



European
Commission

Invasive Alien Species

**A European Union
response**

Environment

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Invasive giant hogweed,
Heracleum
mantegazzianum.



What are Invasive Alien Species?

Alien species are species that have been transported outside their natural ecological range as a result of human action.

The vast majority are unable to survive in an unfamiliar environment without human intervention and eventually die off. But some species manage to adapt to their new surroundings and eventually establish themselves in the wild, where they can cause significant ecological and economic damage.

These are known as **Invasive Alien Species (IAS)**. IAS are defined as species whose introduction and spread outside their natural ecological range poses a real threat to biodiversity and the economy.

It is estimated that there are already over 12,000 alien species present in Europe, of which around 10–15% are invasive. They occur in all major taxonomic groups, ranging from mammals, amphibians, reptiles, fish, invertebrates and plants to fungi, bacteria and other micro-organisms.

They are also found in every type of habitat, both on land and in the surrounding seas. All EU Member States have problems with IAS on their territory to a greater or lesser extent.

Common slider, Trachemys scripta, from America.

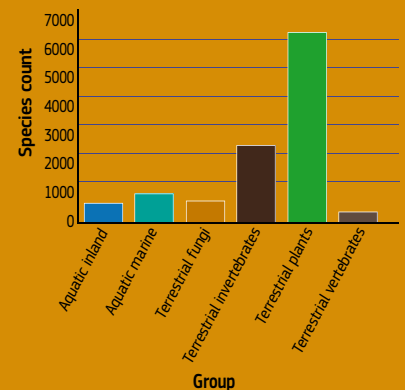


Different types of IAS

In 2008, a EU-funded research project – called DAISIE – developed the first pan-European inventory of Invasive Alien Species containing around 12,000 records of alien species in Europe.

Terrestrial plants are by far the most common alien species, representing over half of all species present in Europe (over 6,500 species), followed by terrestrial invertebrates (over 2,700 species). Aquatic marine species are also relatively abundant with close to 1,000 alien species present. Terrestrial vertebrates on the other hand are far less numerous with only a few hundred species present in the EU.

Estimated number of alien species in Europe per taxonomic group.



Source: Daisie 2009

EXAMPLES OF INVASIVE ALIEN SPECIES IN EUROPE



Ice plant, *Carpobrotus edulis* is a succulent plant, with showy flowers, that forms large dense mats. Native to the Cape Region of South Africa, it was introduced to Europe as an ornamental plant. Having escaped into the wild, it is now widely distributed along the southern and western coastlines of Europe and the Mediterranean.



Spanish slug, *Arion vulgaris*. Not all alien species come from outside the EU; the Spanish slug, for instance, is native to western France and Northern Spain but was unintentionally introduced to other parts of Europe via horticultural plants, packaging and waste materials. It is now present in most EU countries where it has become a major pest species.



American bullfrog, *Lithobates catesbeianus* is the largest North American frog. Captive animals have escaped into the wild and colonised many different types of habitat, where they feed on a wide range of prey: amphibians, fishes, small birds, molluscs, crustaceans and insects. As a result, it has become a very serious threat to Europe's indigenous species.



Harlequin ladybird, *Harmonia axyridis*. Originally from Asia, the Harlequin ladybird was introduced to Europe as a biocontrol agent for aphids. It has also since entered unintentionally in horticultural/ornamental material. A voracious predator, it outcompetes native ladybirds and other non-pest insects causing a reduction in native biodiversity.



Rose-ringed parakeet, *Psittacula krameri* is native to Africa and south Asia. It was originally imported to Europe as a pet species but has escaped into the wild and is now present in almost half of the EU Member States. Its impact is not yet known but it may compete with some native birds for breeding sites when nesting cavities are scarce.



Raccoon dog, *Nyctereutes procyonoides*. The raccoon dog was brought into Europe from Asia for fur-farming in the 1950s and has spread across northern and eastern Europe. They are opportunistic omnivores and may cause a local depletion of prey species. They are also a vector of several important parasites and diseases, such as rabies.

