

Developing an EU Framework for Invasive Alien Species

Discussion Paper

(Final)

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1. Introduction

Invasive Alien Species (IAS) represent a serious threat to biodiversity which needs to be addressed if the EU is to attain its goal "to halt the decline of biodiversity by 2010"¹. The 6th Environmental Action Programme (6th EAP) has identified IAS as a priority area for action. The recent Communication from the Commission on Halting the Loss of Biodiversity by 2010 and Beyond² and its associated Action Plan also highlight action on IAS as a priority objective and the need for the Community to develop a comprehensive strategy to address this threat. This was also endorsed by other EU institutions during discussion on the Communication (see chapter 4.3.).

IAS not only represent a threat to native species of fauna and flora but can also result in major disruption to ecosystem health, with resulting damage and loss of goods and services. Increasing pressures on ecosystems, caused mainly by destruction of habitats, spread of IAS, over-exploitation and pollution, are weakening ecosystem resilience and ability to adapt to new conditions under climate change and thus continuously declining capacity for providing ecosystem services. If unchecked, this problem is likely to be exacerbated as a result of the additional pressure on ecosystems arising from climate change.

IAS are globally considered as a second major threat to biodiversity. In the past, the human kind has greatly benefited from the introduction of alien species (e.g. potatoes and maize in Europe, etc.) and this trend is likely to continue. However some alien species become invasive in their new environment and cause significant damage to native species and ecosystems with significant economic consequences. The Millennium Ecosystem Assessment³ identified IAS as important driver of biodiversity loss with increasing trend.

It is essential to recognise this global threat at the European level and to take necessary actions. Europeans today are more mobile than ever before. Increased mobility for people and goods means increased mobility for other species presenting increased risks. IAS do not recognise national boundaries. This is a shared problem of Member States and where action at EU level has clear added value.

The aim of this paper is to initiate a discussion on an EU framework strategy on IAS contributing to the achievement of halting the loss of biodiversity by 2010 and beyond.

Some examples of negative impacts of IAS:

- Grey squirrels out-compete and displace native red squirrels in Italy and Great Britain as well as transmitting diseases.
- The explosion of zebra mussels throughout different EU water bodies with significant economic and environmental damage (e.g. only in the lower Ebro river basin in Spain it causes damage amounting to 2 million €/per year⁴).
- Marine algae from Asia, destroying a critical marine habitat - sea grass beds in Mediterranean.
- North American Signal crayfish which carry and transmit the crayfish plague to European crayfish species thus decimating the native crayfish.
- The North American water pennywort spreading in Western parts of Germany. Problems from Europe are known e.g. from Great Britain (occurrence since 1990) and Netherlands

¹ Presidency Conclusions, Goteborg European Council, 15-16 June 2001

² COM(2006)216

³ MEA 2005

⁴ Hydrographical Confederation (CHE)

(since 1994), where this species is spreading very fast and leads due to total covers of water bodies to problems for the shipping industry⁵.

2. Definitions

Invasive alien species (IAS) are non-native species that are deliberately or unintentionally introduced by human action outside their natural habitats where they establish, proliferate and spread in ways that cause damage to biological diversity (see specific definitions of terms below).

Box: Definitions of terms

The definitions used in this document correspond to those used in the CBD Guiding Principles (CBD Decision VI/23) and the European Strategy on IAS:

‘invasive alien species’ means an alien species whose introduction and/or spread threaten biological diversity;

‘alien species’ refers to a species, subspecies or lower taxon, introduced outside its natural past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce. (some international/ regional/ national instruments use the terms ‘exotic species’, ‘non-indigenous species’ or ‘non-native species’ when referring to ‘alien species’);

‘introduction’ refers to the movement by human agency, indirect or direct, of an alien species outside of its natural range (past or present). This movement can be either within a country or between countries or areas beyond national jurisdiction;

‘intentional introduction’ refers to the deliberate movement and/or release by humans of an alien species outside its natural range;

‘unintentional introduction’ refers to all other introductions which are not intentional;

‘establishment’ refers to the process of an alien species in a new habitat successfully producing viable offspring with the likelihood of continued survival.

The definitions could be further adjusted for the purposes of measures proposed by the strategy, e.g. for legislative purposes, and with regards to viruses, prions, hybrids, etc.

Though GMO are sometimes considered as IAS, GMO will not be covered by this strategy. There is robust system devoted only to GMO control.

3. What is the problem?

Growing international trade and movement of people increases the probability of introducing alien species into the environment including risk that the species could become invasive and damage native biodiversity. The risk is multiplied by increasing pressures on ecosystems (habitats destruction, pollution, etc.) and climate change.

Invasive alien species have been a major cause of loss of biodiversity, especially on islands and in freshwater habitats, and they continue to be a problem in many areas. On a global level, the introduction of alien species is the second leading cause of species extinction in

⁵ DAISIE

freshwater habitats, and on islands it is the main cause of extinction over the past 20 years, along with habitat destruction.⁶ IAS are not only an environmental problem but are increasingly an economic and social problem.

3.1. Environmental problem

IAS are considered as a second major threat to biodiversity to that caused by habitats loss. IAS could negatively affect biodiversity e.g. by:

- competing with other organisms (plants like Japanese knotweed (*Fallopia japonica*) or the Giant hogweed (*Heracleum mantegazzianum*) form dense stands which displace native plants) and change habitat structure,
- being toxic (toxic algae blooms caused by alien phytoplankton such as *Chattonella verruculosa* and *Alexandrium* species),
- being a reservoir for parasites or a vector for pathogens (rainbow trout which is a host for the salmon parasite *Gyrodactylus salaris*, signal crayfish which is a carrier and host of the crayfish plague),
- hybridising with a related species or varieties, such as the North American Smooth cord grass (*Spartina alterniflora*) which hybridized with the European *Spartina maritima* and produced the very invasive hybrid *Spartina anglica*, which has radically changed coastal mudflat habitats in Great Britain, Denmark and Germany⁷,
- predated on native organisms (the American mink (*Mustela vison*) predation on a wide variety of birds, freshwater organisms and small animals has profoundly influenced the ecosystems of Scandinavian and Baltic islands),
- altering the local food web, e.g. alien plants alter nutrient availability (e.g. nitrogen-fixing *Robinia pseudacacia*, *Lupinus polyphyllus*),
- disrupting pollination services (e.g. *Impatiens glandulifera*),
- causing extinction of native species, e.g. displacement of native species is known for the invasive multicoloured Asian ladybeetle (by intra-guild predation) and the Argentine ant (superior competitiveness),
- are an ecosystem engineer by altering energy and nutrient flows, as well as physical factors in habitats and ecosystems (freshwater plants like the Canadian waterweed (*Elodea canadensis*) and the Nuttall's waterweed (*Elodea nuttallii*)).

