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**COMMUNICATION FROM THE COMMISSION TO THE COUNCIL, THE
EUROPEAN PARLIAMENT, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

TOWARDS AN EU STRATEGY ON INVASIVE SPECIES

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1. WHAT ARE INVASIVE SPECIES?

Earth's flora and fauna have evolved over billions of years, and its oceans, seas, mountain ranges, deserts and even large rivers have created physical barriers to the movement of species, thus contributing significantly to the planet's wide biodiversity and the development of animal and plant communities which we regard as typical of particular regions or localities. However, through the influence of man, the physical barriers that gave rise to the development of regionally distinct flora and fauna have been circumvented and species are arriving, either by accident or by design, in localities hundreds and thousands of kilometres away from their normal habitat. In many cases these non-native species adapt poorly to their new surroundings and they rapidly die out. However, in other cases they survive, reproduce and become established. In some instances these new arrivals are so successful that they are no longer a biological curiosity but a real threat, causing serious damage not only to ecosystems but also to crops and livestock, disrupting the local ecology, impacting on human health and producing serious economic effects. Non-native species that have such a negative impact are known as **Invasive Species** or **IS**¹.

2. NEED FOR AN URGENT RESPONSE AT EU LEVEL

The main drivers directly affecting biodiversity are habitat change, climate change, overexploitation, pollution and IS². While EU instruments exist to deal with four out of those five factors, there is, in contrast to several other OECD countries, currently no comprehensive instrument at EU level to tackle IS. This shortcoming needs to be addressed if the EU is to attain its goal "to halt the decline of biodiversity by 2010"³ In addition, IS represent also a major economic threat to the EU. The damage caused by IS and the necessary control measures are estimated as costing at least EUR 12 000 million annually, according to available documented information.

The need for coordinated action to tackle the IS issue has been expressed at the highest political levels. The Environment Council⁴, the European Parliament⁵, the Committee of the Regions⁶ and the European Economic and Social Committee⁷ have all stressed the need for an EU strategy on IS and an effective early warning system and for effective response mechanisms at EU level. Similar commitments have been included in the Sixth Environmental Action Programme (6th EAP), the Communication from the Commission on Halting the Loss of Biodiversity by 2010 and Beyond⁸ and its associated Action Plan,

¹ The term 'Invasive Species' used throughout this document encompasses the terms 'Invasive Alien Species' as found in the Convention on Biological Diversity and 'Invasive non-native species'. Invasive Species are broadly defined as species whose introduction and/or spread may threaten biological diversity or have other unforeseen consequences.

² Millennium Ecosystem Assessment, 2005.

³ Presidency Conclusions, Goteborg European Council, 15-16 June 2001.

⁴ Council Conclusions (Environment), 3 March 2008, paragraph 13.

⁵ Report on Halting the Loss of Biodiversity by 2010, the Committee on the Environment, Public Health and Food Safety, European Parliament, 28.3.2007.

⁶ Opinion of the Committee of the Regions of 6 December 2006 on the Communication from the Commission: Halting the loss of biodiversity by 2010 – and beyond (COM(2006) 216 final), CdR 159/2006 fin.

⁷ Opinion of the European Economic and Social Committee of 15 February 2007 on the Communication from the Commission on Halting the loss of biodiversity by 2010 - and beyond (COM(2006) 216 final), NAT/334 - CESE 205/2007 fin DE/Ho/hn.

⁸ COM(2006) 216 final.

where it was recognized that "a comprehensive EU strategy should be developed" to substantially reduce the impact on EU Biodiversity of invasive alien species.

The main pathways for IS introduction are associated directly or indirectly with trade. Rapidly growing trade and transport activities expand the opportunities for IS introduction, and environmental pressures such as rising CO₂ concentrations, warmer temperatures, greater nitrogen deposition, altered disturbance regimes and increased habitat degradation are likely to facilitate further invasions. Trade is an exclusive Community competence and once goods are placed on the Community market they are able to circulate freely. Addressing trade-related issues can only be done effectively at the EC's external frontier. The existence of the single market means that once an IS is brought into the territory of one Member State, either as a traded commodity or carried on a traded commodity, it can be dispersed rapidly throughout the EU. Given the way that these species become established and spread, measures taken by one Member State can be totally negated if neighbouring countries fail to take action or respond in an uncoordinated manner.