How do IAS get into the EU?

Invasive Alien Species enter the EU in a wide variety of ways. Some are introduced intentionally for use in farming, forestry, aquaculture, horticulture or for recreational purposes, or even as pets and garden plants or as biocontrol agents (e.g. Asian ladybirds).

Others came into the EU unintentionally, either as contaminants of other commodities (e.g. ragweed seeds in bird feed mixtures) or as 'hitchhikers' and 'stowaways' on board vessels or equipment).

The pathways of release in the environment vary considerably according to the species group and the surrounding environment. Alien plant species mostly escape from cultivation (e.g. gardens, farms) whereas freshwater alien species are often intentionally released for aquaculture or recreational angling. In the marine environment, most alien species come into Europe as unintentional stowaways.

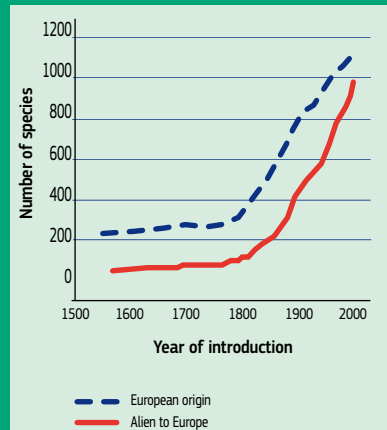
IAS have entered the EU on the hulls of ships, in used tyres and as contaminants in seed mixes.



The rise and rise of Invasive Alien Species in Europe

Although alien species have been entering Europe for centuries, their numbers have risen exponentially in the last 50 years, principally as a result of increased trade and travel.

Studies estimate that the number of IAS in Europe has increased by as much as 76% since the 1970s. The number is likely to continue to grow unless robust action is taken to combat this invasion.



Cumulative number of introduced alien plant species to Europe over time.

Source: Lambdon *et al.* 2008

ECOLOGICAL IMPACTS



The North American **red swamp crayfish**, *Procambarus clarkii*, was originally introduced into Europe for use in aquaculture. Having escaped into freshwater streams, this aggressive species has since spread across several EU countries, actively colonising new territories at the expense of rarer native crayfish, such as *Austropotamobius pallipes* which is listed in the Habitats Directive. Apart from causing local extinctions, the red swamp crayfish is also a carrier of a fungus-like organism that is wiping out entire populations of European crayfish. The disease alone is estimated to have an economic cost of over €53 million/year.

The **yellow-legged hornet**, *Vespa velutina* is native to South-East Asia and was probably introduced by accident through the horticultural trade in 2005. It has since spread rapidly across France, Spain, Portugal and Belgium. The Asian hornet is a highly effective predator of honeybees, common wasps and other important pollinators, such as hoverflies. The huge size of its colonies (producing up to 10,000 individuals per season), means that they can lead to significant beehive losses (observations in France noted losses of 14,000 honey bees per hive per month). It could also have a noticeable impact on local native insect biodiversity and on pollination services in general.



The killer **algae**, *Caulerpa taxifolia*, is a kind of seaweed originating from the Indian Ocean that is commonly used as an ornamental plant in tropical aquaria. Having been released into the wild, the species has spread rapidly across the Mediterranean Sea, invading or displacing valuable native marine plants and habitats such as Posidonia beds. Its presence has not only caused a massive reduction in marine biodiversity in these areas but has also severely affected their ability to deliver key ecosystem functions (such as sediment resuspension) and services (such as protection against seabed erosion).



Why are Invasive Alien Species such a problem?

Invasive alien species have multiple ecological, economic and human health impacts.

They are first and foremost a **major threat to Europe's biodiversity** and can cause the local extinction of indigenous species, for instance through competition for limited resources such as food and habitats, inter-breeding, or the spread of exotic diseases. The impact of IAS may sometimes be so profound that they can alter the structure and functioning of entire ecosystems, compromising their ability to provide valuable ecosystem services, such as pollination, water regulation or flood control.