3.2. Socio-economic problem

IAS cause human health problems (e.g. allergies – *Ambrosia artemisiifolia*, damage to skin and a severe eczema - *Heracleum mantegazzianum*).

⁶ MEA 2005

⁷ S. Nehring and H. Adersen. 2006. NOBANIS – Invasive Alien Species Fact Sheet – *Spartina anglica*. From Online Database of the North European and Baltic Network on Invasive Alien Species – NOBANIS www.nobanis.org

IAS cause major economic problems related to their prevention, control and eradication (e.g. congestions in waterways, damages to forestry, to crops, to building property, damages in urban areas, etc.).

Examples:

- The costs of preventing, controlling and/or eradicating IAS and the environmental and economic damages are significant. The annual economic losses caused by introduced pests to crops, pastures, and forests in the United States, United Kingdom, Australia, South Africa, India, and Brazil amount to nearly US\$ 230 billion. The annual environmental loss caused by introduced pests in the same countries were calculated at over \$100 billion. The calculated cost per capita for the losses incurred due to biological invaders in the six nations investigated were approximately \$240 per year. Assuming similar costs worldwide, damage from invasive species would be more than \$1.4 trillion per year, representing nearly 5% of the world economy⁸.
- The introduced comb-jellyfish caused losses to the anchovy fisheries in the Black Sea estimated at \$17 million annually⁹.
- IAS-related economic damage in Germany's inland water systems from erosion of river banks and embankments is estimated at 32 million € per year for *Fallopia* species and 12 million € per year for *Heracleum mantegazzianum* and for the muskrat *Ondatra zibethicus*¹⁰.
- The introduction of the salmon parasite *Gyrodactylus salaricus* to more than 46 rivers and 37 aquaculture facilities in Norway has decreased the density of salmon by 86% in infected rivers. Losses of income and opportunities for recreational fishing due to *Gyrodactylus salaricus* have been calculated to about 20 million €¹¹.
- Damage to the cultural and landscape and aesthetically valued areas caused by the introduction of insects and diseases which kill and maim trees in parks, urban areas and cultural valued tree plantings are substantial. The Chestnut leaf miner, Sudden oak death caused by *Phytophthora* species, Dutch elm disease has caused substantial economic costs in European cities, parks and cultural valuable landscapes for control measures and replacing trees which have been affected.

From the economic perspective, biodiversity provides benefits for present and future generations by providing ecosystem services. However biodiversity provides not only ecosystem services to humans but also important values (emotional, cultural) loss of which means loss for future generations.

⁸ Pimentel, D., S. McNair, J. Janecka, J. Wightman, C. Simmonds, C. O'Connell, E. Wong, L. Russel, J. Zern, T. Aquino, T. Tsomondo 2001. Economic and environmental threats of alien plant, animal, and microbe invasions. *Agriculture, Ecosystems and Environment* 84 (2001) 1–20.

⁹ D. Knowler and E. Barbier (2000). *The Economics of an Invading Species: A Theoretical Model and Case Study Application*. The Economics of Invading Species. Edited by C. Perrings, M. Williamson and S. Dalmazzone. Edward Elgar, U.K.

¹⁰ Case study cited in SBSTTA 2005. The ecological and socio-economic impacts of invasive alien species on inland water ecosystems (UNEP/CBD/SBSTTA/10/1).

¹¹ B.O. Johnsen (2006). NOBANIS Invasive Alien Species Fact Sheet – *Gyrodactylus salaricus*. From Online Database of the North European and Baltic Network on IAS. NOBANIS www.nobanis.org

4. What has been done so far?

4.1. At international level

The threat of IAS to biodiversity and society has been recognised at global level. Article 8(h) of the Convention on Biological Diversity (CBD) obliges Parties to the Convention to 'prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species'. The European Community (EC) is a party to the Convention and should therefore take actions to ensure its policies comply with that Article. Within the CBD framework, the key development in relation to IAS during the last five years was the adoption of 15 Guiding Principles for the prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species.¹² The Principles provide an international framework for governments and other organisations to develop effective strategies to prevent the introduction of, and promote control and eradication of IAS.

Other international agreements cover different groups of IAS or pathways of their introduction and start to address IAS as a threat to biodiversity:

1. The International Plant Protection Convention (IPPC)¹³ provides a framework for international cooperation to prevent the spread of pests of plants and plant products. The IAS theme is an important subject in the IPPC framework. Several Standards on Phytosanitary Measures can be applied to IAS, in particular the Standard on Pest Risk Analysis (ISPM No. 11) takes the threat of IAS to the biodiversity of plants into account.
2. The International Maritime Organisation (IMO) adopted the "International Convention for the Control and Management of Ships' Ballast Water and Sediments". The aim of the Convention is to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments.
3. The Convention for the Control and Management of Ship's Ballast Water and Sediments under the International Maritime Organisation addresses ballast water as the main pathway for aquatic IAS.
4. International Civil Aviation Organisation adopted a Resolutions on introduction of IAS via civil air transportation
5. The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) adopted a resolution on IAS during COP13 (and reviewed at COP14) (resolution 13.10, trade in alien invasive species).

4.2. At Pan-European level

¹² The Guiding Principles were agreed at the COP 6 in 2002 (The Hague, the Netherlands) and annexed to COP Decision VI/23 (Alien species that threaten ecosystems, habitats or species).

¹³ International Plant Protection Convention (IPPC): <http://www.ippc.int/IPP/En/default.jsp>

In 2003, the 'European Strategy on Invasive Alien Species' was adopted under the Bern Convention. The Strategy offers advice on measures to prevent unwanted introductions and tackle IAS.

NOBANIS (North European and Baltic Network on Invasive Alien Species) is a network of common databases on alien and invasive species of the region. By establishing a common portal with Internet access to IAS-related data, information and knowledge in the region, coordination for working with IAS is facilitated and the system thus can function as an early warning system. Currently it covers 11 countries¹⁴.

SEBI 2010 (Streamlining European 2010 Biodiversity Indicators) is developing a set of biodiversity indicators to measure Europe's progress in preventing the loss of biodiversity by 2010. These indicators include indicators to show the trends in IAS (cumulative number of alien species established in Europe, list of worst IAS – both developed, indicator on costs of IAS is still under development).

The European Plant Protection Organisation (EPPO), the European organisation of IPPC, has an intensive program on IAS, including a list of invasive alien plants that pose an important threat to plant health, environment and biodiversity in the EPPO region. Since 2005, the EPPO Council recommends strongly to countries endangered by these species to take measures to prevent their further introduction and spread or to manage unwanted populations.

