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	*Guiding Principles for the prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species* annexed to Decision VI/23 adopted at 6th 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 2001[1] and designated as a priority for EU biodiversity policy in 2006[2]. 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. 2009[3]) 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 negative[4].

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° 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 IAS[6], 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 2006[7] 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 Principles[8] and the Bern Convention's European Strategy on IAS[9]. 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 at 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 biodiversity[14].

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 species[15] 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/EC[16]. 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 developed[17].

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 practice[19]. 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 influenza[20]. The Animal Health Action Plan[21] 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' facilities[22] 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 condition[23].

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 fund[24] (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 IAS[25] 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 2008[26].

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-aliens.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 importance[28].
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 purpose[29].

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 frameworks[30]. 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 Caïcos 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).

<u>Specific recommendations addressed to the European Commission</u>

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).

<u>Specific recommendations addressed to Member States and local administrations</u>

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-along 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 Consortium[33]);
- 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 legislation[34] 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 purposes[35].

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 funding[36].

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	• 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	• 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 *Fallopia japonica, Heracleum mantegazzianum, Impatiens glandulifera* and *Senecio inaequidens*
Bulgaria	• 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	• 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	• 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 - *Hydrocotyle ranunculoides* and *Lysichiton americanus*). • Changes mainly concern research and voluntary activities
Denmark	• 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	• 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 (*Nyctereutes procyonoides*) and American mink (*Mustela vison*). 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	• 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 *Heracleum mantegazzianum* and *H. persicum* (eg in Karjala and Kainuu regions). • New information exchange and awareness-raising initiatives.
France	• Proposals for IAS prevention and control actions endorsed at national environment forum in 2007 (*Grenelle de l'environnement*).

COUNTRY	Key policy-related developments and activities since 2006
	• 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	• 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 issues[40]. • 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 *A. artemisiifolia* and inform public.
Greece	• Expansion of research on marine invasive alien species; creation of online database (http://elnais.ath.hcmr.gr).
Hungary	• 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 *Robinia pseudoacacia* 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, *Ambrosia artemisiifolia* and *Asclepias syriaca* 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 *Ambrosia artemisiifolia* 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, *Ambrosia artemisiifolia*). • 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	• 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
	and tourism sectors) being developed. • €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	• Bilateral cooperation on *Ambrosia artemisiifolia* 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	• Extension of plant protection legislation in 2006, covering imports, introductions, control and clearance obligations. One invasive plant *Heracleum sosnowskii* 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	• 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	• 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	• 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	• 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	• 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	• 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 *Eichhornia crassipes*. • 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	• Control of invasive plant species included as mandatory condition of direct payments to famers 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	• 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	• 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 *Eichhornia crassipes* on the Guadiana river ongoing.
Sweden	• 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	• 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 Canaries 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 programme[41] 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 investments[42] 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 limited[43]. 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 units[44];
- 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 *Ambrosia artemisiifolia*. (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 operational 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 regulatory requirements address export-related risks (as a contribution to prevention at source) outside the plant and animal health sector.	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).
	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 *Financing Natura 2000: guidance handbook* (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 *Orconectes limosus* 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 pay[45]. 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 vectors[46].

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	**Introductions into Captivity/Containment**	▪ 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.
▪ 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	▪ Botanical and private gardens ▪ Zoos ▪ Farmed animals ▪ Beekeeping ▪ Aquaculture ▪ Pet trade ▪ Aquarium and horticultural pond trade ▪ Research	

[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).