IAS are also known to have **significant economic impacts**, reducing yields from agriculture, forestry and fisheries. They can damage infrastructure, obstruct transportation or decrease water availability by blocking waterways or clogging industrial water pipes. IAS can also destroy landscapes and water bodies, causing the loss of recreational or cultural heritage values.

Additionally, IAS can be a **major problem for human health**, triggering serious allergies and skin problems and acting as vectors for dangerous pathogens and diseases.

IAS such as Elodia canadensis can damage the functioning of entire ecosystems.



Healthy ecosystems – our natural capital

Healthy functioning ecosystems, which are powered by the diversity of life within them, provide society with a whole stream of valuable goods and services such as clean water and air, carbon storage, pollination etc. They also play a central role in fighting climate change impacts by protecting us against floods and other environmental disasters.

If these natural powerhouses are damaged, it is not just our biodiversity that suffers but society as a whole. In Europe, around 4.4 million jobs, and €405 billion in annual turnover, are directly dependent on the maintenance of healthy ecosystems.

Healthy forest ecosystem.



*Clearing invasive
alien species is a
costly business.*



The cost of Invasive Alien Species to society

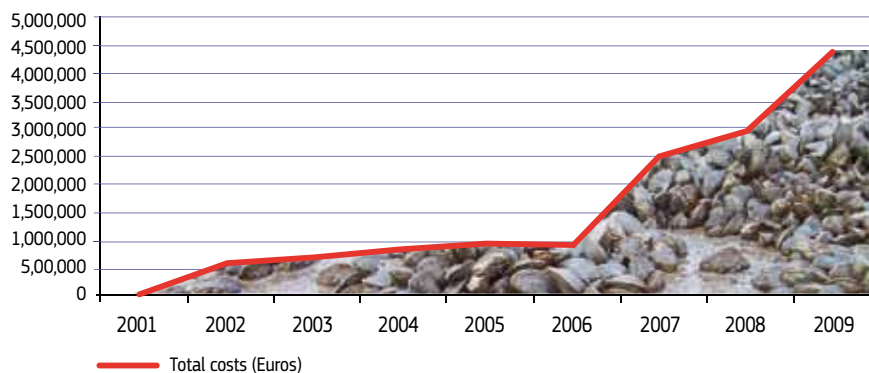
IAS are estimated to have cost the EU at least €12 billion/year over the past 20 years, and the figure is growing all the time. Once an IAS escapes or is deliberately released from their contained environment, substantial human and financial resources are needed in order to repair the damage they cause and take measures to eradicate them, or at least stop them from spreading further.

However, it is also important to recall that not all alien species are problematic or invasive; indeed, some generate significant economic benefits which is why they were introduced into the EU in the first place.

The cost associated with IAS increases exponentially if the species is not eradicated immediately. Without rapid intervention, it will have an opportunity to spread further afield and cause even more damage. Clearly, the sooner the problem is addressed the cheaper it is for all concerned.

The costs and benefits from IAS are also typically distributed unevenly. Those benefitting from bringing IAS into the EU usually have few or no economic incentives to minimise any IAS-related risks, while the costs associated with IAS damage and management are generally met by a much wider cross section of people, including primary producers, public authorities and society.

Evolution of costs of the zebra mussel invasion in the Ebro Delta, Spain, 2001–2009.



Source: Perez y Perez and Chica Moreu, 2009

It pays to tackle IAS as early on as possible

The longer one waits to tackle an IAS, the more expensive it becomes. In the Ebro Delta, the invasion of zebra mussels might have been relatively cost-effective to eradicate had it been done early on.

Now eight years later, the costs have risen dramatically. Over €4 million is being spent every year to repair the damage they cause and prevent the species from spreading. It is no longer feasible to eradicate the species completely from the area as the cost for this has become prohibitive.

Zebra mussel, Dreissena polymorpha.



