



**TECHNICAL SUPPORT TO EU STRATEGY ON INVASIVE ALIEN
SPECIES (IAS)**

**Policy options to minimise the negative impacts of invasive alien
species on biodiversity in Europe and the EU**

Service Contract No 070307/2007/483544/MAR/B2

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EXECUTIVE SUMMARY

This report forms part of a broader study for the European Commission to provide Technical Support for the Development of an EU framework on Invasive Alien Species (IAS). Building on evidence that IAS have significant negative impacts upon Europe's environment, key economic sectors and human well-being, it aims to identify policy measures and packages available to the Commission to minimise IAS damage to European biodiversity in an efficient and cost-effective manner.

IAS have risen rapidly up the global policy agenda in the last eight years. This report analyses developments at international and EU levels to identify emerging trends, lessons learnt and remaining gaps and weaknesses that need to be addressed.

Global policy supports stronger cross-sectoral coordination, economic valuation and targeted measures for introduction pathways, using science-based tools and information exchange and considering possible implications of climate change and other environmental pressures on species distributions. At EU (Community and/or Member State level), progress has been made on strategy development, species inventories, expanded capacity for risk assessment and targeted research. However, existing frameworks do not adequately protect EU biodiversity against existing and predicted risks resulting from biological invasions. Specific actions are needed to address trade-related pathways, crossborder impacts, solidarity among Member States and coordinated action in key sectors (e.g. agriculture, water, biodiversity, fisheries) that are closely integrated at EU level through the single market and common policies.

The report analyses a range of concrete measures for prevention, early detection and rapid response, long-term control and management, ecosystem restoration and cross-cutting and horizontal options, following a gradient from informal to formal approaches and considering possible administrative/resource implications. It takes account of experience gained in non-EU jurisdictions and considers scope for cost-recovery mechanisms to address the currently uneven distribution of costs and benefits of IAS action.

A series of alternative policy packages are proposed in the concluding chapter, ranging from non-legislative approaches through to options involving different types of new legislation. The analysis shows how component measures of these packages could be adjusted to vary the intensity of each package and makes a preliminary assessment of practicability and effectiveness of each package.

ABBREVIATIONS

6EAP.....	Sixth Environmental Action Programme
ACP.....	African, Caribbean and Pacific countries
AEWA.....	Agreement on the Conservation of African-Eurasian Migratory Waterbirds
ALARM.....	Assessing Large-scale environmental Risks for biodiversity with tested Methods
aquaculture Regulation.....	Council Regulation (EC) No 708/2007 concerning use of alien and locally absent species in aquaculture
Bern Convention.....	Convention on the Conservation of European Wildlife and Habitats
BWM Convention.....	IMO International Convention for the Control and Management of Ships Ballast Water and Sediments 2004 (not in force)
BAP.....	biodiversity action plan(s)
Biodiversity Communication.....	Communication on Biodiversity: Halting the Loss of Biodiversity by 2010 – and beyond (COM (2006) 216 Final) and Action Plan
birds Directive.....	Council Directive 79/409/EEC on the conservation of wild birds
CBD.....	Convention on Biological Diversity
CITES.....	Convention on International Trade in Endangered Species of Wild Flora and Fauna
CMS.....	Convention on the Conservation of Migratory Species of Wild Animals
CPM.....	IPPC Commission on Phytosanitary Measures
COM.....	Commission Communication
COP.....	Conference of the Parties
COPHS.....	EU Working Party of Chief Plant Health Officers
DAISIE.....	Delivering Alien Invasive Species Inventories for Europe
EAFRD.....	European Agricultural Fund for Rural Development
EC.....	European Community
ECJ.....	European Court of Justice
EEA.....	European Environment Agency
EFSA.....	European Food Safety Authority
EIA.....	environmental impact assessment
EPPO.....	European and Mediterranean Plant Protection Organization
EU.....	European Union
European IAS Strategy.....	European Strategy on Invasive Alien Species adopted under the Bern Convention
FAO.....	Food and Agriculture Organization of the United Nations
FP.....	EU Framework Programme on Research and Technological Development
GAEC.....	Good Agricultural and Environmental Condition
GISIN.....	Global Invasive Species Information Network
GISP.....	Global Invasive Species Programme
GMO.....	genetically modified organism
GRIS.....	Global Register of Invasive Species
Guiding Principles.....	<i>Guiding Principles for the prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species</i> annexed to Decision VI/23 adopted at 6 th meeting of the CBD COP in 2002 (The Hague, Netherlands)
habitats Directive.....	Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora
HELCOM.....	Convention on the Protection of the Marine Environment of the Baltic
IAS.....	invasive alien species
ICAO.....	International Civil Aviation Organization
ICES.....	International Council for the Exploration of the Sea
IGO.....	intergovernmental organisation
IMO.....	International Maritime Organization
IPPC.....	International Plant Protection Convention
ISPM.....	International Standard for Phytosanitary Measures
ISSG.....	IUCN Invasive Species Specialist Group
IUCN.....	International Union for Conservation of Nature
LIFE.....	Financial Instrument for the Environment
LMO.....	living modified organism
MEPC.....	IMO Marine Environment Protection Committee
MOP.....	Meeting of the Parties
MFD.....	marine strategy framework Directive (2008/56/EC)

MS.....	Member State(s)
NEOBIOTA	European Group on Biological Invasions
NISC	National Invasive Species Council, United States
NOBANIS.....	North European and Baltic Network on Invasive Alien Species
NPPO	National Plant Protection Organisation
OCT	Overseas Countries and Territories
OIE.....	World Organisation for Animal Health
OR.....	EU Outermost Region
OSPAR.....	Convention for the Protection of the Marine Environment of the North-East Atlantic
plant health Directive.....	Directive on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread in the Community (2000/29/EC) as amended
PRA.....	pest risk analysis
RA.....	risk analysis
renewable energy Directive.....	Council Directive 2009/28/EC of 23 April 2009 on the promotion of the use of energy from renewable sources
SEA.....	strategic environmental assessment
SEBI.....	Streamlining European 2010 Biodiversity Indicators
SIA	sustainability impact assessment
SPS Agreement	WTO Agreement on the Application of Sanitary and Phytosanitary Measures
UK.....	United Kingdom
UNCCD.....	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Programme
UNFCCC.....	United Nations Framework Convention on Climate Change
US	United States
WFD.....	water framework Directive (2000/60/EC)
WGBOSV	ICES/IOC/IMO Working Group on Ballast and Other Ship Vectors
WGITMO.....	ICES Working Group on Introductions and Transfers of Marine Organisms
WHO.....	World Health Organisation
wildlife trade Regulation.....	Council Regulation 338/97/EC and Commission Regulation 1808/2001/EC), as amended by Commission Regulation 252/2005
WoNS.....	Weed of National Significance (Australia)
WTO	World Trade Organisation

1 INTRODUCTION

1.1 Scale of the IAS problem in Europe: the need for concerted action

The need for policies and actions to address invasive alien species (IAS) within the European Union was formally recognised in 2001¹ and designated as a priority for EU biodiversity policy in 2006². In 2008, the first assessment of IAS impacts at the European scale was carried out to provide a more quantitative picture of the scale of the IAS problem in Europe and to support the development of an EU framework on IAS. The **Assessment of the impacts of IAS in Europe and the EU** (Kettunen et al. 2009³) provides evidence that IAS have demonstrated significant negative impacts in Europe and presents an economic case for improving the control of IAS into and within the EU.

The Assessment recognises the importance of introduced species (i.e. non-native species that are not considered as invasive) for biological production systems that underpin European economies (agriculture, forestry, fisheries) and/or are highly appreciated in society (e.g. ornamental and recreational use of plants, pet animals, exotic birds, game, fish for angling and aquaculture). However, the results of the Assessment demonstrate the overall negative impacts of IAS (introduced species that have become invasive) in Europe. Whilst some IAS can bring monetary and social benefits to humans despite their invasiveness and threat to biodiversity (e.g. some IAS used as game and ornamentals), the “net” impacts of these species were found to be mainly negative⁴.

The negative impacts identified by the Assessment include:

- extensive ecological impacts on Europe’s native species, habitats and ecosystem functions across terrestrial, freshwater and marine ecosystems, with IAS documented as a threat to many species and habitats threatened at global or European level;
- disproportionately high impacts on the biodiversity of Europe’s islands, including the EU Overseas Entities, which often underpins local livelihoods and economies;
- impacts on almost all ecosystem services that underpin human wellbeing, biological production systems and recreational/tourism amenity (e.g. food and water provisioning, regulation of water, fire and flood regimes, erosion control)
- socio-economic effects on affected individuals and communities through harm to human health (e.g. disease vectors, parasites, allergies, asthma) and/or to local livelihoods;
- significant economic impacts on biological production and other sectors at European level. The Assessment estimated the cost of IAS damage and control measures as at least 12 billion EUR / year. Out of this total, sector-specific information for which

¹ Presidency Conclusions, Goteborg European Council, 15-16 June 2001; 6th Environmental Action Programme 2002.

² Communication from the Commission on Halting the Loss of Biodiversity by 2010 and Beyond (COM(2006)216) and associated Action Plan (SEC(2006)621).

³ Task 1 Report prepared under Service Contract N^o 070307/2007/483544/MAR/B2: analyses the environmental, social and economic impacts of 125 selected IAS in Europe for which documented evidence is available.

⁴ Positive socio-economic impacts on ecosystem services, including use of IAS for game, wood, aquaculture, fur and soil stabilisation, were often accompanied by negative ecological impacts (e.g. on native species) or by negative impacts on other ecosystem services.

evidence was available shows that IAS cost almost 6 billion EUR / year to key sectors, namely agricultural, fisheries/aquaculture, forestry and human health (see Table 1.1).

Table 1.1 Documented monetary costs of IAS per economic sector in Europe (adopted from Kettunen et al. 2009)

Sector	Documented damage cost (e.g. lost revenue)	Documented control costs	Comment
Agriculture	5084 billion EUR/year	30 million EUR/year	
Fisheries/aquaculture	240 million EUR/year	No information	Documented information very limited
Forestry	134 million EUR/year	26 million EUR/year	Documented information very limited
Health sector (excl. animal and human epidemic diseases eg AIDS, influenza)	70 million EUR/year	13 million EUR/year	Documented information limited
Tourism/recreation	No information	No information	
One-off animal disease outbreaks		e.g. BSE estimated at 2.8 billion EUR/year for EU-15 in 2003	

These figures are considered to be a significant under-estimate of real impacts of IAS in Europe for the following reasons:

- the impacts of only about 10 percent of invasive species in Europe are known to ecologists and economists (Vilà et al, 2009);
- monetary estimates for the cost of species extinctions and loss of biodiversity are not commonly available;
- data are inadequate for certain regions (east and south-east Europe) and for some large taxonomic groups (plants, invertebrates and marine taxa); and
- economic impact data are only available for a third of the species studied, for a limited range of taxonomic groups (terrestrial plants and vertebrates in the EU) and for key sectors: they are inadequate/non-existent for important affected sectors such as forestry, fisheries and tourism. Also, there is also only limited amount of information available on the monetary costs of IAS to infrastructure.

It is widely recognised that globalisation creates opportunities for species to move beyond their natural biogeographical barriers. As demand for trade, travel and transport expands within the EU and with the rest of the world, intentional and unintentional introductions of new species are predicted to increase along with the spread of already established species. What is less understood is that environmental degradation caused by pollution, habitat loss and land-use change already create favourable conditions for some introduced species to establish and spread. Looking to the future, the effects of climate change are predicted to aggravate the situation.

Climate change has the potential to modify IAS impacts by affecting the whole process of an invasion (sources, pathways and destinations) and further increasing ecosystem vulnerability. Altered species' distributions due to climate change may make it easier for:

- alien species to become established outside their natural range;

- species that are currently non-invasive to become invasive in native ecosystems;
- already-invasive species to turn into greater or reduced threats, potentially affecting the viability of current IAS management strategies.

The IAS issue facing the EU is thus integrally linked to drivers and pressures associated with climate change and broader environmental degradation (Capdevila and Zilletti 2008, Huntley 2007).

The Assessment demonstrates that IAS are a growing cross-sectoral and transboundary issue affecting the whole of the EU, with severe impacts predicted to further increase in response to environmental pressures including climate change. Based on these findings, there is a clear case for addressing IAS issues and impacts through a coordinated EU policy framework.

1.2 Policy challenges for the European Union in 2008

Implementing proportionate and workable policies at the scale of the EU raises unique difficulties faced by no other region in the world. The EU already comprises 27 countries, mostly sharing land boundaries; includes many islands, including isolated biodiversity-rich islands, amongst its seven outermost regions; and operates in association with a further 21 overseas countries and territories across all oceanic regions. Future enlargement may further extend the range of EU biogeographic regions. Very few species are likely to be invasive throughout the EU but many IAS can have impacts across borders or throughout shared river basins or regional seas.

Current IAS impacts can be seen as “a cost of the way society has chosen to organise its trade”⁵. Trade policy, including the operation of the Single Market, is the exclusive competence of the Community. The future EU IAS framework will need to minimise the entry and/or further spread of potential IAS into and within the EU without disproportionately restricting trade in wanted goods and commodities or travel and transport opportunities. In parallel, the EU could contribute through its external policies to minimise IAS risks associated with export pathways, including development cooperation.

In other relevant policy areas, the Community shares competence with MS and has the power to develop legislation and mandatory standards, coordinate MS responses and/or direct EU funds towards defined actions. Here, a key challenge for the EU will be to determine what action should be taken at Community level and what actions would be more efficiently left to MS consistent with the principle of subsidiarity and proportionality.

2 OBJECTIVES AND SCOPE OF THE REPORT

This report is the second task of a broader study to provide Technical Support for the Development of an EU framework on IAS⁶, following on from the Task 1 report (**Assessment of the impacts of IAS in Europe and the EU**, see 1.1 above)

⁵ Patrick Murphy, DG Environment, European Conference on Invasive Alien Species (Madrid, 15-16 January 2008).

⁶ Service Contract No 070307/2007/483544/MAR/B2.

The report's main objective is to identify policy measures and packages available to the Commission to minimise IAS damage to European biodiversity in an efficient and cost-effective manner. Its content and recommendations take account of the Biodiversity Communication 2006⁷ which called for the development of an EU Strategy on Invasive Alien Species to substantially reduce impacts of IAS and alien genotypes in line with the CBD Guiding Principles⁸ and the Bern Convention's European Strategy on IAS⁹. These instruments endorse the widely-recognised 'three-stage hierarchy' that prevention of unwanted introductions is the most cost-effective, efficient and least environmentally damaging approach, followed by eradication where feasible or long-term containment/control.

The report consolidates information on IAS policy and practice at international, Community and Member State levels and discusses a comprehensive range of tools that could be combined in various ways within the future EU Strategy on IAS. It draws on experience gained and lessons learnt in and beyond the EU to provide preliminary insights on the feasibility of different approaches in the EU context.

The report's Conclusions present a small number of possible policy 'packages' to guide the Commission's selection of options to undergo full impact assessment. The results of this assessment will contribute to the preparation of a detailed Communication on a future EU IAS framework in 2010.

The report is cross-sectoral and covers policy tools for terrestrial, freshwater and marine ecosystems, giving specific consideration to the vulnerability of islands to biological invasions. Although its main focus is biodiversity-related, it recognises that many IAS have cross-cutting impacts (e.g. on primary production sectors, the natural environment, public health) that need to be considered as an integral part of policy development. The report addresses emerging issues as well as known pathway risks.

3 CONTENT, METHODOLOGY AND USE OF TERMS

This report builds on an earlier review and gap analysis of international, Community and MS frameworks carried out for the Commission (Miller et al. 2006)¹⁰. Starting from this 2006 baseline, the report:

- outlines recent developments and emerging issues in international and regional fora (section 4.1 & Annex 1);
- summarises developments in EC instruments, policies and research to mid-2009, incorporating information on their application and effectiveness provided through Commission-MS consultations and/or updated MS reports (section 4.2 & Annex 2);

⁷ Objective 5, Biodiversity Communication (COM(2006)216) and Action Plan (SEC(2006)621).

⁸ Guiding Principles For The Prevention, Introduction And Mitigation Of Impacts Of Alien Species That Threaten Ecosystems, Habitats Or Species (Annex to CBD Decision VI/23, 2002).

⁹ Genovesi and Shine 2004 (available for download at http://www.coe.int/t/dg4/cultureheritage/conventions/Bern/T-PVS/sc24_inf01_en.pdf).

¹⁰ Miller, C., Kettunen, M. & Shine, C. (2006) Scope Options for EU Action on Invasive Alien Species (IAS). Final report for the European Commission. Institute for European Environmental Policy (IEEP), Brussels, Belgium (contract ENV.B.2/SER/2005/0078r).

- summarises developments in MS frameworks and activities to December 2008, including for EU Overseas Entities (section 4.3 & Annex 3);
- provides an updated gap analysis to highlight key issues that still need to be addressed through action at EU level (section 4.4);
- outlines objectives and principles for future policy development (section 5.1);
- analyses a range of vertical and horizontal policy measures that could be combined in different ways as part of a comprehensive EU framework for IAS (sections 5.2-5.4);
- sets out conclusions and recommendations to the Commission on a shortlist of policy packages of varying intensity (see Chapter 6).

The report was produced through desk-based research on policy developments at international, EC and MS level (Annex 1-Annex 3), in selected complex jurisdictions that face some of the EU's particular challenges (Annex 4) and on financial mechanisms potentially applicable to IAS pathways (Annex 5). It was supported through direct contact with MS focal points, members of the Bern Convention IAS expert working group, experts included in the DAISIE expert register and lead IAS personnel in third country jurisdictions (see Chapter 8 for Acknowledgements).

Inputs also came from extensive stakeholder consultations in the following fora:

- European Conference on Invasive Alien Species (Madrid, 15-16 January 2008), jointly organised by the Fundación Biodiversidad and the European Commission;
- Convention on Biological Diversity (13th meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), Rome, 18-22 February 2008; 9th meeting of the Conference of the Parties (COP), Bonn, 19-31 May 2008);
- EC-MS consultations on the Development of an EU Framework on Invasive Alien Species (four one-day meetings held at the Commission, Brussels in June and October 2007 and March and June 2008);
- Great Britain Non-Native Species Forum (Millennium Stadium, Cardiff, 29 May 2008);
- Conference on The European Union and its Overseas Entities: Strategies to counter Climate Change and Biodiversity Loss (Réunion, 7-11 July 2008, organised by IUCN-World Conservation Union with EC support); and
- 5th European Conference on Biological Invasions: Neobiota – towards a synthesis (Prague, 23-26 September 2008).

Lastly, the terminology used in this report (as in Kettunen et al. 2009) follows the definitions used in the CBD Guiding Principles unless otherwise indicated (see Box 1).

Box 1: Definition of key terms under the CBD Guiding Principles

'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. NB: some international/ regional/national instruments (eg Conventions) use the terms *'exotic species'*, *'non-indigenous species'* or *'non-native species'* when referring to *'alien species'*. In the report the term *'alien species'* has been used throughout the text, but where applicable the references used in the original texts have been maintained;

'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. NB: in this report, movements between countries are referred to as 'exports' or 'imports'. Introduction is used to mean introduction into the wild.

'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.

(See generally <http://www.cbd.int/invasive/terms.shtml>)

4 UPDATED SUMMARY OF IAS POLICIES IN THE EUROPEAN UNION

This Chapter briefly describes policy and legal developments at international, EU and MS level, building on the findings of the baseline review carried out in 2006 (by Miller et al).

Section 4.1 summarises policy developments under international and regional instruments and processes that have direct implications for the EC and/or certain MS. Full details and references for all relevant instruments are provided in Annex 1.

Section 4.2 outlines the main changes in Community legislation, policies and activities since 2006, with full details and references provided in Annex 2.

Section 4.3 provides an updated description of Member State IAS legal and policy frameworks, based on information provided by MS focal points and other experts. It identifies areas of progress, highlights remaining or new constraints and shares information on policy initiatives that could be suitable for wider application within the EU.

A synthesis is provided in section 4.4 which lists the main policy trends needing to be addressed through action at EU level and assesses progress made towards filling cross-cutting gaps identified in 2006 (by Miller et al.).

4.1 Key developments at international and regional level since 2006

4.1.1 Biodiversity-related instruments

An in-depth review of IAS activities was conducted under the **Convention on Biological Diversity** (CBD)¹¹ leading to the adoption of Decision IX.4 in 2008 (see Box 2) which notes continuing growth in IAS impacts and calls for additional efforts and resources to address these threats.

¹¹ Ninth meeting of the Conference of the Parties (COP) (Bonn, 19-30 May 2008). For background documents, case studies and detailed review findings, see <http://www.cbd.int/invasive/>.

Box 2: Actions mandated under CBD Decision IX.4 of most relevance to the EU**(1) Collaboration to address remaining gaps and inconsistencies and promote coherence in the international regulatory framework and support effective national action:**

Parties are encouraged to raise the following issues formally through their delegations to specific organisations:

- expanding coverage of IAS which impact on biodiversity, including in aquatic environments (International Plant Protection Convention (IPPC));
- the lack of international standards for invasive animals that are not pests of plants (World Organization on Animal Health (OIE));
- addressing risks from IAS associated with international trade through animal/plant health provisions under the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (WTO Committee on Sanitary and Phytosanitary Measures); and
- formalising existing technical guidance on species introductions for fisheries and aquaculture (Committee on Fisheries, United Nations Food and Agriculture Organization (FAO)).

(2) Targeted mechanisms to address pathway risks, consistent with relevant international obligations:

- closing identified gaps for IAS through use of existing risk assessment guidance, procedures and standards (under IPPC, OIE, other relevant organisations);
- application of IPPC standards for quarantine pests to all IAS with adverse impacts on plant biodiversity and support for development of IPPC guidance on plants for planting (e.g. ornamental plants and landscaping);
- best practices to address risks associated with the introduction of alien species as pets, aquarium and terrarium species and as live bait and live food;
- voluntary schemes, certification systems and codes of conduct for industries/stakeholders for potentially invasive commercially important species (eg plants, pets, invertebrates, fish, terrarium/aquarium species);
- collaborative with key organisations to manage shipping, trade and aquaculture/mariculture pathways and to develop international guidance for civil aviation, tourism, hull fouling and development aid pathways.

(3) Concrete actions and capacity-building at national, regional and subregional levels:

- development and implementation of regional IAS policies, strategies and/or programmes and effective coordination among relevant agencies;
- development/use of early warning systems, including focal point networks, and rapid response mechanisms;
- addressing common capacity gaps including incident lists on introductions of alien species, inter-sectoral planning, economic valuation and integrated policy and legal frameworks;
- support by donor Parties for capacity-building in developing countries;
- building capacity to address how climate change affects IAS-related risks.

(4) Actions to improve communication, education and public awareness:

- greater cooperation between regional agencies and authorities (veterinary, phytosanitary, agriculture, forestry, fisheries, environment and biodiversity): consider establishing/designating coordination centres to ensure a coordinated and coherent science-based approach to addressing IAS threats;
- awareness-raising programmes for decision-makers and practitioners in the freshwater, marine and terrestrial environment sectors (particularly in agriculture, aquaculture and forestry), the horticulture and pet trade and in transport, trade, travel and tourism sectors that are potential pathways of biological invasions;
- support for IAS information initiatives (eg NOBANIS and DAISIE) to ensure inter-operability and facilitated access to these data.

CBD Parties also called for consideration of IAS when developing policy frameworks for sustainable production and use of biofuels (IX/2), forest biodiversity (IX/5) and island

biodiversity (IX/21) and set out detailed recommendations for improving IAS information systems through the Global Taxonomy Initiative (Decision IX/22).

Under the **CBD Cartagena Protocol on Biosafety**¹², recent decisions concern handling, transport, packaging and identification of living modified organisms (LMOs) and risk assessment and risk management. No consensus has yet been reached on a formal mechanism for liability and redress for damage resulting from LMO transboundary movements.

The **Ramsar Convention on Wetlands**¹³ addressed IAS only indirectly in decisions relating to avian influenza, climate change and biofuels but restored IAS to the Scientific and Technical Review Panel agenda for 2009-2011.

The main IAS developments for migratory species concerned the **Agreement on the Conservation of African-Eurasian Migratory Waterbirds** (AEWA) which conducted a comprehensive review of the status of introduced non-native waterbirds in the AEWA area and adopted a resolution recommending actions relating to trade, holding facilities (aviaries, pens, zoos) and hunting of introduced bird species that may present risks to native biodiversity¹⁴.

With regard to species trade, Parties to the **Convention on International Trade in Endangered Species of Wild Fauna and Flora** (CITES) terminated the CITES Secretariat's mandate for active cooperation on IAS threats with CBD on the basis that its ability to assist on such questions is limited. Recommendations still in force call on Parties to consider IAS in national legislation on trade in live animals and plants and to consult with the Management Authority of the country of import when considering exports of potential IAS.

Regional and sub-regional cooperation on IAS issues has continued to strengthen.

At pan-European level, the **Convention on the Conservation of European Wildlife and Natural Habitats** (Bern Convention) maintained active support for implementation of the European Strategy on Invasive Alien Species (Genovesi and Shine, 2004). Species-specific recommendations adopted in 2007-2008 concern invasive plants, ruddy duck (*Oxyura jamaicensis*), grey squirrel (*Sciurus carolinensis*) and water hyacinth (*Eichhornia crassipes*). Policy recommendation no.125/2007 called for national measures to address trade in invasive and potentially invasive alien species in Europe.

Two sub-regions are currently working on joint IAS policy instruments:

- in autumn 2008, Parties to the Benelux Convention (Belgium, Luxembourg, the Netherlands) began discussions to update their 1983 decision requiring prior authorisation, assessment and consultation on proposed introductions;
- for the Carpathians, the Protocol on Conservation and Sustainable Use of Biological and Landscape Diversity (2008) mandates detailed cooperative action on IAS. An Action Plan is being prepared to provide technical guidance on implementation.

¹² Fourth session of the Meeting of the Parties (MOP4, Bonn, 12-16 May 2008: see <http://www.cbd.int/doc/meetings/bs/mop-04/official/mop-04-18-en.pdf>). Note that experience of national implementation by Parties is still limited and only a low number of first national reports were submitted.

¹³ COPX, Changwon, 28 October-4 November 2008.

¹⁴ Resolution 4.5 (Madagascar, 15-19 September 2008).

For the Mediterranean, Parties to the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean adopted a prioritised timetable for implementing their 2003 IAS Action Plan e.g. for targeted awareness-raising amongst stakeholders responsible for introductions and for legal, technical and data collection issues.

TEMATEA, the online resource to support coherent implementation of obligations and commitments under biodiversity-related conventions, including for IAS, became fully operational (www.tematea.org).

4.1.2 Instruments for protection of plant and animal health

IAS coverage remains significantly more developed under the international plant health framework than the animal health framework.

The International Plant Protection Convention (IPPC) continues to address IAS through certain mainstream activities. Ongoing formal cooperation between the IPPC and CBD Secretariats focuses on collaboration between national biodiversity-related agencies and national plant protection organisations (NPPOs), addressing gaps in international standards for IAS and working on issues of mutual interest. These include the development of a supplement to the IPPC Glossary of Phytosanitary Terms to foster understanding of the overlap and differences in use of terms between IPPC and CBD.

In 2008, the IPPC Commission on Phytosanitary Measures (CPM) approved a programme to develop new International Standards for Phytosanitary Measures (ISPMs) of relevance to IAS pathways, including *Minimizing pest movement by air containers and aircrafts*; *Minimizing pest movement by sea containers and conveyances*; *Guidelines for the movement of used machinery and equipment*; *Handling and disposal of garbage moved internationally*; and *International movement of grain*.

The European and Mediterranean Plant Protection Organization (EPPO) expanded relevant work through new standards on invasive alien plants; the EPPO Alert List for invasive alien plants to support early warning; simplification of its Pest Risk Analysis Decision Support Scheme (due for approval in 2009); and non-binding guidance on management options to tackle certain widespread invasive plants. Council Recommendation on Plants for Renewable Energy and Invasive Alien Plants (2007) recommends that NPPOs liaise with relevant departments to discourage the planting of invasive alien plants for bioenergy and supports a risk-based approach to avoid spread outside plantations. No further action has been taken under this measure to date. EPPO also collaborated with the Bern Convention to address invasiveness risks associated with water hyacinth *Eichhornia crassipes* and to develop a joint Code of Conduct for Horticulture and Invasive Alien Plants (see Box 3).