Existing EU legislation and policies already provide part of the solution to the IS problem. However, at present there are no mechanisms to support harmonisation or consistency of approaches between neighbouring countries or countries in the same sub-region. There is no systematic formal requirement for risk analysis in connection with intentional introduction of non-native species that may affect biodiversity, and accidental or negligent introductions remain largely unregulated at both Member State and Community level. No unified system exists to monitor and control IS and their effects on European biodiversity. The fragmented measures in place are unlikely to make a substantial contribution to lowering the risks which IS pose to European ecosystems.

3. IS IN EUROPE AND THEIR IMPACT

3.1. IS in Europe

The DAISIE⁹ project supported under the Sixth EU Research Framework Programme has identified 10 822 non-native species present in Europe, 10-15 % of which are expected to have a negative economic or ecological impact. Isolated islands with high biodiversity, including most of the EU's overseas entities, are exceptionally vulnerable to invasion, which can also have a disproportionate impact on local livelihoods, culture and economic opportunities.

3.2. Pathways

As regards introduction pathways, most invasive plants originally escape from gardens or aquaria, while invasive freshwater fauna reach the wild via aquaculture escapes or deliberate stocking by anglers. In contrast, most invasive species in the marine environment are unintentionally introduced as "hitchhikers" or contaminants (e.g. via ballast water). With increasing volumes of plant and animal materials from more and more locations being transported across the globe, the potential for introduction of IS is also rising.

⁹ DAISIE (Delivering Alien Invasive Species Inventories for Europe), www.europe-aliens.org

3.3. Impact of IS on Ecology

IS are considered one of the major threats to biodiversity¹⁰. Ways in which they impact on the local ecology include:

- competition with native organisms for food and habitat, for example the American grey squirrel (*Sciurus carolinensis*) displaces the native red squirrel (*Sciurus vulgaris*) in many areas of Europe, or the American signal crayfish (*Pacifastacus leniusculus*) displaces the native European crayfish (*Astacus spp.*), or the several species of paraquets which now occupy many European cities compete with native bird species;
- changing ecosystem structures, for example the seaweed *Caulerpa taxifolia* has changed extensive areas of the Mediterranean coast into *Caulerpa* monocultures;
- hybridisation with native species, for example ruddy duck (*Oxyura jamaicensis*) and Sika deer (*Cervus nippon*) can threaten native species with local extinction due to inter-breeding and the production of hybrids;
- direct toxicity;
- being a reservoir for parasites or a vector for pathogens;
- disruption of pollination services due to competition with local bee species.

3.4. Impact of IS on Economic Activities

IS can reduce yields from agriculture, forestry and fisheries. The Asian long-horned beetle (*Anoplophora glabripennis*) for example induces heavy damage in broadleaved stands, including poplar plantations. The Comb jelly (*Mnemiopsis leidyi*) reduces the commercial anchovy catch in the Black Sea. IS are also known to decrease water availability and to cause land degradation. Invasive plants such as the Himalayan balsam (*Impatiens glandulifera*) outcompete native plants that play an important role in binding soil with their roots and may thereby contribute to increased soil erosion.

IS can damage infrastructure due to burrowing or via their root systems. The root system of the Tree of heaven (*Ailanthus altissima*) can damage pavements, archaeological remains and walls. IS may also obstruct transportation by blocking waterways. The Coypu (*Myocastor coypus*) and the Musk Rat (*Ondatra zibethicus*), both brought to Europe from the Americas for their fur, are now established throughout Europe and cause significant damage to dams, canals, irrigation and flood protection systems. One of the most notorious invasive species is the Zebra mussel (*Dreissena polymorpha*) which, in addition to its significant ecological impact, causes massive problems for industry by fouling and blocking intake pipes for water extraction.