IMPACTS ON HUMAN HEALTH



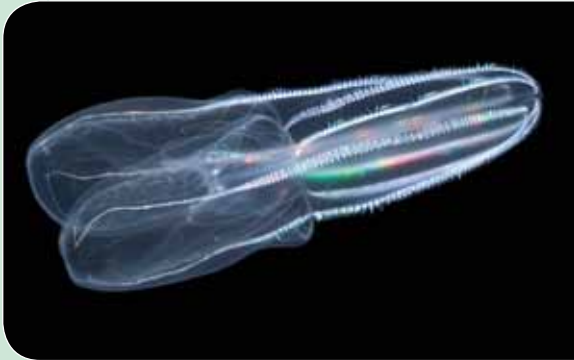
Common ragweed, *Ambrosia artemisiifolia*, was initially introduced through contaminated seed and grain for crops and bird food and is now present in the majority of EU countries. Often found in arable fields, and along roadside verges or railway embankments, it is one of the world's most allergenic plant species, causing severe bouts of hay fever, asthma and dermatitis. It is also a severe agricultural weed, leading to yield losses within arable crops of up to 50%. Altogether, the plant is estimated to cost around €4.5 billion/year as a result of impacts on agriculture and human health.

The **Asian tiger mosquito, *Aedes albopictus***, is native to South-East Asia. It entered Europe by accident in the form of dormant eggs on used tyres or heavy duty equipment. Dormant eggs or larvae have also been repeatedly found in 'lucky bamboo' plants from China. The mosquito is known to carry over 20 highly dangerous human pathogens, including dengue fever, yellow fever and chikungunya. Over the past two decades, there have been regular mosquito outbreaks across western and southern Europe, where it poses a major health risk.



Giant hogweed, *Heracleum mantegazzianum* was introduced to Europe as an ornamental plant. Its high toxicity can cause severe burns and dermatitis when in contact with skin that is exposed to sunlight, and may even cause blindness when in contact with eyes. The economic cost of eradication and medical treatment in Germany alone has been estimated at between €6 to €21 million a year. Because it forms dense impenetrable stands, it also has a major impact on biodiversity reducing the composition and diversity of native plant species by up to 90%. The mono-dominant stands also significantly reduce the recreational value and accessibility of invaded areas.

ECONOMIC IMPACTS



The **American comb jelly**, *Mnemiopsis leidyi*, was accidentally introduced into the Black Sea through ships ballast water in the early 1980s. With no natural enemies, its population exploded. This led to the collapse of pelagic fish populations and caused a major shift in the marine ecosystem. The jellyfish had literally eaten its way through the food chain. The mass occurrence of Mnemiopsis is now acknowledged to have contributed to the sharp decrease in no less than 26 commercial Black Sea fish stocks, including anchovy and chub mackerel. The economic cost attributed to the collapse of fisheries and tourism industries around the Black Sea is estimated at €100 million.

The **water hyacinth**, *Eichhornia crassipes*, is a free-floating aquatic plant native to the Amazon basin. It was introduced into Europe as an ornamental plant for use in garden ponds and public parks. In high densities, it creates large floating mats which drastically change the habitat conditions and diversity of life beneath them. By altering the food web structure and energy flow in aquatic ecosystems it can cause the natural vegetation to be almost completely eliminated. The dense mats also block water pipes, clog up navigation routes and disrupt recreational activities. In 2005–2008, it cost over €14 million to remove 200 000 tonnes of the plant along 75 km in the Guadiana river at the Portuguese-Spanish border.



The **zebra mussel**, *Dreissena polymorpha*, is native to the drainage basins of the Black, Caspian and Aral Seas. It was accidentally introduced to other parts of Europe along inland waterways, having stowed away on the hulls of ships or in their ballast water. Once established it reproduces rapidly, forming dense clusters around any hard surfaces. These encrustations provoke serious damage to infrastructure, clogging up the water-intake/supply of industrial and drinking water plants. The zebra mussel also fouls recreational boats, jetties, fishing nets and aquaculture cages. However, it is worth noting that the species is a powerful water filter which can play a positive role in purifying and improving water quality in certain aquatic systems.

Preventing the spread of IAS.