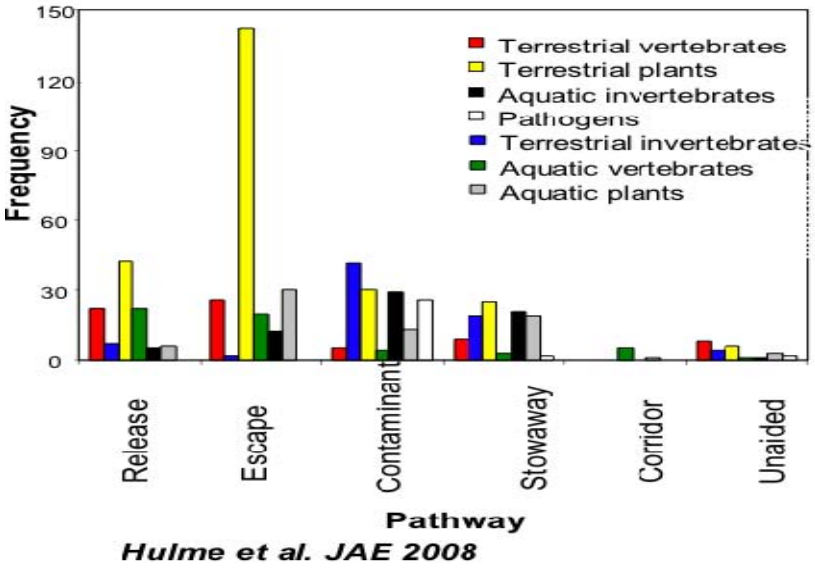

Figure 5.1: Breakdown of pathways by taxonomic group

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	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). European examples include EU Botanic Gardens Initiative, Ambrosia information campaigns (Switzerland and Germany) and, in UK, Royal Horticultural Society entomology campaign. 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.	NGOs Industry MS support	Local/ national Could be wider via internet/ translation	Can be linked to species lists/ databases	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. 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. Potential to extend to known high-risk pathways e.g. use of alien live bait in angling (being developed in Hungary).	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	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). 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. One MS (UK) provides for statutory recognition of voluntary codes: guidance may be cited in court proceedings where relevant.	Flexible	Variable: local to continent	Can be linked to species lists/ databases	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. 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.	Medium, depending on numbers involved in code development. Costs met by industry may be passed on to consumer/user.
Voluntary substitution policies	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). 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: *Workshop on the Code of Conduct on Horticulture and Invasive Alien Plants* (Oslo, 4-5 June 2009: www.eppo.org).	MS Local authorities	Usually local or national	Based on (in)formal white list.	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 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).	Medium, depending on capacity needs in local nurseries or equivalent and also on verification procedures.
Product/source certification and/or industry accreditation schemes (also applicable to unintentional introductions)	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. Possible precedent: EC Fisheries Labelling Scheme provides for labelling of fish products indicating origin and type of production (farmed or wild fish) + system	Industry MS	National Subregion	Can be linked to species lists/ databases	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. Depending on design (level of transparency,	Variable, depending on technical constraints. Costs may be met by industry, could require

Measure	Description of existing application	Action level	Scope	Cross-cutting tool?	Comments on scope and effectiveness	Administrative & resource implications?
	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). 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).				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 *Workshop on the Code of Conduct on Horticulture and Invasive Alien Plants* (Oslo, 4-5 June 2009: www.eppo.org).	transitional support.
Regulation of deliberate release						
Regulation of introductions into the natural environment	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).	MS	National Some local	Currently not linked to RA. Often linked to some kind of species list.	Current implementation is discretionary and uncoordinated. Uneven reporting at Community level. 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.	Medium in terms of institutional change, stronger wardening and public awareness.
Prohibitions linked to specific areas	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). 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).	MS EC	National Some local	RA and species lists	Biogeographical restrictions may contribute to proportionality but can present technical constraints in defining areas subject to restrictions. 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.	Low to medium.
Controls linked to purpose of introduction	**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	MS EC only for tranbound'y impacts	National	RA, White list	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	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?
	within their sovereignty or jurisdiction". Open aquaculture facilities treated as introductions to the wild. 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.				exemption of 10 commercially important aquaculture species (Annex IV). Regionally consistent approaches to RA, promoted through criteria annexed to Regulation.	committee, detailed RA requirements negotiation with affected sectors).
	Biofuels: renewable energy Directive could reduce planting in high biodiverse areas but does not address IAS pathway risks. Prohibitions in place in at least one MS for Natura 2000 sites (Hungary)	MS	National	Could link to species lists. EAFRD funds	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
	Forestry: EU Forestry Action Plan Consistent policies in place in several MS: may be aligned with Forest Stewardship Council certification.	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	Used where trade/holding is permitted but measures are needed to minimise risk of escapes to the wild. 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). At MS level, some use of holding restrictions for specific pathways e.g. Estonia for fur farms.	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	3rd 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	3rd 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	3rd 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	3rd 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	3rd 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 imports 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	3rd 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?
	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. 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) Other large jurisdictions (see Annex 4) have precedents for state-based trade controls: however, most face similar difficulties regarding crossborder coordination.	ORs)	National Possible fine-tuning for ORs	(variable)	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. Currently island Outermost Regions have no clear basis to screen imports that fall outside the plant and animal health or aquaculture frameworks.	implications for oversight of functioning of the Single Market). All costs fall on the MS concerned. Few opportunities for economies of scale between MS (e.g. shared RA, listing etc.)
Export						
Community trade-based instruments	Existing export-related controls are limited to measures to prevent the spread of plant pests and animal pathogens. Sustainability Impact Assessment (SIA) tools could support consideration of export-related IAS risks in development of new trade agreements. 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.	EC	3rd countries	RA and species lists; info exchange tools	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). 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.	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	3rd 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 EIA[47] 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	3rd countries	EIA/SEA	Environmental integration tools are needed to ensure policy consistency for known IAS pathways (e.g. biofuel plantation, reafforestation, erosion control etc.). in EU funded activities in 3rd 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	3rd 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	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). Within Europe, EPPO and at least one MS (the Netherlands) are addressing pathways such as bird seed which link closely to pet retail sector.	IGOs EC MS	3rd countries EC Transb'y National Local	RA and species lists Info exchange	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). 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..	High (expanded capacity for border inspections, quarantine facilities, spraying of vessels and containers etc.) + taxonomic training if scope significantly enlarged beyond conventional plant health/ veterinary focus
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 jurisdiction[48]. 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 regions[49].

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	Some existing (long-term) monitoring programmes are in place for varying taxonomic groups/environments. 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).	NGO MS	National Local	Info exchange	Scope to expand flexible programmes of this kind to encourage specific interest groups to report new arrivals (e.g. gardeners, birdwatchers, divers). Dependent on 'best efforts' for effectiveness. Difficult to quantify effectiveness of detection rates.	Low
Scientific (expert) networking	Promoted through EU-backed programmes such as DAISIE. 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.	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	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.	IGO MS	Sub-regional but expanding	RA/ species lists Research Info exchange	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). 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	Current funding (€50,000 p.a.) for secretariat services. Time of country focal points is provided free but may be limited by other commitments.
	EPPO Reporting Service, Alert System	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 Europe[50]

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 (*Corvus splendens*)	Native to India and introduced deliberately to East Africa, Malaysia and Middle East in 19th 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 (*Callosciurus erythraeus)*	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 (*Callosciurus finlaysonii)*	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 (*Threskiornis aethiopicus)*	Native to sub-Sarahan 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 (*Herpestes auropunctatus)*	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 (*Mustela vison*)	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. *Code of Practice on how to prevent the spread of Ragwort* (Defra 2004)*; Guidance on the control of invasive weeds in or near fresh water* (Environment Agency (2003))*; Code of practice for the management, destruction and disposal of Japanese knotweed* (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 *Ambrosia artemisiifolia; Eichhornia crassipes)*.	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 promoter 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 *ad hoc* 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 *Ambrosia artemisiifolia* 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 protection[52]. 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 not 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	Low. Warning list could be compiled by experts (possibly linked to DAISIE) and linked to existing databases, particularly GRIS.