Azolla waterfern (*Azolla spp.*) and Eastern White pine (*Pinus strobus*) have led to a decline in recreational and cultural heritage values associated with different landscapes and water bodies.

¹⁰ Millennium Ecosystem Assessment, 2005.

3.5. Impact of IS on Human Health

A number of human health problems, e.g. allergies and skin problems, are caused by IS such as the Giant hogweed (*Heracleum mantegazzianum*) and the Common hogweed (*Ambrosia artemisiifolia*). The Asian tiger mosquito (*Aedes albopictus*), which is increasingly present in Europe and is a vector for at least 22 arboviruses (including dengue, Chikungunya, Ross River, and West Nile), was introduced via trade in used tyres. Climate change is likely to foster its spread further north.

3.6. Costs due to IS

The main identified costs in Europe comprise eradication and control costs and damage to agriculture, forestry, commercial fisheries, infrastructure and human health. While it may appear that there are either impact costs or eradication costs, in fact partial eradication and control programmes are undertaken in parallel, on an ongoing basis in order to try and limit the impact. In 2008, an initial estimate assessed annual IS-related costs in Europe at between EUR 9 600 million and EUR 12 700 million per year (Kettunen et al. 2008). This figure is undoubtedly an underestimate, as it is based on current expenditure to eradicate and control IS plus the documented cost of the economic impact. Given that many countries are only now starting to document and record costs and effects, the real figures for the financial costs involved will be considerably higher.

4. FROM INTRODUCTION TO ESTABLISHMENT AND DISPERSAL

To tackle IS successfully it is necessary to understand how and why the problems arise.

Most non-native species present in Europe were introduced intentionally. Their use in farming, forestry, aquaculture, mariculture and ornamental/horticultural or for recreational purposes has increased across Europe since the early 20th century. Non-native species may be imported because they grow faster (e.g. increased economic returns on forestry trees, soil erosion protection), satisfy demand for exotic products (fur trade), feed on and suppress other species (biological control agents), or simply because people like them (pets, garden plants).

Many species introductions are directly related to trade, where the species is itself the commodity (wood, fibres, living or dead plants and animals) or is a contaminant of a commodity (many pests – fungi, bacteria, viruses and insects – are introduced unintentionally attached to the main traded commodity). In addition, ‘hitchhiker’ species may be introduced through trade or transport pathways independently of a commodity. For example, ship hulls provide well-known vectors for hull-fouling organisms and organisms spread with ballast water. Such pathways may be international (e.g. oceanic shipping) or local (e.g. transport of pleasure boats from an infested river basin to an uncontaminated river or lake).

Climate change also has an impact on species distributions, and the survival and spread of some IS can be explained by the milder winters and warmer summers that Europe has been experiencing over the last decade.

Problems with non-native species will generally only start to arise when they move out of controlled and physically restricted locations. Ornamental plants and animals as well as pets will not cause a problem if they remain in gardens, aquaria or homes. Pathogens or pests can be eliminated on arrival by sanitary control measures. Crustacea, molluscs and fish carried in ballast water can be eliminated if the ballast water is treated before being discharged.

However, if plant and animal pests and diseases are not detected and eradicated at the border, or if ornamental plants and pets escape or are released into local ponds and streams, or if animals from fur farms such as Coypu (*Myocastor coypus*), Musk rat (*Ondatra zibethicus*), American mink (*Mustela vison*) and Raccoon (*Procyon lotor*) escape into the wild, then there is a risk that they will become invasive species.

In some cases the climatic conditions may not be suitable or the local flora and fauna may be more resilient and the non-native species may die out. In other situations, if the climate is suitable and competition and predation from the indigenous species is weak, then the non-native species may survive, grow and reproduce and succeed in establishing a local colony.

If the local colony of the invading species is not detected and eradicated quickly, then it establishes a sustainable population at the local level which will disperse into new territories. Obviously, if there are several local populations established from different original stock, then the dispersal process will be speeded up and the species will be less vulnerable to local extinction. Eventually, after a period of years or decades, a species can become widespread across several countries and virtually impossible to eliminate.