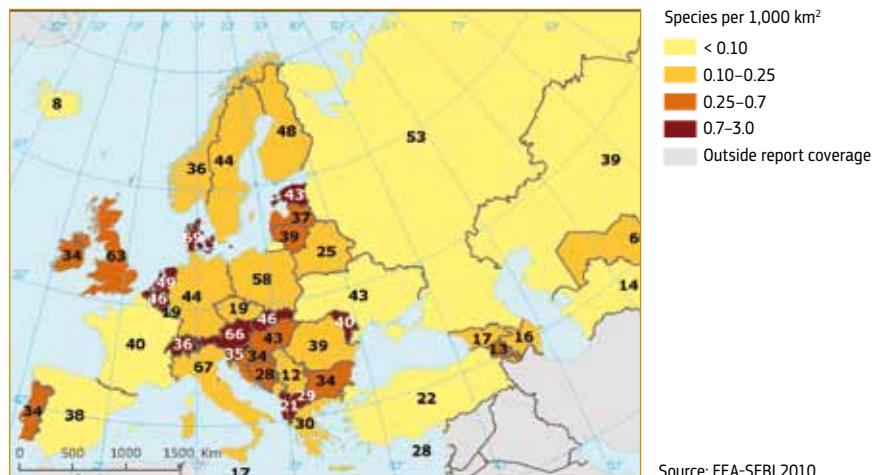
Taking action at the EU level

Invasive alien species are a significant and growing problem in all EU Member States. Once an IAS is established in one country it can easily spread across borders to neighbouring countries. It therefore makes sense to tackle the problem at EU level.

Certain aspects of IAS have already been addressed through a variety of existing EU laws, involving in particular legislation targeting plant health and animal diseases, wildlife trade (CITES) or the use of alien or locally absent species in aquaculture. But they are far from sufficient to tackle the problem in a comprehensive manner. Several Member States have also taken measures to combat IAS on their territory but these are predominantly reactive, seeking to minimise the damage already caused rather than aiming to prevent the problem from arising in the first place.

There is therefore an urgent need for a coordinated European response to IAS. Not only will this ensure that measures taken in one country are not undermined by the lack of action in a neighbouring country, but an EU-wide approach will also help to improve the overall effectiveness of the measures taken to combat IAS, which should, in turn, lead to significant economies of scale and cost savings.

IAS in Europe.



A priority under the EU Biodiversity Strategy to 2020

- **Target 5:** *Combat Invasive Alien Species: 'By 2020, Invasive Alien Species and their pathways are identified and prioritised, priority species are controlled or eradicated, and pathways are managed to prevent the introduction and establishment of new IAS.'*
- **Action 15:** *Strengthen the EU Plant and Animal Health Regimes. The Commission will integrate additional biodiversity concerns into the Plant and Animal Health regimes by 2012.*
- **Action 16:** *Establish a dedicated instrument on Invasive Alien Species. The Commission will fill policy gaps in combating IAS by developing a dedicated legislative instrument by 2012.*

Native red squirrel is threatened by American grey squirrel.



Introducing new EU legislation on IAS

In November 2014, the European Union published a new Regulation on Invasive Alien Species as foreseen under target 5 of the EU's Biodiversity Strategy to 2020. The Regulation establishes a coordinated EU-wide framework for action to prevent, minimise and mitigate the adverse impacts of IAS on biodiversity and ecosystem services, and limit their damage to the economy and human health.

The Regulation includes three distinct types of measures, which follow an internationally agreed hierarchical approach to combatting IAS:

- **Prevention:** a number of robust measures are foreseen to prevent new IAS from entering the EU in the first place, either intentionally or unintentionally.
- **Early warning and rapid response:** Member States must put in place an early warning system to detect the presence of IAS as early as possible and take rapid measures to prevent it from becoming established.
- **Management of already established invasive alien species:** some IAS are already well established in the EU territory, concerted action is needed to manage them so that they do not spread any further and to minimise the harm they cause.