Box 3: Cooperation between pan-European institutions to address emerging IAS threats

EPPO/Council of Europe (Bern Convention) held a joint workshop on “How to manage invasive alien plants? Case study of *Eichhornia crassipes*” (Mérida, Spain, 2-4 June 2008). Water hyacinth is one of the 100 of the World's Worst Invasive Alien Species (Lowe et al. 2000) with multiple environmental, economic and social impacts. In Spain, between 2005-2008, the removal of nearly 200,000 tonnes from 75km of the Guadiana River cost €14.68 million. In Portugal, management actions carried out by the Municipality of Agueda from December 2006 to May 2008 cost €278,000.

A Pest Risk Analysis performed by an EPPO Expert Working Group after the Joint Workshop concluded that *E. crassipes* has the potential to establish and cause detrimental effects in the whole Mediterranean Basin. In September 2008, the EPPO Council approved the addition of *E. crassipes* to the EPPO A2 List (Quarantine Pest locally present in the EPPO area) and wrote to all EPPO member countries recommending them to regulate this plant as a quarantine pest. In November 2008, the Bern Convention Standing Committee adopted Recommendation No. 133 (2008) which invites Parties to: prohibit introduction, trade, planting, possession and transport; monitor introduced populations; draft a national action plan to eradicate or control the plant; and (for affected countries) meet annually to discuss cooperative action in the appropriate fora.

The two organisations jointly convened a *Workshop on the Code of Conduct on Horticulture and Invasive Alien Plants* (Oslo, 4-5 June 2009) attended by industry and other stakeholders (proceedings available through www.eppo.org).

There have been no major developments within the **World Organisation for Animal Health** (OIE) to address IAS issues through the various Terrestrial Animal Health Codes or the Aquatic Animal Health Code. OIE maintains its focus on introduced animal species as potential disease vectors but not as potential IAS in their own right where no disease trigger is present. It continues to play a lead role in global information exchange and warning systems for specific diseases, including avian influenza.

4.1.3 Instruments related to transport and aviation pathways

The IMO International Convention for the Control and Management of Ships Ballast Water and Sediments 2004 (BWM Convention) now has 18 Parties but has not yet entered into force. Spain and France are the only MS to have ratified the Convention: several others are currently addressing technical constraints on implementation. Two subregional instruments, the Convention on the Protection of the Marine Environment of the Baltic (HELCOM) and the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), facilitate work by MS to upgrade national frameworks. A joint notice to shipping was issued under the two instruments in April 2008 to provide guidance on voluntary implementation of ballast water exchange standards linked to the BWM Convention.

The non-binding IMO Globallast Partnerships Project (launched in 2007) promotes national and regional action to meet the BWM Convention's objectives. The Globallast Regional Task Force for the Mediterranean is open to all MS that are Mediterranean riparian States and held its first meeting in September 2008.

The above developments mean that all regional European seas now benefit from some level of coordinated technical support to address ballast water pathways, consistent with future implementation of the BWM Convention.

The other main IAS vector in shipping pathways is biofouling of vessels. This is still not subject to binding rules, but the IMO has established a discussion group to report in 2009.

At international level, mariculture/aquaculture pathways are still not subject to binding rules (c.f. the aquaculture Regulation adopted in 2007 for the EU, see 4.2.1).

For aviation pathways, there has been no concrete progress in addressing the risk of introducing potential IAS through civil aviation to areas outside their natural range. In 2007, the International Civil Aviation Organization (ICAO) adopted a resolution calling for

mutually supportive efforts to reduce such risks. The Global Invasive Species Programme (GISP) has initiated a pilot study with ICAO to develop best practices for this purpose.

Lastly, no guidance has been developed at international level to address other pathways for unintentional introductions such as tourism and international development assistance.

4.2 Updated summary of Community legal instruments and activities

The following section outlines the main changes in Community legislation, policies and activities since the baseline review carried out in 2006 (see Box 4), taking account of information on the application of Community measures provided through Commission-MS consultations and/or updated MS reports. It includes a synthesis table of key legislative changes (Table 4.1) and also covers policy issues relating to IAS in EU Overseas Entities (4.2.3).

Box 4: Key findings on IAS coverage under Community legal and policy instruments (Miller et al, 2006)

In 2006, robust and well-established systems existed at Community level for managing the risks associated with limited categories of potential IAS (animal diseases, including of aquaculture organisms; pests of plants that met the definition of ‘harmful organism’ in the plant health Directive 2000/29/EC; genetically modified organisms). Four invasive animal species¹⁵ were prohibited for import into EU territory under the wildlife trade Regulations, but their trade and movement within the Community were not restricted.

There were no import or intra-Community trade and movement restrictions on:

- non-genetically modified plant species, including highly invasive aquatic plants;
- non-genetically modified animals (except for the four species listed under the wildlife trade Regulations);
- species that were not defined as ‘harmful organisms’, eg hitchhiker organisms such as invasive ants.

The legal basis to address risks related to export of IAS to third countries was limited to plant and animal health requirements, GMOs and micro-organisms that could be used for military purposes after export.

With regard to controls on introduction to the natural environment, the habitats and birds Directives required MS to regulate introductions of alien species to ensure that natural habitats within their natural range or wild native fauna and flora are not prejudiced. For IAS control and eradication, the habitats, birds, and water framework Directives were considered to impose indirect obligations through requirements to maintain the status of certain sites.

The issue of IAS lacked visibility (or indeed, inclusion) in many relevant European policies and documents, including those related to development cooperation and international aid.

4.2.1 Developments in Community legislation since 2006

Import and export of potential IAS

¹⁵ Red-eared slider (*Trachemys scripta elegans*); the American bullfrog (*Rana catesbeiana*); the painted turtle (*Chrysemys picta*); and the ruddy duck (*Oxyura jamaicensis*).

With regard to imports of living organisms, there have been no relevant changes to the legislative frameworks for:

- pests of plants;
- genetically modified organisms (except for aquaculture); or
- ‘ecological threat’ species prohibited for import under the wildlife trade Regulation.

For plants, the position remains that no invasive alien plants are listed for regulation under the plant health Directive 2000/29/EC¹⁶. However, on 1 June 2009, the Commission launched a 12-month evaluation of the Community plant health regime to take account of e.g. relevant treaty developments, globalisation and changed expectations from society, erosion of the scientific expertise underpinning the existing Community regime and the establishment of EFSA. Based on the evaluation, a Community plant health strategy will be developed¹⁷.

The substantive animal health framework is mainly unchanged but a new Regulation to prevent the entry and spread of avian influenza is indirectly relevant to IAS because its effect has been to reduce opportunities for import of wild birds from third countries. **Commission Regulation (EC) No 318/2007 of 23 March 2007 laying down animal health conditions for imports of certain birds into the Community and the quarantine conditions thereof** was adopted on the basis of an assessment by the European Food Safety Authority (EFSA). It sets conditions for approved breeding facilities, animal health certification, marking (leg rings/microchips), transport, quarantine and monitoring. Import restrictions do not apply to species reared or kept in captivity for breeding or re-stocking supplies of game (poultry); birds imported for conservation programmes approved by the competent authority in the MS of destination; pets accompanying their owner; or birds imported for zoos or experiments.

The new **Action Plan for the implementation of the EU’s Animal Health Strategy**¹⁸ proposes major rationalisation of existing instruments, including the development of a single EU Animal Health law and reinforced border biosecurity by 2010 based on the principle of prevention. Measures developed through the Action Plan will address the health of all animals in the EU kept for food, farming, sport, companionship, entertainment and in zoos; wild animals and animals used in research where there is a risk of them transmitting disease to other animals or to humans; and the health of animals transported to, from and within the EU. Development of consolidated new legislation could provide opportunities to consider invasive animals that are not pests of plants (in collaboration with OIE, as recommended by CBD Decision IX/4: see 4.1.1) but this would require significant extension beyond the current focus on IAS that are vectors for diseases and pathogens.

The main substantive development was the adoption of **Council Regulation concerning use of alien and locally absent species in aquaculture (No.708/2007 of 11 June 2007)** modelled on established codes of practice¹⁹. This establishes a Community framework to assess and minimise the possible impact of alien and locally absent species and associated non-target

¹⁶ Some agricultural weeds may be covered by plant pest legislation, but most potentially invasive plants are not covered although greater coverage has been proposed by some MS through their National Plant Protection Organisations through the EU Working Party of Chief Plant Health Officers (COPHS): see Annex 2.

¹⁷ http://ec.europa.eu/food/plant/strategy/index_en.htm.

¹⁸ COM(2008) 545 of 10 September 2008.

¹⁹ The International Council for the Exploration of the Sea (ICES) Code of Practice on the Introductions and Transfers of Marine Organisms and the European Inland Fisheries Advisory Commission (EIFAC) Code of Practice and Manual of Procedures for consideration of introduction and transfer of marine and freshwater organisms.

species on aquatic habitats and thus contribute to sustainable development of the aquaculture sector (see Box 5).

Box 5: Prevention and management of IAS risks under the aquaculture Regulation

The Regulation covers the intentional ‘introduction of alien species’ and the ‘translocation of locally absent species’ for aquaculture use in the Community. ‘Alien species’ includes “a species or subspecies of an aquatic organism occurring outside its known natural range and the area of its natural dispersal potential” (art.3.6). This definition is not limited by jurisdictional criteria, which means that the Regulation covers the import from third countries (i.e. outside the EU) of species meeting this definition.

Member States must ensure that all appropriate measures are taken to avoid adverse effects to biodiversity, and especially to species, habitats and ecosystem functions which may be expected to arise from such introductions/translocations and from the spreading of these species in the wild (art.4). They have primary responsibility for risk assessment and management under the Regulation. The Preamble notes that “potential risks, which may in some cases be far reaching, are initially more evident locally. The characteristics of local aquatic environments throughout the Community are very diverse and Member States have the appropriate knowledge and expertise to evaluate and manage the risks to the aquatic environments falling within their sovereignty or jurisdiction.”

The Regulation applies to all aquaculture facilities under MS jurisdiction, including in Overseas Entities, and establishes harmonised procedures for the analysis of potential risks, the taking of measures based on the prevention and precautionary principles and the adoption of contingency plans where necessary. Each MS must designate a competent authority to ensure compliance and may appoint a scientific advisory committee. Aquaculture operators must obtain a permit from the competent authority for all introductions/translocations. The advisory committee must give its opinion on whether the proposed movement is ‘routine’ or ‘non-routine’ and whether release must be preceded by quarantine or pilot release:

- for ‘routine’ movements (low risk of transfer of non-target species/low risk due to the organism’s characteristics or the aquaculture method to be used), the authority may grant a permit indicating quarantine/pilot release requirements where applicable;
- for ‘non-routine’ movements (all other categories of movement, including movements from closed to open aquaculture facilities), prior environmental risk assessment is required consistent with Annex II of the Regulation. The competent body decides whether this should be carried out by the applicant or an independent body and who should bear the cost. A permit may only be granted where the assessment, including any mitigation measures, shows low risk to the environment. Any refusal of a permit must be duly motivated on scientific grounds and, where scientific information is as yet insufficient, on the grounds of the precautionary principle.
- Movements of alien or locally absent species to be held in closed facilities (involving recirculation of water and separated from the wild by barriers preventing the escape of reared specimens or biological material that might survive and subsequently reproduce) are not subject to prior environmental risk assessment except where MS wish to take appropriate measures. At a future date these may be exempted from permit requirements, based on new scientific information (including Community-funded research relevant to biosecurity of modern closed systems).

Where neighbouring MS may be affected by the potential or known environmental effects of a proposed movement, prior consultation is required and the level of decision-making shifts to the Commission following consultation with the Scientific, Technical and Economic Committee for Fisheries and the Advisory Committee for Fisheries and Aquaculture.

An exemption from the permit requirement applies to alien species listed in Annex IV (used in aquaculture for a long time in certain parts of the Community) to facilitate aquaculture development without additional administrative burden. The Annex IV list includes several known invasive alien fish e.g. *Oncorhynchus mykiss*. MS that wish to restrict the use of such species in their territory must justify this by environmental risk assessment. Conditions for adding species to Annex IV and for the development of a specific information system concerning permits were laid down by Commission Regulation (EC) No 535/2008 of 13 June 2008.

Looking outwards, the EC Thematic Programme for Environment and Natural Resources provides opportunities to address IAS in EU development cooperation. The finalised EU regulations for external assistance instruments (2007-2013) do not mention IAS pathway risks but two IAS projects have been supported through the European Development Fund:

- ‘Increase in the regional capacity to reduce the impacts of invasive species in the Overseas Territories of the United Kingdom in the South Atlantic’ (EDF-9 2006-9: budget almost €2 million) (see 4.2.3);
- a regional project on IAS in the Caribbean (*Management Needs of Nature-Protected Areas to support Sustainable Economies*).

One obstacle to mainstreaming IAS issues is that few countries identify biodiversity as a priority sector for cooperation in their Country Strategy Papers, though these usually include a commitment to undertake Strategic Environmental Assessments (SEA) (EC 2008a). The Community’s Environmental Integration Handbook 2006 includes IAS in the checklist for preparing Country Environmental Profiles that feed into Country Strategy Papers.

Holding and movement within the EC

There have been no relevant changes to the legislative frameworks for:

- pests of plants (no invasive alien plants are listed for intra-Community regulation under the plant health Directive 2000/29/EC);
- genetically modified organisms, other than under the aquaculture Regulation;
- ‘ecological threat’ species (no species subject to intra-Community restrictions).

For plant health, in 2007 EFSA reviewed Pest Risk Assessments for three plant species (*Lysichiton americanus*, *Hydrocotyle ranunculoides* and *Ambrosia artemisiifolia*) carried out by EPPO representatives in MS. These were held to be insufficient in proving the plant health-related damage claimed by their authors and were remitted for further assessment.

Under the animal health framework, controls were introduced on holding, marking and transport of imported birds to prevent spread of avian influenza²⁰. The Animal Health Action Plan²¹ provides for improved intra-Community biosecurity including a harmonised EU framework for responsibility and cost-sharing in detecting and eradicating diseases by 2011. For aquaculture, see box 5 above.

Introduction of alien species into the wild

There have been no substantive changes since 2006 to the provisions of the birds and habitats Directives with regard to authorisation of introductions to the wild. MS implementation of these provisions, and associated reporting, remains uneven.

²⁰ Commission Regulation (EC) No 318/2007 of 23 March 2007 laying down animal health conditions for imports of certain birds into the Community and the quarantine conditions thereof: see under Import and Export above.

²¹ Action Plan for the implementation of the EU’s Animal Health Strategy (COM(2008)545 of 10 September 2008)

The aquaculture Regulation (2007) treats releases into ‘open aquaculture’ facilities²² as if these were introductions to the wild and applies more stringent permit/environmental risk assessment procedures than for movements to closed facilities. It also provides for application of the precautionary principle in advance of such releases by establishing an optional procedure for pilot release subject to specific containment and to preventive measures based on the scientific advisory committee’s recommendations. In addition, permit applicants must prepare contingency plans for all non-routine introductions and pilot releases. Monitoring is mandated for a minimum period of two years following release into open aquaculture facilities but may be extended to assess any possible long-term ecosystem effects.

IAS risks associated with the cultivation of plants for bioenergy are not explicitly addressed by any Community instrument. However, **Directive 2009/28/EC of 23 April 2009 of the European Parliament and of the Council on the promotion of the use of energy from renewable sources** provides that energy generated from biofuels and bioliquids may only count towards Community targets and be eligible for financial support if:

- raw materials are not obtained from specified categories of land of high biodiversity value, high carbon stock or peatland;
- agricultural raw materials cultivated in the Community and used for the production of biofuels and bioliquids respect cross-compliance rules i.e. meet the statutory management requirements of the birds and habitats Directives and respect good agricultural and environmental condition²³.

Control and eradication of IAS

There have been no relevant changes to the legislative frameworks for:

- pests of plants (no invasive alien plants are mandated for EC-coordinated control action under the plant health Directive 2000/29/EC);
- animal pathogens, except for measures under the aquaculture Regulation;
- introductions to the natural environment under the birds and habitats Directives.

Under the aquaculture Regulation (see Box 5), contingency plans approved by the competent authority must cover the removal of the introduced species from the environment or a reduction in density for “unforeseen events with negative effects on the environment or on native populations”. If such an event occurs, the contingency plans must be implemented immediately and the permit may be withdrawn temporarily or permanently (Art.17).

The **Directive on the assessment and management of flood risks (2007/60/EC)** could provide an indirect mechanism to integrate control of IAS that affect water regulation services into mandatory flood risk planning. Flood risk plans must be coordinated with water basin planning under the Water Framework Directive (WFD) which could facilitate integrated treatment of IAS consistent with the ecosystem approach.

²² Facilities “where aquaculture is conducted in an aquatic medium not separated from the wild aquatic medium by barriers preventing the escape of reared specimens or biological material that might survive and subsequently reproduce” (Art 3.2).

²³ See Annex II to Regulation (EC) No 73/2009 of 19 January 2009 establishing common rules for direct support schemes for farmers under the common agricultural policy and establishing certain support schemes for farmers and in accordance with the minimum requirements for good agricultural and environmental condition defined pursuant to Article 6(1) of that Regulation.

The **Marine Strategy Framework Directive (2008/56/EC)** (MFD) includes IAS in certain assessment criteria, related to qualitative descriptors for determining good environmental status (non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems) and to biological characteristics and pressures. Depending on the results of this assessment, appropriate measures might include IAS control/eradication at the ecosystem level, as under the water framework Directive (WFD), and could offer opportunities for transboundary or regional coordination within a shared marine ecosystem.

The European Environment Agency (EEA) commissioned a report on EU funding for IAS control to contribute to development of a cost indicator for IAS. Between 1992-2006, 187 IAS-related projects were supported through the Financial Instrument for the Environment (LIFE) at a cost of €44 million. (Scalera 2008). The new LIFE+ instrument (**Regulation (EC) No 614/2007 of 23 May 2007 concerning the Financial Instrument for the Environment**) provides opportunities for IAS funding under its Nature & Biodiversity and/or Information & Communication components.

The Community rural development fund²⁴ (2007-2013) provides opportunities to include IAS control in the requirements to keep land in Good Agricultural and Environmental Condition as part of cross-compliance (avoidance of deterioration of habitats). IAS funding opportunities are also available through the European Regional Development Fund and Cohesion Fund for 2007-2013.

At the cross-cutting level, there were no relevant developments under Community EIA, SEA or environmental liability legislation but new criminal environmental legislation was adopted.

Table 4.1: Checklist of main changes in Community legislation since 2006

Prevention at external borders (including import/export)	
Animal health	Regulation No 318/2007 (restriction on wild bird imports to control avian influenza. Development of a single EU Animal Health Law proposed by 2010.
Alien and locally absent species in aquaculture	aquaculture Regulation No 708/2007 Establishes framework for risk assessment of proposed introductions of alien aquatic organisms, including from third countries.
Prevention within the Community (including holding and movement)	
Animal health	Restriction on wild bird holding to control avian influenza (Regulation (EC) No 318/2007). Rationalisation of intra-Community animal biosecurity and cost-recovery framework proposed by 2011.
Alien and locally absent species in aquaculture	aquaculture Regulation No 708/2007
Introduction into the wild	
Alien and locally absent species in aquaculture	aquaculture Regulation No 708/2007
Introduction of plants for bioenergy plantation	Possible application to IAS if a threat to species/habitats of Community interest, under renewable energy Directive (2009/28/EC)
Penalties for unlawful introductions	Possible application to IAS under Directive on the protection of the environment through criminal law (2008/98/final)
Control/eradication	
Alien and locally absent species	aquaculture Regulation No 708/2007

²⁴ Regulation on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) (EC) No 1698/2005).

in aquaculture	
Marine environment	marine framework strategy Directive (2008/56/EC)
Inland and coastal waters	Possible consideration of IAS affecting water regulation through the flood risk management Directive (2007/60/EC)

The **Directive on the protection of the environment through criminal law (2008/98/EC)** establishes a minimum set of serious environmental offences that should be considered criminal throughout the Community when committed intentionally or with serious negligence. Participation in and instigation of such activities should also constitute an offence. Two types of conduct to be designated as offences under Article 3 could theoretically be applied to cover conduct involving IAS²⁵ and might thus provide a basis for MS to create or strengthen sanctions on deliberate illegal/seriously negligent introductions of IAS (e.g. in breach of provisions under the birds and habitats Directives or the aquaculture Regulation). However, the Directive leaves MS free to interpret key terms, including “materials”, “substantial damage” and “significant deterioration”.

4.2.2 Developments in Community policies and research activities since 2006

The Commission jointly organised the European Conference on Invasive Alien Species with the Biodiversity Foundation of the Spanish Ministry of the Environment in 2008²⁶.

A preliminary scoping study for the proposed **EU Biodiversity Communication Campaign** found generally low understanding of the concept of biodiversity and that only 2% of general public respondents thought that IAS were an important threat to biodiversity compared to pollution (27%), manmade disasters (27%), climate change (19%), intensified agriculture (13%) and land use/development (8%)²⁷.

The **EU Forest Action Plan (COM(2006) 302 final)** highlights the link between global trade, climate change and increased IAS vectors and calls on MS to update protection strategies against biotic and abiotic agents, including studies on risk assessment in relation to harmful organisms and invasive species.

The White Paper on **Adapting to climate change in Europe – options for EU action” (COM (2009) 147 final)** notes that climate change could increase the spread of serious infectious vector-borne transmissible diseases including zoonoses, threaten animal wellbeing and also impact plant health, favouring new or migrant harmful organisms, which could adversely affect trade in animals, plants and their products. The impact of climate change must also be factored into the management of Natura 2000 to ensure the diversity of and connectivity between natural areas and to allow for species migration and survival when climate conditions change.

The Integrated Maritime Policy for the EU (COM(2007) 575 final) and Action Plan

²⁵ §a ‘introduction of a quantity of materials into air, soil or water, which causes or is likely to cause ... substantial damage to the quality of air, soil, water, animals or plants’; more narrowly, §h ‘unlawful significant deterioration of a habitat within a protected site’.

²⁶ Madrid, 15-16 January 2008: proceedings available from Fundacion Biodiversidad.

²⁷ Scoping Study for an EU wide Communications Campaign on Biodiversity and Nature (Gellis Communications: Final report to the European Commission/DG ENV Contract 07-0307/2007/ 474126/MAR/A1) (survey conducted November 2007, results published March 2008).

(SEC(2007) 1278) supports integration of maritime affairs, including pollution control, across the EU. The framework is broad enough to encompass IAS-related measures but there is no reference to pathways or vectors for introduction of potential IAS into the marine environment or to the BWM Convention.

90 IAS-related projects were funded between 1996-2006 under the 4th, 5th and 6th EU Framework Programmes on Research and Technological Development (FP) at a total cost of €88 million (Scalera 2008). These include several major projects that could support stronger EU IAS policies such as:

- DAISIE (Delivering Alien Invasive Species In Europe), completed in February 2008. Its species and pathway analyses and expert registry are available at www.europe-alien.org, although there is currently no secured funding for future maintenance;
- ALARM (Assessing Large-scale environmental Risk with tested Methods);
- IMPASSE (Environmental impacts of alien species in aquaculture); and
- EFFORTS (Effective Operations in Ports) which integrates research on ballast water treatment techniques into port environmental management.

The FP7 PRATIQUE (Enhancement of Pest Risk Analysis Techniques) project covers: predicting the entry and establishment of new plant pests, diseases and IAS; estimating potential economic, environmental and social impacts; and preventing, eradicating, containing and controlling invasions. It is intended to improve the functionality and user-friendliness of the EPPO-PRA decision support scheme and to back a new decision support scheme to combat pest outbreaks. Another relevant project supports development of new diagnostic methods in support of plant health policy with the long-term objective of enabling ‘DNA-barcode identification’ for all quarantine plant pests or pathogens of statutory importance²⁸. The EC Biodiversity Communication supports the establishment of 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. In 2008, the EEA commissioned a feasibility study for this purpose²⁹.

4.2.3 IAS policy developments with regard to EU Overseas Entities

The need to protect island biodiversity against IAS impacts, and the importance of regional coordination for this purpose, is formally recognised in international policy frameworks³⁰. The European Union counts 7 Outermost Regions (ORs)³¹ as integral elements of its territory, all but one of which is an island, and is closely associated with 21 Overseas Countries and Territories (OCTs)³² which are all islands or archipelagos.

These islands collectively host far greater biodiversity than continental Europe. IAS threaten their endemic and endangered species, particularly seabirds, and rare habitat types (RSPB

²⁸ CALL 2B: KBBE-2008-2B.

²⁹ Contract EEA/BSS/08/008.

³⁰ Eg CBD Programme of Work on Island Biodiversity, CBD Decision IX.4, Bern Convention recommendation 91/2002.

³¹ French Guiana, Guadeloupe, Martinique and Réunion Island (France); Azores, Madeira (Portugal); Canary Islands (Spain).

³² Greenland (Denmark); French Polynesia, French Southern and Antarctic Lands, Mayotte, New Caledonia, Saint-Pierre and Miquelon, Wallis and Futuna (France); Aruba, Netherlands Antilles, (Netherlands); Ascension Island, British Antarctic Territory, British Indian Ocean Territory, British Virgin Islands, Cayman Islands, Falkland Islands, Montserrat, Pitcairn Islands, Saint Helena, Tristan da Cunha, South Georgia and the South Sandwich Islands, Turks and Caicos Islands (UK).

2007, Soubeyran 2008). They are dependent on long-haul transport pathways for introduction and particularly vulnerable to introductions of marine invasive species. The EC Biodiversity Communication recognises that ‘effective action in the biodiversity-rich OCTs of Member States is vital to the EU’s credibility in this international arena’.

The **Green paper on the future relations between the EU and the Overseas Countries and Territories** (consultation closed in October 2008) does not reference IAS but notes that OCTs’ environmental concerns merit special attention given their fragility in the face of climate change and their potential based on their biodiversity, which is of major importance for the Community and the world at large. In 2007-2009, the European Development Fund funded the following project: ‘Increase in the regional capacity to reduce the impacts of invasive species in the Overseas Territories of the United Kingdom in the South Atlantic’, coordinated by the Royal Society for the Protection of Birds.

In 2008, the conference on *The European Union and its Overseas Entities: Strategies to Counter Climate Change and Biodiversity Loss* included a thematic workshop on IAS whose recommendations were adopted as an integral part of the Conference Message (see Box 6).

Box 6: IAS policy recommendations adopted at the conference on *The European Union and its Overseas Entities: Strategies to Counter Climate Change and Biodiversity Loss* (Réunion Island, 7-11 July 2008)

The environmental impact of IAS tends to be much greater in the EU’s ORs and OCTs than in continental Europe, resulting in substantial socio-economic risks and a disproportionately high impact on wider European biodiversity. Campaigns to change awareness and attitudes of public and private decision-makers at all levels are fundamental. The ORs and OCTs should be fully integrated into the future EU Strategy on Invasive Alien Species, and the consistency of other Community policies and actions be enhanced. IAS strategies should be developed in each OR and OCT that build on IAS inventories, monitoring and early warning systems.

1. Strengthening inter-regional and intra-regional cooperation and capacity is essential for timely and cost-effective action. Where possible, this should build on existing regional mechanisms and practical tools such as those developed by the Global Invasive Species Programme. Information sharing to anticipate new threats, alert neighbouring territories of new incursions and provide technical support should be seen as a key element of EU and regional solidarity;
2. Comprehensive prevention policies for ORs and OCTs should cover imports, exports, management of introduction pathways (including trade, shipping and aviation) and internal introductions (including inter-island and mainland-island movements).

Specific recommendations addressed to the European Commission

1. Fully integrate the ORs and OCTs into the future EU Strategy on Invasive Alien Species and ensure co-ordination and consistency across all applicable Community policies and actions;
2. For the ORs, urgently develop strict legal measures consistent with Article 30 of the Treaty to prevent IAS introductions damaging to island biodiversity (eg adapted species-listing techniques).
3. Support the development of interlinked IAS inventories, monitoring and early warning systems in all ORs and OCTs, building on precedents such as DAISIE (Developing Alien Invasive Species Inventories for Europe) and covering terrestrial, freshwater and marine ecosystems;
4. Support co-ordinated research to inform planning and decision-making (eg risk analysis that includes consideration of climate change, application of environmental economic analysis to activities involving risk of introduction or spread of IAS, benefit-cost analysis to identify IAS control programmes that deliver maximum conservation benefit for minimum cost);
5. Mainstream IAS into all relevant funding mechanisms: in particular, strengthen financial support for IAS prevention, rapid response and longer-term control and restoration programmes, and enable funding of programmes covering whole bio-geographic regions (which could include non-EU territories).