4.3. At the EU level

The IAS issue has been for some time recognised at the EC level. The 6th EAP formulate the following objective: "halting biodiversity decline with the aim to reach this objective by 2010, including prevention and mitigation of impacts of invasive alien species and genotypes" and proposes the relevant action of "developing measures aimed at the prevention and control of invasive alien species including alien genotypes".

LIFE programme finances projects dealing with control and eradication of IAS, during 1992-2002 more than 100 projects have been funded.

The 6th Framework Programme on research is currently funding 2 projects concerning IAS – DAISIE¹⁵ and ALARM¹⁶. Both would provide important knowledge on IAS. DASIE project may provide significant input to an EU early warning and information system.

There is no unified system to control IAS. A study "Scope options for EU action on invasive alien species" was launched during 12/2005-06/2006 to identify gaps in the current system and provide recommendations for action on an EU level (results used in this text). CBD Guiding Principles and the European Strategy on IAS were used as the baseline for analysing gaps in this study.

There are some limited categories of potential IAS and pathways that are very well regulated and covered, e.g. animal diseases and plant pests, aquaculture. Gaps are analysed in chapter "5. Gaps in the EU system" below.

The recent Communication on Biodiversity (COM(2006)216) has identified IAS as a key priority area and asks to develop "a comprehensive EU strategy to substantially reduce the impact on EU biodiversity of invasive alien species and alien genotypes as well as specific actions including an early warning system".

¹⁴ Information taken from NOBANIS website on 7.12.2006

¹⁵ DAISIE (Delivering Alien Invasive Species Inventories for Europe), www.europe-aliens.org

¹⁶ ALARM (Assessing Large-scale Risks for biodiversity with tested Methods)

The Environmental Council of Ministers supported the above mentioned Communication and in its conclusions concerning IAS "calls upon the Commission to assess gaps in the current legal, policy and economic framework for the prevention of introduction and for the control and eradication of invasive alien species; invites the Commission, in cooperation with the Member States, to prepare an EU strategy and an effective early warning system, taking into account biogeographical regions, on the basis of the CBD Guiding Principles on Invasive Alien Species, taking into account the Bern Convention European Strategy on Invasive Alien Species and recognizing the efforts made by relevant Conventions and Organisations such as the IPPC and the EPPO"¹⁷.

The European Parliament "urges the development of a comprehensive Community response to the problem of IAS, including an early warning system, and filling gaps in the legislative framework, including the development of an EU Strategy on IAS"¹⁸.

The Committee of the Regions¹⁹ and the Economic and Social Committee²⁰ also supported the Communication and its priorities, including those on IAS.

In addition the CITES regulation 338/97 (article 4.6.d) and the role and work undertaken by the EFSA (European Food Safety Authority) on risk assessment are relevant in the context of IAS.

The EU Directive (2004/35/CE) on environmental liability with regard to the prevention and remedying of environmental damage establishes a framework for environmental liability which is based on the "polluter pays" principle. It needs to be explored whether this directive could be used in the IAS context.

4.4. At member states level

Although most member states (MS) have legislation in place in relation to some aspects of IAS, only few have a comprehensive and streamlined national framework. Only 3 MS has specific national strategies on IAS, 7 MS are developing strategies, some MS have an IAS strategies incorporated under Biodiversity or Sustainable Development Strategies, for 10 MS national strategies on IAS have not been found²¹ (this information will be up-dated accordingly to the development).

There is still a lack of the European Court of Justice (ECJ) case law in relation to control of IAS. There were two cases with relevance to IAS examined by ECJ.

The first, in 1994, concerned imports of live freshwater crayfish to Germany (case C-131/93). In that case, the European Commission sued the Germany for initiating a ban on live crayfish imports. The ban was a response to the crayfish plague (*Aphanomyces astaci*), which was being spread mainly by the introduction of alien species of crayfish. The German law required an import licence to be obtained for the import of live crayfish into Germany. Even with such a licence, crayfish could be imported only for research and teaching purposes. A conditional exemption was provided to allow the import of crayfish for a limited time. The Commission argued that such restrictions were in violation of the EC Treaty because they established import bans against MS. The ECJ found in favour of the Commission, as it considered that the

¹⁷ Council conclusions on Halting the Loss of Biodiversity (COM(2006)216), 18 December 2006

¹⁸ Report on Halting the Loss of Biodiversity by 2010, the Committee on the Environment, Public Health and Food Safety, European Parliament, 28.3.2007

¹⁹ 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

²⁰ 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

²¹ "Scope options for EU action on invasive alien species" (2006), 27 MS analysed, state of May 2006

reduction in risks from the crayfish plague could have been achieved through measures that were less restrictive on intra-Community trade. Alternatives to a ban could have included requirements for health certification for the crayfish, or by regulating the marketing and management of crayfish within Germany.

The second case was the 'Danish bees case' (case C-67/97). Danish law prohibited the keeping of any non-indigenous species of nectar-gathering bee on the island of Læsø, the only species permitted being the brown bee indigenous to that island. When the Danish government pursued a prosecution against an individual who was breaching this rule, he claimed that the law constituted a quantitative restriction on imports and was therefore contrary to Article 28 of the EC Treaty. The Court found that the law was indeed a restriction, but that it was justified under Article 30 of the Treaty, for the protection of the health and life of animals.

This limited amount of jurisprudence in relation to Article 30 has left some degree of uncertainty as to the exact types of restrictions they may put in place to protect their biodiversity without breaching provisions of the Treaty.

5. Gaps in the EU system

An overall framework to control/manage IAS is missing at the EU level; however there are some limited categories of potential IAS and pathways that are very well regulated and covered:

- robust and well established systems exist to regulate trade with animal diseases and plant pests;
- for aquaculture, the new "Regulation for use of alien and locally absent species in aquaculture" (708/2007) will establish a new system for assessment and management of the risks associated with the introduction of new organisms for aquaculture;
- 4 invasive animal species²² are currently listed under the Wildlife Trade Regulations and cannot be introduced into EU territory (however it is not fully in line with the goal of the regulations, which is the protection of endangered species by regulating their trade). However, these species can still be spread within the EU territory.

For organisms outside these categories (mammals, fish, vectors of diseases decimating wildlife, some plants, some insects, etc.) there are no Community-backed controls on import and export. There are also no restrictions on intra-Community trade and movement of IAS for organisms outside the categories mentioned.

With regard to controls on the introduction of alien organisms to the natural environment, the Habitats and Birds Directives contain restrictions on the deliberate introductions of alien species into the wild. In relation to control and eradication of IAS, the Habitats, Birds, and Water Framework Directives may impose some obligations through requirements to maintain the ecological status of certain sites.