Ships require regular maintenance and anti-fouling to prevent the further spread of IAS.



Invasive Alien Species of Union Concern

The new EU Regulation centres around the development of a list of invasive alien species of Union Concern. This will contain a sub-set of IAS that are deemed to be the 'worst offenders' amongst the 1,000–1,800 IAS present in Europe.

This will enable EU action to focus on those IAS that cause the most damage and where targeted measures are clearly required at EU level. As this is a new policy area, a prioritised approach is especially important as it will enable the system to be developed gradually, giving the Commission and Member States the opportunity to learn from experience.

Decisions to list a species as IAS of Union Concern will rely on **evidence-based risk assessments**. The assessments must be done according to agreed criteria so that the results are valid for the whole of the EU, and will therefore only need to be undertaken once.

A Standing Committee of experts nominated by the Member States and the Commission will then evaluate each risk assessment and decide on whether the species should be included in the list of EU Concern. Species on the list will be effectively banned, and Member States will be required to take measures to ensure they are not introduced, traded, kept, bred, or released in the EU.

Japanese knotweed, Fallopia japonica.



What if a species is not on the EU list?

It remains each country's responsibility to tackle IAS that are present on their territory but that are not listed as species of Union Concern. Nevertheless, interim measures are foreseen for Member States who may be worried about the presence – or the risk of entry into their territory – of species that are not yet listed as being of Union concern, but appear to be highly invasive.

In such cases Member States may take emergency measures to address or stop the entry of the species in question while the assessment is performed. In such cases, the Member State concerned will need to inform the Commission and other relevant countries so that they can react accordingly.

Egyptian goose, Alopochen aegyptiacus.



*Plitvice Lakes in
Croatia invaded by
the non-native dace,
Squalius cephalus.*



Regulating trade

Recognising that prevention is always better – and more cost effective – than remedial action, the first set of proposed measures in the new EU Regulation aims to stop IAS of EU concern from entering the EU in the first place.

Thus, it will become illegal to intentionally bring into the EU any species listed as an IAS of Union concern. Their reproduction, transport, sale, use, possession or release into the environment will also be banned. Customs authorities will be mandated to carry out controls at all of the Union borders, and will have the power to seize any shipments that do not conform.

Exceptions will still be possible for duly justified reasons, such as research, but only on condition that the competent authorities in the Member States concerned have issued a permit to that effect and certain conditions are respected, such as keeping the specimens in closed facilities.

As the identification of IAS is not always easy, it is foreseen that guidelines will be issued and training courses organised at the appropriate level to help Customs authorities better detect the IAS.

Border inspections will be stepped up to prevent the entry of IAS of Union Concern.



EU Funds to help tackle IAS

A number of EU funds can be used to assist Member States in eradicating or managing IAS on their territory, including the Rural Development Programme, INTERREG and the EU LIFE fund.

The EU's LIFE-Nature Fund has supported over 180 projects to-date to assist tackling IAS in Natura 2000 sites, at a cost of some €44 million.

Eastern grey squirrel.



ORGANISING AWARENESS-RAISING CAMPAIGNS



The 'Be Plant Wise' Campaign was launched by the UK authorities in 2010. It aims to reduce the spread of invasive non-native species across British waterways by educating key audiences, such as gardeners and retailers, about the threats these plants can pose to the environment and encouraging them to change their behaviour in order to help reduce the threat. The campaign's straplines are: '*Know what you grow, Compost with care, and Stop the spread*'. In addition to raising awareness the campaign also provides ample practical advice for the public on how to manage and dispose of invasive non-native aquatic plants responsibly.

As part of a LIFE-funded Project on the **control of the spread of *Caulerpa taxifolia* in the Mediterranean Sea**, a major information campaign was launched to inform governments and stakeholders (i.e. fishermen, divers, pleasure-craft crews) of the need to stop the invasion of Caulerpa. A video, multi-language leaflets and posters were distributed in no less than eight Mediterranean countries. The effectiveness of this campaign was remarkable: tourists and residents contributed to the discovery of new colonies of Caulerpa, which were subsequently removed. This helped to slow down the spread of this 'killer algae' in the Mediterranean Sea.