Specific recommendations addressed to Member States and local administrations

1. Develop an IAS strategy for each OR and OCT, supported by cross-sectoral co-ordination arrangements and full stakeholder involvement;
2. Strengthen the legal framework, human resources and associated equipment and infrastructure necessary to ensure effective border control, including taxonomic capacity;
3. Integrate measures to enhance ecosystem resilience into sectoral plans and instruments that impact on terrestrial and aquatic ecosystems, and avoid the use in landscaping and other land-management programmes of species known to be invasive in similar environments;
4. Prioritise the amendment or development of legislation to provide a strong legal basis for eradication or control of existing IAS, including feral animal populations and stray animals, and develop collaborative procedures and information materials to address conflicts of interest;
5. Take urgent steps to (re)create sanctuaries for threatened species in small islands where it is still considered feasible to eradicate introduced animals and plants to safeguard globally unique biodiversity.

4.3 Updated summary of Member State legal instruments and activities

The following section updates the 2006 baseline analysis of Member State frameworks (see Box 7) and identifies emerging trends and areas of discrepancy in national practice that may need priority attention through the future EU framework on IAS. The section ends with two synthesis tables: an updated overview of MS frameworks (Table 4.2) and a summary of key developments in each Member State (Table 4.3). Full reports supplied by Member States are provided in Annex 3.

Box 7: Key findings on IAS coverage in Member State frameworks (Miller et al, 2006)

In 2006, most MS had legislation in relation to some aspects of IAS, but few had a comprehensive framework:

- twenty had some provisions in place in relation to import/export of IAS;
- sixteen had some provisions in relation to possession/trade of IAS;
- twenty-six controlled introduction to the wild of some IAS within their borders; and
- nineteen had some provisions for statutory control and/or eradication of IAS.

MS provisions varied widely in terms of scope and purpose (eg taxonomic groups affected, countries of origin for species to be imported, scientific and procedural safeguards applicable etc.). There were no mechanisms to support harmonisation or basic consistency of approach between neighbouring countries or countries in the same sub-region. Some MS with federal systems lacked measures to promote consistency in control of introductions by sub-national authorities.

Measures implemented to control introductions to the wild of potential IAS where these may affect native habitats and species (under the birds and habitats Directives) varied significantly between MS. In some cases there were exceptions for introductions of alien species for commercial uses (eg forestry, agriculture) even though species introduced for these purposes could be invasive. There were also no formal requirements for risk analysis for these sorts of introductions. Ten MS had IAS policies, either in stand-alone IAS Strategies or integrated in their National Biodiversity Strategies. Six more had policies under development.

4.3.1 Developments in national policy and legal frameworks

Import and export of potential IAS

There has been no overall increase in the number of MS (20/27) regulating import and/or export of some category of potential IAS. However, several MS have amended or extended

relevant provisions. This has led to even greater variations in species coverage under national import controls – and to a lesser extent, export controls – than in 2006.

At least three MS have extended the basis for restricting imports that may impact on biodiversity. For example, Estonia now prohibits import of 43 species (double the 2004 figure) and has strengthened regulations for certain pathways (e.g. fur farming). Maltese regulations provide a legal basis for prohibiting import and export of any species that could endanger the biological identity of any ecosystem or species in Malta. Extended import controls based on risk assessment are proposed under Ireland's Biodiversity Action Plan, currently being revised. The Spanish Biodiversity Act 2007 provides for the prohibition of imports and exports of species included in the National IAS Catalogue (under development).

Prevention frameworks for unintentional introductions (international and domestic) remain comparatively weak. With few exceptions (e.g. Ireland, UK), little work has been done on risk analysis for possible entry pathways.

Holding, movement and trade

Three more MS are developing legal measures to regulate possession and/or trade in categories of potential IAS, bringing the total to 19/27. Several MS that already had some controls are drafting additional measures (e.g. Canary Islands for the pet trade, France for invasive alien plants). The scope and scientific underpinning for such measures varies between MS (see discussion in 4.4 below).

There is a marked increase in the number of MS developing risk assessment methodology and tools, either as a precondition for regulatory trade controls (black lists under development in e.g. Belgium, Ireland, UK) or to provide non-binding technical guidance to ministries (e.g. Austria, Germany). Slovenia has developed a 'white list' approach for captive breeding of alien animals: a permit is required except for a short list of species not considered to present risks to native species in the event of an escape.

At least seven MS have or are developing non-legislative approaches to minimise risks associated with trade and containment. Voluntary codes developed with stakeholders cover:

- horticulture (e.g. in southern France, Germany, Ireland, UK and, at regional level, the EPPO/Bern Convention Code, see **Box** above);
- botanic gardens (e.g. in Austria, Germany, EU Botanic Gardens Consortium³³);
- aquatic organisms (e.g. in Ireland and the Netherlands, mainly for aquatic plants);
- recreational water users (under development, Ireland);
- pets (under development, UK);
- birdseed (under development, the Netherlands); and
- general codes of good practice (e.g. Estonia, Poland).

The level of government backing for such initiatives varies extensively. The United Kingdom seems to have gone furthest within the EU in providing formal backing for IAS-related codes.

³³ The Initiative, which has no dedicated funding, coordinates efforts throughout Europe to build awareness and minimise risks of introducing potential IAS to new regions through botanic garden collections. 12 out of 28 countries in the network have so far contributed data to the dedicated site www.plantnetwork.org/aliens.

Recent legislation³⁴ gives statutory backing to IAS codes whose content must be taken into account by a court in any enforcement proceedings to which the guidance seems relevant.

Introductions to the wild

26/27 Member States have controls in place for some categories of introduction to the wild. The broad sectoral exemptions recorded in 2006 (mainly for agriculture and forestry; sometimes for hunting and/or fishing) remain in place in several MS and can constrain coherent action to prevent and manage IAS threats.

Some MS now target specific pathway risks. For example, Hungary has adopted a series of decrees to regulate selection of species for biofuel plantation in protected areas and Natura 2000 sites; Latvia prohibits use of alien tree species for forest restoration or afforestation; and Slovenia prohibits or regulates the translocation of certain alien fish and crayfish species between different river basins.

A few MS operate specific subsidy schemes to promote planting of native species in the wild in preference to introduced species. Measures of this type are most often found in forestry policies (e.g. at national level, Cyprus and Denmark; at subnational level, Flanders in Belgium). In some cases, however, subsidies are available for known invasive tree species, usually those already in long use for forestry purposes³⁵.

Eradication, control and funding

At least four more MS have introduced formal eradication/control measures, bringing the total to 23/27. Their taxonomic scope varies: one of the broadest is Bulgaria's Biodiversity Act 2002 (as amended in 2007) which provides for the adoption of control orders for any IAS that may threaten native biodiversity. Use of hunting legislation as an IAS control tool has widened (e.g. Ireland, Luxembourg).

Several MS have increased investment in species-specific management planning but progress is constrained by lack of time, technical capacity and/or funds. For the most part, techniques to prioritise control and management activities (by species, area, feasibility and cost-effectiveness) are underdeveloped. However, at least two MS are applying risk-based techniques to IAS control (e.g. Ireland has prioritised problematic species and prepared best practice management guidelines for those that are too widespread to be eradicated; the Great Britain Non-Native Species Risk Assessment scheme specifically applies risk-based criteria to management decision-making (Mumford et al, 2008)).

There is still little evidence of cross-border coordination on IAS control strategies, although some initiatives are in place e.g. in Benelux countries; bilateral cooperation through the All-Ireland Strategy; and in Scandinavia for control of Canadian beaver (*Castor canadensis*) that is expanding from central Finland and whose spread threatens native European beaver *C. castor* in Sweden and Norway).

³⁴ Natural Environment and Rural Communities Act 2006 (England and Wales), Nature Conservation (Scotland) Act 2004 (Scotland) amending the Wildlife and Countryside Act 1981.

³⁵ E.g. in Flanders, subsidies for tree planting on agricultural land are also available for IAS such as Locust tree *Robinia pseudoacacia* and Red Oak *Quercus rubra* in Flanders.

EU LIFE co-financing (see 4.2.2) continues to play a key role, with several success stories reported especially from islands. At least three MS have incorporated IAS control prescriptions into their Rural Development Programmes for 2007-2013 financed through the EAFRD (e.g. Hungary, Slovakia, UK). There are several examples of IAS projects with a transboundary dimension supported through INTERREG funding³⁶.

Little information is available on national funding for control. Evidence of cost-recovery mechanisms applicable to landowners is limited outside mainstream plant health regulations but exists in at least three MS (e.g. in Denmark, communes that adopt *Heracleum* eradication plans may recover costs from landowners in certain situations; Hungary has a sophisticated regulatory and financial programme for *Ambrosia artemisiifolia*; Germany has also developed an Action Programme for this plant).

A few MS have made progress on contingency plans and rapid response mechanisms (e.g. Ireland, Estonia, Netherlands). The UK has established a contingency planning working group that will report to the Non-Native Species Programme Board in December 2008. The Spanish Biodiversity Act 2007 provides a basis to support funding of control and emergency activities through the National Biodiversity Fund.

Horizontal issues: strategy, coordination and public awareness

Over half of MS now conduct some form of IAS public awareness activities, which vary from species- or sector-specific campaigns to more general education activities. For the most part, national environment ministries appear to be fairly isolated in their activities.

As of December 2008:

- seven MS (Austria, Denmark, Lithuania, Netherlands Spain, Sweden, United Kingdom) had formally adopted/submitted for adoption a dedicated IAS Strategy or Action Plan;
- six MS (Bulgaria, Finland, Hungary, Ireland, Malta, Slovenia) were developing IAS strategies; and
- ten MS included IAS-related measures (significant variation in the level of detail) in their National Biodiversity Strategy or equivalent.

Bulgaria and Ireland have convened national IAS strategy workshops for autumn 2008. Denmark made its first specific allocation to IAS prevention and control in the 2008 budget.

Horizontal issues: monitoring, research and information exchange

Virtually all MS have maintained and often expanded their research on IAS issues. At least two (Ireland, UK) have used WFD assessment mechanisms to make an assessment of aquatic IAS and develop a monitoring and reporting strategy.

³⁶ Regulation (No 1080/2006) for the European Regional Development Fund.

IAS inventories are in preparation in a growing number of MS, including Bulgaria and Cyprus. Some countries with established inventories are in the process of establishing IAS internet portals to provide one-stop access to IAS knowledge resources and management programme information. At least three countries have developed internet-based open-access databases and reporting systems through which sightings can be recorded.

Table 4.2: Overview of existing MS legal and policy frameworks (as of December 2008)

Country	Import/ export	Possession/ trade	Introduction	Control/ eradication	IAS Strategy
Austria	Not found	Not found	Yes	Not found	Action Plan
Belgium	Yes	Not found	Yes	Yes	In Biodiversity Strategy
Bulgaria	Yes	Not found	Yes	Yes	Under development
Cyprus	Being developed (fauna)	Yes	Yes	Not found	Not found
Czech Republic	Yes	Not found	Yes	Yes	In Biodiversity Strategy
Denmark	Not found	Not found	Yes	Yes	Yes (pending approval, Sept 2008)
Estonia	Yes	Not found	Yes	Yes	Not found
Finland	Yes	Not found	Yes	Yes	Under development
France	Yes	Yes	Yes	Yes	In Biodiversity Strategy (most Overseas Territories plans address IAS)
Germany	Not found	Yes	Yes	Yes	In Biodiversity Strategy
Greece	Yes	Yes	Not found	Yes	Not found
Hungary	Not found ³⁷	Being developed (pets)	Yes	Yes	Under development
Ireland	Yes	Yes	Yes	Yes	Actively developed (Invasive Species in Ireland, legal review)
Italy	Yes	Yes	Yes	Not found	Not found
Latvia	Yes	Not found	Yes	Yes	In Biodiversity Strategy
Lithuania	Yes	Yes	Yes	Yes	Action Plan
Luxembourg	Not found	Yes	Yes	Being developed	In National Nature Conservation Plan
Malta	Yes	Yes	Yes	Yes	Under development + covered by Sustainable Development Strategy
The Netherlands	Yes	Yes	Yes	Yes	Yes (pending approval)
Poland	Yes	Being developed	Yes	Yes	In Biodiversity Strategy
Portugal	Yes ³⁸	Yes	Yes	Yes	In Biodiversity Strategy
Romania	Yes	Not found	Yes	Yes	Not found
Slovakia	Yes	Yes	Yes	Yes	In Biodiversity Strategy
Slovenia	Not found ³⁹	Yes	Yes	Not found	Under development
Spain	Yes	Yes	Yes	Yes	Yes
Sweden	Yes	Yes	Yes	Yes	Yes (end 2008)
UK	Not found	Yes	Yes	Yes	Yes (May 2008)

Table 4.3: Synthesis of key developments at national level since 2006

³⁷ Were in place prior to EU membership.

³⁸ Specific restrictions in relation to Madeira, under development for the Azores.

³⁹ Were in place prior to EU membership.

COUNTRY	Key policy-related developments and activities since 2006
Austria	<ul style="list-style-type: none"> National conference on IAS and climate change scheduled for 2009. Risk assessment scheme (black list) to evaluate risks posed by IAS on native biodiversity developed with the German Agency for Nature Conservation as an advisory support to administrative decision-making: being trialled on selected plant and fish species. Adoption of guidelines by Austrian Botanical Gardens: website hosted by Austrian Botanic Gardens Working Group (linked to corresponding sites at the Austrian Environmental Agency) to collect information about potential invasiveness of species cultivated in botanic gardens or newly-reported as occurring in Austria.
Belgium	<ul style="list-style-type: none"> IAS addressed in Action Plan for integration of biodiversity into the economic sector (completion end 2008): measures to include sectoral awareness-raising, identification of appropriate measures and review of federal legislation. IAS addressed in National Biodiversity Strategy (adopted October 2006): objectives include consideration of species invasiveness when making import and export decisions. Black list of IAS developed, based on a standardised impact assessment protocol (ISEIA). Active eradication in some river basins on <i>Fallopia japonica</i>, <i>Heracleum mantegazzianum</i>, <i>Impatiens glandulifera</i> and <i>Senecio inaequidens</i>
Bulgaria	<ul style="list-style-type: none"> National IAS Strategy and Action Plan under development; national IAS Seminar held in October 2008. Assessment of Invasive Species in Bulgarian Fauna, Flora and Mycota and Measures to Control their Impact on the Native Species and Ecosystems completed in 2007. New legal provision (2007) requiring the Ministry of Environment and Water to organise and manage activities for the removal of introduced alien species that could threaten native biodiversity (Art.67a Biological Diversity Law).
Cyprus	<ul style="list-style-type: none"> Incentives available to general public and local authorities to use native species for planting, coordinated with subsidies under Rural Development Plan (but still no legal controls to restrict import or sale of alien plants). Inventory of most invasive fauna under preparation: proposal for new legal decree to prohibit their import in order to protect the island's biodiversity Extension of research on IAS (monitoring of distribution of IAS in the Cyprus marine environment by the Department of Fisheries and Marine Research).
Czech Republic	<ul style="list-style-type: none"> Few substantive changes. Reduction in list of invasive alien plants subject to mandatory monitoring by State Phytosanitary Service (formerly 14 species, now limited to 2 invasive plants covered by EPPO Pest Risk Analysis - <i>Hydrocotyle ranunculoides</i> and <i>Lysichiton americanus</i>). Changes mainly concern research and voluntary activities
Denmark	<ul style="list-style-type: none"> National IAS Strategy completed in 2008 (formal approval expected end 2008). Specific IAS budget line allocated for the first time in 2008 (2 million DKK): allocation for 2009-2010 increased to 8 million DKK. Expansion of research, control and public information programmes.
Estonia	<ul style="list-style-type: none"> Significant expansion in 2007 of regulatory List of Invasive Alien Species adopted under the Nature Conservation Act (13 plant species and 30 animal species now prohibited for import into Estonia c.f. 2 and 19 respectively in 2004). 2008 regulations govern import for fur-farming (gene pool refreshment) of raccoon dog (<i>Nyctereutes procyonoides</i>) and American mink (<i>Mustela vison</i>). Management plan for control raccoon dogs under development, due for completion end 2009. Improved cross-sectoral cooperation, coordinated by Ministry of the Environment. Inclusion of IAS emergency situations in Ministry's Environmental Emergency Plan. Voluntary codes of conduct due for completion end 2008. Preliminary steps taken to ratify the IMO BWM Convention.
Finland	<ul style="list-style-type: none"> Preparation of national IAS Strategy and Action Plan begun in June 2008. Participating in FP6 project "Effective Operations in Ports" (EFFORTS). New regional-level projects to eradicate/control <i>Heracleum mantegazzianum</i> and <i>H. persicum</i> (eg in Karjala and Kainuu regions). New information exchange and awareness-raising initiatives.
France	<ul style="list-style-type: none"> Proposals for IAS prevention and control actions endorsed at national environment forum in 2007 (<i>Grenelle de l'environnement</i>).

COUNTRY	Key policy-related developments and activities since 2006
	<ul style="list-style-type: none"> • Black lists of invasive animals and plants subject to trade/introduction controls currently under development for mainland France (pursuant to L.411-3, Environment Code). • Control programmes enlarged to cover sacred Ibis and American mink.
Germany	<ul style="list-style-type: none"> • National Biodiversity Strategy (2007) sets specific IAS targets, including preparation of a National IAS Strategy. Discussions ongoing on feasibility of developing an overarching strategy c.f. separate sectoral approaches. • National Agrobiodiversity Strategy (2007) addresses IAS issues⁴⁰. • Draft National Strategy for the protection and sustainable use of the seas addresses IAS. • Difficulties with legal definition of ‘alien’ still not resolved (see Annex 3.10 for German national report). • Collaboration with Austria on development of biodiversity risk assessment methodology and black list system. • Expansion of internet manual for identifying and managing invasive plant species. • Voluntary code of conducts adopted for botanic gardens (2007) and the horticultural sector (2008). • “Action programme Ambrosia” launched in 2007 by interdisciplinary working group and supported by Federal Ministry of Food, Agriculture and Consumer Protection with the aim to stop the spread of <i>A. artemisiifolia</i> and inform public.
Greece	<ul style="list-style-type: none"> • Expansion of research on marine invasive alien species; creation of online database (http://elnais.ath.hcmr.gr).
Hungary	<ul style="list-style-type: none"> • Revision of Forest Act in 2008, new Act to contain lists and regulations of invasive tree and herbaceous plant species. • Several 2007 Decrees are relevant to IAS that may impact biodiversity (regulation of biofuel plantations in protected areas and Natura 2000 sites eg prohibition on planting <i>Robinia pseudoacacia</i> for this purpose; requirement for applicants for EAFRD subsidies for biofuel plantations to prevent spread of species planted; IAS added to monitoring rules under Decree on environmental damage and remediation; list of invasive plant species added to Decree on maintenance rules for Natura 2000 grasslands). • In 2008, <i>Ambrosia artemisiifolia</i> and <i>Asclepias syriaca</i> added to list of noxious weeds under decree regulating conditions of the maintenance of GAEC for EAFRD support. • Inter-ministerial coordination, mandatory control and tax generation mechanism in place for <i>Ambrosia artemisiifolia</i> since 2004. New 2008 legislation on the food chain and its supervising authorities will streamline regulatory measures applicable to this species. • Draft Decree (2008) on keeping and transfer of pets will contain a list of 15 species which endanger Hungarian biodiversity and may not be traded, sold, kept or bred. • New list of terrestrial and aquatic IAS being finalised (2008). • Preparation of draft National IAS Strategy during 2008. • Awareness-raising with targeted stakeholders (anglers, <i>Ambrosia artemisiifolia</i>). • Increased funding for IAS aquatic plant research in 2007-8. • New financial mechanism for IAS control as part of habitat restoration (Environment and Energy Operational Programme, New Hungary Development Plan).
Ireland	<ul style="list-style-type: none"> • Legislative review for Republic of Ireland and Northern Ireland completed May 2008: possible development of IAS legislation under consideration. • Launch of ‘Invasive Species in Ireland’ project (2006-2009); All-Ireland Invasive Species Forum meets annually; National IAS Workshop and Progress Review held in November 2008. • Risk assessment protocol developed. Over 600 RAs carried out on established and potential IAS to identify those posing greatest threat to biodiversity on the island of Ireland: exclusion strategies, contingency plans and/or management strategies being prepared. • Codes of Practice for horticulture (completed) and for the aquaculture sector and recreational water users (in development). • IAS designated as the focus of Ireland’s biodiversity awareness campaign Notice Nature (www.noticenature.ie) for 2008. Information materials (schools; business, construction

⁴⁰ http://www.bmelv.de/cln_045/nn_757144/EN/10-BiologicalDiversity/StrategyAgrobiodiversity.html__nnn=true.

COUNTRY	Key policy-related developments and activities since 2006
	<p>and tourism sectors) being developed.</p> <ul style="list-style-type: none"> • €280,000 project launched to address knowledge gap identified under the Water Framework Directive for IAS in Ireland's River Basin Districts, and produce a monitoring and reporting strategy. • Expansion of research and control projects, mainly for IAS in inland water systems.
Italy	<ul style="list-style-type: none"> • Bilateral cooperation on <i>Ambrosia artemisiifolia</i> initiated in 2008 (Venice Region/Croatian Region on Slavonia) to address health and economic impacts. • Guidelines for application of the prohibition on introducing alien animal species in Italy produced in 2007: due to be included in a Ministry of Environment Decree. • Lombardia adopted a regional law in 2008 banning the introduction of alien invertebrates, herps and plants into the natural environment, except for authorised biocontrol, and establishing a black list of species to be monitored, eradicated and/or controlled: the Region has requested approval of a trade regulation for grey squirrel which is currently being considered by the Ministry of Environment.
Latvia	<ul style="list-style-type: none"> • Extension of plant protection legislation in 2006, covering imports, introductions, control and clearance obligations. One invasive plant <i>Heracleum sosnowskii</i> currently listed (list may include any invasive plant recommended for regulation by EPPO). • National Giant Hogweed Control Programme (2006-2012) adopted by Cabinet of Ministers.
Lithuania	<ul style="list-style-type: none"> • IAS regulations updated in 2008. • IAS website to be launched in 2010. • Finance allocated 2008-2009 for development of around 10 prevention/control plans for specific IAS.
Luxembourg	<ul style="list-style-type: none"> • Review of IAS-related legislation under way. • National Nature Conservation Plan adopted May 2007: includes list of priority invasive alien species (plants, reptiles, amphibians, mammals) for which action plans may be developed. • Monitoring programme expanded to cover selected alien plants.
Malta	<ul style="list-style-type: none"> • Amended Flora, Fauna and Natural Habitats Protection Regulations 2006 contain extensive powers to regulate imports, releases and control measures. • Sustainable Development Strategy for the Maltese Islands 2006-2016 mandates development of official national policy on the introduction and eradication of alien species. Dedicated IAS Strategy now under development.
Netherlands	<ul style="list-style-type: none"> • IAS Strategy submitted to Parliament in 2007 based on 3-stage hierarchical approach. • Establishment of IAS team within Ministry for Agriculture, Nature and Food Quality. • Creation of informal network of experts and interest groups to advise the ministerial IAS team on all IAS issues affecting biodiversity, across forests, inland and marine waters. • Development of voluntary agreements with aquatic plant trade and birdseed sectors. • Cooperation on control projects for shared water catchments with neighbouring countries.
Poland	<ul style="list-style-type: none"> • Revised Nature Conservation Act (2008) will define 'alien' species for the first time, provide criteria for selecting alien species that are harmful to biodiversity and provide for prohibition on possession and trade in listed IAS. • IAS addressed in National Strategy and Action Plan for Conservation and Sustainable Use of Biological Diversity (2007) which provides for implementation of CBD Guiding Principles • Expansion of Alien Species in Poland database (over 800 species covered) and development of IAS information portal in 2008 (Institute of Nature Conservation). • 2007 survey of species and areas subject to IAS control measures.
Portugal	<ul style="list-style-type: none"> • Ongoing revision of IAS legislation (Decree-Law 565/99) to address difficulties in implementation related to listing criteria, safety criteria in holding facilities and absence of regulatory duties for eradication/control. • Ongoing development of control/eradication plan for <i>Eichhornia crassipes</i>. • Approval pending for regional Decree to regulate the import, detention and introduction of specimens of non-native species in the in the Azores Autonomous Region. • Multiple IAS control projects in the Azores, including for marine IAS.
Romania	No updated information received.

COUNTRY	Key policy-related developments and activities since 2006
Slovakia	<ul style="list-style-type: none"> Control of invasive plant species included as mandatory condition of direct payments to farmers under Rural Development Programme 2007-2013. Ongoing development of National Strategy on Invasive Alien Species. Continuation of IAS public awareness activities originally launched through INTERREG trilateral neighbourhood programme. 2008 application to join NOBANIS programme.
Slovenia	<ul style="list-style-type: none"> Updated Regulations (2007) under Nature Conservation Act list alien animal species that do not require a permit for captive breeding (ie white list of mammals, birds, fish and invertebrates considered to present no risk to native species in the event of escape). New Regulation on Fishing Species in Inland Waters (2007) lists fishing species by river basin and names alien species of fish and crayfish whose release/translocation between different river basins is regulated or prohibited.
Spain	<ul style="list-style-type: none"> Hosted EU Conference on invasive alien species (Madrid, 15-16 January 2008). New biodiversity law (42/2007) supports development of national and regional catalogues of IAS, prohibitions on trade and transport in listed IAS and funding of control activities. Ratification of IMO BWM Convention. Eradication of <i>Eichhornia crassipes</i> on the Guadiana river ongoing.
Sweden	<ul style="list-style-type: none"> 2008 Report recommends ratification of BWM Convention except for Baltic Sea shipping National Strategy for invasive alien species finalised for adoption in 2008. IAS action plan presented in December 2008: includes an updated legislative review/gap analysis and an analysis of administrative roles and responsibilities. Assessment of IAS damage and control costs published (Gren et al., 2007). Proposed development of an IAS portal within national species reporting and information system as well as a dedicated national IAS website.
United Kingdom	<ul style="list-style-type: none"> New powers to prohibit sale, advertisement for sale, possession or transport of live specimens of specified alien species (Scotland since 2004; England & Wales since 2006). Legislative backing for IAS codes of conduct: content must be taken into account by a court in any enforcement proceedings to which the guidance seems relevant. Code of practice in place for horticulture, under development for plants. Creation of Non-Native Species Programme Board, Secretariat and stakeholder Forum. Invasive Non-native Species Framework Strategy for Great Britain launched May 2008. Country IAS working groups in place for Scotland and (since 2008) Wales and England. Cooperation (Northern Ireland) with Republic of Ireland for development of strategic IAS framework for the whole island. Risk assessment methodology developed for both intentional and unintentional introductions, for all taxonomic groups: following testing and peer review, refined methodology will be completed by end 2008. Aquatic IAS assessment carried out as part of WFD implementation. Research into biocontrol of Japanese knotweed.

4.3.2 Member State actions on IAS threats in EU Overseas Entities

The Outermost Regions count for legal purposes as part of Community territory and thus form part of the Single Market. In terms of IAS prevention, this can present specific challenges because Community legislation does not provide for differentiated screening of goods or consignments on the grounds of the vulnerability of the receiving insular territory.

One Outermost Region, Madeira (Portugal), regulates imports and holding for all alien animals that are not listed under regional decree. Similar legislation is under preparation for the Azores. In contrast, French and Spanish Outermost Regions do not operate equivalent restrictions on imports (see Box 8).

Box 8: IAS, islands and the Single Market: the case of the Canary Islands (Spain)

The *Estatuto de Autonomía de Canarias* (Articles 31.3 and 32.12) confers exclusive competence for internal trade on the Canary Autonomous Community. This covers restrictions on possession and trade within the Canaries but not regulation of trade with mainland Spain. Within the Canaries, a decree is currently being developed under environmental impact and biodiversity conservation legislation to list species that may be lawfully sold in pet shops. Currently, any species purchased in mainland Spain can be legally brought into and kept in the Canaries, regardless of potential invasiveness. The proposed decree would not affect introduction from mainland Spain but is likely to list species that may not be kept in the Canaries, except in zoos.