Species of birds that are not native to the European territory of the Member States are not protected by the Birds Directive unless specifically mentioned in the Annexes of the Directive²³. The Canada Goose (*Branta canadensis*) and Wild Turkey (*Meleagris gallopavo*)

²² Species listed are the red-eared slider (*Trachemys scripta elegans*); the American bullfrog (*Rana catesbeiana*); the painted turtle (*Chrysemys picta*); and the American ruddy duck (*Oxyura jamaicensis*).

²³ A listing of non-native bird species is available on the web site of the Commission at http://ec.europa.eu/environment/nature/conservation/wildbirds/eu_species/introd_species_en.htm

have been introduced to Europe and are listed as huntable species under the Birds Directive. However, Canada Geese also naturally occur as migrants in very small numbers and the Wild Turkey does not show invasive patterns. There would not appear to be similar listings of non-native species in the species annexes of the Habitats Directive. However, there is present reference to an invasive species, Azolla as a typical species associated with the natural habitats type (Code 3150) "Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation".

In spite of the above mentioned instruments, there is no consistent policy on IAS in EU. In many cases import of proven IAS continues (e.g. water ornamental plant Water pennywort, is covering water bodies and thus destroying water ecosystems and causing problems for the shipping industry, or American crayfish, rainbow trout). Important pathways, e.g. ballast water, are not controlled and are allowing invasion of further species.

6. Why is co-ordinated EU action necessary?

1. IAS do not respect political borders.
2. IAS remain an increasing threat to European biodiversity.
3. The increasing spread of IAS is closely linked to the increasing volume of trade. Trade in goods is the exclusive competence of the EC. Free trade is perceived by MS as problem for control of import of IAS at a national level.
4. The IAS issue could be compared to the phytosanitary and animal health issues (in some cases there could be overlaps in species) which are the competence of EC.
5. Council Regulation concerning use of alien and locally absent species in aquaculture (708/2007) has been adopted in June 2007. A similar approach should be taken with other organisms.
6. MS call for EC action. See reference to Council Conclusion on IAS in chapter 4.3. Need for development of an EU framework was endorsed also during a meeting with representatives of Member States and stakeholders in June 2007.
7. Stakeholders encourage the EC to implement a cooperative legal framework at EU level to address IAS (e.g. Resolution of NEOBIOTA conference held in September 2006 gathering about 350 European scientists²⁴).
8. International obligations:
 - CBD requires contracting parties to take measures on preventing IAS;
 - COP 9 in 2008 in Germany will have IAS as one of the main issues;
 - IPPC recommends Contracting Parties to take an active role with regard to national strategies in order to address threats to biodiversity posed by invasive alien species.
9. EU policy obligations:
 - Priority of the 6th EAP ("developing measures aimed at the prevention and control of invasive alien species including alien genotypes");

²⁴ Part of the conference resolution: "to complement existing European activities to close gaps in pathways, habitats and taxonomic groups in order to build a cooperative legal framework and to address IAS at the appropriate level"

- Priority area of the Communication on Biodiversity ("to substantially reduce the impact on EU biodiversity of invasive alien species") and its Action Plan. Four actions are required in the Action Plan:
 1. "Assess, at EU level, gaps in the current legal, policy and economic framework to prevent, control and eradicate IAS and mitigate their impacts on biodiversity and develop a community strategy to address IAS including, where necessary and appropriate, measures to fill gaps [by 2007].
 2. Encourage Member States to develop national strategies on invasive alien species [by 2007] and to implement them fully [by 2010].
 3. Encourage ratification and implementation by Member States of the International Convention for the Control and Management of Ship's Ballast Water and Sediments under the International Maritime Organisation [2006 onwards].
 4. Establish an early warning system for the prompt exchange of information between neighbouring countries on the emergence of IAS and cooperation on control measures across national boundaries [by 2008]."
- Need for development of an EU framework was endorsed by other EU institutions during discussion on the Communication on Biodiversity.

7. Proposed EU Strategy / Framework

Vision: Europe where biodiversity, native species, incl. the genetic variations, and ecosystem services are not declining or being lost due to IAS.

Global objective: To substantially reduce the impact of invasive alien species on EU biodiversity, to contribute to halting the biodiversity loss by 2010 and beyond, to minimise economic and social costs caused by IAS and thus contribute to the Lisbon Strategy.

Specific objectives:

1. Measures to address intentional and unintentional introduction are in place.
2. Measures to address "escapees" and established IAS species are in place (eradication, containment, control).
3. A well functioning early warning and information system is in place supported by functioning surveillance and monitoring systems.
4. Financing mechanisms to eradicate/control IAS are in place.
5. MS implement national strategies and co-operate at EU level.
6. The public understands and accepts necessary measures and contributes to the objective.

In general, the strategy should cover IAS with the exception of areas already addressed in other regulations, i.e. plant pests, animal diseases, IAS in aquaculture.

The strategy should follow general principles. Some major principles have been so far identified during the discussion with MS and stakeholders:

- Precautionary principle
- Subsidiarity principle
- Cooperation
- Solidarity principle
- Public involvement

This proposed strategy is based on existing documents, i.e. CBD Guiding Principles, the European Strategy on IAS (adopted by Bern Convention), and it is using the best examples of various other institutions and initiatives.

Island ecosystems are very vulnerable to IAS and it should be discussed more in detail during the consultation, if there is a need for special measures. This applies also to overseas territories.

Note: Proposed measures, which are briefly described below, are discussed more in detail in Annex I.

7.1. The three-stage hierarchical approach

The strategy should follow a three-stage hierarchical approach in line with recommendations of CBD in adopted Guiding Principles:

1. Prevention – Prevention is generally far more cost effective²⁵ and environmentally desirable than measures taken following introduction and establishment of IAS. Priority should be given to preventing the introduction of IAS into the EU and spread between MS.
2. Early detection and rapid eradication – If an IAS has been introduced, early detection and rapid eradication is the most cost effective way of preventing its establishment and wider spread (see Annex 2).
3. Long-term control and containment – if eradication is not feasible, IAS population should be controlled in order to prevent further spread. Control measures should be implemented.

The three-stage hierarchical approach addresses new introductions (via prevention) as well as established species (via steps 2 and 3).

7.1.1. Prevention

List of IAS

IAS species need to be identified in order to target other measures. There is a need to develop a scientifically based methodology for risk assessment of species as a basis for developing lists for regulating the spread of IAS. In principle, three list systems are possible:

- "black list", which identifies prohibited or strictly regulated species;
- "white list" which identifies low risk or benign species for which perhaps no more than a basic standard of behaviour or good practice might be appropriate;
- "grey list" for species whose potential is not yet known and has yet to be assessed for risks, these would be subject to regulation or precautionary measures until such time as they could be assigned to either of the other lists.