Working with volunteers: The Sonian forest is vast semi-natural forest located on the outskirts of Brussels, Belgium. Over 2,000 ha have been included in the EU Natura 2000 network in view of its rare biodiversity and unique forest habitats. Like many other forests however, it is under constant threat from invasive alien species. To help tackle this problem, regular events are organised to enlist the help of volunteers in removing invasives such as the black cherry and red-veined maple. Their assistance is invaluable in helping to contain the spread of IAS within the forest.

Dealing with hitchhikers and contaminants

As regards the unintentional introduction of IAS, this is, of course, a much harder problem to deal with. The new Regulation intends to address this by asking Member States to carry out a comprehensive analysis of the pathways of introduction or spread of IAS within their country. The aim is to identify pathways requiring priority action because of the volume of species using them or the level of damage caused by the species entering the EU along these routes.

Once the priority pathways have been identified, Member States should prepare and implement an action plan to address these routes of access. Whilst some measures are likely to be regulatory in nature (e.g. appropriate inspections, measures to minimise contamination...) it will also be important to organise extensive public awareness campaigns.

Because there are so many different types of IAS about and so many kinds of pathways they can use, it is essential that all sectors, associated in one way or another with the problem of IAS, are made fully aware of the problem and given a role to play in limiting their introduction or spread. A number of sectors have already introduced codes of good conduct and guidelines to address the risk of IAS for instance: the European code of conduct for botanic gardens on IAS and the European code of conduct on hunting and IAS.

Ships ballast water is a major pathway for IAS into the EU.



Tackling harmful aquatic IAS

Parties to the International Convention for the Control and Management of Ships Ballast Water and Sediments, have agreed to prevent, minimise and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments.

The International Maritime Organisation (IMO) is also facilitating the development and application of guidelines on the fouling of ship hulls with such organisms.

Styela clava attached to boat keel.



A European Alien Species Information Network (EASIN)

A strong knowledge base is essential for underpinning efficient and scientifically-justified decision-making. To assist the Member States in their tasks, the European Commission's Joint Research Centre (JRC) has set up a European Alien Species Information Network, EASIN, which provides a single interface for around 40 existing databases on IAS in Europe.

A variety of on-line tools and web features are available to help find out more about each species, for instance their distribution in Europe, or pathways or impacts. Further web-tools will be added in due course.

<http://easin.jrc.ec.europa.eu>

Coypu, *Myocastor coypus*.



Early detection and rapid eradication

The second component of the new Regulation focuses on early detection and rapid eradication. In this respect each Member State will need to establish an official surveillance system to collect and record key data on IAS of Union concern in their territory.

These surveillance systems are designed to enable a Member State to notify the Commission and other Member States as soon as an IAS of Union concern has been detected on their territory. It should also ensure that immediate action is taken to eradicate the IAS early on, before it has had a chance to spread and cause significant damage.

The surveillance system should also make it possible for countries to evaluate the effectiveness of various management techniques that have been developed for the eradication or management of different IAS.

Surveillance and research into the fathead minnow, *Pimephales promelas*. © NNSS



Management of already established IAS in the EU

The final element of the new Regulation deals with the management of IAS of Union concern that are already well established in one or more Member States, so that their impacts on biodiversity and ecosystem services, human health and the economy are minimised. Each country will be required to put in place a series of measures to control or contain populations of IAS of Union concern – or eradicate them completely from their territory if this is still feasible. When applying such measures to invasive animals, Member States must ensure that they are spared any avoidable pain, distress or suffering.

Member States are encouraged to coordinate their management programmes across national borders where there is a significant risk that an invasive alien species will spread to neighbouring countries or where joint action will lead to a more cost-effective result. In addition, appropriate measures should be taken to restore the habitats that have been damaged or destroyed by IAS in order to assist their recovery and prevent any subsequent re-invasions.

Clearing invasive rhododendron from Snowdonia National Park, UK.



Tackling IAS in the EU's Outermost Regions

The EU's Outermost Regions are important biodiversity hotspots but they too are under threat from IAS, especially in the case of islands. As these regions are part of the EU, the new IAS Regulation foresees specific provisions for them.

Thus, if a species listed as a species of Union Concern is native to an Outermost Region, the provisions for the list will not apply to that species in that region. Additionally, Member States with Outermost Regions will be asked to identify those invasive alien species that are problematic in their Outermost Regions. These will then be treated as IAS of Union Concern in those Regions.

*The Kahili ginger lily, *Hedychium gardnerianum*: a major IAS in Madeira.*



EU-FUNDED PROJECTS TACKLING IAS



Several LIFE projects focused on the eradication of the **North American ruddy duck, *Oxyura jamaicensis***, which was introduced to Europe as part of a private wildfowl collection in the 1940s. Having escaped into the wild, the bird has since spread to more than 20 countries across Europe where it began to interbreed with its much rarer native cousin, the white-headed duck, *Oxyura leucocephala*. A number of ambitious eradication programmes were launched under LIFE to help reduce its presence. Now it is present in just four EU countries and the aim is to eradicate all remaining birds by 2015.



The remote Western Isles of Scotland host some of the most important sites for ground-nesting birds in Europe. However, the invasive **American mink, *Mustela vison***, has caused a serious decline in these birds as well as damage to aquaculture, crofting and tourism. LIFE funds helped launch a project to eradicate the mink population from the southern end of the archipelago. Thanks to its rigorous scientific approach, the project has also considerably advanced our understanding of how to carry out such eradication programmes in the most efficient and cost-effective way possible.



RINSE (Reducing the Impacts of Non-native Species in Europe) is a European project under the Interreg IVA 2 Seas Programme with a total budget of €2.5 million. It brings together nine partners from France, England, Belgium and the Netherlands to share best practices, raise awareness and adopt strategic approaches to tackle the threats posed by invasive non-native species (INS) across these four countries. The project is broad-ranging in approach and will examine INS across species groups including aquatic plants, aquatic invertebrates, birds, fish and land mammals and across a range of habitats.

Annex. Summary of different impacts caused by IAS

On BIODIVERSITY

- Competition for food and habitat
- Predation
- Vector of disease
- Hybridisation
- Changes in habitat conditions



On ECOSYSTEM SERVICES

- Interference with supporting services (e.g. nutrient cycling, soil formation)
- Interference with provisioning services (e.g. timber production)
- Interference with regulating services (e.g. water regulation, erosion control, pollination)
- Interference with cultural services (e.g. landscape and aesthetic values)



On ECONOMY AND INFRASTRUCTURE

- Damage to commercial crops, leading to significant losses in yield (e.g. agriculture, forestry, aquaculture)
- Damage to infrastructure (clogging of water pipes, erosion of dams, bridges, river banks, fouling of ship hulls and other equipment ...)
- Disruption of recreational activities (blocking of water ways, damage to fishing nets, damage to landscape leading to loss in tourism)



On HUMAN HEALTH

- Vector of disease
- Source of allergies and asthma
- Source of dermatitis and skin abrasions



Further reading

Information on IAS in Europe and EU response

The following information is available from the DG ENV IAS website: http://ec.europa.eu/environment/nature/invasivealien/index_en.htm

Key documents on IAS

- Regulation (EU) of the European Parliament and of the Council on the prevention and management of the introduction and spread of invasive alien species
- Press Release on the new Regulation
- Four-page factsheet on IAS in Europe (May 2009 all languages)
- Video on IAS in Europe
- Commission proposal of 9.9.2013 for a Regulation on the prevention and management of the introduction and spread of invasive alien species – Com (2013) 620 Final + Impact Assessment – SWD (2013) 322 final
- EU 2020 Biodiversity Strategy of 3.5.2011 – Com (2011) 244 final
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- Interreg IVA RINSE project: <http://www.rinse-europe.eu/>

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