5. STRATEGIES TO TACKLE IS

5.1. The Three-stage Hierarchical Approach

As regards the policy response to IS threats, an internationally agreed "**three-stage hierarchical approach**"¹¹ supports measures based on 1) prevention, 2) early detection and eradication, and 3) control and long-term containment. This approach covers new introductions and management of established IS. It reflects scientific and policy consensus that **prevention** is generally far more cost-effective and environmentally desirable than post-introduction measures. However, where an IS has been introduced, **early detection and rapid eradication** are the most cost-effective ways to prevent establishment and further spread, backed by early warning and information exchange. If eradication is not feasible, **control and/or containment measures** should be implemented.

Prevention: There are six principal pathways for IS: release, escape, contaminant, hitchhiker, corridor and unaided. The majority of introductions occur directly or indirectly as a result of trade. To reduce or prevent further introductions by this route it would be necessary to step up controls and inspections at borders in conjunction with an assessment procedure for determining the acceptability or otherwise of importations of new commodities. Such approaches would need to be informed by exchange of information between national, regional and international bodies working on the control of IS. Prevention in relation to hitchhiker organisms brought in on the hulls or in the ballast water of ships would hugely benefit from the ratification and implementation of the Ballast Water Convention.

Early Detection and Rapid Eradication of IS depend on effective monitoring programmes coupled with an early warning mechanism to inform other potentially affected areas as quickly as possible and to exchange information on potential eradication strategies. In cases where the IS has already become established and is spread across a wide geographical area,

¹¹ Convention on Biological Diversity (CBD): Guiding Principles for the prevention, introduction and mitigation of impacts of alien invasive species that threaten ecosystems, habitats or species annexed to Decision VI/23 (The Hague, April 2002).

coordinated eradication programmes overseen and possibly financially supported by a central body would be desirable.

Control and/or Containment: Where IS are both established and widespread, the emphasis must be placed on control and containment. Once again this will entail effective exchange of information and implementation of coordinated campaigns/actions to control/stop the spread of the species concerned.

5.2. Existing Tools for tackling IS in Europe

Having regard to the different elements of a strategy as described above, the Commission has assessed the current legislation, research programmes, action plans and other initiatives to identify which aspects are already covered and where there are gaps.

The **Plant Health Directive** (2000/29/EC) is primarily concerned with preventing the introduction and spread of harmful organisms which are injurious to plants or plant products. New species can be added to the EU list of harmful organisms recognised under the Directive based on a pest risk assessment. The Member States have well-developed mechanisms for transmitting information, cooperation, inspection and control. The Directive allows flexible mechanisms to take emergency measures in case where harmful organisms are found on the territory of the Member States. However, IS impacts on human health or direct economic consequences resulting, for instance, from the clogging of waterways do not fall within the scope of the legislation.

EU legislation on **animal diseases** can cover IS when they are vectors of animal disease. Control and inspection procedures are in place in the Member States as are EU-wide assessment procedures. Under the Community network for communicable diseases, harmonised rules have been adopted which require early notification of public health measures taken or intended to be taken by Member States in the event of for example a new epidemiological situation or health threats caused by the occurrence of IS.

The import of four species¹² which constitute an ecological threat is prohibited under the **Wildlife Trade Regulation (Council Regulation 338/97)** primarily designed to control trade in endangered species. Member States have established inspection and control procedures under the Regulation, but there are no assessment procedures.

Council Regulation 708/2007 on the use of alien and locally absent species in aquaculture provides for assessment of risks associated with intentional introductions of aquaculture organisms and associated non-target species. The **Nature Directives (79/409/EEC and 92/43/EEC)** proscribe introductions into the wild that may threaten native species. The **Water Framework Directive (2000/60/EC)** requires Member States to achieve good ecological status in relevant waters. The **Marine Strategy Framework Directive (2008/56/EC)** recognises the introduction of non-native species as a major threat to European biodiversity and specifically requires Member States to include IS in the description of "Good Environmental Status".

The **LIFE programme** finances projects dealing with IS control and eradication: between 1992 and 2002, over 100 projects were funded (total cost EUR 27 million), and 80 were

¹² Red-eared slider (*Trachemys scripta elegans*); American bullfrog (*Rana catesbeiana*); Painted turtle (*Chrysemys picta*); American ruddy duck (*Oxyura jamaicensis*).

financed between 2003 and 2006 (total cost EUR 17 million). The **Sixth Research Framework Programme** funded 2 IS-related projects: ALARM¹³ and DAISIE¹⁴. The DAISIE project delivered the first pan-European inventory of Invasive Alien Species. The South Atlantic Invasive Species Project (SAIS), supported by the **Ninth European Development Fund**, aims to increase the regional capacity to reduce the impact of invasive species on the South Atlantic United Kingdom Overseas Territories.

In 2003, the **European Strategy on Invasive Alien Species** was adopted under the **Bern Convention**. The **European and Mediterranean Plant Protection Organisation (EPPO)** operates a pest reporting system and maintains lists of IAS recommended for national regulation to prevent further introduction and spread, including invasive alien plants. Four IAS have been the subject of assessments undertaken by EPPO and considered by the European Food Safety Authority (EFSA), but as yet none of the assessments are considered satisfactory by EFSA.

6. POLICY OPTIONS

There are a number of possible responses to tackling IS which could be envisaged in the EU. This Communication describes four options¹⁵ in order of increasing intensity. However, the options are not discrete or mutually exclusive and elements from the different options could be combined. For each option the benefits and drawbacks are described.

A) Business as Usual

The "business as usual" option provides a reference point against which other options can be assessed. But clearly, if no action is taken, IS will continue to become established in the EU with increased associated ecological, economic and social consequences and related costs.

B) Maximising the use of existing legal instruments together with voluntary measures

The formal legal requirements would remain as they are today but there would be a conscious decision to proactively address IS problems under existing legislation. This would imply carrying out risk assessments using existing institutions and procedures such as the European Food Safety Authority. Member States would voluntarily make IS issues part of their border control function. A Europe-wide Early Warning and Information System based on existing activities¹⁶ could also be set up¹⁷. The DAISIE inventory of IS could be maintained and updated regularly. Species eradication plans would be developed and supported by national funds. Cross-sectoral stakeholder groups could be set up at appropriate levels to foster exchange of best practice, to develop targeted guidance and to help resolve conflicts of interest. Voluntary codes of conduct could be drawn up to encourage responsible behaviour by retailers, users and consumers.

¹³ ALARM (Assessing Large-scale Risks for Biodiversity with tested Methods), www.alarmproject.net

¹⁴ DAISIE (Delivering Alien Invasive Species Inventories for Europe), www.europe-aliens.org

¹⁵ The choice for one option or combined options will depend on the results of a prior financial impact analysis.

¹⁶ The IAS Inventory for Europe delivered by DAISIE see <http://www.europe-aliens.org/index.jsp>; NOBANIS (North European and Baltic Network on IAS); scientific online journals including "Aquatic Invasions" and "Biorisk".

¹⁷ A feasibility study is currently being carried out by the EEA.

The main advantage of this option is that it would not require new legislation. Assessment procedures and Member States' control and inspection procedures already exist. However, even with a proactive approach the coverage would not be complete, considerable legal uncertainty would remain, and the level of response to the threat of IS would be likely to vary considerably between Member States. Coordination of the assemblage of ad-hoc arrangements could prove challenging. A system which is built on voluntary undertakings by Member States and voluntary codes of conduct would only be as effective as the weakest link in a chain.

B+) Adapted existing legislation

This option is similar to option B in most respects, but would include amendments to the existing legislation on plant/animal health to cover a broader range of potentially invasive organisms and extension of the list of 'ecological threat species' for which import and internal movement are prohibited under the Wildlife Trade Regulation. If this approach were followed, additional resources would need to be dedicated to IS in the assessment process and in the border control activities carried out by Member States.

The advantage of this approach is that while some legal uncertainties and gaps would be addressed, no new piece of legislation would be required. However, coverage of the IS problem would still not be comprehensive or complete and co-ordination would be a significant challenge.

C) Comprehensive, dedicated EU legal instrument

This option would involve the setting up of a comprehensive, dedicated legal framework for tackling IS with independent procedures for assessment and intervention taking into account existing legislation. If it were considered desirable and cost effective, the technical aspects of the implementation could be centralized by a dedicated agency¹⁸. Member States including the European Outermost Regions would be obliged to carry out controls at borders for IS and to exchange information on IS. Mandatory monitoring and reporting procedures and efficient rapid response mechanisms might also be established. While it is possible to envisage some EU funding being dedicated to support eradication and control actions, Member States could also fund these actions directly.

This option would be the most effective in terms of control of IS. It would provide the greatest legal clarity whilst respecting the principle of proportionality. However, there would be administrative costs for the Member States and for the Commission as well as direct costs for economic operators.

7. HORIZONTAL ISSUES

It is important to have an informed and engaged public in order to address IS issues effectively, particularly as regards unintentional introductions which administrative/legal instruments cannot cover satisfactorily. Communication and education activities should build

¹⁸ The partial or full implementation of this option will also depend on the outcomes of the forthcoming discussion of the Inter institutional working group on agencies. Extension of the mandate of existing bodies could also be considered.

a sense of responsibility amongst European citizens, authorities and industries with regard to trade in and movement of potential IS, as well as eradication and/or control programmes. A better informed public would bring fewer non-native species into their gardens and ponds.

Further research can contribute to a better understanding of IS and the pathways of their introduction as well as the risks and severity of IS occurrences, e.g. prediction of invasion by new species and cost-effective control and management methods. Research and monitoring results together with initiatives such as open-access online journals can all contribute to the development of information systems on IS. The Global Monitoring for Environment and Security (GMES) initiative¹⁹ could also be a valuable tool for the monitoring and control of the impact of IS on the environment.

Any future EU strategy on tackling IS should also take account of the possibilities for using EU funding instruments to support the policy. The potential to involve the private sector, including the insurance sector, should also be assessed.

Third countries are the source of IS arriving in the EU. However, the EU may also represent a potential source of IS to these third countries. IS in third countries may lead to deterioration of livelihoods and hence enhanced migration and possible conflicts. While efforts will continue to be made in the context of international conventions such as the Convention on Biological Diversity and the Bern Convention, the European Community has a considerable potential for direct bi-lateral actions with third countries to reduce the pressure from IS in both directions. The European Community can support third countries and regional or international activities through its Development Cooperation Instrument (in particular the Environment and Natural Resources Thematic Programme), the European Development Fund and the European Neighbourhood and Partnership Instrument. Member States can provide additional support through their own development cooperation instruments.

8. CONCLUSION

Halting the loss of biodiversity in the EU will not be possible without tackling IS in a comprehensive manner. The ecological, economic and social consequences of IS in the EU are significant and require a coordinated response. At present the Community is unable to deal with IS efficiently and biodiversity-rich areas, e.g. EU overseas entities, do not receive appropriate attention. The existing EU legislation partially covering different aspects of IS makes coordinated implementation difficult. Policy consistency between most Member States is low or non-existent. Scientific scenarios point to a dramatic increase in biological invasions. Therefore the situation is likely to get worse.

This Communication describes the nature of the threat posed by IS as well as the possible approaches for addressing the problem. The feedback received from the Council, the other EU institutions and stakeholders will be taken into account by the Commission in finalising its proposal for an EU Strategy which it intends to bring forward in 2010 with the aim of substantially reducing the impact of IS on European biodiversity. In the meantime, the Commission will examine the possibility of setting up an Early Warning and Information System based on a regularly updated inventory combined with effective response mechanisms which it considers would be an important step forward.

¹⁹ COM(2008) 748 final.