Other options include a mechanism whereby controls apply unless a species appears on a list of un-restricted species (white list).

For the development of lists, agreed, scientifically based, methodology on risk assessment must be used. The risk assessment should be developed by experts (institution or working group) and should build on already developed and widely accepted risk assessment methodologies, e.g. EPPO. Risk assessment should also serve as a tool for identifying priority IAS for urgent action, i.e. eradication, control and containment.

Administrative procedure for adoption of lists should be very flexible to allow rapid response to new threats and at the same time it should involve all MS (and stakeholders). As it is not today possible to identify all IAS, such procedure for adopting the IAS list should reflect the latest scientific knowledge and natural evolution (linked e.g. to ecosystem dynamics or climate change). At the same time it should allow consideration of regional differences in environment and of environmental effects of IAS.

The scope of lists (national /EU), type of list (black white, grey) and nature of lists (legally binding/advisory/information for awareness rising; addressing import into EU only/movement within EU; for intentional introduction only or for all kind f introduction) should be discussed together with discussion on measures to address IAS. It should also be noted that legally binding measures require strict (long) risk assessment procedures while a more voluntary

²⁵ See Annex 2

approach allow more flexibility but needs to be accompanied by very efficient awareness raising campaigns and ad hoc labelling of commercialised products.

Intentional and unintentional introduction

Prevention efforts should begin at the place of origin or export of the IAS. At the place of import – at the border, measures need to be taken to prevent unwanted introductions, e.g. border controls, quarantine measures. Measures should cover both, import to the EU from third countries and trade between MS.

Measures could be divided as for:

- Intentional introduction
 - The intentional release of IAS into the wild for economic reasons needs to be controlled and prohibited.
 - Control of import of species should be developed and introduced with the aim of stopping legal imports and trade of IAS (e.g. as ornamental plants, pets, etc.).
 - Legal instruments could be used on banning imports and controlling trade of listed IAS at the EU level, as well as to consider regional aspects (e.g. species that are invasive in the Mediterranean region may not be invasive in the Nordic region).
- Unintentional introduction
 - The main pathways should be identified and analysed in depth. These pathways should include tourism, ballast water, air transport, hunting, etc.
 - Unintentional introduction includes a large number of sectors, such as fisheries, agriculture, forestry, horticulture, shipping, ground and air transportation, construction projects, landscaping, aquaculture, tourism, the pet industry, game-farming, etc.
 - The unintentional introduction would be probably best addressed by measures as public awareness and information, voluntary approaches (e. g development of best-practice techniques, codes of conducts).
 - Existing mechanisms should be preferably used, e.g. Ballast Water Convention.

Information exchange and early warning system

A system for exchange of information and early warning should be developed at EC level (it is included as a priority action in Biodiversity Communication Action Plan). A central database of information on IAS in Europe, including an ‘inventory’ of IAS in Europe, a database on control measures, and an alert system for new arrivals should be established. It should preferably build on existing networks (e.g. DAISIE, NOBANIS). The information system would gather general information as well as national experiences and field observations. The early warning system would be activated once a new potential IAS is identified. It should have a list of relevant administration/sectors/experts to be informed quickly.

7.1.2. Early detection and rapid eradication

A surveillance system needs to be established (as a part of early warning information system). Detected IAS should be eradicated within a limited period of time before the population is established, i.e. as soon as possible. Early action has been proven to be much more economically and environmentally effective (see Annex 2).

Currently the early detection is on ad hoc basis in most MS and the possibility for more systematic approach should be considered.

There is a need for a co-ordinated approach by MS, e.g. species eradication plans could be developed and approved at the EU level and implemented in a co-ordinated way, esp. in the case of cross-border impacts and in the case of funding from EU funds. At the same time development of such plans should not delay action taken. Rapid action rather than long approval process of plans should be preferred.

Public understanding is crucial to avoid public protests (e.g. animal right groups).

7.1.3. Long-term control and containment

If the IAS becomes established, appropriate management responses are needed (eradication, containment, control) at the relevant geographical scale. Species management plans co-ordinated throughout MS and, approved at the EU level, could be considered, esp. in the case of cross-border impacts and in the case of EU funding. Responsibilities (EU or MS) need to be clarified as well as potential scope (region – biogeographical region, species distribution region, etc.). This would be without prejudice to MS taking action that they deem to be necessary to address IAS within their territory.

7.1.4. Restoration of native biodiversity

Species, habitats and ecosystems after an invasion can be assisted in recovering. Measures to support restoration of native biodiversity or re-introduction of native species could be taken. Restoration plan could be a part of monitoring programme after eradication. Responsibilities (EU or MS) need to be clarified.

7.2. Horizontal issues

7.2.1. Communication, education and public awareness

Informed and engaged public could be very important in addressing IAS issue. Administrative / legal instruments cannot cover all aspects of IAS.

The aim of communication, education and awareness activities should be to build a sense of responsibility amongst European citizens with regard to imports, exports and unintentional introduction of potential IAS to and from third countries, their movement in the intra-Community trade zone, and also in relation to eradication and/or control programmes where public support can be crucial in achieving a successful outcome. A better informed public would probably bring fewer alien species into their gardens and ponds. An important

segment of these activities would be directed towards policy makers and as well as to sectors vulnerable to unintentional introduction.

Important segment would be retail sector and emphasis should be put on prevention and potential escapes of species. Voluntary instruments could be used to involve retailers.

The other major objective of public awareness would be to support an acceptance by public to measures addressing IAS. Public is more sensitive to eradication of some species, esp. mammals and birds e.g. grey squirrels, thus more communication would be needed here.

Communication and awareness raising activities should address all relevant levels: EU, national, regional, local.

7.2.2. Improved co-ordination and building partnerships

IAS are by the CBD recognised as a horizontal issue. Aside from causing damage to biodiversity, they have also significant negative social and economic impacts. Potential measures to manage the issue could include: trade, international co-operation, agriculture, forestry, climate change, tourism, financing, aviation, transport, shipping, etc. A joint institutional body (e.g. working group, committee) should be established first at the level of the Commission to involve different DGs (e.g. as continuation of current informal inter-institutional working group). Wider involvement of MS and stakeholders (esp. relevant industry) is needed to develop and implement the EU policy. Current bodies, e.g. BEG (Biodiversity Expert Group), should be used as much as possible. Establishment of specific "board" for IAS is other option which needs to be considered. E.g. in the USA National Council on IAS has been established in 1999 involving various departments. Future EU co-ordination scheme would depend on the type of policy options selected.

As for communication, co-ordination should be improved at all levels, i.e. EU, national, regional, local.