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 study[54]. 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: • 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: • 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
	• 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	Co-financing regime based on the principle of solidarity, covers two types of measure: • 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.	Well-established and regularly reviewed mechanism applicable to IAS included in definition of 'harmful organisms'. Supports capacity-building for improved prevention as well as early detection, rapid response, control and management.
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)				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: • emergency fund; • supportive measures such as reference laboratories, communications and vaccines ; • disease eradication and monitoring programmes.	animal pathogens covered by relevant Directives. Supports capacity-building for improved prevention and early detection; emergency funding for rapid response; and harmonised approaches to control and management.
Financing Instrument for the Environment (LIFE+)	EC / DG ENV	EU (MS & regional)	2007-2013	Precedents: LIFE 1994-2006: €44 million spent on IAS-related projects (Scalera 2008). Current scope: 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.*	Project selection administered at the EU level: the Community can have a strong role in setting priorities. Can support holistic approaches (eg awareness raising). Limitations: • 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	Precedents: mainly minor or indirect contribution in the past. Current scope: IAS are not specifically addressed but can fall within the Fund's scope. Several possibilities	Scope: agriculture and rural development. Can support holistic & community driven approaches (eg LEADER). Limitations: • No specific IAS focus though several possibilities

				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).* 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).	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 Risks: • 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	Precedents: mainly a minor or indirect contribution in the past Current scope: 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.*	Scope: fisheries and related rural development. Can support holistic & partnership driven actions. Limitations: • 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 Risks: • Possible use of funds for non-native aquaculture species

Structural and Cohesion Funds European Regional Development Fund (ERDF) European Social Fund (ESF) Cohesion Fund	EC / DG REGIO	EU (MS & regional)	2007-2013	Precedents: mainly a minor contribution in the past, although some INTERREG projects have supported transboundary cooperation on IAS control and management. Current scope: 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*.	Funded actions need to support general regional development. Can support holistic & partnership driven actions with several stakeholders. Can fund cross-border and transnational actions Could fund large projects with infrastructure (eg to develop risk prevention) Limitations: • 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 sectors[55] 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 MS[56] 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 means 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 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

Application of existing mechanism	Action level	Comments on scope and effectiveness	Administrative and resource implications
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 Industry	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. Non-binding. Difficult to document contribution to more responsible attitudes.	Low
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.

<u>Could be associated with:</u>

- 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 approach[58] 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 I 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.

7 REFERENCES AND BACKGROUND DOCUMENTS

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

ANSTF. 2007. Aquatic Nuisance Species Task Force Strategic Plan 2007-2012. Approved March 2007.

Banks, A.N., Wright, L.J., Maclean, I.M.D., Hann, C. & Rehfisch, M.M. 2008. Review of the Status of Introduced Non-Native Waterbird Species in the Area of the African-Eurasian Waterbird Agreement: 2007 Update (Report of work carried out by the British Trust for Ornithology under contract to AEWA Secretariat) BTO Research Report no.489, February 2008.

Bonjean M. 2003. Ballast Water Invasions in the North Sea: An International Problem Requiring More Efficient International Measures. European Masters in Environmental Technology. Åalborg University (Denmark), Fachhochschule Oldenburg / Ostfriesland / Wilhelmshaven (Germany), and De Montfort University (United Kingdom). Master Thesis. 93 pp.

Brunel, S., Petter, F., Fernandez-Galiano, E. and Smith, I. 2008 (in press). Approach of the European and Mediterranean Plant Protection Organization to the evaluation and management of risks presented by invasive alien plants. In Inderjit (Ed) Management of invasive alien plants, Springer.

Burgiel S., Foote, G., Orellana, M. and Perrault, A. 2006. Invasive Alien Species and Trade: Integrating Prevention Measures and International Trade Rules (Centre for International Environmental Law and Defenders of Wildlife)

Burt, J.W., Muir, A.A., Piovia-Scott, J., Veblen, K.E., Chang, A.L., Grossman, J.D., Weiskel, H.W. 2007. Preventing horticultural introductions of invasive plants: potential efficacy of voluntary initiatives. Biological invasions. DOI 10.10007/s10530-007-9090-4 (http://www.cpb.ucdavis.edu/bioinv/downloads/Burt_etal_2007 _Biol_Inv.pdf).

Capdevila-Argüelles L. & B. Zilletti. 2008. A Perspective on Climate Change and Invasive Alien Species. Convention On The Conservation Of European Wildlife And Natural Habitats. T-PVS/Inf (2008) 5 rev. Strasbourg, 16 June 2008.

Commission for Environmental Cooperation (CEC) for North America. 2007. Protecting North America's Priority Conservation Regions (PCRs) from the impact of Alien Invasive Species. Project Description. Montreal, Quebec, Canada.

David, M. and Gollasch, S. (2008 accepted). EU Shipping in the Dawn of Managing the Ballast Water Issue. Marine Pollution Bulletin.

EBRD.2008. Environmental and Social Policy, European Bank of Reconstruction and Development (approved by the Board of Directors 12 May 2008.

Emerton L. and Howard G. 2008 A Toolkit for the Economic Analysis of Invasive Species. Global Invasive Species Programme, Nairobi.

EC. 2008a. Progress towards halting the loss of biodiversity by 2010: a first assessment of implementing the EC Biodiversity Action Plan. European Commission DG Environment, 15 January 2008

EC. 2008b. Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment: Interpretation of definitions of certain project categories of Annex I and II of the EIA Directive. Document 2008-022.

EC. 2008c. Developing an EU Framework for Invasive Alien Species : Discussion Paper (Final), available from http://ec.europa.eu/environment/nature/invasivealien/docs/ias_discussion_paper.pdf

ELI. 2004. Invasive Species Control: a comprehensive Model State Law. May 2004. Environmental Law Institute, Washington D.C., United States.

ELI. 2002. Halting the Invasion: State Tools for Invasive Species Management. August 2002 Environmental Law Institute, Washington D.C., United States.

Fundación Biodiversidad. 2008. Proceedings of the European Conference on Invasive Alien Species (Madrid, 15-16 January 2008), jointly organised by the Spanish Biodiversity Foundation and the European Commission (http://www.fundacion-biodiversidad.es/opencms/export/fundacionbiodiversidad/envios/portal_invasoras07.htm)

Garrett, L. 2004. Protecting Against Invasive Plant Pests in Koo and Mattson, 2004.

Genovesi, P., 2005. A Strategy to prevent and mitigate the impacts posed by invasive alien species in Europe. In Nentwig, W. et al. (Eds.): Biological Invasions – From Ecology to Control. Neobiota 6 (2005): 145-147

Genovesi, P., 2007. Towards a European strategy to halt biological invasions in inland waters. Pages 627-638 in: "Biological invaders in inland waters: profiles, distribution, and threats" (ed F. Gherardi). Invading nature; Springer series in Invasion ecology, Vol. 2.

Genovesi, P. and Scalera, R. 2007. Towards a black list of invasive alien species entering Europe through trade, and proposed responses. Convention on the Conservation of European wildlife and natural habitats.T-PVS/Inf (2007). 43 p.

Genovesi, P. and Shine, C., 2004. European Strategy on Invasive Alien Species. Nature and Environment No.137, Council of Europe Publishing. 67 p. (http://www.coe.int/t/dg4/cultureheritage/conventions/Bern/T-PVS/sc24_inf01_en.pdf).

Global Invasive Species Programme, 2007. Assessing the risk of invasive alien species promoted for biofuels (Context, recommended actions and list of high risk IAS involved). 6 pp.

Gollasch, S. 2004 (unpubl.). Review of Self-Financing Mechanisms for Ballast Water Management. Prepared for the Global Ballast Water Management Programme (Globallast) in 2004. Project No: GLO/99/G31/A/1G/19, Contract No: 2004-30. 37 pp.

Hachileka E. 2006. Guidelines for the development of national financing and cost recovery mechanisms for invasive species management in four countries in Africa. Report submitted to CABI under the UNEP/GEF Project: Removing Barriers to Invasive Plant Management in Africa. Lusaka, Zambia.

Hulme, P.E. 2007. Biological Invasions in Europe: Drivers, Pressures, States, Impacts and Responses. In Hester, R.E. and Harrison, R.M. (eds) 2007. Biodiversity Under Threat. Issues in Environmental Science and Technology, No. 25, pp.56-80. The Royal Society of Chemistry, 2007 (study supported by the European Union within the FP 6 Integrated Project ALARM (GOCE-CT-2003-506675).

Hulme, P., Bacher, S., Kenis, M. (2008). Grasping at the routes of biological invasions: a framework for integrating pathways into policy. Journal of Applied Ecology. 45(2):403-414. (study supported by the European Union within the FP 6 Integrated Project ALARM: Assessing LArge-scale environmental Risks for biodiversity with tested Methods (GOCE-CT-2003-506675).

Huntley, B. 2007. Climatic change and the conservation of European biodiversity: towards the development of adaptation strategies. T-PVS/Inf (2007) 3, presented to Standing Committee of the Bern Convention (27th meeting, Strasbourg, 26-29 November 2007).

Imeson A., Koning P.C. de, Kistermann H., and Wolvekamp P.S. 2007. Report on activities undertaken and support provided by the European Community to combat desertification in Asia, Latin American and Caribbean, Central and Eastern Europe in the period Jauary 2001-December 2005. Report for the European Commission (ENV 2006-122800) submitted to UNCCD CRIC-5 on 8 March 2007.

IPPC 2005. Identification of risks and management of invasive alien species using the IPPC (International Plant Protection Convention) framework. Proceedings of a workshop in Braunschweig, Germany 22-26 September 2003. Available from the Secretariat of the International Plant Protection Convention FAO, Rome (Italy).

Jenkins, P.T. 2002. Paying for Protection from Invasive Species. Issues in Science and Technology, Fall 02, 67-72

Kettunen, M., Genovesi, P., Gollasch, S., Pagad, S., Starfinger, U. ten Brink, P. & Shine, C. 2009. Technical support to EU strategy on invasive species (IAS) - Assessment of the impacts of IAS in Europe and the EU (Final module report for the European Commission). Institute for European Environmental Policy (IEEP), Brussels, Belgium. 43 pp. + Annexes (draft version, to be finalised June 2009).

Kim, C. and Lewandrowski, J. 2004. Public Policies for Managing Invasive Pest Species. In Koo and Mattson 2004.

Koo, W. and Mattson, J. 2004. Economics of Detection and Control of Invasive Species: Workshop Highlights. Proceedings of a Workshop held on 30 April 2004, Center for Agricultural Policy and Trade Studies, North Dakota State University

Lowe S., Browne M., Boudjelas S., De Poorter M. (2000) 100 of the World's Worst Invasive Alien Species A selection from the Global Invasive Species Database. Published by The Invasive Species Specialist Group (ISSG) a specialist group of the Species Survival Commission (SSC) of the World Conservation Union (IUCN), 12pp. First published as special lift-out in Aliens 12, December 2000.

Macdonald I.A.W., Reaser J.K., Bright, C., Neville, L.E., Howard, G.W., Murphy, S.T. & Preston, G. (eds) (2002) Prevention and Management of Invasive Alien Species. Proceedings of a Workshop on Forging Cooperation throughout Southern Africa. 10-12 June 2002, Lusaka, Zambia, 89 pp.

Martin, P., Verbeek, M., Thomson, S. and Martin, J. 2005. The costs and benefits of a proposed mandatory invasive species labelling scheme. Discussion paper prepared for WWF-Australia by the Australian Centre for Agriculture and Law, University of New England. 30 pp.

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.

Miller, C., Kettunen, M. & Torkler, P. 2007. Financing Natura 2000 Guidance Handbook, Revised version June 2007. European Commission, Brussels. 112 pp

Miller, M., and Fabian, R. (eds). 2004. Harmful Invasive Species: Legal Responses. Environmental Law Institute, Washington, D.C., USA.