The following example illustrates difficulties that can arise from weak IAS legislation:

In 2008, an inhabitant of Lanzarote Island purchased a specimen of *Bufo marinus* and a kingsnake *Lampropeltis getula* (recently established as an invader in Gran Canaria island) by internet from mainland Spain. These were detected on arrival at Lanzarote airport and the Agricultural Council veterinary service informed. The accompanying documentation was correct but the animals were temporarily placed in a zoo while the Environmental Service assessed the invasive potential of the species. The communal veterinary service used this ongoing assessment to refuse listing of these animals in the Municipal Register of Domestic Animals in the relevant commune. Some months later, the animals concerned were still in the zoo pending completion of the administrative procedure.

The Environmental Service of the Canaries Government funds eradication efforts for *Lampropeltis getula* in Gran Canaria and is developing a regulation for control of all snakes, yet its purchase (eg via internet) and holding currently remain legal. The proposed decree would prohibit the holding of nearly all snake species except a white list subject to very strong control.

Source: pers. comm. of 4 September 2008, Juan-Luis Rodriguez-Luengo, Canary Islands Government.

The need for adapted IAS policies in isolated islands is now receiving much greater attention from concerned MS.

Although France does not have a National IAS Strategy, its Overseas Territories Strategy called for each territory to prepare individual biodiversity strategies and virtually all of these identify IAS as a key priority. IUCN-France recently completed a three-year programme⁴¹ to assess IAS threats, legal frameworks and capacity constraints and make policy recommendations for the country's four ORs and six OCTs (Shine and Soubeyran 2008). The second phase of this project (2009-2011) will support regional coordination, capacity development and implementation of policy recommendations.

The Regional Governments of Madeira and Azores cooperate with Spanish authorities on the joint project, Control of Invasive Vertebrates in Islands of Spain and Portugal. As noted (see 4.2.3), regional cooperation on IAS in UK Overseas Territories in the South Atlantic has received substantial EU funding.

4.4 Progress towards addressing priority issues and filling cross-cutting gaps

This section summarises key policy trends emerging from international, regional and national developments and assesses progress made towards filling eight cross-cutting gaps identified in Miller et al in 2006 (see Table 4.4).

⁴¹ *Projet Espèces envahissantes d'outre-mer*, co-financed by IUCN France, WWF France, the French Coastal Conservation Agency (*Conservatoire du Littoral*) and the French National Forestry Office (see <http://www.uicn.fr/Synthese-especes-envahissantes-OM.html>).

International and regional level

The dominant policy trends include:

- closer coordination between competent authorities and organisations (e.g. veterinary, phytosanitary, agriculture, forestry, fisheries, environment and transport sectors);
- inter-sectoral planning, economic valuation and integrated policy and legal frameworks;
- targeted measures to address risks associated with pathways falling outside the existing regulatory framework (e.g. ornamental, landscape and aquatic plants; pets, aquarium/terrarium species, live bait and food; transport and development assistance) including through voluntary practices and expanded international standards and guidance;
- formalised biogeographic cooperation (under development in the Benelux and Carpathian regions and for ballast water management in all regional European seas);
- science-based tools and capacity-building to address IAS threats, including early warning systems, species alert lists and taxonomic identification support for customs and quarantine services at national and regional levels;
- recognition that climate change and its predicted impacts on species distribution need to be addressed within IAS policies, consistent with sustainable development.

Community level

The most important overarching development is the formal commitment to develop a specific EU framework on IAS and the accompanying launch of stakeholder and public consultations. At the substantive level, IAS are explicitly addressed by one new instrument, the aquaculture Regulation, and covered marginally or indirectly by several other new instruments (e.g. marine strategy framework Directive, renewable energy Directive, Forest Action Plan). The overall legal framework remains fragmented:

- consistent with current international law and standards, existing procedures, capacity and funding at the EU's external borders and within Community territory are mainly focused on preventing entry and spread of plant pests ('harmful organisms') and animal diseases and pathogens;
- there are few explicit requirements to screen entering commodities for invasiveness risks, except for intentional introductions for aquaculture;
- there are no requirements to coordinate prevention, rapid response and management efforts for newly-detected species affecting biodiversity and for crossborder IAS threats;
- existing Community legislation does not reflect the acknowledged vulnerability to invasion of many European islands;
- damage resulting from IAS-related activities is not explicitly covered by EU environmental liability or criminal environmental legislation;

Although funding for IAS control is delivered through earmarked environmental funds (LIFE) and potentially through other mechanisms (e.g. EAFRD, EDF), these instruments are not suited to handling rapid response or to re-occurring management needs. However, the

Community has made significant research investments⁴² to improve the IAS knowledge base (e.g. DAISIE) and to improve risk analysis methodology and decision support schemes (e.g. ALARM, IMPASSE, PRATIQUE). There is still no formalised information exchange or early warning system linked to international databases, although the EEA has launched a feasibility study for this purpose.

Member State level

There has been a steady increase in strategic measures to address IAS although operational coordination between key sectors remains rare. At the substantive level, research for the report found a steady trend towards national/subnational regulation of IAS trade and movement. However, stakeholder consultations highlighted widespread legal uncertainty about how far an individual country or subnational unit can go to protect its biodiversity against risks linked to sale and/or movement of known high-risk species, particularly because existing European Court of Justice case law on this subject is very limited⁴³. The following variations in national/subnational practice were identified:

- a few Member States have invested in sophisticated risk assessment capacity to provide scientific justification for national measures and/or to prioritise pathway and management interventions;
- a second group of States had adopted measures with less robust scientific backing; and
- others had decided not to adopt any trade/movement measures pending clarification of the legal position at Community level;
- in several cases, trade in known high-risk species was banned in one country/subnational unit and freely permitted in neighbouring units⁴⁴;
- biodiversity-related risk assessments were not usually coordinated with other national systems or easily replicable. In some cases, different Member States conducted separate risk assessment on the same species which could lead to duplication of effort and/or contradictory results;
- available scientific protocols were not well developed and staff training was needed in the practical application of risk analysis procedures.

⁴² 90 IAS-related projects were funded between 1996-2006 under Framework Programmes 4, 5 and 6 at a total cost of €88 million (Scalera 2008).

⁴³ National measures potentially affecting free movement of goods could infringe the operation of the Single Market (quantitative restriction on imports, exports or goods in transit) unless scientifically justified on the grounds of protection of health and life of humans, animals or plants under Article 30 of the Treaty. Several Member States indicated that the small number of case-specific judgments to date (see Annex 2) does not provide an adequate level of certainty for development of national measures to secure a higher level of biodiversity protection..

⁴⁴ e.g. within Spain, the Autonomous Community of Valencia has banned the sale of the invasive water hyacinth but no equivalent measure is in place in adjacent units. Trade in grey squirrels is prohibited in France and Switzerland but authorised in Italy (although its release into nature is prohibited): however, the Lombardia region in Italy is considering possible development of a subnational trade ban.

Table 4.4: Progress towards filling cross-cutting gaps and priority issues identified in 2006

Jurisdiction	Extent of progress achieved?	Comment, including consistency with international policy trends
Gap 1: Varying coverage in relation to different groups of organisms		
EC level	Major progress with adoption of aquaculture Regulation, although some known invasive fish of commercial importance are excluded from the risk assessment requirements.	For aquaculture, the EC is in advance of the international framework as binding regulation adopted in 2007.
	For plants, regulatory coverage limited to harmful organisms (plant pests). Non-binding EU Forest Action Plan supports protection strategies and targeted risk assessment for harmful organisms and invasive species affecting forest biodiversity.	To date DG SANCO has not followed the IPPC/EPPO trend for closer engagement between plant protection and biodiversity frameworks. No invasive alien plants are listed under Directive 2000/29. Alien genotypes are not currently addressed. However, comprehensive review of EU plant health legislation launched on 1 June 2009 to take account of such policy changes.
	Limited potential to screen potentially invasive plants for biofuel plantation under the renewable energy Directive 2009/28/EC.	Consideration of invasiveness in biofuel planting supported by CBD Decision IX/2 and EPPO Council Recommendation 2007.
	Wild bird imports prohibited as part of avian influenza prevention, may reduce opportunities for some potential IAS to enter the EU.	No EC mechanisms to address risks associated with pets, aquarium and terrarium species and as live bait and live food (cf CBD Decision IX/4). IAS risks through trade in live animals and plants are not adequately or systematically considered (c.f. CITES Recommendation 13.10).
	Overhaul of EU Animal Health framework by 2010-2011 may provide opportunity to address some invasive animals that are not pests of plants as part of new biosecurity framework.	The existing EC framework reflects OIE gaps with regard to animals that are not pests of plants. No work carried out to date in EC on pre-import screening of live animals (c.f. CBD-supported expert workshop on this topic, Indiana, 12-16 April 2008).
MS level	Increase in coverage of invasive plants in some MS, mainly under plant health legislation; some consideration of pathway risks (e.g. use of potential IAS for bioenergy plantation, pet trade).	EPPO invasive plant recommendations, guidance and PRA decision support have provided catalyst to several MS taking action in this area.
	Several MS developing risk assessment methodology to address IAS risks to biodiversity, mainly to support development of species 'black lists'.	Wider application of recognised risk assessment techniques supported by CBD Decision IX/4. However, lack of coordination and variable practice between MS (e.g. in terminology, assessment criteria and techniques).
	Several MS developing codes of conduct for horticulture, botanic gardens, aquatic plants, companion animals, water users.	Voluntary approaches with stakeholders strongly backed by CBD Decision IX/4 and under the Bern Convention. Sharing of codes appears limited (the lack of translation into English is sometimes a constraint on dissemination).
Gap 2: Lack of coordination between Member States		
EC level	Aquaculture Regulation introduces the first IAS-specific requirement in Community legislation for prior consultation on proposed introductions that could affect neighbouring MS and establishes a decision-making procedure for the Commission. Other coordination mechanisms are limited to plant pests, animal pathogens and GMOs.	Prior consultation not explicit under other EC legislation c.f. CBD VIII/27 encourages Parties to develop procedures/controls to ensure that cross-border impacts of potential IAS are considered as part of national and regional decision-making processes (similar recommendation in Bern Convention European IAS Strategy).

Jurisdiction	Extent of progress achieved?	Comment, including consistency with international policy trends
	Cooperative ecosystem management frameworks (WFD, flood risk management Directive, MFD) potentially support coordinated assessment and management of IAS in aquatic ecosystems.	Activities linked to these instruments could contribute to CBD Decision IX/4 support for mechanisms to manage pathways for potential IAS in inland water, marine and coastal ecosystems.
	Some scattered use of EU Structure Funds for transboundary programmes including an IAS component (e.g. through INTERREG).	EU IAS funding has grown but is allocated on a case-by-case basis and does not cover rapid response funding (Scalera 2008).
MS level	Limited examples of formal crossborder prevention (mainly through regional seas ballast water cooperation and subregional treaty mechanisms). Different approach to risk assessment and species listing taken by neighbouring MS, with serious inconsistencies for certain species (e.g. grey squirrel, some aquatic plants). Weak coordination between subnational administrations in some MS. Several examples of informal cooperation e.g. Austria/Germany/EU Botanic Gardens Consortium, all-Ireland IAS initiative, cooperation on <i>Ambrosia artemisiifolia</i> . (Italy/Croatia; German/Austrian/Swiss information exchange; EUPRHESCO project).	Decision IX/4 supports concrete actions for capacity-building and coordination at all levels. As noted above, lack of coordination and variable practice between MS affects all areas of IAS prevention and control (eg in terminology, information exchange, risk assessment techniques, species regulation, management).
Gap 3: Constraints linked to operation of the Single Market		
EC level	No clarification by Commission of scope for MS to take national IAS-related measures that may affect free movement of goods, for reasons of protection of plant, animal or human life. ECJ case-specific judgments currently provide sole source of guidance to MS wishing to address identified risks related to trade.	Small number of relevant ECJ judgments (see Annex 2 e.g. Case C-219/07 provides useful guidance for national measures based on risk assessment). However, continuing legal uncertainty cited by some MS as reason for not taking regulatory action even where considered necessary for effective prevention.
	Several EU research projects support development of consistent RA methodology for EU-wide application (eg ALARM, PRATIQUE) which could help to harmonise decision-making procedures and promote transparent criteria across all MS.	Strengthening EC expertise in science-based risk assessment methods is fully consistent with CBD Decision IX/4. More consistent and coordinated application of recognised risk assessment techniques is in line with existing international obligations linked to the WTO-SPS Agreement.
	Except under the aquaculture Regulation, there is no provision for differentiated screening of goods or consignments on the grounds of the ecological fragility of the receiving environment (e.g. in isolated islands, including but not limited to the EU Outermost Regions).	EC recognition of island priorities is reflected in IAS control funding (LIFE projects on islands) but not in IAS prevention mechanisms.
MS level	Increase in the use of national trade/possession controls, backed in some MS by stronger science-based risk assessment capacity.	Most RA focused on risks to biodiversity are currently carried out on a country-by-country basis and there is little scope or incentive to share lessons learnt and avoid duplication.
Gap 4: No early warning system for IAS threatening biodiversity		
EC level	Significant progress in EU-supported information tools (DAISIE, SEBI-2010 etc.) and other European information frameworks (e.g.	No formal links yet established to international information tools to address IAS not yet present in Europe (e.g. GISIN, GRIS). High-level Community

Jurisdiction	Extent of progress achieved?	Comment, including consistency with international policy trends
	NOBANIS, EPPO Reporting Service). EEA-commissioned feasibility study on an EU Early Warning and Information System in line with EU Biodiversity Action Plan.	commitment to early warning system consistent with recommendations under CBD Decision IX/4
MS level	Many MS actively support DAISIE and ALARM; steady growth in national IAS inventories and online information resources.	Standardisation of data format and terminology remains a problem, although now addressed through NOBANIS. Lack of clear allocation of roles and responsibilities for early detection, contingency planning and rapid response is a major constraint in most MS.
Gap 5: Low awareness, resourcing and political attention		
EC level	Backing from all Community institutions for development of EU framework on IAS; Inter-Service group and stakeholder consultation established; online questionnaire and dedicated Community webpage with links to technical resources.	Development of regional IAS strategy is consistent with CBD recommendations but <u>operational</u> coordination on IAS issues between relevant DGs (veterinary, phytosanitary, agriculture, forestry, fisheries, environment and biodiversity) remains limited c.f. recommendation in CBD Decision IX/4.
	IAS to be addressed through EU Biodiversity Communication Campaign 2008-2010. Recognition of low awareness levels via Communication campaign survey.	IAS will need special attention in this Campaign as awareness ranked lower than any other biodiversity threat (2%) in preliminary scoping study.
MS level	Significant investment by some MS in IAS Strategy development, usually backed by expert and stakeholder collaboration.	Specific IAS coordination mechanisms (formal or informal) remain rare c.f. CBD Decision IX/4 and European Strategy on IAS.
	Growth in public awareness initiatives (usually species- or stakeholder-specific) but still low for some pathways (e.g. angling).	Voluntary codes developed in some MS may catalyse wider awareness and help build partnerships with key industry sectors.
Gap 6: Lack of attention to IAS in dealings with third countries		
EC level	Generic environmental integration instruments (EIA, SEA, SIA) can support consideration of IAS in export-related and development cooperation activities but there is currently no specific guidance on best practice.	No evidence was found that IAS as a livelihood issue (linked to climate change adaptation, measures to combat desertification...) have been integrated into EC programmes to date. NB the European Bank of Reconstruction and Development's Environmental and Social Policy 2008, aligned with EU environmental policy, sets out detailed requirements for clients seeking funds for projects involving IAS risks, including in the context of forestry and fisheries (EBRD 2008).
	No regulatory requirements address export-related risks (as a contribution to prevention at source) outside the plant and animal health sector.	
	IAS are not directly addressed in current EC consultations with OCTs and in cooperation with ORs.	
MS level	Only three MS seem to have legislation that provides for consideration of export-related risks, but these do not appear to have been made operational to date.	
Gap 7: Insufficient MS implementation/understanding of existing Community instruments		
EC level	Improved understanding of how existing instruments address IAS (due to e.g. Miller et al, 2006; DG ENV IAS stakeholder	IAS provisions in habitats and birds Directives remain low profile e.g. the 2008 EC Sustainable Hunting guidance under the birds Directive does not

Jurisdiction	Extent of progress achieved?	Comment, including consistency with international policy trends
	consultations and dedicated webpage). Opportunities offered by LIFE+ and the FP7 – and other financial sources - with regard to IAS management are reported in <i>Financing Natura 2000: guidance handbook</i> (Miller and Kettunen 2007).	mention possible risks associated with hunting as an introduction pathway for potential IAS (alien game species). Use of existing EC funding mechanisms for IAS programmes is non-strategic and take-up varies between countries.
	New Community instruments (e.g. MFD, Forest Action Plan, proposed renewable energy Directive) provide opportunities to prevent and manage IAS risks.	In the absence of an overarching framework, relevant provisions are scattered and have low overall visibility.
MS level	Several MS have carried out legal/institutional reviews to clarify strengths and weaknesses of existing IAS measures. At least two MS now use a broader range of EC tools to support targeted monitoring of IAS (especially the WFD for aquatic ecosystems).	There is still an uneven approach to implementation of certain instruments e.g. very variable consideration of IAS in the context of WFD ecological status assessments.
Gap 8: Inconsistent/inappropriate definitions and listing		
EC level	Progress through aquaculture Regulation in defining key terms for EU application eg ‘alien’, ‘locally absent’ ‘adverse effect’.	Some species invasive in parts of the EU are listed under the habitats or birds Directives e.g. the Austrian report under the habitats Directive notes that a legal exemption of <i>Orconectes limosus</i> was made from the full protection of all crayfish species to allow for selective elimination of that species.
MS level	At least 3 MS are developing or adjusting legislative definitions to accommodate risks to biodiversity but this remains problematic. Several MS still have widespread exemptions for introductions of alien species for agriculture, forestry, fishing and hunting and/or legal constraints due to blanket species protection legislation.	Fragmentation of national frameworks (legal and institutional) works against a common understanding of key concepts and priorities. As noted, uncoordinated approach to black listing of species.

5 POLICY OPTIONS TO MINIMISE IAS IMPACTS ON BIODIVERSITY

The policy options presented below follow the three-stage hierarchical approach endorsed by the CBD Guiding Principles (see 2) and include options for ecosystem restoration, consistent with the Bern Convention European Strategy on Invasive Alien Species.

Based on the updated analysis of gaps, best practice and priorities, the following sections:

- suggest objectives and principles for Community action on IAS (section 5.1);
- outline a range of vertical measures that could be combined in different ways within a future EU framework on IAS (section 5.2);
- discuss cross-cutting policy tools, namely risk assessment, species listing, research and information exchange and financial mechanisms (section 5.3); and
- identify horizontal policy options for improving institutional and regional coordination, communication and public awareness, and accountability (section 5.4).

5.1 Suggested objectives and principles for Community action on IAS

The **Assessment of the impacts of IAS in Europe and the EU** (Kettunen et al. 2009) provides evidence that IAS have significant negative impacts upon Europe's environment, key economic sectors and human well-being, with real monetary impacts are likely to be higher than the figures presented (see section 1.1). The updated review of IAS policies for the EU (see 4) indicates that whilst positive progress has been made in some areas, the current framework does not adequately address existing and potential IAS threats to European biodiversity or to affected economic and social interests.

Based on the above analysis, a future EU framework on IAS would need to be both comprehensive to address the full range of pathways and impacts and flexible to adapt to pressures associated with globalisation and environmental change.

Its overarching aim should be to conserve and enhance European biodiversity at the ecosystem, species and genetic level through coordinated measures to prevent, rapidly respond to or control IAS and mitigate their impacts on the environment, economy and human health and well-being. Coverage of this broad range of impacts is consistent with the Bern Convention European Strategy on Invasive Alien Species and also with strategy documents adopted in other large jurisdictional units (e.g. Canada, United States: see Annex 4).

Given the low level of IAS awareness in Europe and problems associated with sectoral fragmentation, the EU framework would need to provide high-level political commitment and strategic direction to guide and support prevention and management actions and efficient use of available tools at all levels. This would require targeted communication of IAS issues to politicians and decision-makers, economic stakeholders, resource managers, interest groups and the public.

In accordance with the EC Treaty, the EU framework should aim for a high level of environmental protection and be based on the precautionary principle and on the principles

that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay⁴⁵. The principles of prevention and precaution, emphasised in the EC Discussion Paper developed with stakeholders (EC. 2008c), are of fundamental importance because of the technical constraints and higher cost of eradicating or controlling species that have become established and spread.

The EU framework on IAS would also need to be based on the principles of subsidiarity, proportionality, cooperation, solidarity and transparency. The Community should only take action in areas that do not fall within its exclusive competence if the objectives sought cannot be sufficiently achieved by MS acting independently, at central or at regional and local level: in such cases, it would need to show how Community action will better achieve the objectives of the proposal. The content and form of Community action should not exceed what is necessary to achieve the objectives of the Treaties.

The EU framework should also support overarching EU objectives on sustainable development and contribute to broader regional and subregional cooperation with non-Member States, building on existing cooperation policies with neighbouring countries that face common challenges of IAS prevention and management.

5.2 Possible policy options for an EU framework on IAS

The following sections link the analysis in Chapter 4 to policy options for prevention, early detection, rapid response and contingency planning, control and management, and ecosystem restoration. Each section begins with a stand-alone summary of:

- the problem to be addressed;
- current practice at EC and MS level;
- the rationale for possible Community action;
- desired outcome(s).

This overview is followed by a table listing a range of possible measures, following a gradient from least to most formal/binding. For each measure, the table provides examples of existing applications (in or outside the EU, as applicable) and simple screening in terms of:

- the level of action required (EC, MS, other stakeholder);
- scope of application (3rd countries, intra-Community);
- the cross-cutting tools required for implementation (see section 5.3);
- possible effectiveness; and
- possible administrative and resource implications.

For reasons of space, generic conditions for effectiveness are not repeated in each section. Decision-maker support for stronger IAS policies is clearly fundamental whilst public awareness is critical to change attitudes and manage risks efficiently.

⁴⁵ Article 174(2).

5.2.1 Policy options for prevention

Problem definition: Prevention is generally recognised as the most cost-effective policy option but requires a range of policy approaches. Introductions may be intentional or unintentional (see examples in Table 5.1). Intentional introductions provide clear opportunities to apply legal tools to analyse, regulate and manage risks assessed for particular species. Illegal introductions are hard to detect but can be addressed by establishing and publicising clear prohibitions and penalties. Measures to minimise risks of unintentional introductions need to be tailored to specific pathways and vectors⁴⁶.

Table 5.1: Major pathways and vectors for different types of introductions (after Burgiel et al. 2006)

Intentional Introductions		Unintentional Introductions
Direct Introductions into the Environment <ul style="list-style-type: none"> ▪ Agriculture ▪ Forestry ▪ Soil improvements ▪ Horticulture (ornamentals, nursery stock, house plants, etc.) ▪ Conservation ▪ Fishery releases ▪ Hunting and fishing ▪ Release of mammals on islands as food sources ▪ Biological control ▪ Aid trade ▪ Smuggling ▪ Aesthetics, medicinal 	Introductions into Captivity/Containment <ul style="list-style-type: none"> ▪ Botanical and private gardens ▪ Zoos ▪ Farmed animals ▪ Beekeeping ▪ Aquaculture ▪ Pet trade ▪ Aquarium and horticultural pond trade ▪ Research 	<ul style="list-style-type: none"> ▪ Aircraft/vehicles/trains, rolling stock ▪ Ballast water ▪ Hull fouling ▪ Sea cargo and containers ▪ Personal baggage/equipment ▪ Agricultural produce ▪ Seed contaminants ▪ Soil, gravel, sand, etc. ▪ Timber ▪ Packaging material ▪ Dirty equipment, machinery, tyres, vehicles - including military ▪ Hitchhiking organisms, including parasites and diseases.

⁴⁶ A pathway is basically the route along which an alien species is transported to a new location e.g. means of transport such as shipping. A vector is the mechanism for species transfer within each pathway e.g. rolling stock, ballast water, shoes....

Research carried out through the EU-funded ALARM project identified six main categories of pathways, which vary significantly depending on taxonomic group (see Figure 5.1).

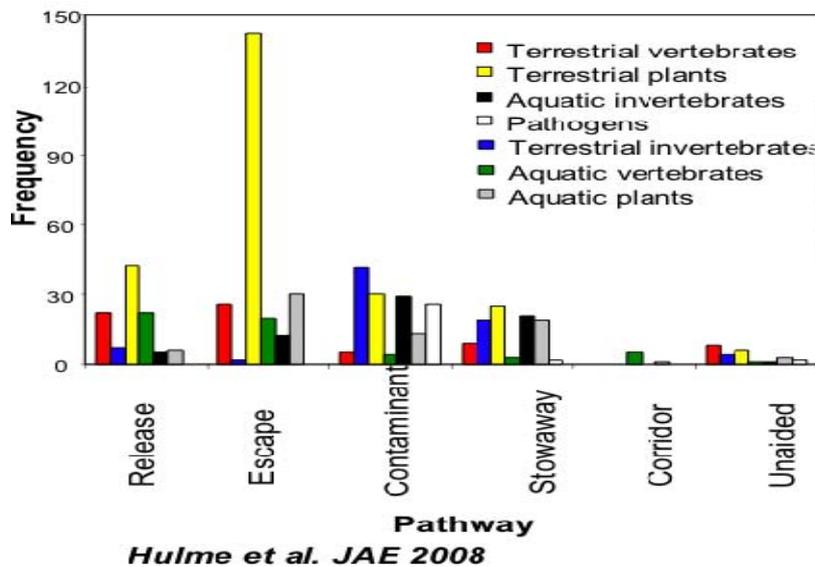


Figure 5.1: Breakdown of pathways by taxonomic group

Current practice: Procedures and capacity to anticipate problems at the EU's external borders (border control, quarantine, risk screening and assessment) and within Community territory are focused on pests of plants, animal health, human health and more recently, aquaculture. Outside these sectors, there are no tools to coordinate prevention efforts for IAS that are problematic in more than one MS or to apply stricter prevention measures to fragile ecosystems (e.g. imports to islands). There is growing disparity between national regulatory frameworks with some MS or subnational jurisdictions adopting trade and movement restrictions and other MS taking a different approach.

Rationale for EC action: The EC has exclusive competence for trade with third countries and operation of the Single Market (i.e. intra-Community trade and movement). It interacts with WTO and international standard-setting bodies and is committed through the CBD to promote closure of regulatory gaps and improved pathway management. Once goods are cleared at the EU's external border in one MS, there is normally no longer any customs or other intervention to prevent the free movement of an introduced organism within Community territory. Provided that organism is able to tolerate a wide range of circumstances, it may move anywhere which means that damage can be felt across the Community.

Outcomes sought:

- improved prevention at source and prevention of spread into and within the Community;
- more effective targeting of available resources at the highest-risk pathways and vectors, based on strategic pathway risk assessment;
- greater consistency and transparency in the use of risk assessment to justify adoption of restrictive measures where necessary and to prioritise interventions;

- closer coordination between prevention policies and effective systems for surveillance aimed at the early detection of new potential IAS;
- significant progress in ratification and implementation of existing instruments (e.g. IMO BWM Convention) and/or internationally-backed voluntary guidance.

Table 5.2: Prevention of intentional introductions: policy options linked to trade, contained use, movement, holding and release (following a gradient from least to most formal)

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
Voluntary and market-based approaches						
Information campaigns	<p>Most used in horticulture, nursery/landscape and pet/aquarium trade sectors. Encourage retailers not to stock and/or consumers not to buy legally available products (informally labelled). Can be associated with promotion of locally-sourced species and with guidance on responsible use/planting of the species if purchased (eg avoidance of release of exotic pets).</p> <p>European examples include EU Botanic Gardens Initiative, Ambrosia information campaigns (Switzerland and Germany) and, in UK, Royal Horticultural Society entomology campaign.</p> <p>In US and Australia, extensive online information on environmental weeds (Greening Australia, Plantlife, US garden associations, Habitattitude, California Horticultural Invasive Prevention Partnership at www.plantright.org). Generally include links to local websites with adapted advice and photos for different biogeographic conditions.</p>	NGOs Industry MS support	Local/ national Could be wider via internet/ translation	Can be linked to species lists/ databases	<p>Limited documentation. Some success stories e.g. Netherlands media campaign led to pet shops and garden centres removing Bullfrog tadpoles from sale (Adrados and Briggs, 2002). Can trigger broader awareness-raising of IAS and stimulate responsible behaviour.</p> <p>Best efforts approach, totally dependent on voluntary participation in scheme. Some potential to deter purchase/well-meaning release of eg exotic pets but difficult to document effectiveness. Cannot ensure consistency or be monitored or enforced. No sanctions for non-compliance. Criteria may vary widely: may be particular problems in correct and consistent use of scientific names.</p> <p>Potential to extend to known high-risk pathways e.g. use of alien live bait in angling (being developed in Hungary).</p>	Low If costs met by retailer, scope to pass on to consumer/user.
Point of sale guidance	Main sectors and coverage as above. Usually provided by retailer (clear entry point). Art.9, Wildlife Trade Regulation provides existing legal basis to incorporate IAS component into welfare advice (MS required to ensure that pet traders provide buyers of wild pet animals with information about how to take care of the animals).	Industry-led NGO/MS may catalyse action.	Local/ National Could be wider via internet/ translation	Can be linked to species lists/ databases	Offers targeted educational opportunity as clear entry point to consumer. Implementation depends on retailer awareness and motivation/incentives. Industry associations can play catalyst role but may themselves lack awareness of trade-related IAS risks. Difficult to document effectiveness as no 'traceability' of purchaser/consumer.	Low If costs met by retailer, scope to pass on to consumer/user

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
	Current practice most developed through the Ornamental Aquatic Trade Association and, for North America, the Pet Industries Joint Advisory Council.					
Codes of practice	<p>Scope for broader application e.g. may be extended to other recreational activities involving alien species (e.g. anglers) and for public or private sector use (eg local authority roadside planting, landscaping, aquaculture).</p> <p>European examples include EPPO/Bern Code of Conduct on Horticulture and Invasive Plants (2008) and ICES/EIFAC Codes that led to EU aquaculture Regulation. Several MS initiatives. e.g. the Netherlands for aquatic plants.</p> <p>One MS (UK) provides for statutory recognition of voluntary codes: guidance may be cited in court proceedings where relevant.</p>	Flexible	Variable: local to continent	Can be linked to species lists/databases	<p>May be fully voluntary, given regulatory backing (still rare) and/or integrated into industry certification/accreditation schemes (see below). Can be detailed, technically rigorous and foster high level of responsibility and stewardship. Need properly-funded communication and dissemination.</p> <p>Likely to be most effective if close collaboration between industry and government (i.e. code development contributes to partnership formation). Can offer a strong incentive for compliance where used to trial voluntary prevention policies before a decision is taken on possible need for binding standards.</p>	<p>Medium, depending on numbers involved in code development.</p> <p>Costs met by industry may be passed on to consumer/user.</p>
Voluntary substitution policies	<p>Policies targeted at sectors that purchase/cultivate/breed and/or deliberately introduce potential IAS in the wild. Seem to be concentrated on plants for planting: promote use of native taxa in landscaping, infrastructure development, restoration (e.g. forestry, ornamental or landscaping purposes).</p> <p>Existing Green List schemes in place or being developed in several MS e.g. Cyprus, Denmark, parts of France, including La Réunion. Can be integrated into local authority planning and procurement policies (see case study for Sète municipality, France: <i>Workshop on the Code of Conduct on Horticulture and Invasive Alien Plants</i> (Oslo, 4-5 June 2009: www.eppo.org).</p>	MS Local authorities	Usually local or national	Based on (in)formal white list.	<p>Implementation depends on availability of reliably-sourced local species as an alternative to using introduced species. May also be linked to elimination of subsidies for IAS and/or incentives for purchase of alternative species.</p> <p>May be progressively formalised through national forestry or biodiversity plans (EU Forestry Action Plan provides support for this type of approach). Scope to extend to angling and hunting sectors and to sectors excluded by the aquaculture Regulation (ornamental aquatic plants and animals in pet-shops, garden centres, contained garden ponds or aquaria).</p>	<p>Medium, depending on capacity needs in local nurseries or equivalent and also on verification procedures.</p>
Product/source certification and/or industry accreditation schemes (also applicable to unintentional introductions)	<p>Monitoring of performance is integrated at different levels through product chain e.g. importers/exporters, retailer, producers, transporters. Potential application at product level to eg locally-sourced plants.</p> <p>Possible precedent: EC Fisheries Labelling Scheme provides for labelling of fish products indicating origin and type of production (farmed or wild fish) + system</p>	Industry MS	National Subregion	Can be linked to species lists/databases	<p>Technically complex (e.g. to define what is native/alien) but opportunities for economies of scale through industry federations and/or regional approaches. Scope to expand application to other retail and production sectors and to associate with incentives.</p> <p>Depending on design (level of transparency,</p>	<p>Variable, depending on technical constraints.</p> <p>Costs may be met by industry, could require</p>

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
	<p>to guarantee traceability; Marine Stewardship Council Certification. Limited IAS application through e.g. Forest Stewardship Certification; horticulture industry certification in Netherlands (currently considering certification scheme for clean plants and clean seed through the industry chain).</p> <p>In Australia, mandatory labelling of non-native plant species in horticulture considered but rejected (see Annex 4). Plant biosecurity standards now promoted through the Nursery Industry Accreditation Scheme (NIASA) (www.ngia.com.au).</p>				<p>monitoring, audit, sanctions for non-compliance), credible schemes can provide an incentive for reputable suppliers/producers to participate (i.e. customer/client preference for companies with associated logo, recognition of professionalism, greater product consistency, preferred supplier status). For industry and government perspectives, see proceedings of <i>Workshop on the Code of Conduct on Horticulture and Invasive Alien Plants</i> (Oslo, 4-5 June 2009: www.eppo.org).</p>	transitional support.
Regulation of deliberate release						
Regulation of introductions into the natural environment	<p>Wide range of national measures to implement habitats and birds Directives. Generally no presumption against introduction of non-native species or requirement for prior assessment of risks. No EC-backed guidance for consistent implementation. Uneven application between MS to key pathways for IAS introduction e.g. use of live bait in angling. Generalised difficulty with enforcement (problems of detection and proof; cost of legal proceedings; public lack of awareness/conflicts of interest).</p>	MS	National Some local	<p>Currently not linked to RA. Often linked to some kind of species list.</p>	<p>Current implementation is discretionary and uncoordinated. Uneven reporting at Community level.</p> <p>Scope to promote more consistent implementation e.g. through improved information tools and closure of sectoral exemptions. Effectiveness linked to targeted public awareness campaigns, in association with relevant industries or associations.</p>	Medium in terms of institutional change, stronger wardening and public awareness.
Prohibitions linked to specific areas	<p>More limited area-based restrictions on deliberate introductions, usually linked to protected areas and/or Natura 2000 sites. Can be associated with specific pathways (e.g. Hungary for biofuel planting).</p> <p>Legislation may regulate introductions to different types of area based on categories of invasion risk (e.g. under the South Africa Conservation of Agricultural Resources Act commercially important pines may only be grown in certain areas and landowners are required to control spread beyond these areas).</p>	MS EC	National Some local	RA and species lists	<p>Biogeographical restrictions may contribute to proportionality but can present technical constraints in defining areas subject to restrictions.</p> <p>Scope to provide EC-level guidance for Natura 2000 sites, shared water catchments etc. to promote more consistent prevention for sites and ecosystems of transboundary or Community importance.</p>	Low to medium.
Controls linked to purpose of introduction	<p>Aquaculture Regulation: explicit risk assessment responsibility prior to introductions conferred on individual MS on the grounds that they “have the appropriate knowledge and expertise to evaluate and manage the risks to the aquatic environments falling</p>	MS EC only for transbound’y impacts	National	RA, White list	<p>Permit requirements not yet in force so not possible to comment on effectiveness to date (but high technical capacity requirements). Risk-based application to all alien/locally-absent aquatic organisms, including GMOs but</p>	High (technical demands on competent authority and advisory

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
	<p>within their sovereignty or jurisdiction". Open aquaculture facilities treated as introductions to the wild.</p> <p>Currently no EU equivalent for introductions of other taxonomic categories. Updated EU Guidance on hunting under the birds Directive (2008) does not address risks associated with introductions of alien species for game breeding purposes.</p>				<p>exemption of 10 commercially important aquaculture species (Annex IV).</p> <p>Regionally consistent approaches to RA, promoted through criteria annexed to Regulation.</p>	committee, detailed RA requirements negotiation with affected sectors).
	<p>Biofuels: renewable energy Directive could reduce planting in high biodiverse areas but does not address IAS pathway risks.</p> <p>Prohibitions in place in at least one MS for Natura 2000 sites (Hungary)</p>	MS	National	<p>Could link to species lists.</p> <p>EAFRD funds</p>	Discretionary for MS. Encourages best practice but not subject to oversight. Scope to provide guidance to MS to design national rural development programmes to promote avoidance of potential IAS and support use of native species/control of problem species.	Low
	<p>Forestry: EU Forestry Action Plan</p> <p>Consistent policies in place in several MS: may be aligned with Forest Stewardship Council certification.</p>	MS	National Local	EAFRD funds	Discretionary for MS: not subject to oversight. Scope to provide guidance to MS to design national RDP programmes to promote avoidance of potential IAS and support use of native species/control of problem species.	Low
Control of transboundary impacts of proposed introductions	Aquaculture Regulation establishes formal decision-making procedure through the Commission. No explicit equivalent for other species. Consideration of IAS transboundary aspects operates on an informal basis, if at all, between MS	MS EC	National	EIA tools	The transboundary/biogeographic dimension could be given much greater attention through ecosystem-based instruments like WFD and MFD.	Low to medium, depending on capacity and information tool needs.
Regulation of containment facilities and possession of IAS (to reduce risk of escape)						
Licensing of containment facilities	<p>Used where trade/holding is permitted but measures are needed to minimise risk of escapes to the wild.</p> <p>At EC level, generally regulated for several categories of facilities (e.g. zoos) but as regards specific IAS risks, only for aquaculture (adapted provisions for defined closed facilities).</p> <p>At MS level, some use of holding restrictions for specific pathways e.g. Estonia for fur farms.</p>	MS EC (if potential to distort trade)	Local National EC	Can be linked to RA and species lists	Potentially wide application (retail; containment facilities eg public or private fur farms, aviaries, aquaria, botanic gardens, research establishments). Can be fine-tuned by different categories of species lists and other measures (eg sterilisation of contained specimens). Should not hamper research. Depending on scope of restrictions, opposition from interest groups: may or may not have welfare connotation.	Medium to high, in terms of industry and administrative/inspection costs.
Ban or licensing of possession	Legal basis to regulate intra-Community holding ecological threat species under Wildlife Trade Regulation (Art. 9.6) but never activated.	MS EC	National	Can be linked to RA and	Difficult to apply and enforce if trade in the species is lawful. Depending on scope of restrictions, opposition from interest groups:	Variable. Impacts likely

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
	Instrument used by several MS e.g. Portugal prohibits possession of 'invasive' and 'ecological risk' species and uses official information channels to alert potential importers to fact that possession is prohibited. Some scope for control of invasive animals under pet registration schemes (eg Canaries).			species lists	may or may not have welfare connotation. Targeted education and public awareness likely to play key role in effectiveness. Should not hamper research.	to be directly felt by relevant trade sector.
Regulation of trade and movement into and within the Community						
Community instruments	Wildlife Trade Regulation: legal basis to ban imports (4 species) and intra-Community holding and movement (none). Solid legal foundation to address 'ecological threat species' at the level of the EU, consistent with the principle of solidarity (all MS must regulate, whether or not they are or could be affected). However, IAS are not the main purpose of instrument and it has no horizon-scanning or precautionary function (applies to species for which it 'has been established' that they present an ecological threat but no specific risk assessment provision). No monitoring, contingency planning or rapid response provisions.	EC	3 rd countries. No biogeog distinction (uniform applicat'n to Outermost Regions)	Black list No RA function	Strong legal tool, mandates consistent action across all MS. Currently operates in reactive way. Application may lead to development of markets in alternative products: documented cases of substitute products also proving invasive (Adrados and Briggs 2002). Extension to cover a broader range of species would need to be linked to a more rapid and preventive listing procedure and to education and public awareness. Probably parallel need to investigate legislative avoidance via internet-based trade channels in potential IAS.	High (border controls, training in species recognition) if scope extended, but probably less than adoption of a new instrument and procedures)
	Plant health Directive: covers IAS that are 'harmful organisms' to plants. Application to date is limited to pests of plants of economic importance in agriculture and forestry. Lists of harmful organisms under the Directive have not been extended to cover IAS that impact on the unmanaged environment eg by outcompeting wild plants. Does not address pests established over large areas. Does not address impacts on e.g. human health, ecosystem function and services. Precedents for explicit consideration of invasive alien plants exist through Invasive Alien Plant Panels established under EPPO and the North American Plant Protection Organization and are supported by CBD-IPPC Memorandum of Cooperation.	EC	3 rd countries; intra-Cty; biogeog	Black lists, PRA	Strong tool providing for consistent action across all MS, backed by information exchange requirements, biogeographic restrictions where necessary and rapid response tools and funds. Established professional expertise with good coordination between international, regional and MS levels. No consensus between EC and MS on whether Directive in current form provides an explicit basis for regulating invasive plants. Current rate of introduction of new ornamental plants into EU outstrips the number of species subjected to screening. Full review of Community plant health regime launched June 2009.	Medium-high (increase existing border control capacity, taxonomic training and tools) + intra-EC investment to adjust existing legal framework and institutional focus
	Animal health Directives: currently no clear legal basis to refuse import or regulate intra-Community trade and movement of an animal purely on the grounds of its invasiveness (c.f. an animal that carries pathogens	EC	3 rd countries; intra-Cty; biogeog	Black lists, PRA	Strong tool providing for consistent action across all MS related to animal disease risks, backed by information exchange requirements, biogeographic restrictions where necessary and	As above.

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
	or parasites or for which there is an animal welfare issue). Existing framework and training are not adapted to address IAS due to disease focus, without consideration of environmental damage.				rapid response tools and funds. Established professional expertise with veterinary focus, good coordination between international, regional and MS levels. Scope to expand coverage through the streamlining of EC animal health legislation by 2010, but this would require progress at international level (OIE) as well as EU level.	
	Aquaculture Regulation-type approach	MS	3 rd countries; intra-Cty; biogeog.	RA	May provide precedent for broader regulation of holding/trade of other categories of potential IAS: balances subsidiarity (decentralised RA and decision-making) with Community procedure if transboundary impacts.	Medium-high technical demands
New Community IAS instrument	A new instrument could establish an explicit legal basis to regulate international and intra-Community trade, movement and holding of potentially invasive animals and/or plants not covered by existing EC instruments and mandate transboundary cooperation. One precedent for applying binding trade and movement rules on invasive plants in linked jurisdictions is found under Australia's Weeds of National Significance strategy, which required all states/territories to ban sale (and other actions) of 20 listed species. Note that not all states were equally affected by these species (example of applying the principle of solidarity to IAS). Compliance by all states (adoption of specific regulations) took over six years (see Annex 4).	EC MS, depending on design	3 rd countries National Biogeog	RA and species lists; info exchange	Strong tool for consistent and enforceable prevention action. Some provisions of existing EC instruments provide precedents e.g. potential to transfer existing WTR provisions to new instrument; to build on aquaculture Regulation approach with regard to RA, pilot release and quarantine, contingency planning and monitoring; to integrate biogeographic approaches already embedded in the plant and animal health Directives. To facilitate application, controls would need to be linked to species lists, which could be of varying type (black/negative; white/positive) and possibly of varying biogeographic application.	Very high (major administrative and capacity implications for Commission). However, costs incurred to be offset against damage avoided through significant improvements in level of prevention.
Holistic biosecurity framework	The most comprehensive approach to IAS prevention (across all pathways) is delivered through Biosecurity New Zealand (http://www.biosecurity.govt.nz/) which addresses all aspects of import and export control through a unified system.	National	National	RA and species lists; research and info exchange.	Most comprehensive approach to prevention currently in place in the world: imports regulated through a comprehensive risk analysis and species listing system. Streamlined and high visibility approach contributes to raised awareness, backed by strong sanctions for non-compliance.	Highest (in terms of implications for institutional reorganisation, border control and screening).
Nationally-developed trade regulations	Trend towards country-level regulation (partly due to the absence of locally-adapted measures at EC level). Existing measures mainly focus on local priorities and	National Local (some	3 rd countries	RA and species listing	Current legal uncertainty and inconsistency works against efficient prevention policies.	None for the EC under the status quo (but indirect

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
	<p>threats. Varying use and quality of RA tools to justify national measures. Except for aquaculture Regulation, no EC parameters for national decision-making on introductions.</p> <p>One precedent for delegation of import control power from EC to MS is provided by the 2003 Decision adopted under Forest Reproductive Materials Directive 1999/105/EC): because EC lacked access to adequate information and conferred temporary power on MS (linking to notification requirement) to avoid disruption to trade in such materials with 3rd countries (see Annex 2)</p> <p>Other large jurisdictions (see Annex 4) have precedents for state-based trade controls: however, most face similar difficulties regarding crossborder coordination.</p>	ORs)	National Possible fine-tuning for ORs	(variable)	<p>Currently no means for Community to exercise oversight of RA criteria used or to promote coordination. One option could be for the EC to clarify whether and on what basis MS may adopt national trade and movement measures justified by risk assessment and how national measures should be communicated to the Commission.</p> <p>Currently island Outermost Regions have no clear basis to screen imports that fall outside the plant and animal health or aquaculture frameworks.</p>	<p>implications for oversight of functioning of the Single Market). All costs fall on the MS concerned.</p> <p>Few opportunities for economies of scale between MS (e.g. shared RA, listing etc.)</p>
Export						
Community trade-based instruments	<p>Existing export-related controls are limited to measures to prevent the spread of plant pests and animal pathogens.</p> <p>Sustainability Impact Assessment (SIA) tools could support consideration of export-related IAS risks in development of new trade agreements.</p> <p>CITES Resolution 13.10 generally calls on Parties to address invasiveness risks in countries of destination through their wildlife trade policies. Currently no Community mechanism to implement this.</p>	EC	3 rd countries	RA and species lists; info exchange tools	<p>In line with the duty under customary international law to avoid environmental damage to other States, the Community could support measures to avoid the intentional export of species known to present high risk of invasiveness in destination countries (using internationally recognised databases which rank species by risk and location).</p> <p>Regional fora could play a facilitation role by coordinating information supply regarding IAS risks in blocs of destination countries. Scope for industry to promote trade in alternative species: possible need for transitional incentives.</p>	High (given current absence of clear legal basis + costs of adapting approach for many different regions). Costs could reduce with improved access to data tools and awareness of new approaches.
National regulations	At least three MS have a legal basis to regulate export of potential IAS but none appear to have adopted implementing regulations to put this provision into effect.	MS	3 rd countries	Species lists; info exchange tools.	Unilateral approaches may help to catalyse broader responsible action: could also be used in a transboundary context within the EU.	Medium (if RA involved).

Table 5.3: Prevention of unintentional introductions: additional policy options linked to pathway management

Existing Community environmental integration tools (<http://www.environment-integration.eu>) include IAS in the criteria to be considered in EIA⁴⁷ and SEA procedures, without detailed guidance. These generic procedures need to underpin any specific options developed to address unintentional pathways.

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
Voluntary guidance and technical codes						
Information campaigns	Can promote responsible behaviour (e.g. scraping of boat hulls before transport) to prevent further spread of IAS. Emerging use in Europe for recreational water users to prevent spread of e.g. Zebra mussel (Ireland, Spain). Much more developed in other large jurisdictions (see e.g. US 'Spread the Message, not the Mussel' campaign).	NGO Industry MS	Local/ National/ transbdy	Can be linked to species lists/databases	Flexible best efforts approach that can be developed rapidly and applied to broad range of pathways and vectors (e.g. cleaning of vehicles, tyres, footwear; handling of potentially invasive plant material, including disposal of garden waste). May catalyse public-private partnerships. Cannot ensure consistency or be monitored or enforced. No sanctions for non-compliance.	Low
Technical guidance and codes of practice	Most advanced examples developed for ballast water pathways (IMO Guidelines, voluntary guidelines through HELCOM and OSPAR) Experience gained with voluntary code implementation paved way for adoption of IMO's BWM Convention. EC can play a formal role in code development by intergovernmental organisations where it is a 'participating organisation' e.g. in relevant IMO working groups. Under consideration for civil aviation (joint initiative by ICAO/GISP, supported by CBD).	EC (working with IGOs) MS	Global EC Transb'y National	RA Research	May catalyse progressive technical improvement: allow technical constraints to be addressed relatively informally before consideration of possible adoption of enforceable rules. Effectiveness is closely linked to maintained working groups (e.g. ICES Working Group on Introductions and Transfers of Marine Organisms; ICES/IOC/IMO Working Group on Ballast and Other Ship Vectors). Scope for EC to foster international cooperation on code development, possibly through targeted funding.	Medium

⁴⁷ E.g. under European Commission EIA Scoping guidelines page 28 (<http://ec.europa.eu/environment/eia/eia-support.htm>).

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
Industry-led certification/ accreditation schemes	Hazard Analysis and Critical Control Points (HACCP) protocols may be developed to address IAS/biosecurity risks e.g. BioSecure HACCP developed by the Australian Nursery and Garden Industry Association now recognised under one state's legislation (South Australia Plant Health Act 2009: see Annex 4).	Industry	MS EC	RA	Benefits to participating industries may include cost savings (i.e. less audits required), improved market access and technical support. Potential to promote co-regulation and co-enforcement between industry and governments.	Medium
Application of risk and impact assessment procedures to unintentional introduction pathways						
Pathway ranking based on strategic risk assessment	Under development through GB Non-Native Species RA Scheme and supported through PRATIQUE (Mumford et al, 2008). Well developed for aquatic pathways in north America through Commission for Environmental Cooperation (Canada, Mexico, US). In US, formal pathway ranking guidelines developed (2005). NISC and US Aquatic Nuisance Species Task Force have issued formal Training and Implementation Guide for Pathway Definition and Risk Analysis and Risk Prioritization (www.anstaskforce.gov) (see Annex 4).	EC (working with IGOs) MS	EC Transb'y National	RA Research	Can provide decision support scheme for more effective application of prevention and management measures and resources. Scope to build on capacity and procedures in plant and animal health sectors, lessons learnt through ALARM etc. Similar approaches used in some regional seas fora (e.g. HELCOM, OSPAR). Could be developed and applied to shared aquatic ecosystems under e.g. WFD and MFD.	Medium (depending on available technical expertise and networks)
Infrastructure and territorial development planning	Limited integration of IAS criteria in EIA and SEA procedures used for large infrastructure projects, water transfers between basins etc. Some evidence that Scandinavian countries cooperating through NOBANIS provide transboundary notification consistent with the Espoo Convention where there are risks of IAS spread across borders.	EC MS	EC Transb'y National Local		Current effectiveness difficult to assess given limited visibility and awareness. Scope to develop IAS-specific guidance that could be applied in assessment procedures across all relevant policy areas (see e.g. EBRD 2008). Additional guidance available in CBD voluntary guidelines annexed to Decision VIII/28 (2006).	Low-medium, depending on training and capacity needs in EIA services.
Development cooperation	As a major donor, the EC is committed through the CBD to minimise IAS risks associated with pathways such as international development assistance. Basis exists to integrate IAS into EC Country Strategy Papers but under-developed as biodiversity is not considered a priority by many recipient countries.	EC MS	3 rd countries	EIA/SEA	Environmental integration tools are needed to ensure policy consistency for known IAS pathways (e.g. biofuel plantation, reforestation, erosion control etc.). in EU funded activities in 3 rd countries.	Medium. Scope to cooperate with e.g. GISP to develop appropriate measures and procedures.
	The European Bank of Reconstruction and Development's Environmental and Social Policy 2008 lays down detailed rules (Performance Requirement 6) for preventing unintentional introductions of	EC MS	3 rd countries	EIA SEA	EBRD standards are aligned with existing international instruments or certification schemes where available, which can promote greater transparency and responsibility in	Low, where integrated into project design from the start.

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
	potential IAS to native habitats, use of risk analysis to minimise accidental transfer and release, compliance with BWM Convention standards and precautionary measures prior to use of alien species in farming, forestry and fisheries.				funded projects.	
Internationally-recognised standards and mandatory procedures						
Phytosanitary standards and animal health codes	<p>Embedded in international regulatory framework. Standards developed by IPPC and OIE recognised as basis for national/EU measures under the WTO SPS Agreement. ISPMs address environmental as well as economic risks and address hitchhiker/contamination risks associated with a broad range of pathways (e.g. draft ISPMs address e.g. minimising pest movement by air containers and aircrafts, and by sea containers and conveyances; movement of used machinery and equipment; handling and disposal of garbage moved internationally; and international movement of grain).</p> <p>Within Europe, EPPO and at least one MS (the Netherlands) are addressing pathways such as bird seed which link closely to pet retail sector.</p>	IGOs EC MS	3 rd countries EC Transb'y National Local	RA and species lists Info exchange	<p>Strong tool for consistent approach to IAS pathway management, support transparency and other principles enshrined in WTO Agreements, although differing interpretations of how precaution is/can be applied within this framework (see Burgiel et al, 2006 and Shine, 2006).</p> <p>IAS regularly addressed through IPPC linked to formal Memorandum of Cooperation with CBD. IPPC and EPPO committed to expand relevant ISPM coverage but rate of progress constrained by size of workload. EPPO has track record of addressing some emerging threats to EU biodiversity and economy (e.g. spread of Water Hyacinth across southern part of EU) although only a small number of invasive plants addressed through region-specific standards and guidance..</p>	<p>High (expanded capacity for border inspections, quarantine facilities, spraying of vessels and containers etc.)</p> <p>+ taxonomic training if scope significantly enlarged beyond conventional plant health/ veterinary focus</p>
Ballast Water Management Convention	Binding Convention to address one of most serious global pathways for introduction. Product of years of collaboration in which EC participates (though not a party). EC endorses ratification by relevant MS (currently two) and provides technical support through EFFORTS project.	IGO (EC) MS	Global Transb'y National Local	RA Research Info exchange	Already strong tool (even though not in force) for developing consistent approaches to ballast water management. Scope at EU level to promote more coordinated approach to aquatic pathway management and ensure greater visibility through WFD, MFD and new Maritime Policy.	High (years of negotiation and ongoing technical research to refine guidance and standards).

5.2.2 Policy options for early detection and rapid response

Problem definition: Prevention can never be foolproof. Prompt detection and intervention of new unwanted species that have managed to enter is essential to enable rapid action before significant populations are established and eradication becomes technically and/or financially impossible. This depends on much better understanding of what is being looked for and a more systematic approach to horizon scanning for emerging risks. A major challenge is dealing with new species not yet listed or known to be invasive in Europe.

Current practice: There have been major advances in technical tools but these are not well embedded in the existing regulatory framework except for plant and animal health. There is no formalised EC support to leading international databases. Existing EC mechanisms do not support contingency planning and rapid response for IAS with biodiversity impacts or facilitate consistent responses by affected regions. At MS level, surveillance and response actions for IAS affecting biodiversity are mainly ad hoc and uncoordinated, both between sectors and between central and local authorities.

Rationale for EU action: The Community has recognised that countries where a non-natural biological invasion first occurs have the key responsibility to prevent the spread both within and beyond national jurisdiction⁴⁸. It is committed under the Biodiversity Action Plan to 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, taking into account biogeographical regions⁴⁹.

Outcomes sought:

- regional information exchange on risks presented by potential or new arrivals in Europe, and on the possible invasiveness of alien species already established in Europe's terrestrial, freshwater and marine ecosystems, is supported and maintained, linked to international and regional databases;
- improved surveillance, monitoring, forecasting and reporting systems are in place and facilitate decision-making on rapid response;
- contingency planning is supported through clear lines of responsibility between competent agencies, advance preparation of technical protocols based on prediction tools, risk analysis where necessary, and access to up-front funding and equipment;
- Community backing for coordinated rapid response is available and targeted at high-risk or shared threats;
- ongoing monitoring follows response action, with the results fed into the information system.

⁴⁸ Environment Council meeting on 4 March 2002.

⁴⁹ Currently under consideration through feasibility study, "Towards an early warning and information system for IAS threatening biodiversity in Europe" (Contract No. EEA/3606/B2008/EEA.53386).

Table 5.4: Example of possible application: candidates for coordinated EU intervention to address terrestrial species with transboundary impacts

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
Surveillance and reporting mechanisms						
Volunteer networks	<p>Some existing (long-term) monitoring programmes are in place for varying taxonomic groups/environments.</p> <p>Several precedents for online voluntary reporting of target species, organised at central level (e.g. Austria, Finland and Germany) or by private sector or NGO (e.g. UK Royal Horticultural Society Entomology Group encourages gardeners to act as sentinels to identify new outbreaks).</p>	NGO MS	National Local	Info exchange	<p>Scope to expand flexible programmes of this kind to encourage specific interest groups to report new arrivals (e.g. gardeners, birdwatchers, divers).</p> <p>Dependent on ‘best efforts’ for effectiveness. Difficult to quantify effectiveness of detection rates.</p>	Low
Scientific (expert) networking	<p>Promoted through EU-backed programmes such as DAISIE.</p> <p>The free online journal Aquatic Invasions, (www.aquaticinvasions.ru) rapidly publishes new findings of alien species : this can guide eradication and other management efforts, track spread and impact at European level, and make sure that an IAS similar to native species is not inadvertently overlooked.</p>	EU MS	EC Transb’y National Local	RA/ species lists Research Info exchange	Stronger technical basis but dependent on availability and priorities of participating researchers as well as secured funding for maintenance of database.	Low to medium, depending on scope of existing funded programmes.
Inter-governmental alert networks	<p>NOBANIS operates through official focal points nominated within national environment ministries. Steadily expanded with continued active commitment by member countries. Currently launching quarterly newsletter and more interactive database, following process to standardise use of key terms (e.g. ‘invasive’) and taxonomic references.</p>	IGO MS	Sub- regional but expanding	RA/ species lists Research Info exchange	<p>Potential for NOBANIS to generate alerts depends on technical support for a maintained portal (e.g. to make it possible to interlink data on arrival in an area, change of behaviour, abundance etc to generate alerts).</p> <p>Scope to expand operations to the pan-European level. However, current financing depends on annual budget allocations from environment ministries of participating countries: long-term commitment not possible</p>	Current funding (€50,000 p.a.) for secretariat services. Time of country focal points is provided free but may be limited by other commitments.
	<p>EPPO Reporting Service, Alert System</p>	IGO MS	Pan- European	As above	Evidence of benefits in providing rapid notifications to member countries on new detections, response techniques and emerging risks.	Invasive plant work (including PRA oversight) = 75% one employee’s time

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
Mandatory EC reporting systems	Surveillance and contingency planning established under EC plant and animal health frameworks (Community-wide approach). Monitoring (but not formal surveillance) supported through WFD and MFD.	EC MS	EU National Local	Species lists Info exchange	Well-established systems with Community wide application have limited scope (plant and animal health). Existing surveillance procedures (e.g. around major entry points, for high-risk target species) do not focus on IAS likely to present high risks to Community biodiversity.	Medium to high, depending on capacity for existing surveillance to address broader range of threats.
Dedicated early warning system for IAS	Options under consideration through EEA feasibility study (Contract No. EEA/3606/B2008/EEA.53386: final report due May 2009). Precedents for electronic early warning systems exist in EU Plant Health sector (EUROPHYT) and Animal Health sector (ANIMO (trade notification) and Animal Disease Notification System (covers all MS and many neighbouring non-EU MS). In parallel sectors, in place through e.g. European Centre for Disease Control.	EEA EC MS	Pan-European	Species lists Research Info exchange	Potential to address gaps identified in this report and to build on existing European initiatives (e.g. NOBANIS, EPPO). Effectiveness will depend on rapidity and consistency of reporting, which could be placed on a discretionary or mandatory basis. Strongest results likely to be achieved if linked to an EU coordination body or panel and an EU-wide network of focal points (see 5.4.1). Could incorporate a non-binding warning list (see 5.3.1) and be combined with a low-cost information bulletin to share alerts (see 5.3.2).	Medium to high, depending on scope and formality of system adopted.

Options for rapid response capacity and contingency planning in Europe⁵⁰

Options discussed below assume that the core of any team would be provided by a number of experts, with manpower provided locally. This would keep costs down, but on islands with limited local manpower or in cases where the skills needed are particularly specialised, it could be necessary to call on an external source of manpower.

Generic conditions for effective intervention include: power to access land; timely access to contingency funds, equipment and materials; legal authorisation for use of certain control techniques; technical protocols and know-how; awareness and commitment e.g. by local authorities which usually lack a global perspective. These partly depend on MS legal frameworks but may also be addressed through EC support for information campaigns and targeted research into eradication and control techniques.

Specific considerations to be addressed in selecting an appropriate option, building on precedents in the EC plant/animal health sector, include:

- what constitutes a contingency response of EU importance;
- when should response action be mandatory (i.e. if a MS fails to take action against a common threat);
- which authority is competent to decide on contingency response of EU importance;
- when should EC funds be available for such response action.

⁵⁰ Based partly on input from N.Moore, GB Non-native species Programme Board, and P.Robertson (Central Science Laboratory, UK).

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
Expert registers	Listing people with expertise in particular species, regions or issues.	EC MS	Pan-European	Species lists Research	Already in place through DAISIE but this is unvetted and focused on researchers. Could be further focused or adapted to European needs.	Low (nearest to status quo)
Active expert network	Active support for a community of responders with appropriate skills to coordinate actions, interacting through meetings, conferences. Could provide a pool of expertise that could be drawn upon in particular cases, relying on personal contacts and shared objectives.	As above	Regional National	As above	Informal, would not guarantee support. Its effectiveness could be increased by basing the process on a project office/team to advise from a distance. This could offer peer review and support for funding and logistics, but leave the organisation and response to local interests.	Low.
Designated pool of responders	More formal mechanism requiring members to act if called upon. Could comprise members with relevant skills, paid to respond as and when required and/or a range of experts pulled together to form small task forces as needed. Skills would range from species knowledge, modelling, planning and logistics through to audit. Need for access to pre-stored equipment e.g. traps, sprayers, GPS. Fairly similar to EU-backed systems already in place for plant and animal health. Close to the system currently being developed in the UK, with staff effectively on call to assist with outbreaks as they occur (additional to normal day job).	As above	Regional National	As above Financial mech.	Provides stronger certainty that experienced responders will be available, but requires them to be supported in other ways when not required. Supports more consistent approaches as may be linked to recognised quality systems for contingency response organisation, detailing approved processes for training, call-out, planning, communications and exit strategy.	Medium to high, because costs of responders would need to be met when in use (scope for synergies with plant and animal health frameworks).
Specialist contractors	Pre-existing agreements to provide services as needed. Existing examples include New Zealand rodent teams; agricultural contractors on call in the UK to provide spraying and disinfectant services to deal with plant and animal disease outbreaks.	MS	National	Financial mech.	May be used to complement above approaches.	Medium, depending on extent used and scope for synergies.
EU-backed 'rapid response force' (dedicated staff of responders)	This would act as a team to coordinate and act as issues arose. Although it could operate at EU level, more likely to be effective if linked to biogeographic regions or to existing regional/subregional fora.	EC			The most expensive option but also likely to provide high level of responsiveness and regional consistency with regard to transboundary and EU threats. Offers potential to maintain and built on in-house expertise on an ongoing basis. Should not inhibit or delay action in individual MS where rapid response is important to domestic needs.	High

Table 5.5: Examples of possible application: candidates for coordinated EU intervention to address terrestrial species with transboundary impacts

Species	Origins, spread and known impacts
Indian house crow (<i>Corvus splendens</i>)	Native to India and introduced deliberately to East Africa, Malaysia and Middle East in 19 th Century. Continuing to spread – most of the recent spread is by hitching rides on ships rather than deliberate introduction. Its most northerly – and currently only EU - colony is in Hoek van Holland near Rotterdam where it was discovered in 1994. It has survived 2 severe winters and now numbers 25-30 individuals. There appears to have been no action by the Dutch authorities to eradicate this species. Main impacts – Predates native wildlife – birds eggs, chicks, small mammals etc. Human nuisance.
Pallas's squirrel (<i>Callosciurus erythraeus</i>)	Native to Taiwan, Bhutan and Malaysia. Introduced to 1 site in the south of France in the 1970's (Cap d'Antibes). 100 individuals in 1999. Main impacts – tree damage (bark stripping) and damage to utilities (cable gnawing).
Thailand tree squirrel (<i>Callosciurus finlaysonii</i>)	Native to Burma, Thailand and southern Indochina. Introduced to 1 site in N. Italy in 1980's. By 1999 was increasing but still confined to 2ha area of a park. Main impacts – pest of conifer and broadleaved trees (bark stripping).
Sacred Ibis (<i>Threskiornis aethiopicus</i>)	Native to sub-Saharan Africa and Iraq. Escaped from zoos and waterfowl collections in France (southern Brittany was the main source). Populations on the Atlantic coast (c. 3,000 individuals) and in the south (250 individuals) are increasing. Also breeds in Italy (approx. 200 individuals) and the Canaries (less than 20 individuals). Main impacts – predation on native wildlife, including terns. Bird strike risk.
Small Indian Mongoose (<i>Herpestes auropunctatus</i>)	Native to India, Indochina, Burma, Iraq. Introduced in 1910 to Croatia – now found on the islands of Korcula, Mljet and Hvar. Also reported to be numerous on the nearby mainland in 1999 although this is uncertain. Main impacts – predation on native wildlife, pest of vegetables, some fruit, poultry and wildfowl.
American mink (<i>Mustela vison</i>)	Widespread in Europe. Intensive mink control activities are carried on in several European countries (Iceland, Denmark, Scotland, Finland, etc – see Bonesi L, Palazon S. 2007. The American mink in Europe: status, impacts, and control. Biological Conservation 134: 470-483) but mink is still localised in several others (Italy, Portugal, etc., see DAISIE). There is a risk of invasion in all countries with farms. Transfer of knowledge from experienced countries to new areas of invasions would be valuable. A European task force was proposed to enhance prompt and effective response by newly-invaded countries but never created.

5.2.3 Policy options for control and management

Problem definition: Where prevention has failed and the establishment of an IAS is detected, appropriate responses (eradication, containment, long-term control) need to be implemented in the earliest possible stages of invasion to mitigate adverse effects. However, effective action is often constrained by lack of funds, technical tools and/or capacity to prioritise and implement interventions as well as overlapping institutional responsibilities. Social resistance to control may be high where the introduced species is valued for economic, cultural or recreational reasons (sport fish, game, exotic plants etc.), there are animal welfare concerns (e.g. control of mink, grey squirrel, ruddy duck) or access to private land is required.

Current practice: Community measures are limited to control of plant pests and animal pathogens. The aquaculture Regulation mandates contingency planning (withdrawal or reduction in density of escaped species) with approval of plans carried out at MS level. Outside these sectors, control programmes for IAS affecting biodiversity are designed and implemented by MS (national or local authority level), mostly without common criteria or transboundary consistency. Species-specific management planning has increased and MS may choose to follow regional recommendations (e.g. Bern Convention, EPPO management guidance for some widespread invasive plants). Limited EU funding is available for IAS control directly through the LIFE Programme or indirectly through Rural Development

Programme funds as implemented by MS (see 5.3.3) but is not targeted at strategic IAS priorities to deliver added value (e.g. benefits for multiple MS).

Rationale for EU action: The EC does not directly address invasiveness within countries but does have a basis for action where IAS may affect multiple MS (e.g. crossborder impacts in shared ecosystems) and/or interests protected under existing instruments (e.g. species listed under the birds and habitats Directives). There is scope for the EC to promote targeted and consistent action on ‘worst IAS’, backed by information, prioritised research, funding and communication tools, to prevent further spread of known problematic species to new parts of Community territory.

Outcomes sought:

- more strategic and consistent action to tackle shared IAS problems and threats to species of Community importance, coordinated with neighbouring countries where appropriate to ensure an ecologically coherent regional approach;
- significant increase in awareness, particularly at local authority and stakeholder level, with steps taken to address and resolve conflicts of interest;
- improved technical and management capacity to prioritise and implement efficient responses, supported by risk assessment as appropriate;
- freedom for MS to set local priorities and decide what action is most cost-justifiable;
- sustainable funding for long-term control programmes where appropriate.

Table 5.6: Example of possible policy options for control and management

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
Guidance to support management prioritisation and consistency						
National technical codes and factsheets	Mainly developed on a country-specific basis. Examples of MS practice include factsheets on c. 35 invasive plants (Neoflora, Germany) and a series of government-backed technical codes in the UK: e.g. <i>Code of Practice on how to prevent the spread of Ragwort</i> (Defra 2004); <i>Guidance on the control of invasive weeds in or near fresh water</i> (Environment Agency (2003)); <i>Code of practice for the management, destruction and disposal of Japanese knotweed</i> (Environment Agency (2001)). Zebra mussel addressed in Spanish guidance linked to the WFD.	MS NGOs Other stakeholders	National Local Could be wider	RA and species lists Research Info exchange	Non-binding flexible tool, likely to be most effective if combined with targeted education campaigns. May be given statutory backing (i.e. may be referenced in court proceedings) under national legislation (as in UK). Scope for regional economies of scale if existing MS guidance disseminated for wider application. Strategic RA may be used to prioritise species for which guidance and control is most urgently needed (see e.g. Mumford et al, 2008).	Low to medium, depending on available precedents and expert availability
Inter-government management guidance	EPPO PM9 ('National Regulatory Control measures') provides non-binding recommendations for management of invasive plants (eg <i>Ambrosia artemisiifolia</i> ; <i>Eichhornia crassipes</i>).	MS and other States	Pan-European	RA and species lists	Standardised management advice highly appreciated by EPPO member countries, but process of development and consultation is slower. Workload constraints may limit rate at which new sets of recommendations are developed.	Low to medium, depending on available precedents and expert availability. Demand driven by countries.
	Bern Convention Standing Committee recommendations promote coordinated responses by Parties for target IAS or ecosystems (e.g. ruddy duck, grey squirrel eradication from island ecosystems).	Parties	Pan-European	Species lists Info exchange	Non-binding recommendations followed up by national reports on implementation to biannual Bern IAS Expert Working Group. No power to compel affected Parties to take recommended action, even where this adversely affects neighbouring countries. Resulting delays likely to lead to higher intervention costs in long term.	Variable but generally low as targeted number of species and actions is relatively small.
New EU-level management guidance	The EU could support development of species-specific action plans for the 'worst' IAS (eg as identified through DAISIE and/or those documented to impact on Community-protected species and habitats and on transboundary waters). Relevant components could also be incorporated into EC implementation guidance	EC MS	EU National	Species lists Research Info	Scope for EU to provide backing for non-binding measures to promote consistent approaches and higher visibility for common problems, backed by information campaigns. Potential to encourage coordinated transboundary control action. Could not be	Low-medium: scope to build on existing expertise (including outside EU).

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
	documents for biogeographical/ecosystem units (eg management criteria for Natura 2000 sites, Common Implementation Strategy for WFD, future guidance for MFD).			exchange	enforced against MS choosing not to take action.	
Improved institutional coordination and networking						
Sectoral committees	Existing EC Standing Committees promote harmonised approach to listing of plant pests and animal pathogens of concern and are networked to NPPOs and national veterinary services. Existing biodiversity-related EC committees do not specifically address IAS (except in a limited way for listing of ecological threat species under Wildlife Trade Regulation). Networking variable at national level. IAS are typically covered by multiple institutions e.g. in Sweden, IAS management responsibility divided between at least eleven separate central government authorities and the many regional and local authorities.	EC MS	EU National	RA and species lists Info exchange	Effectiveness is closely linked to clear legal framework, clear allocation of responsibilities, and linkage of EC and MS-level focal points and regularity of meetings. EC IAS coordination mechanism could take different forms varying from informal panel to creation of formal biosecurity-type authority (see 5.4.1 below).	Medium to high, depending on whether existing structures adapted for this purpose.
Subregional or bilateral cooperation	IGOs such as NOBANIS, HELCOM and OSPAR can play a catalyst role in coordinated approaches to eradication and management (designation of focal points and formal channel for alerts increases pressure for respondent state to take action eg in Scandinavia for Canadian beaver). Bilateral cooperation tends to be on a more <i>ad hoc</i> basis (e.g. Italy-Croatia for Ambrosia) and may be dependent on personal good relations between officials.	IGO MS	Pan-European Transb'y	RA and species lists Info exchange	Existing IAS work programmes in IGOs can provide cost-effective way to expand range of species/pathways addressed: likely to be most efficient where networking and technical capacity already available through the IGO concerned. However, existing workload constraints (e.g. on individual focal points) may be a significant limiting factor.	Low to medium, depending of availability of paid officials to devote time to IAS.
Mandatory control measures						
Plant and animal health frameworks	Operate on the basis of black lists of harmful organisms annexed to relevant Directives. Cater for biogeographic approach. Key tools and funding mechanisms based on solidarity support rapid eradication and containment (e.g. Asian longhorned beetle found in Austria in 2000 for first time in Europe: immediate eradication attempted, high cost but species now present only at low levels. Pine wood nematode in Portugal is	EC, MS	All levels	RA and species lists Financial mech.	Well-established procedures that mandate consistent approaches and reporting of control action across EU. Depending on level of support from plant and animal health sectors, scope to extend this approach to a priority list of IAS with biodiversity impacts, linked to biogeographic region, This would strengthen the currently weak 'trigger' for control action	High.

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
	controlled through EU funds to prevent spread to other countries).				under most national environmental legislation.	
Biological control legislation	In EU, use of biocontrol for invasive weeds is hampered by unclear legal situation. Council Directive 91/414/EEC states that active substances of plant protection products cannot be used in plant protection products unless they are included in a positive EU list. The Directive may require adaptation to the special properties of microbial biocontrol agents and semiochemicals, which have different modes of action than conventional pesticides ⁵¹ .	EC MS	All levels	RA and species lists	Biocontrol of invasive weeds can be a strong and cost-effective tool for control, subject to prior risk assessment (e.g. use against water hyacinth in Africa, recent development of agent for use against Japanese knotweed in UK). Difficulties in applying existing EC legislation may delay timely application of available agents e.g. to register biocontrol agents in the US, the Environmental Protection Agency needs on average 2 years c.f. in Europe registration of the same products took almost 7 years (pers.comm, U.Starfinger).	High (given technical constraints).
National legislation for control	Dominant mechanism outside plant and animal health sector. MS approaches vary widely in scope, procedures and sanctions for non-compliance. Effectiveness on national territory depends on enabling legal framework, including access to private land where necessary. Variable national practice: more modern biodiversity legislation shows trend towards clearer powers for IAS eradication. Other complex jurisdictions also promote inter-jurisdictional consistency to control priority species (see Annex 4 e.g. in Australia for Weeds of National Significance, backed by standardised management guidance)	MS	National Local	RA and species lists Financial mech.	National measures provide no basis for coordinated abatement at EU level. Unilateral approaches can be tailored to local circumstances but offer no leverage for transboundary consistency. There are almost no examples of neighbouring MS jointly establishing priority IAS lists and/or priority areas for control action.	Medium if transboundary cooperation strengthened, depending on scope of existing information tools and control techniques.
Financial and/or land certification schemes to support control	Small number of measures identified that shift responsibility/incentives to landowner e.g. Hungary: control requirements for <i>Ambrosia artemisiifolia</i> linked to tax incentives and finance generation mechanism. Under South Africa's Conservation of Agricultural Resources Act, land infested with listed categories of invasive plants may not be sold without prior eradication: verification through certification scheme.	N/A	N/A	N/A	This type of approach treats biological invasion like a form of long-term pollution (like lead or asbestos). Fully consistent with the polluter pays principle. May require technical and financial support to landowners, at least in transitional phase.	Shifts responsibility to landowner.

⁵¹ Proper evaluation for characterisation and environmental and human health risk profiles of microbials and semiochemicals may require a different approach with different data (see e.g. project REBECA www.rebeca-net.de).

5.2.4 Policy options for ecosystem restoration

Problem definition: IAS control often needs to be accompanied by ecological restoration work to prevent the same species or another IAS spreading rapidly after the control programme has finished. Increased resilience of native biodiversity can provide greater protection not only against re-invasion or new incursions but also against cumulative environmental pressures linked to habitat degradation, pollution and climate change. Where restoration measures are not programmed, the long-term returns on investment in IAS control may be reduced.

Current practice: EU policies and funding instruments provide strong generic support to ecosystem resilience and restoration (Natura 2000 network and connectivity; WFD; MFD; Rural Development Programme). However, IAS control programmes are often focused on single species management rather than management based on broader ecosystem goals.

Rationale for EU action: Environmental protection is a fundamental goal of Community action. IAS, if not contained to the maximum extent feasible, may compromise the effectiveness of EU-supported resource and ecosystem management policies and adversely affect the social and economic interests of European stakeholders. Restoration of terrestrial, freshwater and marine ecosystems, where feasible, contributes directly to the EU's 2010 biodiversity commitment.

Outcomes sought:

- Stewardship and responsible land and water management practices are fostered through support for activities that prevent or minimise IAS introduction or spread;
- IAS considerations are fully integrated into programmes, plans and research for conservation and sustainable use of biodiversity, including activities aimed at restoring native ecosystems, managing habitats for rare, threatened and endangered species, protecting ecosystem services and adapting to climate change.

Table 5.7: Example of possible options for ecosystem restoration

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
Voluntary codes and substitution policies	Closely related to voluntary options for prevention; the counterpart to avoiding potential IAS is active promotion of native species. 'Green List' policies for local authorities, protected area managers and other land managers need to cover selection of plants for use in restoration and replanting projects (e.g. for forestry or landscaping).	MS Strong local authority role	Local/ national	Species lists/ databases	Best efforts approach, dependent on voluntary participation in scheme. Implementation depends on availability of reliably-sourced local species as an alternative to using introduced species. May also be linked to elimination of subsidies for IAS and/or incentives for purchase of alternative species. May be supported through national/local forestry biodiversity and/or environmental planning tools.	Low, depending on capacity needs in local nurseries or equivalent and also on verification procedures.
EU funding of restoration projects	LIFE+ and INTERREG funding	EC MS	Local	Species lists/ databases	Scope to develop more strategic and targeted approach to IAS-related funding under these instruments, with a particular focus on transboundary added value.	Funding secured until 2013.
Mainstreaming of ecological restoration objectives in key policies	Integration of IAS risks and response measures into EC policies and funding for agriculture, forestry, fisheries, water management, aquaculture and renewable energy.	EC MS	Local/ national	Species lists/ databases	Mainstreaming of good management practice can increase ecosystem resilience and adaptability to predicted effects of climate change. Effectiveness subject to awareness, information tools and capacity in relevant policy sectors.	Variable depending on sector.

5.3 Cross-cutting tools for implementation

As the Tables in section 5.2 indicate, a small number of cross-cutting tools play a critical role throughout the policy spectrum from prevention to ecosystem restoration. The following sections loosely group available tools into three categories related to risk assessment and species listing, research and information exchange, and funding.

5.3.1 Risk assessment and species listing

Role of risk assessment tools: Science-based risk assessment (RA) provides the foundation for most decision-making related to IAS and is embedded in the CBD Guiding Principles and the WTO/SPS Agreement. It is designed to provide technical justification for:

- measures that may affect international or intra-Community trade;
- development of species lists, particularly those with regulatory consequences;
- prioritisation of contingency and management responses;
- selection of control measures (e.g. by screening possible risks associated with biocontrol agents and/or potentially harmful chemicals).

Risk assessment is used to assess available information, identify uncertainty and provide advice to the competent authority. When addressing identified uncertainty, the Community applies the precautionary principle consistent with its overarching objective of environmental protection⁵². A recent judgment by the European Court of Justice notes that full risk assessment should be established:

“... on the basis of the most reliable scientific data available and the most recent results of international research. Where it proves impossible to determine with certainty the existence or extent of the risk envisaged because of the insufficiency, inconclusiveness or imprecision of the results of the studies conducted, but the likelihood of real harm to human or animal health or to the environment persists should the risk materialise, the precautionary principle justifies the adoption of restrictive measures.”⁵³

Role of species lists: Species lists may be developed for information and advisory purposes and/or as part of trade control frameworks. Lists generally help to streamline decision-making on intentional introductions, border checks, rapid response and control and management measures by differentiating between species on the basis of risk and can be referenced by border control services, permit authorities and stakeholders. Whatever type of listing system is used, lists need to be regularly reviewed and updated to remain effective and accurate.

Within the context of trade regulation, there are broadly three types of species listing system:

⁵² Article 174(2), EC Treaty.

⁵³ Case C-219/07: judgment delivered on 19 June 2008 (§36-38).

- **‘black’ (negative) lists** contain species banned from import/introduction/domestic trade and transport because of the level of assessed damage risk (i.e. the findings of the RA trigger regulatory measures).
- **‘white’ (positive) lists** contain species that are considered low risk and approved for introduction, based on prior RA (which has determined the species to be safe) or on long experience. Such lists may include widely-established species that can no longer be controlled.
- **‘grey’ (holding) lists** can provide for a temporary ban where risk cannot be adequately determined, pending further assessment to determine whether a species is safe or potentially invasive. These function as provisional black lists to the extent that they prevent import until the competent agency can make a scientifically-based determination (see further Burgiel et al, 2006; Shine, 2008).

Whatever type of listing system (or combination of lists) is used, generic design considerations that need to be taken into account include the purpose of the list, the procedure and institutional responsibility for drawing up the list, the frequency and procedure for list revision and the level at which a list applies (e.g. EU, biogeographic, MS).

Current practice: At EU level, procedures are in place for risk analysis in the plant and animal health sectors backed by the European Food Safety Authority and the Community has provided significant research funding to improve risk assessment techniques. For focused consideration of biodiversity risks, a minority of MS are developing national systems with varying degrees of scientific ‘robustness’. These are generally not coordinated with other national systems: in some cases, MS have conducted RA on the same species which could lead to duplication of effort and/or contradictory results. In most MS, risk assessment protocols applicable to biodiversity are not well developed and there is a need to build capacity for practical application of risk analysis procedures, including proper staff training.

Rationale for EU action: Risk assessment practice and procedures are integrally linked to trade policy and to other areas of Community policy that are highly integrated. A more coordinated approach at EU level is desirable to avoid the emergence of disparate unilateral approaches, with the accompanying uncertainty and lack of transparency.

Outcomes sought:

- species lists support efficient application of prevention and rapid response procedures and rules;
- more rapid, streamlined and cooperative production of RAs, sharing workload between MS where feasible and appropriate and avoiding duplication of effort;
- greater consistency in the quality of RA outputs through some form of quality screening or coordinated evaluation of RA results;
- enhanced access to RA documentation and results as part of information sharing;
- freedom for MS to use RA to set national priorities, preferably linked to national IAS strategies.

Table 5.8: Example of possible options for risk assessment and species listing

Measure	RA procedure and/or type of list generated	Action level	Comments on scope and effectiveness	Administrative and resource implications
Options for listing systems				
Development of white lists for non-target species (assessed either as safe or already widespread)	Limited use at MS level (Madeira, for holding/trade in alien mammals; Slovenia, for holding of game species). Involve prohibition or permit requirement for all non-listed species.	MS	Can provide incentives to focus economic activities on white-listed species. Precautionary focus as only low-risk species are added to the list.	Potentially high, depending on taxonomic group, to the extent that increased training for border control and inspection staff, especially in taxonomy, is needed to identify and screen non-listed species.
	Aquaculture Regulation uses white list for long-established commercially important species (Annex IV): criteria for adding new species to that Annex have been established by supplementary Regulation.	EC	System not yet in force. Some concern that commercial considerations outweigh scientific considerations in selection of species for listing.	Low, in that exclusion of listed species from permit requirements reduces administrative burden on commercial operators.
Extension of black list systems (focused on target IAS)	Widespread use at national level: significant variations of approach between MS (advisory c.f. regulatory). Example of an advisory black list being given regulatory force: Swiss Commission for Wild Plant Conservation CPS/SKEW produced black and grey lists for Switzerland (www.cps-skew.ch/). New 2008 regulations for the release of organisms (www.bafu.admin.ch) reference this black list and prohibit the marketing of 11 invasive plant species and 3 animal species)	National	Unless black lists are regularly reviewed, tend to be reactive and may not cover emerging IAS risks. Currently no EU procedures to support consistent approaches to development of national black lists with regulatory consequences.	Medium: easier to implement as number of listed species to be controlled is limited (c.f. white list approach, under which everything <u>not</u> listed should be screened).
	Black lists used by several EC instruments (e.g. plant health Directive: Annex A.1 lists harmful organisms not present in EU which may not be imported; other annexes support biogeographic lists. Basis for listing ‘ecological threat species’ under WTR, but practice to date is reactive and very restricted: not adapted to horizon-scanning for new ecological threat species.	EC	Biogeographical approach makes sense in an expanding EU (c.f. some pan-EU listings under habitats Directive cover species that are alien in some parts of EU).	Medium. Expanding the use of black list systems consistent with WTO rules and disciplines would require more proactive and systematic use of RA as well as regular review and updating of lists.
	Creation of a non-binding warning list linked to early warning systems and rapid response.	A warning list for high-risk taxa could be created for target species not yet arrived in the EU but known to be invasive elsewhere (based on international databases). Target species could be grouped by climatic zones, taking biological characteristics and adaptability into account. Detection of a target species on this list could trigger RA and possible precautionary measures.	EC MS	Strong preventive horizon-scanning benefits (links to Early Warning System). Should be linked to global lists to facilitate and rapid checking, backed by system for reporting the information. For maximum effectiveness, lines of responsibility to address detected species need to

Measure	RA procedure and/or type of list generated	Action level	Comments on scope and effectiveness	Administrative and resource implications
			be clear in advance.	
Comprehensive listing system combining black, white and grey lists	Most ambitious policy option, found e.g. in New Zealand's biosecurity system.	National	Provides adapted coverage for all risk categories of species, linked to streamlined systems for import risk analysis.	High, but significant reduction of opportunities for potentially damaging IAS to slip through the net. Comprehensive coverage of all species and commodities raises visibility of prevention as a policy objective.
Options to expand coverage and efficiency of risk assessment				
Development of standardised criteria and procedures in Europe	Aquaculture Regulation establishes detailed RA procedures and criteria to be applied by individual MS, who decide whether operator bears cost of environmental risk assessment. The Commission decision-making procedure only comes into operation where the MS notifies risk of transboundary impacts. Neighbouring MS do not have the right of consultation or veto where they are concerned by a proposed introduction.	MS-led	Effectiveness depends on consistent and rigorous application by MS.	Medium to high, if a quality screening process was introduced to ensure consistency across MS-led RA.
	EPPO: well-established, network of national experts involved in PRA through Invasive Alien Plants Panel. Variable take-up by MS: Germany, Netherlands and UK active in applying PRA techniques to invasive alien plants. Few cases found in Europe of shifting costs to economic operators (these are state-supported) c.f. in Canada, importers pay part of import risk analysis costs to Canada Food Inspection Service.	IGO MS	Identified need to simplify and speed up the listing system: EPPO RA procedures significantly slower than e.g. New Zealand. Capacity constraints limit scope for RA expansion.	Medium. Existing PRA support for invasive plants takes up less than one man-year. Training courses on PRA decision support scheme scheduled for November 2008.
	EU-funded PRATIQUE programme developing common science-based protocols for expanded use of PRA across EU. Based on existing EPPO Decision Support Scheme for PRA. Could support development of generic RA procedures based on models pioneered elsewhere.	MS-led	May help address current capacity constraints that limit production of PRAs to deal with emerging threats	Medium: increased capacity needed to expand use of high-quality PRA but scope for synergy through development of generic support tools and methodologies.
	ALARM: EU-funded prototype interactive Risk Analysis developed to promote integrated risk assessment techniques e.g. including consideration of climate change and other cumulative risks.	MS-led	Development of online RA toolkit could make significant contribution to expanding practical use of RA tools.	Low, as funding already secured through FP7. Roll-out and dissemination may require resources for targeted capacity-building and training.
	Aquatic pathway risk classification system developed through ALARM, linked to WFD Common Implementation Strategy. Biogeographic approach, based on calculation of integrated biocontamination in selected Assessment units in European waterways to produce integrated biopollution index. May be used in association with other aquatic pathway assessment	MS-led	Could be used to generate grey, white, black lists of species at water catchment or pan-European level and to make wider management recommendations for transboundary ecosystems to potentially affected	Low-medium as funding secured through ALARM. Cost-effective dissemination of research results and online decision support system (www.reabic.net) .

Measure	RA procedure and/or type of list generated	Action level	Comments on scope and effectiveness	Administrative and resource implications
	procedures (BWM Convention, IMPASSE). Strategic RA precedents also available from north America (see Annex 4).		countries (Panov et al, 2008).	
Application of international precedents to develop RA guidance for specific taxonomic categories	Scope for EU to build on tools developed through IGOs e.g. risk analysis matrix for pre-import screening of live animals developed through CBD-backed workshop in Indiana, US (12-16 April 2008): see http://www.cbd.int/doc/meetings/cop/cop-09/information/cop-09-inf-32-add1-en.pdf .	IGOs NGOs MS	Use of expert-backed precedents developed through international collaboration complies with CBD Recommendations: can provide risk of duplication through parallel processes in different regions.	Medium capacity implications, as RA not currently applied to live animals in the EU context outside the animal health framework.
National adaptation of PRA to address environmental risks	GB Non-Native Risk Assessment scheme. Non-taxon specific, covers unintentional as well as intentional introductions. – extended to cover risk management too (Mumford et al. 2008) Revised Scheme provides for generation of magnitude scales (monetary costs, health, environmental and social impacts; likelihood scale of occurrence over a five-year period (then generate scores for a one year period).	National	Scheme provides basis for creating a likelihood and magnitude matrix to produce a more quantified approach to help managers compare different species risk profiles to prioritise measures and ensure proportionality.	High, but may reduce as potential to develop generic response tools to incursions which could deliver economies of scale. Can support risk-based approach to in-country management and thus improve allocation of available resources.
	In Belgium, through the Harmonia system, IAS are ranked by risk category by combining information from an adapted EIA analysis with data on species distribution (invasion stage). This (http://ias.biodiversity.be/ias/documents/ISEIA_protocol.pdf)	MS	Risk-based approach provides a basis for prioritising management actions and has informed new Royal Decree to regulate import of high-risk IAS.	
Options to promote consistency and quality control of RA at EU level				
Community system of evaluation through informal expert Panel or inter-agency risk analysis group with biodiversity focus	Purpose is to ensure quality control of results of RAs and minimise duplication of national efforts. Possible precedent at national level through e.g. GB Non-native species risk analysis panel. Could involve creation of advisory panel, possibly based on DAISIE expert register.	EC MS	This approach could support phased consistency if there is a lack of support for a fully standardised RA system at EU level. Results of PRATIQUE and other EU-supported research could feed into improved delivery and coordination.	Low to medium, depending on costs that individual MS are prepared to undertake and the level of formality of the panel or group's operations. Possible risk of duplication with EFSA.
Expanded consideration of IAS-related RA through European Food Safety Authority (EFSA)	EFSA has powers to conduct PRA and to deliver/obtain scientific opinions as basis for developing Community measures. Specialist Panels cover animal health and welfare, plant health and the environment. No Panel focused on IAS, though biodiversity is addressed through Plant Health Panel. Scientific Committee may provide opinions on multisectoral issues falling within the competence of more than one Scientific Panel, and on issues that do not fall within the competence of any of the Scientific Panels.	Pan-EU.	In 2007-8, EFSA returned 3 PRAs submitted by EPPO member countries for known invasive plants for further consideration on basis that data on economic impacts was insufficient.	Budget and mechanism in place: monthly meetings for European PRA experts where country PRAs are reviewed.

5.3.2 *Research and information exchange*

Role of research and information exchange: The need for high-quality practical research feeds into every stage of IAS prevention, monitoring and management. Constraints on access to state-of-the-art research and expertise can delay the timely implementation of prevention and response techniques and increase overall costs of intervention.

The availability of policy-relevant information is critical for objective decision-making based on clear and transparent criteria. Poor sharing and exchange of information can lead to damaging decisions being made in good faith (if no tools to pre-screen) or to waste of funds due to duplication of effort.

Current practice: Several information systems exist already at the EC and MS levels. Possible interlinkage between these systems and with international databases is under consideration through an ongoing EEA feasibility study⁵⁴. At MS level, national conservation authorities often do not have the necessary resources, expertise, and overview to take well-founded decisions on release permits or to prioritise management action. EU Overseas Entities may face particular difficulties in accessing information resources.

Rationale for EU action: The EU supports coordinated research by MS institutions on scientific priorities defined through FP7. Technical tools and protocols developed on the basis of this research can facilitate more consistent and cost-effective action by all MS, with possible roll-out to isolated regions including the EU Overseas Entities. Efficient interlinkage of information resources and available expertise can improve the quality and transparency of decision-making in MS.

Outcome sought:

- A simple (library) system for practitioners to access reliable and updated policy-relevant information from national and international sources, possibly through an EU-maintained online IAS information system;
- Ways to record and share success stories such as eradication efforts;
- More strategic approach to commissioning research and collating results to improve the scientific basis for policy-making and feed into capacity-building.

⁵⁴ Contract No. EEA/3606/B2008/EEA.53386.

Table 5.9: Example of possible options for research and information exchange

Measure	Application of existing mechanism	Action level	Comments on scope and effectiveness	Administrative and resource implications
Options to strengthen information exchange				
Informal networking and exchange of best practices	Already operational with varying focus. Scope to extend, including for specific subregions e.g. EU Integrated Maritime Policy and Action Plan support networking for exchange of best practice between islands, the outermost regions and other isolated maritime regions. IAS portal under development for French overseas territories.	MS	Flexible and responsive but depend on availability and commitment of participants. Do not usually provide for standardised use of key terms. Not a mechanism for comprehensive information access unless linked to international databases. Effectiveness limited by data gaps (e.g. data lacking for 9/27 MS covered by the unfunded EU Botanic Gardens Initiative).	Low
Development of standardised IAS indicators	Ongoing through SEBI-2010 process, including a cost indicator for EU expenditure on IAS. Also ongoing through development of aquatic IAS indicators linked to the WFD Common Implementation Strategy, supported through the ALARM project.	NGO MS	Standardisation is technically complex but once agreed, can support more consistent approaches by MS and other stakeholders to data submission: facilitates collation of data and more rapid access to results for decision-making purposes.	Medium: progress is subject to funding for expert working groups.
Dedicated European information exchange mechanism (IAS observatory for Europe) + Interlinkage of national and international databases	Technical mechanism to facilitate information exchange at MS, subregional and EU levels to feed into early warning, RA and prioritisation of management efforts. A 'light' IAS Panel, based on DAISIE approach could link interoperable databases, rank information sources, regularly update the DAISIE List and screen information supplied by MS researchers or other stakeholders before deciding whether to include it in the List. Would need to meet 2-3 times a year.	EEA EC MS	For maximum effectiveness, outputs should include: <ul style="list-style-type: none"> • technical support for MS (what is alien/native; high/low risk etc.); • predictions and horizon-scanning; • recommendations to MS on surveillance, alerts and effective management practices (aligned with EPPO reporting service precedent). 	Low cost if 'housed' by EEA, as technical infrastructure and data systems already well-established. Funding of Panel members' time.
Options to target research and improve dissemination of results				
Coordination through IAS Panel (see above)	IAS Panel supporting European information exchange mechanism could provide guidance on emerging risks and propose priorities for targeted/strategic research.	EEA MS	Similar to PRATIQUE-type approach, could focus on policy-orientated research outputs.	Low (no additional costs): advisory role only.
Coordination through dedicated EU research programmes	Existing initiatives include: <ul style="list-style-type: none"> • European Platform for Biodiversity Research Strategy, priorities to orient biodiversity research towards policy needs under Biodiversity Action Plan; • EURECA project on ecosystem assessment (EEA, 2007-2012) to contribute to research work on modelling future trends for biodiversity and ecosystems in Europe; 	EEA EC MS	Contributes to IAS mainstreaming in research programmes at pan-European level.	Variable, depending on whether new projects initiated.

Measure	Application of existing mechanism	Action level	Comments on scope and effectiveness	Administrative and resource implications
	<ul style="list-style-type: none"> SANCO ERA-NET Coordination of European Phytosanitary (Statutory Plant Health) Research. 			
Dissemination of research results	Existing tools to provide quicker access to research outputs include EPPO Reporting Service and the online Aquatic Invasions (www.aquaticinvasions.ru).	EEA MS	Prompt release of research findings to the scientific community and decision-makers may be constrained by lack of incentives/willingness to share data.	Low.

5.3.3 *Financial mechanisms*

Problem definition: Sustained and accessible funding is needed for timely and cost-effective prevention and response measures for IAS that impact on biodiversity. Where funding is absent or erratic, the efficiency of management efforts may be compromised, leading to higher damage and/or control costs. Long-term funding is particularly important because:

- it may take a while to assess whether or not new alien species are established or if just occasional findings occur;
- success of eradication efforts can only be proven with longer term sampling;
- ongoing research is needed to proof that risk assessments were right; and
- long-term samplings may only show natural variation of the species composition (i.e. naturally migrating species which are only rarely found should not be treated as IAS).

Current practice: There is no specific EU funding mechanism for IAS. The overall picture in both internal and external EU programmes is of relatively successful but small-scale control projects funded through ear-marked environmental funds (e.g. LIFE), but poor incorporation of IAS/biodiversity considerations in programmes funded with the major budget lines (Scalera 2008). Outside the plant and animal health sector, EU funding mechanisms are too slow (length of application procedure) to provide up-front funding for rapid response. Control funding, where allocated, is usually released once the target species has already become widespread. Very few MS have a dedicated budget or fund to address IAS coordination, prevention and/or control. There is generally no clear allocation of responsibilities for tackling and funding necessary actions, especially at local level. Funding constraints also delay development of contingency and management plans.

Rationale for EU action: In view of the Task 1 impact assessment (Kettunen et al. 2009), EU funding for IAS prevention and control is justified for the three pillars of sustainable development. IAS could be more efficiently mainstreamed through existing Community policies and budget lines. In parallel, a more coordinated approach is required to effectively address IAS with crossborder impacts and/or that threaten species and habitats of Community interest. The EU can contribute to more equitable sharing of costs and benefits of IAS action by supporting development of cost-recovery and cost-sharing mechanisms.

Outcomes sought:

- incorporation of IAS/biodiversity considerations in programmes funded with major EU budget lines, backed by clear guidance on access to funds;
- expansion of funding for prevention, early detection and rapid response, with clear definition of criteria for EU co-financing;
- support for development of cost-recovery and self-financing mechanisms, based on the polluter pays principle, to generate sustainable long-term funding to address predicted increase in IAS pathways and impacts.

Table 5.10: Example of possible options for financial mechanisms

Funding mechanism	Action level	Geographic scope	Duration	Application to IAS	Comments on scope and effectiveness
Existing mechanisms					
Plant health: Allocation of financial contribution from the Community for plant-health control and for inspection infrastructure	EC / DG SANCO	EU (MS & regional)	Indefinite	<p>Co-financing regime based on the principle of solidarity, covers two types of measure:</p> <ul style="list-style-type: none"> • Infrastructure (linked to prevention at external borders): Member States may receive from the Community a financial contribution in order to strengthen inspection infrastructures for plant health checks on plant and plant products originating in third countries. • Rapid response and control: In the event of the appearance of a harmful organism as a result of its introduction or spread within the Community, MS may receive a 'plant health control' financial contribution from the Community. The financial contribution is used to cover expenditure for measures to eradicate or contain the harmful organism. 	<p>Well-established and regularly reviewed mechanism applicable to IAS included in definition of 'harmful organisms'.</p> <p>Supports capacity-building for improved prevention as well as early detection, rapid response, control and management.</p>
Animal health: Co-financing of measures in the animal health sector by the Community	EC / DG SANCO	EU (MS & regional)	Indefinite	Co-financing regime based on the principle of solidarity: MS measures to improve animal health considered to	Well-established and regularly reviewed mechanism but only applicable to IAS that are

(currently regulated by Council Decision 2006/965/EC)				<p>be mutually beneficial in that they reduce the risk of costly disease spread and remove sanitary barriers to trade between MS. Co-financing available for three types of measure:</p> <ul style="list-style-type: none"> • emergency fund; • supportive measures such as reference laboratories, communications and vaccines ; • disease eradication and monitoring programmes. 	<p>animal pathogens covered by relevant Directives.</p> <p>Supports capacity-building for improved prevention and early detection; emergency funding for rapid response; and harmonised approaches to control and management.</p>
Financing Instrument for the Environment (LIFE+)	EC / DG ENV	EU (MS & regional)	2007-2013	<p><u>Precedents:</u> LIFE 1994-2006: €44 million spent on IAS-related projects (Scalera 2008).</p> <p><u>Current scope:</u> LIFE+ Nature and Biodiversity component provides possibilities to finance specific innovative or demonstration projects to contribute to implementing objectives of EU Biodiversity Action Plan, in addition to existing project support to help implement Natura 2000 and the nature Directive.*</p>	<p>Project selection administered at the EU level: the Community can have a strong role in setting priorities. Can support holistic approaches (eg awareness raising).</p> <p><u>Limitations:</u></p> <ul style="list-style-type: none"> • Mobilising funds relatively slow: not suitable for rapid action • No systematic IAS focus • Funded activities need to be innovative, with EU level value and not possible to fund under other EU funds • Not applicable to re-occurring/long-term management needs
European Agricultural Fund for Rural Development (EAFRD)	EC / DG AGRI	EU (mainly MS)	2007-2013	<p><u>Precedents:</u> mainly minor or indirect contribution in the past.</p> <p><u>Current scope:</u> IAS are not specifically addressed but can fall within the Fund's scope. Several possibilities</p>	<p>Scope: agriculture and rural development. Can support holistic & community driven approaches (eg LEADER).</p> <p><u>Limitations:</u></p> <ul style="list-style-type: none"> • No specific IAS focus though several possibilities

				<p>for providing funding for IAS related action, e.g. Natura 2000 and agri-environment payments (agricultural land and forest). Also scope for more holistic approaches, e.g. awareness raising (LEADER payments).*</p> <p>MS have the option to include IAS-related measures when finalising their national Rural Development Programmes and starting implementation. Evidence of application to IAS in at least 3 MS (Slovenia, Hungary, UK).</p>	<p>for IAS available</p> <ul style="list-style-type: none"> • Final funding priorities set at MS level, Community's role in setting national level priorities limited • Mobilising funds relatively slow: not suitable for rapid action <p><u>Risks:</u></p> <ul style="list-style-type: none"> • Possible funding of non-native plants for bioenergy • Commission has proposed to remove article 22(b) of the habitats Directive from the cross-compliance SMR measures.
European Fisheries Fund (EFF)	EC / DG MARE	EU (MS mainly)	2007-2013	<p><u>Precedents:</u> mainly a minor or indirect contribution in the past</p> <p><u>Current scope:</u> IAS are not specifically addressed but IAS can fall under the fund's scope. Several possibilities for providing funding for IAS related action, eg in the context of aquaculture, protection of aquatic environment.*</p>	<p>Scope: fisheries and related rural development. Can support holistic & partnership driven actions.</p> <p><u>Limitations:</u></p> <ul style="list-style-type: none"> • No specific IAS focus though several possibilities for IAS available • Final funding priorities set at MS level, Community's role in setting national level priorities limited • Mobilising funds relatively slow: not suitable for rapid action <p><u>Risks:</u></p> <ul style="list-style-type: none"> • Possible use of funds for non-native aquaculture species

<p><u>Structural and Cohesion Funds</u></p> <p>European Regional Development Fund (ERDF)</p> <p>European Social Fund (ESF)</p> <p>Cohesion Fund</p>	EC / DG REGIO	EU (MS & regional)	2007-2013	<p><u>Precedents:</u> mainly a minor contribution in the past, although some INTERREG projects have supported transboundary cooperation on IAS control and management.</p> <p><u>Current scope:</u> IAS are not specifically addressed but can fall under the scope of one or more of these Funds. Several possibilities for providing funding for IAS action related to prevention of risks, management of natural hazards and environmental protection*.</p>	<p>Funded actions need to support general regional development.</p> <p>Can support holistic & partnership driven actions with several stakeholders.</p> <p>Can fund cross-border and transnational actions</p> <p>Could fund large projects with infrastructure (eg to develop risk prevention)</p> <p><u>Limitations:</u></p> <ul style="list-style-type: none"> • No specific IAS focus though possibilities available (eg in the context of risk management) • Final funding priorities set at MS level, Community's role in setting national level priorities limited • Mobilising funds relatively slow: not suitable for rapid action • IAS would need to have been identified as one of the priorities by the partner country: however, the EU could help to support this.
European Development Cooperation Instrument (DCI)	EC / DG DEV	Developing countries	2007-2013	No information on application to IAS found.	In order to be one of the funding focal points, IAS would need to be included in a call for proposals. The EU could specifically target them in the ENRTP Annual Action Plan as well as in the call itself.
Instrument for Pre-Accession Assistance (IPA)	EC / DG Relex	EU neighbouring countries	2007-2013	No information on application to IAS found.	IAS would need to have been identified as one of the

				In principle, IAS could be addressed under the general environmental objective of the fund, e.g. as apart of the EU-European Neighbourhood Policy (ENP) cooperation activities.	priorities by the partner country: however, the EU could help to support this.
National level funds (national budget)	MS (different authorities)	MS (possibly regional)	Variable	Very variable between MS: some evidence of increased budget allocations dedicated to IAS coordination, prevention and/or control in a minority of MS.	Development of national strategy often provides catalyst for increased political and sectoral awareness of IAS problems, may pave way for formal budget allocation (e.g. in Denmark).
National level funds (private)	MS (different stakeholders)	MS (possibly regional)	Variable	Very variable between MS: linked to level of engagement in IAS issues by industry (e.g. development of codes of conduct) and NGOs (e.g. information campaigns, control projects).	Usually limited funds available for specific projects and small scale/ local actions.
New possible funding sources and approaches					
Dedicated EU fund for IAS	EC	MS/regional	N/A	Co-financing mechanism could be focused on support for early detection, rapid response and contingency planning, triggered for species that present a transboundary/EU threat but which may not be considered a priority for action by some individual MS where incursions take place.	For maximum effectiveness, fund would need to be flexible, responsive, easy and fast to access. Would need to be linked to a pre-identified list of high-risk target species, regularly updated, and drawn up by an advisory IAS panel or a formal EU-level Committee.
Cost-recovery mechanisms	EC/MS	EU/MS	N/A	Provide a generic tool to raise funds on an ongoing basis from public and private stakeholders proposing intentional introductions. Examples include	Aligned with the polluter pays principle. Aquaculture Regulation provides basis for charging aquaculture operators for environmental risk analysis.

				fees/charges for risk analysis and import permits (see examples in Annex 5).	Potential for more comprehensive application to plant health sector under active consideration (Waage et al, 2007).
Self-financing mechanisms	Variable	Variable		Provide a generic tool to raise funds on an ongoing basis from operators of activities that provide pathways and vectors for IAS introduction, whether intentional or unintentional. Many possible approaches e.g. levies on retail transactions or transport, higher port fees for vessels, deposit funds (see Annex 5 for details).	Aligned with the polluter pays principle. Very under-developed in Europe with regard to IAS pathways.

5.4 Horizontal policy options

The following sections link the analysis presented in Chapter 4 to a range of possible options to provide a solid foundation for a future EU framework on IAS.

5.4.1 Institutional and regional coordination

Problem definition: IAS present a major challenge for organisational collaboration. The causes and impacts of unwanted introductions concern at least ten mainstream economic sectors⁵⁵ and vary from global to very localised. Coordinating responsibilities and activities across concerned administrations with different mandates is a critical element of successful IAS policy. This is particularly complex in jurisdictions with shared competencies, not only in the EU and some of its MS⁵⁶ but also in other regions of the world (see detailed examples of coordination mechanisms in Australia, Canada and the US in Annex 4).

Current practice: Lead institutional responsibility for IAS that affect biodiversity is usually located in the environment department but resources, technical expertise and capacity for terrestrial prevention, surveillance, risk assessment and response are usually concentrated in the primary production sector (agriculture, forestry, plant and animal health departments). Aquatic introduction pathways may come under a range of departments (fisheries, water resources, transport etc.). Poor cross-sectoral coordination can mean that certain pathways or impacts are neglected or intervention is delayed, increasing long-term costs.

Rationale for EU action: The Community has recognised the need for a cross-sectoral approach to developing an EU framework on IAS, consistent with international policy trends through the CBD, IPPC and other organisations to reinforce inter-agency cooperation. Stronger coordination at EU level can improve efficient use of available resources and stimulate more consistent and comprehensive IAS policies and tools at all levels.

Outcomes sought:

- clarification of respective roles and responsibilities for all aspects of IAS prevention and management;
- improved synergy between sectoral institutions and procedures to address potential conflicts of interest;
- stronger basis for forging links between policy makers and decision makers, practitioners and researchers and risk assessors and managers;
- stronger basis for mainstreaming IAS into plans, policies and budgets of relevant ministries, thereby spreading the costs and providing for greater sustainability of IAS activities at EU level.

⁵⁵ Trade, health, agriculture, forestry, water resource management, infrastructure development, horticulture, aquaculture, tourism and recreation (indicative list from European Strategy on invasive alien species, Genovesi and Shine 2004).

⁵⁶ In Italy, each of the 20 regions can make internal legislation: some Regional Laws have provisions on IAS. In Spain, up to four administrations may be involved: State Government; Autonomous Community Government; for islands such as the Canaries, the insular *Cabildo* for each island; and local councils (*Ayuntamientos*).

Table 5.11: Example of horizontal policy options

Measure	Application of existing mechanism	Action level	Comments on scope and effectiveness	Administrative and resource implications
Informal networks (expert-led)	Mainly technical with strong focus on exchange of information and best practices (see 5.3.2). Can be formalised and address targeted priorities where linked to IGO (eg. Bern Convention IAS experts group).	MS	Voluntary participation, may not cover all MS. Effectiveness linked to good relations and availability of experts. Informal structure supports flexibility to address emerging risks. Usually no cross-sectoral dimension.	Low
National coordination mechanisms (non-statutory)	Coordination mechanisms vary from relatively informal (e.g. Netherlands: ministry committee with advisory expert support group) to formal secretariat-supported programme (e.g. GB Non-Native Species Programme Board). Precedents outside the EU include Australia's Weed and Pest committees and Canada's Leadership and Coordination Committee (see Annex 4).	MS	Potential to catalyse partnerships through stakeholder forums and develop high-profile information campaigns. Do not usually modify sectoral responsibility for decision-making but can promote consideration of biodiversity dimension in relevant processes. Establishment depends on commitment of MS and cooperating institutions. Based on experience to date, getting results may be lengthy and approaches very variable between MS.	Variable, depending on status and level of operation.
Nomination of formal IAS focal point by each MS	Formal focal point provides pre-identified person/institution to be contacted on IAS-related matters (e.g. alerts, technical requests) and supply information (e.g. to European information and early warning system). Provides fixed responsibilities for IAS within MS and also at the regional levels. Experience gained through NOBANIS demonstrates the value of having 'officially' designated focal points and up-front details of who to contact.	EEA EC MS	Does not require legislation (e.g. building on EEA system). Potentially very useful mechanism, with benefits for domestic coordination as well as transboundary and intra-Community coordination. Introduces clearer responsibility for receiving and sharing information and can streamline communication channels. Mandate likely to depend on design of overall EU framework on IAS. Effectiveness dependent on genuine availability of focal point: need to avoid overload or conflicting responsibilities.	Low-medium
Mandatory designation of national IAS 'competent body'	MS designate an existing or new body responsible for national IAS planning (building on precedent under e.g. the WFD). More ambitious than the focal point approach in previous line as would have organisational potential to coordinate prevention, surveillance and response measures.	EC MS	Would provide Community-driven political support for IAS coordination in line with approaches endorsed through CBD and Bern Convention. Could only be achieved in all MS through specific legislation (e.g. a framework Directive leaving MS free to select most appropriate mechanism(s) consistent with subsidiarity).	High, in terms of new EC legislation. Low to medium resource implications depending on existing bodies.
Dedicated EU IAS mechanism	This would give IAS the highest profile at EU level. Various design options, from a Standing Committee with representatives from each MS linked to an advisory technical panel to a dedicated EU IAS Agency.	EC MS	Mandate and justification directly linked to extent of legislative changes proposed under the future EU framework on IAS. Higher risk of sectoral institutional resistance if functions are not limited to coordination (i.e. are also part-regulatory).	Variable but likely to be high during initial phase of establishment.
	US National Invasive Species Council (see Annex 4) provides precedent for a statutory coordination mechanism linking key sectors (no independent decision-making powers). About half of US states have established State Invasive Species Councils over the last decade.	EC MS	High visibility and valuable catalyst role, domestically and internationally: develops national management plan and oversees public consultation processes. However, no direct powers: decisions made by sectoral member agencies and individual States.	Relatively high (permanent secretariat).

Measure	Application of existing mechanism	Action level	Comments on scope and effectiveness	Administrative and resource implications
	Precedent for a unitary mechanism across biodiversity, primary production and health sectors provided by Biosecurity New Zealand.	EC MS	Most streamlined option but requires highest-level political commitment to comprehensive biosecurity goals for whole jurisdiction.	High.

5.4.2 *Communication, awareness and partnerships*

Problem definition: IAS problems arise at multiple levels: local (including offshore islands); national (with risk of spread to other MS); regional (species spreading in one sea); and at continental level (species occurring throughout Europe and/or potential IAS which have yet to become established in Europe). As a result, the number of stakeholders affected and/or able to contribute to solutions is large and very diverse. In contrast, perception at EU level of IAS as a risk to biodiversity is extremely low (2%)⁵⁷.

Current practice: Generalised lack of awareness, including within the conservation community and NGOs, represents potentially the biggest barrier to significant progress on IAS issues. A growing number of MS are now investing in communication and awareness-building initiatives, usually focused on specific target groups (gardeners, anglers, boat users etc.). Partnerships with economic stakeholders and industry are strongly promoted in some MS but non-existent in other parts of the EU. A range of conflicts of interest may delay or block management actions, increasing the longer-term cost of damage and/or control.

Rationale for EU action: Existing policies and funding already address communication on nature and biodiversity issues (LIFE+) but without a targeted focus on IAS. Given its competence for issues such as animal welfare (e.g. farmed animals, wildlife moving in trade), the EC also has an interest in ensuring coherent policy positions (e.g. with regard to culling of feral and invasive species). Regional cooperation is essential to avoid duplication of effort and develop coordinated approaches for communication on high risk target species.

Outcomes sought:

- Communication of clear and consistent messages to decision-makers and other European stakeholders that IAS prevention and control is an integral part of biodiversity conservation and essential to minimise economic and social impacts;
- Conservation NGOs made more aware and supportive of the need for IAS control and management and contribute actively to building public and decision-maker awareness;
- Partnerships developed with a broader range of business, research and sectoral stakeholders to support development of voluntary codes and best practices and foster responsible attitudes at all levels;
- Efficient production and dissemination of educational materials to show target groups how to minimise future IAS problems.

⁵⁷ Scoping Study for an EU wide Communications Campaign on Biodiversity and Nature (Gellis Communications: Final report to the European Commission/DG ENV Contract 07-0307/2007/ 474126/MAR/A1) (survey conducted November 2007, results published March 2008).

Table 5.12: Example of communication, awareness and partnerships

Measure	Application of existing mechanism	Action level	Comments on scope and effectiveness	Administrative and resource implications
Local and national initiatives and partnerships	Diverse and expanding (see under Prevention: information campaigns) but constraints on time, resources and access to expertise may limit production of information tools. Some sectors poorly covered e.g. in some areas, low communication to anglers of IAS risks associated with release of live bait.	MS NGO Industry	Highly flexible tool for EU or locally-specific problems. Scope to build on precedents and collaboration in other parts of EU or the world and to promote economies of scale Industry-led or joint development of Codes of good practice in conjunction with stakeholders provide strong tool to develop partnerships: one way to test alternatives to regulatory approaches.	Low.
Targeted campaigns to address animal welfare concerns and other conflicts or interest	Concerns primarily focused on birds and mammals but may also apply to plants. May act as a disincentive to reporting of IAS sightings (if this is likely to lead to deliberate killing or destruction). Social attitudes vary between MS. Conservation NGOs considering control campaigns to protect native species may face a serious conflict of interest if supporters are opposed to such actions.	EC MS	The EU could take a leadership role in communicating the importance of IAS control as an integral part of positive biodiversity conservation strategies (consistent with the Biodiversity Action Plan). Targeted information campaign could focus on problems facing multiple MS e.g. control of feral animals on islands.	Low (possible scope for synergy with existing Animal Health Action Plan and information tools through DG SANCO.
Communication through existing EU networks	Targeted IAS information and ‘messages’ could be disseminated through informal practitioner networks at EU level, including information of relevant best practices. Options through e.g. ENCA (European network of heads of nature conservation agencies) is considering development of an IAS interest group/discussion platform (October 2008); GreenForce (EU network of MS practitioners in nature conservation and forestry): http://ec.europa.eu/environment/greenforce/index_en.htm .	EC MS	Cost-effective way to leverage higher profile for IAS within existing networks and thus broaden the range of informed practitioners. Use of EU-wide networks can contribute to greater consistency and clarity of message. Does not preclude approaches at national and subregional levels. If established, a future EU IAS Panel could include a communication component and agree on priorities for development of educational and awareness material (e.g. for IAS of EU importance).	Low
EC communication campaign	COM major communication campaign on Biodiversity 2008-2010 already scheduled (linked to survey mentioned above). DG ENV has established dedicated IAS website	EC	Scope for EC to promote IAS communication activities at the next International Day of Biodiversity (22 May 2009) which has IAS as its theme.	Medium if expanded and given stronger IA focus.
Dedicated funds for information and communication	LIFE+ application field ‘Information and Communication’ could be used to support high quality IAS awareness-building campaign (supports campaigns related to the implementation, updating and development of EU environment policy and legislation).	EC MS	High-profile funding through LIFE+ fund could be launched fairly rapidly (e.g. ahead of full EU framework on IAS) and help build political and decision maker awareness.	Low (funding already secured).

5.4.3 *Accountability and compliance*

Problem definition: Conventional legal tools for enforcement are notoriously difficult to apply to activities leading to IAS impacts because of the problems they raise with regard to detection, proof of causation, definitions, legal certainty and level of intention (deliberate, negligent, accidental or unintentional). Deliberate illegal introductions certainly take place but far more actions that lead to unwanted introductions occur as part of lawful routine activities and usually involve many different stakeholders at different stages of particular pathways. Fostering responsible attitudes to and greater accountability for IAS prevention is as much a matter of education and appropriate incentives as of sanctions and penalties.

Current practice: Many MS regulate certain categories of intentional introductions to the wild in line with the birds and habitats Directives, but enforcement of related criminal offences appears to be low or almost non-existent. This is partly linked to problems of detection and proof but also in some cases to a reluctance to embark on costly legal proceedings. Civil liability tools are also almost non-existent. At EU level, existing environmental liability and criminal environmental legislation do not explicitly reference IAS. At international level, efforts to pioneer a mechanism for liability and redress under the CBD Biosafety Protocol have so far been unsuccessful (see 4.1.1).

Rationale for EU action: The EC is competent to establish binding requirements and procedures related to environmental protection and to enforce these through the national and European courts. More broadly, it supports higher standards of environmental protection through a range of policy and funding tools. Principles for any action undertaken need to include practicability and transparency.

Outcomes sought:

- Increased responsibility and accountability for IAS-related activities, including through development of cost-recovery mechanisms for appropriate stakeholder groups;
- Determination of IAS-related actions that should constitute criminal offences, supported by appropriate communication strategies to ensure high visibility and explain the rationale behind such measures: availability of meaningful penalties;
- Clarification of liability framework in the event of transboundary impacts;
- Capacity-building to support stronger inspection and compliance programmes.

Table 5.13: Example of accountability and compliance

Civil liability	Environmental Liability Directive generally covers activities that trigger damage to Natura 2000 sites and to species protected under habitats and birds Directives (potentially includes damage to natural resource services). No explicit reference to IAS but scope for MS to integrate IAS into implementing legislation (e.g. Hungary).	EC MS	Extension of EC legislation establishing binding requirements (e.g. transboundary requirements under aquaculture Regulation; possible mandatory reporting under future early warning system) could enlarge the basis for liability actions with regard to IAS-related damage to neighbouring MS.	Medium to high.
	Use of Codes of conduct or best practice (see under Prevention: information campaigns) to leverage progressively higher standards of prevention behaviour.	MS NGO	Potential to engage an open-ended number of users/consumers in improved compliance efforts. May provide an incentive for industry to invest in code development and communication efforts as a preferred alternative to regulatory approaches.	Low
		Industry	Non-binding. Difficult to document contribution to more responsible attitudes.	
Technical guidance underpinned by statutory framework	Voluntary technical guidance can be given formal recognition through legislation (e.g. UK, codes may be cited in legal proceedings) and/or IGO certification systems (ballast water voluntary guidance aligned with BWM Convention).	IGO MS	Effectiveness linked to awareness and capacity at appropriate administrative level (e.g. environmental inspectors, retail inspectors, port state control officers). Existence of statutory framework can stimulate improved business practice to reduce compliance costs.	Low to medium, depending on need for training and capacity building.
Cost-recovery and cost-sharing mechanisms	Wide range of incentive and economic instruments used in other environmental policy areas can potentially be applied to IAS-related activities: funds generated can be used to support prevention and rapid response activities (see overview in Annex 5).	IGO EC MS Industry	Suitable for addressing pathway risks where many parties involved and where impossible/inappropriate to define individual responsibilities. Flexible tools that can spread burden across all stakeholders in a given sector, depending on design (see further Emerson and Howard, 2008; Shine 2008).	Low (once established) as costs borne by target group of stakeholders, therefore more equitable distribution of costs across sectors.
Criminal liability	National offences vary widely in scope and level of enforcement. No minimum standards applied through EU law (except for import ban on 4 ecological threat species under the Wildlife Trade Regulation). EU legislation on environmental crimes could provide scope to apply minimum penalties to certain types of IAS-related activities but leaves wide latitude to MS.	EC MS EC	Existing EC rules could be broadened to require the prohibition of listed species/actions that impact on interests of Community importance and/or have transboundary impacts. Strong tool that would mandate consistent implementation at EU level. Effectiveness in practice is closely linked to visibility, through proactive communication strategies, and legal certainty. Legislation needs to provide unambiguous definition of species/activities subject to regulation.	Medium (implications for increased communication, inspection and judicial efforts). High (with regard to possible commercial stakeholder resistance).

6 CONCLUSIONS: POSSIBLE POLICY PACKAGES FOR IMPACT ASSESSMENT

This final section builds on the background analysis and policy options presented in Chapters 4 and 5 above. It outlines five indicative policy ‘packages’ which combine policy measures in different ways to demonstrate a range of possible approaches to the future EU framework on IAS. For each package, the choice of specific components could be varied to include more or less stringent options and thus adjust the overall effect or focus of the package concerned.

This preliminary overview is intended to assist the Commission in developing a shortlist of policy packages to undergo full impact assessment under Task 3 of this study.

PACKAGE 1

“Member State action with full subsidiarity” approach

- 1.a No legislative change at Community level.
- 1.b The Community provides limited support for improved practice at MS level, building on non-legislative options identified in this report. Areas for support could include: dissemination of voluntary codes of practice and other policy-relevant approaches through dedicated EU website; development of management guidance/protocols for target IAS of Community concern (e.g. known high-risk IAS; IAS that affect or potentially affect several MS; IAS that threaten species or habitats protected through the birds and habitats Directives); guidance to facilitate access to existing EU funds; organisation of European stakeholder fora, possibly focused on specific industry sectors; and Community backing for communication campaigns.

Could be associated with:

- creation of a voluntary network of MS focal points;
- creation of an informal information hub to streamline information exchange; and/or
- periodic meetings at the Commission to review progress in MS implementation.

Pros and cons

Package 1 is a high subsidiarity/low concrete action approach focused on voluntary best efforts. It could be flexibly implemented according to MS priorities and needs (with or without scientific justification), contribute to improved awareness of IAS problems and support increased stakeholder engagement and partnerships.

Package 1 would not tackle key gaps, constraints and areas of legal uncertainty in the existing Community framework or secure coordinated prevention, rapid response and control for IAS of Community concern. Its contribution to horizon scanning for potential IAS and emerging

pathways would depend on the motivation and availability of the voluntary focal points feeding data to an informal information hub.

Likely effectiveness (resource implications, clarity, practicability and enforceability)

This is the least onerous option at EC and MS level and could be rapidly implemented as no legislation is required. It is not enforceable and with regard to prevention and management of common IAS risks, would only be as good as the ‘weakest link’. It could improve visibility of IAS issues but would not bring greater clarity to existing fragmented frameworks.

Overall, it is not commensurate with the scale of assessed and predicted IAS impacts and would not prevent the arrival or spread of IAS or address emerging pathways.

PACKAGE 2

“Strong Community coordination and clear parameters for Member States” approach

- 2.a No legislative change at Community level.
- 2.b Community rapidly develops and periodically reviews formal guidance on the criteria and procedures to be used by MS when developing national prevention measures that could affect intra-Community movement and trade, consistent with relevant ECJ judgments and EU-funded research on best practice for risk assessment e.g. PRATIQUE, IMPASSE.
- 2.c Coordination and quality control of national risk assessments is provided through an informal IAS advisory panel and/or existing expert groups.
- 2.d A voluntary network of MS focal points (technical or government-appointed) is established and interacts with the Commission to support early warning and improved communication flow when new IAS are detected.
- 2.e Elements of Community support as under Package 1.b.

Could be associated with:

- Annual EU forum where MS report on implementation, including costs of application;
- Creation of informal cross-sectoral Coordination Mechanism at Commission level; and/or
- Creation of informal Task Forces or Working Groups to coordinate management of target species or pathways.

Pros and cons

Package 2 is a non-legislative option that could support a flexible Open Method of Coordination-type approach⁵⁸ to improve oversight of action to address species and pathways of national concern that are not addressed through existing EU instruments. It would allow the Community to provide guidance on the emerging trend towards unilateral adoption of trade-related measures and to promote consistency and higher quality of risk assessment used to justify national IAS measures that may affect trade.

This approach recognises that MS progress at different rates. It would enable lessons learnt through existing MS initiatives to be efficiently shared and could address the current ‘paralysis’ in other MS by providing reassurance on the types of measures compatible with the operation of the Single Market.

Package 2 still relies on ‘best efforts’ at national level. It could encourage but not mandate coordinated approaches to IAS of Community concern. It would not protect proactive MS from the consequences of inaction in neighbouring MS. It does not build capacity for contingency planning and rapid response.

Likely effectiveness (resource implications, clarity, practicability and enforceability)

Package 2 is relatively low-cost for the Community, though it would involve short-term intensive demands for the preparation of guidance. Some support funding could be necessary for the informal quality control of risk assessments. It does not introduce a regulatory burden for MS as it is voluntary: for those already carrying out risk assessment, it could reduce certain costs e.g. by streamlining common protocols for risk assessment procedures, improving information-sharing and pooling expertise.

Package 2 would improve legal certainty on a critical issue but would not of itself clarify existing fragmented frameworks. There is a high risk that such an approach might be seen as ‘undermining’ the Single Market and could encounter opposition and/or delay at Commission level.

Package 2 is not enforceable but could catalyse performance improvements through a regular reporting and periodic review mechanism. It would not overcome the problem of the ‘weakest link’ (MS failing to act on IAS of Community concern).

The effectiveness of Package 2 would be contingent on improved access to scientific and technical information on high-risk species and risk assessment protocols. If supported by efficient networking and communication, Package 2 could help prevent the arrival or spread of some IAS and address some emerging pathways. However, it does not amount to a strong strategic package with advance horizon scanning support and is not commensurate with the scale of assessed and predicted IAS impacts.

Package 2 could be used in a transitional phase to test-drive new approaches and pending the possible development of amended or new legislation at Community level.

⁵⁸ Ten Brink, P., Farmer, A., Wilkinson, D., von Homeyer, I; and Kranz, N. 2005. Explorations of options for the Implementation of the Open Method of Coordination for Environmental Policy: Final Report. Ecologic and Institute for European Environmental Policy, October 2005.

PACKAGE 3

“Building on existing legislation” approach

- 3.a Implementation of the EU plant health framework is adjusted, in line with IPPC/EPPO standards and the PRATIQUE programme, to address invasive plants and impacts of harmful organisms on biodiversity (linked to the review of the Community plant health regime launched on 1 June 2009).
- 3.b The ongoing revision of EU animal health legislation is used to provide an explicit basis to address invasive animals that are not pests of plants or animal pathogens, in consultation with OIE as recommended by the CBD.
- (complement or variant: existing provisions for imports and intra-Community holding of ecological threat species under the Wildlife Trade Regulation are used proactively to address target invasive animal species, including within the Community).
- 3.c Target IAS are integrated into the border inspection, electronic notification (early warning), control and co-financing systems already operational for plant and animal health.
- 3.e Cross-sectoral (inter-service) coordination is formalised between DG SANCO and DG ENV. Equivalent coordination mechanisms are developed at MS level between NPPOs, national veterinary services and ministries responsible for the environment.
- 3.e Elements of Community support as under Package 1.b.

Could be associated with:

- Creation of informal Task Forces or Working Groups to coordinate management of target species or pathways.

Pros and cons

Package 3 makes maximum use of existing tools, resources, risk assessment capacity and quality control (through EFSA), early warning mechanisms, biogeographic and co-financing mechanisms that are already well established in these sectors. Coordination procedures are already in place through the EC-MS network of focal points and regular committee meetings. Although the Package requires a significant change for the animal health sector, comprehensive legislative revision is already ongoing in this sector which could provide opportunities for mainstreaming.

However, Package 3 would require a major institutional shift to enlarge the focus of existing systems beyond the primary production sector. Without explicit institutional commitment and strong cross-sectoral coordination, there is a high risk that European biodiversity would have no ‘champion’ and that IAS with biodiversity-related impacts would be relegated behind

species of more quantified economic concern. Experience to date, including with implementation of the Wildlife Trade Regulation, has not demonstrated an adequate level of prioritisation and horizon-scanning for potential IAS affecting biodiversity. Far more new plant species currently enter the EU than are subject to screening for potential risks.

Specific measures would be needed under this Package to promote strategic pathway coverage and prioritisation, especially for freshwater and marine pathways.

Likely effectiveness (resource implications, clarity, practicability and enforceability)

Package 3 has medium to potentially very high resource implications for the Community and MS. Although it is mainly based on existing instruments, it involves an extremely demanding process of institutional negotiations as well as regulatory review and adjustment and (for animal health) a major expansion of focus. Significant investment in training and capacity would be needed for border control and other personnel for aspects beyond their existing expertise and mandates. However, cost-recovery mechanisms already under consideration for the plant and animal health sector could quite rapidly be developed to recover some of the incremental IAS-related costs.

Measures and procedures adopted would be binding and thus overcome the ‘weakest link’ problem. However, extension of the biogeographic approach used for plant pests and animal pathogens to a broader range of target IAS would need very careful technical consideration, especially given uncertainties associated with climate change.

Package 3 would retain the current sectoral focus to IAS prevention and management. It would only bring increased clarity and visibility to IAS as a priority issue for European biodiversity if high-level backing and coordination was introduced to ensure an integrated approach.

PACKAGE 4

“(Framework) Directive with species-based annexes and high subsidiarity” approach

4.a A new IAS Directive combines targeted species-based measures within a phased timetable to develop national coordination and planning that takes account of transboundary IAS. Potential components include:

- creation or designation of an appropriate administrative mechanism/competent authority to be notified to the Commission and to function as focal point on IAS issues with the Commission;
- assessment of the IAS situation and establishment of a surveillance and monitoring network in each MS or on a sub-regional basis (building on existing fora where appropriate);
- development of cross-sectoral IAS plans and operational measures in each MS, fully integrated with existing EU instruments and planning processes for the terrestrial, freshwater and marine environment;

- mandatory requirements for prevention/exclusion, contingency planning/rapid response and control/management for black lists of target IAS contained in annexes to the Directive, applicable (depending on their design) to all MS, to those MS on whose territory a listed species is detected or to defined biographical regions.
- 4.b An EU Committee supports implementation of the Directive and provides for a fast-track procedure, based on scientific advice from e.g. an IAS Advisory Panel, to review species listing and where appropriate, add new species to relevant annexes. Other tasks could include development of strategic pathway risk analysis and management and establishment of task forces or working groups (possibly on a regional basis).
- 4.c A formalised Early Warning and Information Exchange System for IAS is established, supported by maintained links to national and international interoperable databases and supervised by the IAS Advisory Panel mentioned in 4.b. Prompt reporting of defined categories of information is supported by the Directive.
- 4.d Coordination and quality control of national risk assessments is provided through an IAS Advisory panel and/or existing expert groups, with specific oversight for proposed introductions that may have transboundary impacts.
- 4.e A co-financing mechanism is established in accordance with Community precedents to support defined categories of rapid response action for ‘IAS of Community concern’ (linked to the species listed in one or more annex under the Directive).
- 4.e Elements of Community support as under Package 1.b.

Could be associated with:

- Strengthened use of existing Wildlife Trade Regulation provisions to address intentional trade-related introductions of ecological threat species from third countries (to avoid delay and discrepancies in national implementation).
- Development of cost-recovery and self-financing mechanisms to generate sustained funding for proactive horizon scanning, targeted practical research and rapid responses.

Pros and cons

Package 4 provides a strong mechanism to specify EU objectives for action on IAS and support progressive mainstreaming of IAS measures with broader Community policies for the environment, natural resource management and adaptation of biodiversity to climate change.

A Directive would enable the Community to establish binding targets while leaving MS free to choose the most appropriate form and methods for implementation, consistent with subsidiarity. It could support harmonised approaches across the range of areas indicated above and mandate minimum standards with regard to prevention and management actions for categories of listed IAS of Community concern and possibly for specific pathways. Specific provisions could support catchment/ecosystem-based approaches, consistent with existing EU instruments and environmental integration tools, as well as formalised transboundary cooperation for IAS with cross-border implications.

Under a framework Directive approach, voluntary approaches could be actively encouraged during the first phase of implementation. The Committee ‘machinery’ would provide opportunities for regular review of the effectiveness of informal mechanisms, to support more informed decision-making on whether or not binding standards are needed. Such an approach would ensure both transparency and proportionality.

However, a Directive-based approach would not secure immediate and uniform (self-executing) prohibition of trade in the highest risk IAS as under a Regulation. Any delay and/or discrepancy in national implementation would slow down progress and potentially expose other MS to certain risks, although possibly at a lower overall level.

One option would be to maintain and better target the existing provisions of the Wildlife Trade Regulation during the first phase of implementation of a future Directive.

Likely effectiveness (resource implications, clarity, practicability and enforceability)

Package 4 has high resource implications for the Community and MS because it involves new legislation as well as training and capacity-building for relevant personnel and infrastructure. Adoption of a Directive is procedurally more burdensome than Packages 1-2 but would probably not be significantly more complex than the regulatory adjustments under Package 3.

Package 4 would give high-level political backing and legal visibility to IAS as a critical component of biodiversity conservation. It would clearly ‘nest’ IAS within DG ENV and lead to much stronger mainstreaming of IAS with other relevant Community policies. This approach would reinforce efforts by national environment ministries to draw the attention of other sectors, especially the primary production sector, to IAS that affect biodiversity. It could support clarification of respective roles and responsibilities with relevant ministries and agencies at national level and involve a much higher number of stakeholders in policy development and implementation.

A Directive would enable the Community to set and enforce binding minimum standards whilst leaving Member States free to maintain or introduce more stringent measures than those foreseen in the directive (Article 176 EC). It would in the long term overcome the ‘weakest link’ problem, although in the shorter term non-compliance or inadequate compliance by MS could impede optimum action on the highest-risk target IAS.

A Directive would have benefits for practicability because it provides a formal framework for implementing actions aligned with existing policy recommendations on which many MS are already actively working (CBD Guiding Principles, Bern Convention European Strategy on Invasive Alien Species (Genovesi and Shine, 2004)).

A phased timetable allows for an evolving approach which has been found useful in other large jurisdictions which face similar challenges of building horizontal and vertical coordination and common approaches (see Annex 4). In this respect, a Directive probably offers maximum opportunities over time to build awareness, understanding, good will and mainstreaming.

PACKAGE 5

“Regulation focused on control of trade-related pathways” approach

- 5.a A dedicated IAS Regulation, building on the ecological threat species of the Wildlife Trade Regulation, seeks to prevent the intentional introduction into and establishment in the EU of alien species that will cause or are likely to cause economic or environmental harm or harm to human, animal or plant health (excluding species already defined or regulated as plant pests or under animal health legislation). Potential components include:
- a mandatory risk assessment procedure and criteria to ensure consistency and consideration of transboundary and broader EU impacts in all decision-making;
 - species coverage based on a series of lists, depending on design of the Regulation and considerations of feasibility. Possibilities include development of (1) a ‘white list’ of species (on the basis of the best available scientific and commercial data) that are either assessed as non-harmful to the interests protected under the Regulation or are already so widespread that future import prohibitions or restrictions would have no practical utility; (2) a ‘black list’ of high-risk species prohibited or restricted from entry into the EU except under permit for educational, research or other accredited purposes; and (3) prior screening requirements for intentional introduction of new species, possibly linked to a biogeographic approach;
 - contingency planning and rapid response obligations for species introduced in accordance with the Regulation;
 - cost-recovery mechanisms to generate a Community or MS fund to support incremental costs of implementation;
 - a co-financing mechanism to support defined categories of rapid response and control action for IAS of Community concern listed in an annex to the Regulation.
- 5.b A formalised Early Warning and Information Exchange System for IAS is established, housed by EEA, supported by maintained links to national and international interoperable databases and supervised by the IAS Advisory Panel mentioned in 4.b. Prompt reporting of defined categories of information is required under the Regulation.
- 5.c A formal EU Coordination Mechanism with cross-sectoral membership is established to oversee implementation of the Regulation, supported by the IAS Advisory Panel.
- 5.d Elements of Community support as under Package 1.b.

Pros and cons

Package 5 establishes a strong new instrument focused on risks associated with intentional introductions through trade-related pathways into and within the Community. It would establish an explicit legal basis for the Community to take action against all categories of invasive plants and animals, including alien genotypes, but could exclude plant pests, animal pathogens and aquaculture species regulated under existing legislation. It would introduce a standardised risk assessment procedure for ecological threat species that could build on

existing EU level initiatives such as the PRATIQUE project.

A regulation is binding in its entirety and directly applicable in all MS and thus entails a low level of subsidiarity. The approach outlined above recommends a Community-led or – coordinated approach to species risk assessment and listing. An alternative approach is that used by the aquaculture Regulation which provides a precedent for ‘decentralising’ the risk assessment process to MS on the grounds of their more detailed and specialist knowledge of local conditions. This approach may offer significant advantages for proportionality and responsiveness but increased safeguards would be needed to ensure consistency. Specifically, robust EU-wide horizon scanning and information exchange functions would be essential to ensure that an MS that is the first point of entry into the EU actually takes action for target species of the highest concern.

This type of approach is heavily focused on trade-related approaches. It is commensurate with addressing the scale of the IAS problem associated with international and regional trade pathways linked to globalisation. However, it would not be broad enough to promote locally- or nationally-driven innovation and partnerships, address pathways for unintentional introduction or support phased and progressive approaches to cross-sectoral coordination that have been found essential in many jurisdictions.

Likely effectiveness (resource implications, clarity, practicability and enforceability)

Package 5 has very high resource implications for the Community and MS because it involves new legislation. As an instrument with strong repercussions for current trade practices, the costs and impacts on different economic sectors are potentially significant, although alternative trade opportunities could be opened up in parallel. On the other hand, this type of regulation offers the most robust prevention framework to address risks associated with new species entering through trade and would thus make a significant contribution to reduced IAS damage and control costs in the future.

Package 5 would also give high-level political backing and legal visibility to IAS as a critical component of biodiversity conservation. It would require very high institutional commitment in key Community sectors and entail complex institutional negotiations to avoid overlap and duplication with existing mechanisms and frameworks. There are clear opportunities for synergy in implementation and for streamlining with risk assessment expertise already present in the plant and animal health sectors. Cost-recovery mechanisms already under consideration for these sectors could be applied to recoup the costs of significantly expanded import risk assessment requirements.

In terms of practicability, Package 5 requires significant expansion of border control and inspection functions and intensive training of personnel including in taxonomic recognition. In terms of enforceability, it would need very high investment in awareness-building for industry, the public and specific stakeholder groups as an essential component of compliance. Specific efforts would be needed to foster partnerships and maximise consultation throughout the species listing and review procedures.

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ANNEXES

Annex 1: Updated information on international and regional policy processes

Annex 2: Updated information on Community instruments and activities relevant to IAS

Annex 3: Updated information on Member State instruments and activities relevant to IAS

Annex 4: IAS frameworks in other complex jurisdictions: mechanisms used and lessons learnt

Annex 5: Review of self-financing mechanisms for ballast water management