7.2.3. Support of action at Member States level

The IAS issue should be strengthened at the MS level. There is a strong need for development and implementation of national strategies on IAS. Due to cross-sectoral nature of IAS, MS should be encouraged to include all involved sectors and to develop wide consultation process. It is important to link national and regional strategies.

There is a need to support MS with relevant information and existing web based instruments could be used for this purpose, e.g. EC CHM²⁶.

7.2.4. Knowledge base

Further development of research should be supported and streamlined building on the existing European frameworks. It would be important to analyse research gaps and needs and to ensure that there is a good balance between research on assessing the risks and extent or severity of the problem, e.g. prediction of invasion for new species, and research into developing cost effective control and management methods, e.g. bio-control. Major knowledge gaps exist in the field of the magnitude and pathways of Invasive Alien Species impact on ecosystems, and

²⁶ EC Clearing House Mechanism, <http://biodiversity-chm.eea.europa.eu/>

on how climate change will affect biological invasions. The integrated approach initiated in the ALARM project should be pursued further.

Monitoring and reporting, incl. indicators, should be supported in order to obtain feedback on policy effectiveness. Duplication with other existing monitoring and reporting requirements should be avoided to minimise need for resources.

Results of research and monitoring should feed into information system and also should support exchange of information on best and bad practices.

7.2.5. Financing

Adequate financing for dealing with IAS should be ensured and sought. If new measures are required from member state, the financing issue will be important. The option of EU special funding for IAS, similar to solidarity fund under plant protection policy, should be analysed. Currently it is mainly LIFE+ programme supporting action on IAS through specific projects. However, outside such a specific nature conservation project-oriented regime and project based financing, there would be a need to support a number of other actions and to develop more flexible mechanisms. Early response is important.

Possibilities for use of other EU funding mechanisms should be sought, esp. for "after 2013" period. Also possibilities for involvement of private sector should be analysed, esp. of insurance sector, and thus to apply polluter-pays-principle.

7.2.6. EU as an exporter of IAS

The EU is an important exporter and as such contributes to spread of IAS to other countries. The EU is as well important world donor and IAS issue is not addressed in EU development work. The EU should take the responsibility for global IAS issues.

7.3. Major conclusions of the meeting on 22 June 2007 related to general IAS policy

- EU coordinated approach was supported.
- Future EU framework should be balanced and realistic and should respect subsidiarity principle.
- The strategy on IAS could have a legal framework, preferably possibilities of using existing legislation on control of trade with species (wildlife trade, plant health and animal health legislations) should be analysed and instruments to fill gaps proposed.
- Most significant gaps for the EU policy were identified in the field of trade and information exchange.
- Newly developed system to address IAS should not create heavy administrative burdens neither at EU or member states level.

Annex 1: Measures in more detail

This section presents possible measures in two alternatives – compulsory/legally binding and voluntary. Only for "intentional introduction" there are two separate alternative measures developed (no. 1 and 2).

1. Prevention

1.1. *Intentional introduction*

There are two opposite alternatives possible: new complex legislation or the integration of IAS issue into the current legal framework. The alternative of no action is not discussed.

1. Measure: New legislation on first and ongoing import into and trade within EU territory

- Legislation to regulate and control import of alien species for horticulture, pets market, falconry, agriculture, forestry. Species imported for the first time to the EU should be subject to a risk assessment concerning invasiveness/impact on native biodiversity. Based on this risk assessment the species will be placed on the list – black list (import forbidden) or white list (import allowed without limitation). IAS already established within EU should be subject to this as well.
- Imports for scientific research purposes as well as educational purposes could be allowed but controlled subject to a risk assessment procedure and strictly regulated should it pose a high risk.
- Development of lists should be EU-wide, co-ordinated and dynamic. Committology procedure seems to be appropriate and flexibility must be ensured. An EU list should have EU coverage as well as regional/country coverage (MS or biogeographical regions?).
- New EC legislation would be necessary.
- The above described legislation should also allow control of trade within the EU territory. Species native in some European regions could become invasive in others. Room for flexibility for MS should be ensured.
- Institutional needs: evaluation of risk assessments at national level (e.g. inspectorates, MoE?); EC level co-ordination and lists approval. Species imported to the EU should be subject to a risk assessment concerning invasiveness/impact on native biodiversity. Based on this risk assessment the species will be placed on the list – black list (import forbidden) or white list (import allowed without limitation).

Strengths	Weaknesses
- would address majority of new entrants	- new structures needed at MS level
- comprehensive, would cover all species	- new structure within EC (co-ordination) needed
- centralised responsibilities linked to environmental authorities	- opposition from importing industry could be expected (and from plant health?)

2. Measure: Integration of IAS into existing legislation on animal and plant health and wildlife trade

- Robust systems protecting commercial crop and other plants and commercial animals against imported pests and diseases are in place in the EU. These include control measures (incl. border control, quarantine), eradication and monitoring. Co-ordination is ensured between MS and EC.
- EC Regulation on wildlife trade²⁷ implements CITES (Convention on International Trade in Endangered Species of wild fauna and flora) in the EU to regulate trade in endangered species and in addition 4 animal IAS species²⁸ are banned from import into the EC through listing on the Annexes of this Regulation.
- Theoretically it would be possible to make use or broaden the scope of existing legislation:
 - o Plant health – to include plant IAS, which are harmful to biodiversity, not only to commercial plant health and to include invertebrates that are not considered pests or invertebrates that are imported for bio control purposes
 - o Animal health – to include pathogens and parasites harmful to all animals, not only to economically valuable animals
 - o Wildlife trade – to regulate the introduction and holding or movement of more IAS species (which will not be covered by the two categories above)
- Remaining gaps should be filled appropriately

Strengths	Weaknesses
- would address the majority of new entrants, if negotiated	- system is confusing and difficult to have an overview of due to different competences (animal and plant health at DG SANCO and at Ministries of Agriculture in MS; wildlife at DG ENV and Min. of Environment). The goals of existing instruments don't fully cover the IAS concern. There are separate EC Committees dealing with animal and plant health and wildlife trade.
- structures in place in MS and EC	- difficult to co-ordinate
- WTO is familiar with these systems	- how to develop complex list of IAS??
- no new legislation needed	- opposition from industries and sectors importing IAS
	- high risk that complex system will not be achieved

²⁷ Regulations 338/97/EC and 865/2007/EC - The Commission is presently studying the effectiveness of the Wildlife trade regulations. The scope of the Regulations is to protect species by regulating international trade therein.

²⁸ Species listed are the red-eared slider (*Trachemys scripta elegans*); the American bullfrog (*Rana catesbeiana*); the painted turtle (*Chrysemys picta*); and the American ruddy duck (*Oxyura jamaicensis*).

<p>- plant health – IPPC applies to weeds and other species that have indirect effects on plants and also applies to the protection of wild flora (standard ISPM No. 11 (2004) - Pest risk analysis for quarantine pests including analysis of environmental risks and living modified organisms)</p>	<p>- wildlife trade regulation – not as a prevention, only for established species²⁹; the regulation is not sufficient to deal with all problems related to IAS and all IAS³⁰. IAS species, included in the Annexes in the Regulation, can inadvertently be protected by implementing measures in Member States that are designed to protect the bulk of the species in the Annexes. Regulation covers import to EU and can cover restrictions on holding or movement of live specimens, but these are not used for the present listed species. Regulations do not address species that are native to one part of the Community (where they may even be under threat) but are IAS in another.</p>
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1.2. Unintentional introduction

3. Measure: Unintentional introduction under control

The main pathways should be analysed in depth. There are however already existing international instruments or on-going activities, that the EU could benefit from. Some issues could be improved by soft instruments or targeted communication/information campaign.

Existing international instruments/activities:

- Convention for the Control and Management of Ship's Ballast Water and Sediments under the International Maritime Organisation
 - o ballast water is the main pathway for aquatic IAS, which would be secured under this Convention;
 - o The EC should strongly encourage MS to ratify – task from Biodiversity Communication Action Plan (in August 2007 there were only 10 contracting states to the Convention, of which 3 MS from the EU: Finland, The Netherlands and Spain).
- International Civil Aviation Organisation – Resolutions on introduction of IAS via civil air transportation
- IMO Convention on the Control of Harmful Antifouling System on Ships
- EPPO – pest risk analyses and recommendations to member states
- EC should support activities developed by these organisations

²⁹ Council regulation 338/1997 on wildlife trade: "live specimens of species for which it has been established that their introduction into the natural environment of the Community presents an ecological threat to wild species of fauna and flora indigenous to the Community."

³⁰ Adrados, Briggs (eds.) (2002): Study of application of EU wildlife trade regulations in relation to species which form an ecological threat to EU fauna and flora, with case studies of American bullfrog (*Rana catesbeiana*) and red-eared slider (*Trachemys scripta elegans*). Study report to the European Commission. Amphi Consult, Denmark.

"Soft instruments"

- Sectoral activities, such as fisheries, agriculture, forestry, horticulture, shipping, ground and air transportation, construction projects, landscaping, aquaculture, tourism, the pet industry and game-farming, are often pathways for unintentional introductions. Environmental impact assessment of such activities should address the risk of unintentional introduction of IAS. There is potential to consider risks of unintentional introduction of IAS in the context of EIAs and SEAs and environmental liability. Soft instruments, such as codes of conducts, standards, etc., could deliver results in controlling IAS.
- For unintentional introduction, esp. by tourists, targeted information and public awareness campaign could be developed as most suitable measure. As opposite, stronger measures could be considered, as e.g. strict border control of tourists similar to USA, New Zealand; disinfection on entrance to the EU, etc. However at present the border control of passengers inside the EU is in principle abolished and thus such strong measures are not feasible.

4. Measure: Early warning and information exchange system

- Information system should be developed at EC level (it is included as a priority action in Biodiversity Communication Action Plan). The early warning system should include the establishment of a central database of information on IAS in Europe, including an 'inventory' of IAS in Europe, a database on control measures, and a surveillance and alert system for new arrivals.
- basic pre-requisite of the overall EU framework which would enable to MS to take measures.

Compulsory system	Voluntary system
<ul style="list-style-type: none"> - Information system should be legally binding and structured, so all MS provide necessary information. - new EC legislation necessary - new structures needed (information system itself – hardware + software, gathering data, need to develop information flows at EU level and in MS, resources to update and keep the system) 	<ul style="list-style-type: none"> - Information system should be developed at EC level, but on voluntary basis. - new structures needed (information system itself – hardware + software, gathering data, need to develop information flows at EU level and in MS)
<i>Strengths</i>	<i>Strengths</i>
<ul style="list-style-type: none"> - consistent information and early warning system would provide necessary information to all stakeholders; - such system would allow early action on IAS 	<ul style="list-style-type: none"> - easier for MS than compulsory system; - allow more flexibility and can be established faster.
<i>Weaknesses</i>	<i>Weaknesses</i>
<ul style="list-style-type: none"> - new requirements for information from MS - new information structures needed 	<ul style="list-style-type: none"> - new requirements for information from MS - new information structures needed

	<ul style="list-style-type: none"> - without legislative background it cannot work properly, e.g. gaps in geographical coverage. Some MS may decide not to monitor, not to provide information, etc.
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Box

Single market and WTO

Single EC market and WTO are perceived by MS as a barrier to dealing with IAS.

Measures undertaken either by the Community or by the MS to deal with IAS would need to fit into a legal framework constituted by the rules on the Single Market and WTO obligations.

Single Market is based on the principle of free movement of goods within the EC. MS are not permitted to impose quantitative restrictions on imports or exports or measures having equivalent effect to those (Articles 28 and 29, EC Treaty), but this 'shall not preclude prohibitions or restrictions on imports, exports or goods in transit justified on grounds of [...] the protection of health and life of humans, animals or plants [...]. Such prohibitions or restrictions shall not, however, constitute a means of arbitrary discrimination or a disguised restriction on trade between Member States' (Article 30). There are only 2 ECJ cases on IAS. Certain guidance on the application of Article 30 exceptions can be derived from a more general case law of the ECJ concerning trade in goods.

As trade in goods falls within the exclusive competence of the European Community (common commercial policy) legal measures regulating imports to/ exports from the EU would need to be enacted at Community level.

WTO

Any measure introduced by the Community to regulate trade in IAS would need to be compatible with GATT and SPS Agreements. Article XI GATT similarly to the provisions of the EC Treaty prohibits quantitative restrictions on trade in goods among WTO Members. Certain exceptions to this general rule are possible under GATT Article XX which allows for adoption and enforcement of measures necessary for the protection of human, animal, plant life or health. Such measures cannot however be applied in a manner that would constitute arbitrary or unjustifiable discrimination or a disguised restriction to international trade. It would be considerably easier to prove that such criteria have been fulfilled in cases where the problem has been recognised by the international community. The WTO Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement) requires the WTO Members to base their sanitary and phytosanitary measures on international standards, guidelines and recommendations where they exist. Measures based on international standards developed under Codex Alimentarius Commission for food safety, under IPPC for plant health and under OIE for animal health benefit under the SPS Agreement from a presumption of consistency with SPS and GATT. WTO Members may, however, also apply measures that differ from international standards where this is scientifically justified by risk assessment. Basic WTO rules must be followed, e.g. non-discrimination, transparency, consistency, necessity, etc. Use of species listing techniques, e.g. black list, white list, is advised as useful tool³¹.

³¹ Shine (2006): Overview of existing international/regional mechanisms to ban or restrict trade in potentially IAS. Document prepared for the Convention on the Conservation of European Wildlife and Natural Habitats

E.g. New Zealand, which has developed robust system on the restriction of IAS import, has developed risk assessment for IAS which is recognised under SPS.

2. Early detection and rapid eradication

5. Measure: Surveillance system for early detection

- see Measure 4 above

6. Measure: Rapid eradication programmes

- Rapid eradication programmes for newly arriving IAS should be developed and implemented in respective MS in order to prevent spread of IAS and higher economic costs linked to later control.
- on financing see Measure 8 below;
- opposition from civil society (e.g. animal rights NGOs) could be expected, thus a proper communication strategy is needed;
- efficiency of eradication programmes depend on efficiency of preventive measures (control of introduction and surveillance and early detection).

Compulsory programmes	Voluntary programmes
<i>Strengths</i>	<i>Strengths</i>
- coordinated approach would be more effective	- probably stronger support from MS
- early eradication at first outbreak would save costs of later actions in the case of wider spread of IAS	
<i>Weaknesses</i>	<i>Weaknesses</i>
- new demand for MS	- the effectiveness depends on activities of MS
- financially demanding and at the same time not very predictable	- risk of gaps

3. Long-term eradication, control and containment

7. Measure: Eradication, control and containment programmes

- Eradication, control and containment programmes for EU-wide established IAS should be developed at the EU level to prevent further spread. Programmes should be jointly agreed upon by MS and Commission and implemented by MS.
- on financing see Measure 8 below;

- opposition from general public (e.g. animal rights NGOs) could be expected; thus proper a communication strategy is needed.

Compulsory programmes	Voluntary programmes
<i>Strengths</i>	<i>Strengths</i>
- joint control of IAS would prevent costs of further IAS spread	- probably stronger support from MS
<i>Weaknesses</i>	<i>Weaknesses</i>
- new demands on MS	- if this measure is voluntary, effectiveness depends on activities of MS and their willingness to pay
- financially demanding	
- without centralised EU financing mechanism MS probably would oppose	

4. Horizontal issues

8. Measure: Financing mechanism

- Early detection, eradication, control and containment measures as well as restoration measures would be financially demanding. At the same time geographical distribution of outbreaks would differ, e.g. states on the EU borders have higher probability of new entrants than inside states. Non-action of a MS in the frame of approved control programme could neglect results achieved in other MS.
- Two alternatives of financing:
 - I. Centralised EU financial mechanism/fund could be established to cope with (according to priorities):
 1. Early eradication (at least)
 2. Eradication under EC programmes
 3. Control under EC programmes
 4. Containment under EC programmes
 - Development of such mechanism/fund could be economically justified (see Annex 2)
 - II. Financing provided by MS directly to particular measures

EU fund	National/MS funding
<i>Strengths</i>	<i>Strengths</i>
- easy access to funding	- no financial requirements on EC budget
- it would allow rapid response at EC level	
- it would prevent further costs caused by spread of IAS	
<i>Weaknesses</i>	<i>Weaknesses</i>
- new demand on EC funding	- the efficiency of the whole system might be weakened. It would work in some MS, in some not and IAS could spread and

	cause additional economic costs.
- new legislation necessary	- no coordinated actions

Effectiveness of early action compared to no-action

A. Benefit-cost ratios for managing IAS in the USA (table)³²

BOX 15			
BENEFIT - COST RATIOS FOR MANAGING IAS IN THE USA (BASED ON OTA, 1993) (\$US IN MILLIONS)			
Invasive alien species	Benefits of control/prevention/eradication	Cost (US\$)	Ratio Benefit - cost
Melaleuca	183.0	16.0	11.4/1
Water hyacinth	3.8	.28	13.6/1
Sea lamprey	296.0	9.8	30/1
Alfalfa blotch leafminer	17.0	2.0	8.5/1
Purple loosestrife	53.0	2.0	26.5/1
Mediterranean fruitfly	1,829.0	93.0	19.6/1
Foot and mouth disease	25,275.0	1013.0	25/1
Siberian log imports	64,704.0	39.0	1659/1

B. Example from UK

The estimated cost of eradicating Japanese knotweed (*Fallopia japonica*) was £1.5 billion in the UK in 2003. Research has estimated that in Wales alone, it would have cost £53.3 million for a three year eradication programme had it started in 2001, but the cost would now be £76 million for such a programme starting in 2007.³³

³² McNeely, J.A., H.A. Mooney, L.E. Neville, P. Schei, and J.K. Waage (eds.) 2001. A Global Strategy on Invasive Alien Species. IUCN Gland, Switzerland, and Cambridge, UK

³³ Information provided by the UK

Main driver's impact on biodiversity ³⁴

Figure 3. MAIN DIRECT DRIVERS

The cell color indicates the impact to date of each driver on biodiversity in each biome over the past 50–100 years. The arrows indicate the trend in the impact of the driver on biodiversity. Horizontal arrows indicate a continuation of the current level of impact; diagonal and vertical arrows indicate progressively increasing trends in impact. This Figure is based on expert opinion consistent with and based on the analysis of drivers of change in various chapters of the assessment report of the Condition and Trends Working Group. This Figure presents global impacts and trends that may be different from those in specific regions.



³⁴ Source: Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Biodiversity Synthesis. World Resources Institute, Washington, DC.

Abbreviations

ALARM	Assessing large scale environmental risks on biodiversity
BAP	Biodiversity Action Plan
BEG	Biodiversity Expert Group
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
COP	Conference of Parties
DAISIE	Delivering Alien Invasive Species Inventories for Europe
DG	Directorate General
DG ENV	DG Environment
DG SANCO	DG Health and Consumer Protection
EAP	Environmental Action Programme
EC	European Communities
EC CHM	European Communities' Clearing House Mechanism
ECJ	European Court of Justice
EIA	Environmental Impact Assessment
EPPO	European Plant protection Organisation
EU	European Union
GATT	General Agreement on Tariffs and Trade
GMO	Genetically Modified Organisms
IAS	Invasive Alien Species
IMO	International Maritime Organisation
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
MEA	Millennium Ecosystem Assessment
MS	Member States
NGO	Non-Governmental Organisation
NOBANIS	NOrth European and BAltic Network on Invasive alien Species
OIE	Office International des Epizooties (World Organisation for Animal Health)
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SEA	Strategic Environmental Assessment
SEBI 2010	Streamlining European 2010 Biodiversity Indicators
SPS	Sanitary and Phytosanitary measures

UNEP	United Nations Environmental Programme
WTO	World Trade Organisation