Moss, W. and Walmsley, R. 2005. Controlling the Sale of Invasive Garden Plants: Why Voluntary Measures Alone Fail, WWF-Australia Discussion Paper. WWF-Australia, Sydney. Available at: www.wwf.org.au/News_and_information/Publications/PDF/Report/InvasivesVoluntaryMeasures.pdf

MPA News (2001) International News and Analysis on Marine Protected Areas. Vol. 2(8), 1-6

Mumford, J., Baker, R., Booy, O., Cannon, R., Copp, G., Eyre, D. and Rees, M. 2008. Enhancing the Great Britain non-native risk assessment scheme. In Pysek and Pergl. 2008.

NISC. 2008. 2008-2012 National Invasive Species Management Plan. Approved by the United States National Invasive Species Council on 1 August 2008. 35 pp.

Panov, V., Alexandrov, B., Arbaciauskas, K., Binimelis, R., Grabowski, M., Lucy, F., Leuven, R., Nehring, S., Paunovic, M., Semenchenko, V and Son, M. 2008. Risk Assessment of invasive alien species introductions via European inland waterways. In Pysek and Pergl. 2008.

Pysek, P. and Pergl, J. 2008. Neobiota: Towards a Synthesis. Proceedings of the 5th European Conference on Biological Invasions (Prague, 23-26 September 2008).

RSPB. 2007. Costing Biodiversity Priorities in the UK Overseas Territories. Final report 2 April 2007. www.rspb.org.ork

Scalera, R. 2008. EU funding for management and research of invasive alien species in Europe (prepared as support for a pilot project on 'Streamlining European 2010 Biodiversity Indicators (SEBI2010)', Contract no. 3603/B2007.EEA.53070).

Shine, C. & Soubeyran, Y. 2008. *Etat des lieux et recommandations sur les outils juridiques portant sur les espèces exotiques envahissantes dans les collectivités françaises d'outre-mer*. Comité français de l'UICN, Paris, France. 116p. (available from http://www.especes-envahissantes-outremer.fr/).

Shine, C. 2008 (in press). A Toolkit for developing legal and institutional frameworks for invasive alien species. Global Invasive Species Programme, Nairobi.

Shine, C. 2006. Overview of existing international/regional mechanisms to ban or restrict trade in potentially invasive alien species. (T-PVS/Inf (2006) 8), Report presented at Standing Committee of the Bern Convention December 2006.

Shine C., Williams N., and Gündling L. 2000. A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species, Environmental Policy and Law Paper No. 40, IUCN - Environmental Law Centre, A Contribution to the Global Invasive Species Programme.

Soubeyran Y. (2008). *Espèces exotiques envahissantes dans les collectivités françaises d'outre-mer. Etat des lieux et recommandations.* Collection Planète Nature. Comité français de l'UICN, Paris, France.

SPREP-SPC. 2008 (in press). Guidelines for Invasive Species Management in the Pacific. Secretariat of the Pacific Regional Environment Programme, Apia, Samoa (endorsed by South Pacific Regional Environment Programme 11 September 2008).

UNEP/CBD/COP/9/INF/32/Add.1 Preliminary Report of the Expert Workshop on Best Practices for Pre-Import Screening of Live Animals in International Trade (9-11 April 2008, South Bend, Indiana, USA) (SCBD)

UNEP-MAP-RAC/SPA. 2005. Action Plan concerning species introductions and invasive species in the Mediterranean Sea . Ed. RAC/SPA, Tunis . 30 pp. (http://www.rac-spa.org/dl/invasive.pdf)

Vilà M., Basnou C., Pysek P., Josefsson M., Genovesi P., Gollasch S., Nentwig W., Olenin S., Roques A., Roy D. and Hulme P. 2009. How well do we understand the impacts of alien species on ecosystem services? A pan-European cross-taxa assessment. