese hop). The Aleutian ragwort, Canadian waterweed and tree of heaven have spread from botanical gardens. Senegal tea plant has been imported into Finland as an aquarium plant.

Escape from confinement was also a pathway of spread for the mink and raccoon dog (fur farming) and the wolfdog, chipmunks and the yellow-bellied toad.

Four pathways of spread were identified in the 'transport by contaminated organisms' category. The Nootka lupine, Canadian waterweed, large-leaved lupine, Japanese rose and Himalayan balsam have spread on animals. The Himalayan balsam, giant hogweed, Japanese knotweed, giant knotweed, large-leaved lupine and Japanese rose have spread through transportation of habitat material. The Spanish slug has spread through nursery material, plant waste and transportation of habitat material.

Two pathways of spread were identified in the 'transport by vectors' category. The Spanish slug has spread with machinery and equipment and the Himalayan balsam with machinery, equipment and vehicles.

Waterways were identified as a pathway of spread for the Himalayan balsam, Canadian waterweed, Japanese rose and orange jewelweed and as a potential pathway of spread for other plant species.

All alien species of birds and the giant hogweed, muskrat, raccoon dog and American mink examined in the CBD analysis were found to have spread into Finland independently of humans. Of these species, spreading across the national border is most significant for hybrids of lesser white-fronted goose and the raccoon dog.

2.2.2 Potential pathways of spread

The most important potential pathways of spread are related to alien bird species, the sand lizard and amphibians escaping from confinement or being intentionally released by pet owners.

Potential pathways of spread for plant species

Plant species have many potential pathways of spread. Usage as an ornamental, economic or aquarium plant and subsequent escape from confinement is the most significant pathway of spreading for species not yet found in Finland. Escape from confinement may also occur in other use of the plants (including use in agriculture or forestry). The highest risk of spreading is related to the Chilean rhubarb, which people may try to import to be used as an ornamental plant in Finland when the climate becomes warmer. Broadleaf watermilfoil, alligator weed and Nuttall's waterweed have been used elsewhere as ornamental plants in ponds and as aquarium plants, but their spreading into Finland through this pathway is unlikely. Intentional release may occur only as the result of erosion control and/or landscape/flora/fauna 'improvement' using alien species. Plant species may spread in contaminated products as a byproduct of transportations of fauna, other flora, saplings, timber trade or habitat materials. Of these, the most likely pathway of spread to Finland is arrival with other plant material. Plant species may spread shorter distances along waterways. However, many plant species are already common in Finland and their use as ornamental plants has been their main pathway of spread. Of the other potential pathways of spreading, many are largely related to the local spreading of the species. Japanese stiltgrass was previously spread due to its use as packaging material, but this is no longer the case.

Spreading through transport

Overland and sea transport are potential pathways of spreading into Finland. Giant hogweed can spread into Finland on cars and trains, particularly from Russia. Amphibian species can spread as stowaways aboard ships. Spreading along waterways is also possible for amphibian species. Nuttall's waterweed could potentially spread into Finland aboard ships, but it is more likely to be spread by aquatic birds. Other species could spread unintentionally with passenger traffic, but the risk of this is presumed to be low.

Potential pathways of spread for striped eel catfish include spreading with ballast water aboard ships, natural distribution along waterways, and possible use in aquariums. However, as the species' chances of success in the Baltic Sea are low, it is unlikely to spread naturally in Finland.

Other potential pathways of spreading

The most potential pathway of spread for the common myna is natural distribution (one specimen has been encountered in Finland). It could potentially spread into the country as a stowaway aboard a ship or as the result of being imported intentionally by humans as pets and released into the environment. Potential pathways of spread for *Arthurdendyus triangulatus* include introduction with contaminated goods, particularly plant nursery material. The species can also spread over short distances with plant material, animals, machinery and equipment.

3 Goals for management of primary pathways and prevention of spread

3.1 Prevention of intentional spreading

In the case of pumpkinseed, prevention of intentional spreading and release is essential in preventing the spread of the species.

3.2 Escape prevention

Escape prevention is a key measure in terms of preventing the spread of alien species under human control. Of all unintentional pathways of spreading of invasive alien species, escape from confinement is the most serious from Finland's perspective.

The unintentional spreading of invasive alien plant species is common in natural environments. Of these plant species, the Canadian waterweed, large-leaved lupine, Japanese rose, Himalayan balsam and giant hogweed are widespread species with a high frequency of populations that enable unintentional spread. In contrast, crimson fountaingrass and common milkweed are rare ornamental plants in Finland, and the number of such populations is quite low. In the case of these species, careful disposal of garden and other

mowing waste is key in preventing further spread. Species to which this measure applies also includes Senegal tea plant, tree of heaven and Japanese hop, which are occasionally used as garden and aquarium plants. Raising awareness about the ban on the sale of the species is also important. According to the Alien Species Act, the owner or holder of a property must eradicate intentionally grown invasive alien plant species from their property. However, invasive alien species spread from nature are found in unattended properties in particular. In such cases, the statutory requirements to order the owner or holder to eradicate the occurrence or limit its spreading are not necessarily met or the enforcement of orders is difficult.

Escape prevention is also a key measure in terms of preventing the spread of the mink, wolfdog, chipmunks, yellow-bellied toad and raccoon dog. Minks occasionally escape from fur farms, but escaped individuals do not thrive in the wild. In Finland, fur farms using raccoon dogs implement measures adopted by the European Commission to prevent animals from escaping. The introduction of species or their fertile specimens into the environment is not a significant risk in raccoon dog farming or in other operations that have been granted permits in accordance with the EU Regulation on Invasive Alien Species.¹⁶ The escape of alien species kept as pets that their owners are allowed to keep until the end of their lifetime in accordance with the EU Regulation on Invasive Alien Species can be regarded as a risk to some extent. Wolfdogs and chipmunks are occasionally kept as pets. Owners must prevent pets under their control from escaping.

3.3 Spreading through contaminated products or through vectors

Spreading through contaminated products or through vectors may occur both from abroad to Finland and within Finland. Within Finland, the species may be transported by vehicles and soil. Transportation of plants and the Spanish slug on habitat material plays a key role in terms of management. Spanish slugs may also spread on nursery material and plants. In spreading from abroad to Finland, significant contaminated products may include the seeds

¹⁶ According to the EU Regulation on Invasive Alien Species, invasive alien species may, for example, be used for research purposes under separate permits, and permits can also be granted on special grounds for using an invasive alien species in other economic activities. Keeping invasive alien animal species in zoos is also allowed without a separate permit, in line with the established application of the EU Regulation.

of permitted ornamental plants that accidentally contain seeds of an invasive alien plant species. However, spreading through this pathway is unlikely or insignificant from the perspective of managing invasive alien species. New Zealand flatworm can potentially spread into Finland as a contaminant in nursery material, but the species is unlikely to survive in the wild. Alien species can also spread with aquacultured fish and crayfish and, in the case of the Asian hornet, potentially with packaging material. Through vectors, the most likely species to spread into our country are Nuttall's waterweed, with waterbirds and possibly also maritime transport, and giant hogweed, with cars and trains.

Spreading through both contaminated products and through vectors is difficult to monitor and prevent due to the large volume of transports. If prevention of the spread of a certain species is to be prioritised, this will require specified objectives and targeted measures. Raising awareness is the most significant measure to prevent unintentional spreading. Education can be used to facilitate the prevention of local spreading through garden waste, for example. The responsibility of retailers and suppliers should be stressed, and these parties should be provided targeted awareness campaigns and training on invasive species.

3.3.1 Prevention of spreading through land transport

Cleaning of vehicles and trains:

One way to control species spreading through road transport is the careful washing of tyres, wheels, vehicles and trains at the border, as seeds and pieces of plants may become stuck on wheels and the chassis. For example, Sosnowsky's hogweed and Persian hogweed have been proven to spread in this manner. As these species are already widely spread in Finland, the washing of wheels or chassis in road or rail transport is no longer deemed to be cost-effective at this stage. These species mainly spread by escaping from gardens.

3.3.2 Prevention of spreading through maritime transport

Through maritime transport, alien species spread in ballast water tanks, stuck on the hull and amidst cargo or otherwise as stowaways. At least the Chinese mitten crab, raccoon, small Asian mongoose and Indian house crow are known to spread with maritime transport. Aquatic organisms, such as the Chinese mitten crab most likely, spread unintentionally in ballast water tanks: the water is taken into the ship at a port outside the Baltic Sea, and the water – along with the specimens – is released at a port in Finland. The raccoon, small Asian mongoose and

Indian house crow probably spread through maritime transport by hiding somewhere amidst the ship's cargo or structures.

Treatment of ballast water:

The International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention of the IMO, the International Maritime Organisation of the United Nations) came into effect on 8 September 2017. The measures agreed in the Convention will reduce the spread of Chinese mitten crab and other aquatic species in new areas and into Finland in the future.

The Finnish Transport and Communications Agency monitors compliance with the BWM Convention in connection with port state control (PSC) inspections. Such inspections cover the ship's documents, the condition and function of its ballast water treatment equipment and its crew's expertise, as well as sampling the water in the ballast water tank, if necessary.

Cleaning of hulls:

Finnish legislation does not currently require ships to clean their hulls, even as there exist international recommendations to this effect.

Anti-fouling paints used on the bottoms of ships prevent organisms from sticking to the hull. Anti-fouling systems are governed by the International Convention on the Control of Harmful Anti-Fouling Systems on Ships (2001) and Regulation (EC) No. 782/2003 of the European Parliament and of the Council. The Finnish Transport and Communications Agency monitors compliance with the Convention and the EU Regulation.

Inspections:

In preventing the spreading of species entering ships by themselves, inspections on the ships seem to be the only possible prevention measure concerning the pathway in question.

With regard to the goals presented above, only measures that are regarded as primary due to their cost-effectiveness (cost-to-benefit ratio) and which are suggested to be implemented (see section 4: 'Primary measures') are listed here.

4 Primary measures

4.1 Targeted civic awareness and general communication:

Provision of information about species that the legislation concerns.

Information will be provided about the pathways and prevention of spread of invasive alien species and the ban on release into the environment. Information will be provided to citizens about the EU Regulation and the Finnish Alien Species Act , as well as the species that the legislation concerns. This provision of information is aimed at preventing the intentional and unintentional sale, purchase, breeding and cultivation of the species included in the list, as well as their escape into the environment.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Natural Resources Institute Finland, Finnish Environment Institute, Finnish Food Authority, Finnish Wildlife Agency, ELY Centres, local authorities, landscaping operators, hobbyist associations, associations and NGOs, companies.
- Schedule: continuous.

Information campaigns will be launched.

Information will be provided about the appropriate treatment and disposal of garden waste to prevent ornamental plants and the Spanish slug from spreading into the environment. Information measures will especially focus on the prevention of Japanese rose, large-leaved lupine and Himalayan balsam and the disposal of prevention waste. Pet owners will also be informed about responsible pet keeping to prevent escape into the environment, and non-Finnish recreational fishers are informed not to bring alien species for use as live bait in Finland.

- Responsible parties and co-operation partners: Ministry of Agriculture and Forestry, Ministry of the Environment, Natural Resources Institute Finland, Finnish Environment Institute, ELY Centres, local authorities, Finnish Museum of Natural History, hobbyist organisations, companies.
- Schedule: continuous.

4.2 Targeted communication related to contaminated plant material and vectors

Information campaigns will be launched and a training day will be organised about the processing of soil and about alien species spreading through transport (work machines in particular).

- Responsible parties and co-operation partners: ELY Centres, local authorities, landscaping operators, nursery and garden producers' organisations, companies.
- Schedule: continuous.

4.3 Enforcement of measures targeted at transport

Measures targeted at transport will be implemented through obligations in line with the BWM Convention of the IMO, the Anti-Fouling Convention and EU Regulation No 782/2003.

- Responsible parties and co-operation partners: Ministry of Transport and Communications, Finnish Transport and Communications Agency.
- Schedule: continuous.

Annex 1

Union list of invasive alien species, i.e.:

- **List of Invasive Alien Species of Union concern** (effective as of 3 August 2016):
- **First update of the list of Invasive Alien Species of Union concern, 2 August 2017**, so-called 1st update to the Union list and
- **Second update of the list of Invasive Alien Species of Union concern, 15 August 2019**, so-called 2nd update to the Union list.

The list indicates the date on which each species was included in the list of invasive alien species of Union concern.

FLORA

Crimson fountaingrass (*Pennisetum setaceum* (Forssk.) Morrone) (2 August 2017)

Sosnowsky's hogweed (*Heracleum sosnowskyi* Mandenova) (3 August 2016)

Tree of heaven (*Ailanthus altissima* (Mill.) Swingle) (15 August 2019)

Balloon vine (*Cardiospermum grandiflorum* Sw.) (15 August 2019)

Japanese hop (*Humulus scandens* (Lour.) Merr.) *Humulus japonicas* (15 August 2019)

Himalayan balsam (*Impatiens glandulifera* Royle) (2 August 2017)

Vine-like fern (*Lycodium japonicum* (Thunb.) Sw.) (15 August 2019)

Perennial veldt grass (*Ehrharta calycina* SM.) (15 August 2019)

Giant hogweed (*Heracleum mantegazzianum* Sommier & Levier) (2 August 2017)

Chinese bushclover (*Lespedeza cuneata* (Dum.Cours.) G.Don) (15 August 2019)

Chinese tallow (*Triadica sebifera* (L.) Small (*Sapium sebiferum* (L.) Roxb.) (15 August 2019)

Mesquite (*Prosopis juliflora* (Sw.) DC.) (15 August 2019)

Common milkweed (*Asclepias syriaca* L.) (2 August 2017)

Broomsedge bluestem (*Andropogon virginicus* L.) (15 August 2019)

Japanese stiltgrass (*Microstegium vimineum* (Trin.) A. Camus) (2 August 2017)

Persian hogweed (*Heracleum persicum* Fischer) (3 August 2016)

Parthenium weed (*Parthenium hysterophorus* L.) (3 August 2016)

Groundsel-bush (*Baccharis halimifolia* L.) (3 August 2016)

Kudzu vine (*Pueraria montana* (Lour.) Merr. var. *lobata* (Willd.) (*Pueraria lobata* (Willd.) Ohwi))

[**Japanese arrowroot**] (3 August 2016)

Mile-a-minute weed (*Persicaria perfoliata* (L.) H. Gross (*Polygonum perfoliatum* L.)) (3 August 2016)

Purple pampas grass (*Cortaderia jubata* (Lemoine ex Carrière) Stapf) (15 August 2019)

Golden wreath wattle (*Acacia saligna* (Labill.) H.L.Wendl.) (15 August 2019)

Chilean rhubarb (*Gunnera tinctoria* (Molina) Mirb.) (2 August 2017)

AQUATIC PLANTS

- African elodea** (*Lagarosiphon major* (Ridley) Moss) (3 August 2016)
- Senegal tea plant** (*Gymnocoronis spilanthoides* (D. Don ex Hook. & Arn.) DC.) (15 August 2019)
- Parrot's feather** (*Myriophyllum aquaticum* (Vell.) Verdc.) (3 August 2016)
- Broadleaf watermilfoil** (*Myriophyllum heterophyllum* Michx.) (2 August 2017)
- Carolina fanwort** (*Cabomba caroliniana* Gray) (3 August 2016)
- Water hyacinth** (*Eichhornia crassipes* (Martius) Solms) (3 August 2016)
- American skunk cabbage** (*Lysichiton americanus* Hultén & St. John) (3 August 2016)
- Nuttall's waterweed** (*Elodea nuttallii*) (Planch.) H. St. John) (2 August 2017)
- Water primrose** (*Ludwigia grandiflora* (Michx.) Greuter & Burdet) (3 August 2016)
- Creeping water primrose** (*Ludwigia peploides* (Kunth) P.H. Raven) (3 August 2016)
- Salvinia moss** (*Salvinia molesta* D.S. Mitch. (*Salvinia adnata* Desv.)) (15 August 2019)
- Floating pennywort** (*Hydrocotyle ranunculoides* L. f.) [**water-pennywort, floating marsh-pennywort**] (3 August 2016)
- Alligator weed** (*Alternanthera philoxeroides* (Mart.) Griseb.) (2 August 2017)

BIRDS

- Egyptian goose** (*Alopochen aegyptiacus* L.) (2 August 2017)
- Indian house crow** (*Corvus splendens* Viellot, 1817) (3 August 2016)
- Ruddy duck** (*Oxyura jamaicensis* Gmelin, 1789) (3 August 2016)
- Common myna** (*Acridotheres tristis* Linnaeus, 1766) (15 August 2019)
- Sacred ibis** (*Threskiornis aethiopicus* Latham, 1790) (3 August 2016)

FISH

- Pumpkinseed** (*Lepomis gibbosus* Linnaeus, 1758) (15 August 2019)
- Striped eel catfish** (*Plotosus lineatus* (Thunberg, 1787)) (15 August 2019)
- Chinese sleeper** (*Perccottus glenii* Dybowski, 1877) (3 August 2016)
- Topmouth gudgeon** (*Pseudorasbora parva* Temminck & Schlegel, 1846) (3 August 2016)

MAMMALS

- Grey squirrel** (*Sciurus carolinensis* Gmelin, 1788) (3 August 2016)
- Small Indian mongoose** (*Herpestes javanicus* É. Geoffroy Saint-Hilaire, 1818) [**Indian mongoose**] (3 August 2016)
- Fox squirrel** (*Sciurus niger* Linnaeus, 1758) (3 August 2016)
- Reeves' muntjac** (*Muntiacus reevesii* Ogilby, 1839) (3 August 2016)
- South American coati** (*Nasua nasua* Linnaeus, 1766) (3 August 2016)
- Coypu** (*Myocastor coypus* Molina, 1782) [**river rat**] (3 August 2016)

Pallas's squirrel (*Callosciurus erythraeus* Pallas, 1779) (3 August 2016)

Raccoon (*Procyon lotor* Linnaeus, 1758) [common raccoon] (3 August 2016)

Muskrat (*Ondatra zibethicus*, L. 1766) (2 August 2017)

Siberian chipmunk (*Tamias sibiricus* Laxmann, 1769) (3 August 2016)

Raccoon dog (*Nyctereutes procyonoides* (Gray, 1834)) (2 February 2019)

AMPHIBIANS

American bullfrog (*Lithobates (Rana) catesbeianus* Shaw, 1802) (3 August 2016)

REPTILES

Red-eared slider (*Trachemys scripta* Schoepff, 1792) (3 August 2016)

INSECTS

Asian hornet (*Vespa velutina nigrithorax* de Buysson, 1905) (3 August 2016)

OTHER INVERTEBRATES

Spiny-cheek crayfish (*Orconectes limosus* Rafinesque, 1817) (3 August 2016)

Virile (northern) crayfish (*Orconectes virilis* Hagen, 1870) (3 August 2016)

Marbled crayfish (*Procambarus fallax* (Hagen, 1870) f. *virginalis*) (3 August 2016)

Red swamp crayfish (*Procambarus clarkii* Girard, 1852) [**Louisiana crayfish, mudbug**] (3 August 2016)

Signal crayfish (*Pacifastacus leniusculus* Dana, 1852) (3 August 2016)

New Zealand flatform (*Arthurdendyus triangulatus* (Dendy, 1894) Jones and Gerard (1999)) (15 August 2019)

Chinese mitten crab (*Eriocheir sinensis* H. Milne Edwards, 1854) (3 August 2016)

Annex 2

List of invasive alien species of national concern (Government Decree on Managing the Risk Caused by Alien Species 740/2019).

Annex A

ANIMALS

Paragraphs 1.1–2.4 and 4.1 of Annex A refer to those species belonging to the taxonomic group in question that, in Finland, are outside of their native area and that are not included on the list of invasive alien species of European Union concern.

1 Mammals

1.1 taxonomic group: **carnivores** (*Carnivora*),

including

1.1.1 **hybrids of domestic dog and wolf** (*Canis lupus*) or **domestic dog and other canid species** (*Canidae*) **in generations F1–F4, as well as hybrids of these hybrids and canids other than the domestic dog;**

1.1.2 **hybrids of domestic cat and other feline species in generations F1–F4, as well as hybrids of these hybrids and felines other than the domestic cat;**

and excluding the following species:

- carnivores referred to in paragraphs 1 and 2 of section 42, subsection 1 of the Hunting Act (615/1993);
- domestic dog and its hybrids from generation F5 onwards;
- domestic cat and its hybrids from generation F5 onwards;
- ferret.

1.2 taxonomic group: **bats** (*Chiroptera*)

1.3 taxonomic group: **chipmunks** (*Tamias*)

2 Birds

2.1 taxonomic group: **birds of prey** (*Accipitriformes*) **and their hybrids**

2.2 taxonomic group: **falcons** (*Falconiformes*) **and their hybrids**

2.3 taxonomic group: **owls** (*Strigiformes*)

2.4 taxonomic group: **crows** (*Corvidae*)

2.5 **hybrids of lesser white-fronted goose** (*Anser erythropus*) **and other species of geese**

3 Reptiles

3.1 **sand lizard** (*Lacerta agilis*)

4 Amphibians

- 4.1 taxonomic group: **green frogs** (*Pelophylax*)
- 4.2 **European green tree frog** (*Hyla arborea*)
- 4.3 **yellow-bellied toad** (*Bombina variegata*)
- 4.4 **northern leopard frog** (*Lithobates pipiens*)
- 4.5 **agile frog** (*Rana dalmatina*)
- 4.6 **alpine newt** (*Ichthyosaura alpestris*)

5 Molluscs

- 5.1 **Spanish slug** (*Arion vulgaris*)

Annex B

FLORA

- 1 **Nootka lupine** (*Lupinus nootkatensis*)
- 2 **Aleutian ragwort** (*Jacobaea cannabifolia*)
- 3 **Himalayan knotweed** (*Reynoutria x bohemica*)
- 4 **Japanese knotweed** (*Reynoutria japonica*)
- 5 **giant knotweed** (*Reynoutria sachalinensis*)
- 6 **Canadian waterweed** (*Elodea canadensis*)
- 7 **large-leaved lupine** (*Lupinus polyphyllus*)
- 8 **rugosa rose** (*Rosa rugosa*, incl. *Rosa rugosa* f. *alba*)
- 9 **orange jewelweed** (*Impatiens capensis*)

Annex 3

Study on pathways of spread: **Pathways of spreading and primary prevention methods for the first list of invasive alien species of Union concern (2016).**

This analysis included the following species: Sosnowsky's hogweed, Himalayan balsam, common milkweed, Persian hogweed, parthenium weed, groundsel-bush, kudzu vine, mile-a-minute weed, African elodea, parrot's feather, Carolina fanwort, water hyacinth, American skunk cabbage, water primrose, creeping water primrose, floating pennywort, Indian house crow, ruddy duck, sacred ibis, Amur sleeper, topmouth gudgeon, grey squirrel, South American coati, coypu, Pallas's squirrel, raccoon, Siberian chipmunk, American bull frog, red-eared slider, Asian hornet, spiny-cheek crayfish, American virile crayfish, marbled crayfish, red swamp crayfish, signal crayfish and Chinese mitten crab.

Species	Habitat	Ways of spreading					Survival in Finland As the climate warms, many species may survive better than before	Prioritised measure
		Contamination	Path-way	Vector	Escape	Other aspects of spreading		
Carolina fanwort	Freshwater				Ornamental plant	Pieces of plant may spread easily over long distances on flowing and flooding water.	An aquarium plant in Finland. Could survive in standing and flowing water in the southernmost parts of Finland.	Provision of information and education to aquarium hobbyists and retailers
Water hyacinth	Freshwater				Ornamental plant	Spreads into new places through human action and through other materials, also used in packaging material	An aquarium plant in Finland. Not likely to survive in ponds in the Finnish climate.	Provision of information and education to aquarium hobbyists and retailers
Floating pennywort (<i>Hydrocotyle ranunculoides</i>)	Freshwater	Through contaminated products			Ornamental plant	May also spread through pieces of other commercial ornamental plants. Pieces of plant may spread easily over long distances on flowing and flooding water.	Grown in Sweden. Could survive in the climate of southern Finland.	Provision of information and education to aquarium and garden/ornamental plant hobbyists and sellers
African elodea	Freshwater	Through contaminated products			Ornamental plant	May also spread through pieces of other commercial ornamental plants used in garden ponds and on leisure boats.	An aquarium plant in Finland. Could survive in the climate of southern Finland.	Provision of information and education to aquarium and garden/ornamental plant hobbyists and sellers
Water primrose	Terrestrial, freshwater	Through contaminated products			Ornamental plant	May spread through pieces of other commercial ornamental plants. Could theoretically spread into Finland from the nearest occurrence in Germany, but this is highly unlikely. Pieces of the plant and its	Could survive in the climate of southern Finland.	Provision of information and education for the garden/ornamental plant sector

						fruit remain viable for a long time can easily spread over long distances over water.		
Creeping water primrose	Terrestrial, freshwater	Through contaminated products			Ornamental plant	May spread through pieces of other commercial ornamental plants. Can spread into Finland from the nearest populations in Germany. Pieces of the plant and its fruit remain viable for a long time can easily spread over long distances over water.	Could survive in the climate of southern Finland.	Provision of information and education for the garden/ornamental plant sector
American skunk cabbage	Terrestrial, freshwater				Ornamental plant	Spreads easily from seeds in flowing and flooding water	Found only in around 10 locations in Finland, spreads rapidly in opportune places.	Provision of information and education for the garden/ornamental plant sector
Parrot's feather	Freshwater	Through contaminated products			Ornamental plant	May spread through other commercial ornamental plants used in garden ponds from pieces of shoot. Also spread by watercraft and fishing equipment. Pieces of plant may spread easily over long distances on flowing and flooding water.	Grown in Sweden. Not likely to survive in the Finnish climate, with the possible exception of southern Finland.	Provision of information and education to aquarium and garden hobbyists and sellers
Mile-a-minute weed	Terrestrial	Through contaminated products				Can spread through the sale of other plants.	Not found in Europe.	No prioritised measures. Provision of information and education for the garden/ornamental plant sector
Groundsel-bush	Terrestrial				Ornamental plant	Seeds spread with the wind.	Would likely survive in Finland, at least in the south. Causes allergic reaction.	Provision of information and education for the garden/ornamental plant sector
Persian hogweed	Terrestrial		Railways and roads	Land transport	Ornamental plant	Seeds also spread through garden waste, with the wind and on flowing water.	Established population in Finland.	Prevention and control Provision of information and education for the garden/ornamental plant sector
Sosnowsky's hogweed	Terrestrial		Railways and roads	Land transport	Ornamental plant	Seeds also spread through garden waste, with the wind and on flowing water.	Established population in Finland.	Prevention and control Provision of information and education for the garden/ornamental plant sector
Kudzu vine	Terrestrial	Through contaminated products			Ornamental plant	Seeds may spread by soil and animals	Grown in Sweden and Finland. Not likely to survive in Finnish nature, now used as a house plant.	Provision of information and education for the garden/ornamental plant sector
Parthenium weed	Terrestrial	Through contaminated products				Seeds have spread among other seeds. Also spread by the wind, flowing water and by birds and vehicles.	Cannot survive in Finland. Causes strong allergic reaction.	No prioritised measures. Provision of information and education for the

								garden/ornamental plant sector
Small Asian mongoose	Terrestrial			Maritime transport		Introduced at least into the islands in the Adriatic Sea to kill horned desert vipers. Has also spread unintentionally aboard ships.	Possibly found in southern Finland.	No prioritised measures.
American bullfrog	Terrestrial, freshwater				Aquarium species		Kept as pets, not likely to survive winters in Finland	Raising awareness among pet owners and retailers
Reeves' muntjac	Terrestrial						No unintentional pathways to Finland. Not likely to survive Finnish climate.	No prioritised measures.
Coypu	Terrestrial, freshwater				Breeding, may escape from farms	No longer farmed in Finland and unlikely to spread on its own. No longer found in nature.	Cannot survive hard winters.	Raising awareness with breeders, ban on imports
Coati	Terrestrial				Pet	Specimens in Mallorca are descendants of abandoned pets	Closest population in Mallorca. Not likely to survive Finnish climate.	No prioritised measures. Raising awareness among pet owners and retailers
Raccoon	Terrestrial			Maritime transport	Breeding: may escape from farms; zoos, pets	Current large population in Germany originates from a few specimens liberated or escaped from animal and fur farms. Has also been imported as pets to many countries, and spreads as a stowaway on ships.	Kept as pets in many European countries, but no cases are known in Finland. Nearest increasing natural populations are in Sweden and Denmark. Kept in zoos, including Korkeasaari. Would survive in Finnish nature, at least in the south if the winters are mild. Also survives well in cities. Climate change helps.	Provision of information and education to pet owners and sellers and also to zoos.
Grey squirrel	Terrestrial				Pet	The grey squirrel was originally introduced to Europe for release into parks. Current distribution in nature: UK, Ireland, Italy.	Might survive in the Finnish climate, but does not have a probable pathway of spreading into Finland.	Raising awareness among pet owners and retailers
Fox squirrel	Terrestrial				Pet	No natural populations in Europe.	Not likely to survive Finnish climate.	Raising awareness among pet owners and retailers
Siberian chipmunk	Terrestrial				Pet	Escaped pets have formed many feral populations in Europe, usually in cities. Not likely to spread into Finland on its own. Nearest natural population is in the Northern Dvina region in Russia.	Bred in Finland as a pet, would also survive in nature.	Raising awareness among pet owners, breeders and retailers

Pallas's squirrel	Terrestrial				Pet	Originally brought to Europe to be kept as an ornamental animal in gardens and zoos and as a pet in the 1960s and 1970s. Current natural populations: France, Netherlands and Italy.	Not known to be kept as pets in Finland. Known to be sold as pets in Denmark and Sweden, among other countries. Not likely to survive Finnish climate.	Raising awareness among pet owners and retailers
Red-eared slider	Freshwater				Pet		Cannot survive Finnish winters.	Raising awareness among pet owners and retailers
Asian hornet	Terrestrial	Through contaminated products				Most probably pathway is unintentional spreading through international merchandise and packaging material	Cannot survive Finnish climate.	No prioritised measures
Indian house crow	Terrestrial			Maritime transport	Other: planting		Cannot survive in Finland, tropical bird.	No prioritised measures
Ruddy duck	Freshwater, terrestrial				Breeding, may escape from farms.	Kept on bird farms; may escape into the environment. May stray into Finland from other European countries; is found regularly in Sweden, for example.	Found occasionally in Finland, but not since 2011. However, conditions for survival may be ideal.	No prioritised measures Raising awareness to prevent imports on bird farms.
Sacred ibis	Terrestrial				May escape from zoos	Kept on bird farms; may escape into the environment.	Not likely to survive in Finland; originates from Africa.	No prioritised measures
Chinese mitten crab	Seawater, brackish water, freshwater		Inland water ways	Maritime transport		Also spreads by migrating from the southern Baltic Sea.	Found rarely but annually in Finland, in inland water and the Baltic Sea. Unable to breed in Finland.	No prioritised measures, informing citizens not to release caught crabs back into the sea
Spiny-cheek crayfish	Freshwater				Aquarium species, aquaculture, use as live bait		Nearest populations in Lithuania and Kaliningrad, Russia.	Provision of information and education to aquarium hobbyists and retailers
Signal crayfish	Freshwater, brackish water				Aquaculture		Found in more than 500 bodies of water in Finland.	Provision of information/education to crayfishers
Virile crayfish	Freshwater				Aquarium species, aquaculture, use as live bait		Found in France and the UK. Would survive in Finland.	Provision of information and education to aquarium hobbyists and retailers
Red swamp crayfish	Freshwater				Aquarium species, aquaculture, use as live bait		Nearest populations in Denmark. Kept in aquariums in Finland. Would survive in Finland.	Provision of information and education to aquarium hobbyists and retailers
Marbled crayfish	Freshwater				Aquarium species,		Germany, Netherlands, UK. Found only in aquariums in	Provision of information and education to

					aquaculture, use as live bait		Finland but would probably survive in the wild.	aquarium hobbyists and retailers
Topmouth gudgeon	Freshwater	Through aquaculture			Use as live bait	Also imported for release into ponds.	Already found in Lithuania, Poland and Denmark. No observations in Finland but would survive in the climate.	Provision of information and education to aquarium hobbyists and retailers
Chinese sleeper	Freshwater, brackish water						Already found in the eastern Gulf of Finland, but has not yet spread into Finland. Likely to spread into Finland soon. Would survive in Finland.	Provision of information and education to aquarium hobbyists and retailers

Annex 4

Study on pathways of spread: **Pathways of spread of invasive alien species in the first update of the list of Union concern (2017)**. Pathways of spreading detected in Finland are marked with an x, and potential pathways of spreading are marked with an (x). The following species are included in this study: crimson fountaingrass, Himalayan balsam, giant hogweed, common milkweed, Japanese stiltgrass, Chilean rhubarb, broadleaf watermilfoil, Nuttall's waterweed, alligator weed, Egyptian goose, muskrat and raccoon dog.

		FLORA								BIRDS	MAMMALS		
		Crimson fountaingrass	Himalayan balsam	Broadleaf watermilfoil	Giant hogweed	Nuttall's waterweed	Common milkweed	Japanese stiltgrass	Alligator weed	Chilean rhubarb	Egyptian goose	Muskkrat	Raccoon dog
INTENTIONAL													
MOVEMENT OF COMMODITY													
RELEASE IN NATURE													
	Biological control												
	Erosion control												
	Fish stocking												
	Game stocking											X	
	Landscape/flora/fauna 'improvement' with alien species												
	Release for conservation or population management purposes												
	Release for other purposes (furs, transport, haulage, medicinal use)												
	Other intentional release												
ESCAPE FROM CONFINEMENT													
	Agriculture (incl. bioenergy)												
	Aquaculture												
	Botanical garden/zoo/aquarium (excl. home aquariums)				(x)		(x)	(x)		(x)	(x)		
	Pet, aquarium and terrarium species and live food for such species			(x)		(x)							
	Farmed animals (incl. animals left under minimal supervision)												
	Forestry (incl. reforestation)												
	Fur farming												
	Horticulture												
	Ornamental purpose (other than horticulture)	X	X	(x)	X	(x)	X		(x)	(x)			
	Research and ex-situ breeding				(x)		(x)						
	Live food and live bait												
	Other escape from confinement												
UNINTENTIONAL													
TRANSPORT BY CONTAMINATED ORGANISMS													
	Contaminant nursery material							(x)					
	Contaminated bait												
	Food contaminant (incl. live food)												
	Contaminant on animals (excl. parasites, parasites, species transported by host/vector)	(x)	X	(x)		(x)		(x)		(x)			
	Parasites on animals (incl. species transported by host/vector)												
	Contaminant on plants (excl. parasites, species transported by host/vector)			(x)				(x)	(x)				
	Parasites on plants (incl. species transported by host/vector)												
	Seed contaminant									(x)			
	Timber trade							(x)					
	Transportation of habitat material	(x)	X		X		(x)	(x)		(x)			
VECTOR													
TRANSPORT BY VECTORS													
	Angling/fishing equipment												
	Container/bulk												
	Hitchhikers in or on airplane												
	Hitchhikers on ship/boat (excl. ballast water and hull fouling)									(x)			
	Machinery and equipment	(x)	X		(x)		(x)	(x)		(x)			
	People and their luggage/equipment (in particular tourism)				(x)								
	Organic packaging material (in particular wood packaging)							(x)	(x)				
	Ship/boat ballast water												
	Ship/boat hull fouling												
	Other vehicles	(x)	X		(x)		(x)	(x)					
	Other means of transport												
CORRIDOR & DISPERSAL													
DISPERSAL													
CORRIDOR													
	Interconnected waterways		X	(x)	(x)	(x)		(x)	(x)	(x)			
	Tunnels and land bridges												
UNAIDED													
	Natural dispersal of an alien species across borders				X	(x)					X	X	X

Annex 5

Study on pathways of spread: **Pathways of spread of species in the list of invasive alien species of national concern.** Pathways of spread detected in Finland are marked with an x and potential pathways of spread with an (x).

The following species are included in this study: Nootka lupine, Aleutian ragwort, Himalayan knotweed, Japanese knotweed, giant knotweed, Canadian waterweed, large-leaved lupine, Japanese rose or rugosa, orange jewelweed, birds of prey, falcons, owls, crows, hybrids of lesser white-fronted goose, American mink, wolfdog, bats, chipmunks, sand lizard, green frogs, European tree frog, yellow-bellied toad, Northern leopard frog, agile frog, alpine newt and Spanish slug.

	FLORA	BIRDS	MAMMALS	REPTILES	AMPHIBIANS	MOLLUSCS
	Nootka lupine Aleutian ragwort Himalayan knotweed Japanese knotweed Giant knotweed Canadian waterweed Large-leaved lupine Japanese rose Orange jewelweed	Birds of prey Falcons Owls Crows Hybrids of lesser white-fronted goose	American mink Wolfdog Bats Chipmunks	Sand lizard	Green frogs European tree frog Yellow-bellied toad Northern leopard frog Agile frog Alpine newt	Spanish slug
INTENTIONAL						
MOVEMENT OF COMMODITY						
RELEASE IN NATURE						
	Biological control					
	Erosion control	(x)	(x)	(x)	(x)	X
	Fish stocking					
	Game stocking					
	Landscape/flora/fauna 'improvement' with alien species			X		
	Release for conservation or population management purposes			(x)		
	Release in nature for other use ¹					
	Other intentional release	(x)		(x)	(x)	(x)
ESCAPE FROM CONFINEMENT						
	Agriculture (incl. bioenergy)		(x)	(x)		
	Aquaculture					
	Botanical garden/zoo/aquarium ²	X		X	(x)	(x)
	Pet, aquarium and terrarium species and live food for such species ³		(x)	(x)	(x)	(x)
	Farmed animals ⁴			(x)	(x)	(x)
	Forestry (incl. reforestation)	(x)				
	Fur farming				X	
	Horticulture			(x)		
	Ornamental purpose (other than horticulture)	X	(x)	X	X	X
	Research and ex-situ breeding					
	Live food and live bait					
	Other escape from confinement		(x)	(x)	(x)	(x)
UNINTENTIONAL						
TRANSPORT BY CONTAMINATED ORGANISMS						
	Contaminant nursery material					X
	Contaminated bait					
	Food contaminant (incl. live food)					
	Contaminant on animals ⁴	X		X	X	(x)
	Parasites on animals ⁵					
	Contaminant on plants ⁶			(x)		
	Parasites on plants ⁷					(x)
	Seed contaminant			(x)	(x)	
	Timber trade					
	Transportation of habitat material	(x)	X	X	X	(x)
VECTOR						
TRANSPORT BY VECTORS						
	Angling/fishing equipment		(x)			
	Container/bulk					
	Hitchhikers in or on airplane			(x)	(x)	
	Stowaways on ships ⁸					
	Machinery and equipment		(x)	(x)	(x)	(x)
	People and their luggage/equipment (in particular tourism)					X
	Organic packaging material (in particular wood packaging)					
	Ship/boat ballast water				(x)	
	Ship/boat hull fouling		(x)			
	Other vehicles		(x)	(x)	(x)	
	Other means of transport		(x)	(x)	(x)	
CORRIDOR & DISPERSAL						
DISPERSAL						

		FLORA	BIRDS	MAMMALS	REPTILES	AMPHIBIANS	MOLLUSCS
	CORRIDOR						
	Interconnected waterways	(x)	X (x) X X			(x) (x) (x) (x) (x)	
	Tunnels and land bridges						
	UNAIDED						
	Natural dispersal of an alien species across borders		X X X X X X X				

¹(fur, transport, medical use); ²(excl. domestic aquaria); ³(incl. animals left under limited control); ⁴(excl. parasites, species transported by host/vector); ⁵(incl. species transported by host/vector); ⁶(excl. parasites, species transported by host/vector); ⁷(incl. species transported by host/vector); ⁸(excl. ballast water and hull fouling)

Annex 6

Study on pathways of spread: **Pathways of spread of invasive alien species in the second update of the list of Union concern (2019)**. Pathways of spreading detected in Finland are marked with an x, and potential pathways of spreading are marked with an (x).

This study includes the following species: Senegal tea plant, tree of heaven, balloon vine, Japanese hop, vine-like fern, perennial veldtgrass, Chinese bushclover, Chinese tallow, mesquite, broomsedge bluestem, salvinia moss, purple pampas grass, golden wreath wattle, pumpkinseed, striped eel catfish, common myna and New Zealand flatworm.

	FLORA													FISH	BIRDS	INVERTEBRATES	
	Gymnocoronis	Allanthurus altissima	Cardiospermum	Humulus scandens	Lygodium japonicum	Ehrharta calycina	Lespedeza cuneata	Triadica sebifera	Prosopis juliflora	Andropogon virginicus	Salvinia molesta	Cortaderia jubata	Acacia saligna				Lepomis gibbosus
INTENTIONAL																	
MOVEMENT OF COMMODITY																	
RELEASE IN NATURE																	
Biological control																	
Erosion control		(x)			(x)			(x)			(x)	(x)					
Fish stocking													X				
Game stocking																	
Landscape/flora/fauna 'improvement' with alien species		(x)			(x)	(x)		(x)			(x)						
Release for conservation or population management purposes																	
Release for other purposes (furs, transport, haulage, medicinal use)													X				
Other intentional release													X	(x)	(x)		
ESCAPE FROM CONFINEMENT																	
Agriculture (incl. bioenergy)					(x)	(x)		(x)			(x)						
Aquaculture																	
Botanical garden/zoo/aquarium (excl. home aquariums)		X		(x)	(x)		(x)	(x)			(x)						
Pet, aquarium and terrarium species and live food for such species	X									(x)						(x)	
Farmed animals (incl. animals left under minimal supervision)																	
Forestry (incl. reforestation)		(x)						(x)	(x)		(x)						
Fur farming																	
Horticulture		(x)											(x)				
Ornamental purpose (other than horticulture)	(x)	(x)	(x)	X	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)				
Research and ex-situ breeding																	
Live food and live bait																	
Other escape from confinement																	
UNINTENTIONAL																	
TRANSPORT BY CONTAMINATED ORGANISMS																	
Contaminant nursery material					(x)												(x)
Contaminated bait																	
Food contaminant (incl. live food)																	
Contaminant on animals (excl. parasites, species transported by host/vector)						(x)	(x)	(x)	(x)			(x)					(x)
Parasites on animals (incl. species transported by host/vector)																	
Contaminant on plants (excl. parasites, species transported by host/vector)					(x)					(x)	(x)	(x)					(x)
Parasites on plants (incl. species transported by host/vector)																	
Seed contaminant																	
Timber trade		(x)															
Transportation of habitat material					(x)							(x)					(x)
VECTOR																	
TRANSPORT BY VECTORS																	
Angling/fishing equipment	(x)																
Container/bulk																	
Hitchhikers in or on airplane																	
Hitchhikers on ship/boat (excl. ballast water and hull fouling)																(x)	
Machinery and equipment	(x)	(x)		(x)	(x)	(x)	(x)			(x)	(x)						(x)
People and their luggage/equipment (in particular tourism)		(x)			(x)					(x)	(x)						
Organic packaging material (in particular wood packaging)					(x)												
Ship/boat ballast water														(x)			
Ship/boat hull fouling																	
Other vehicles																	

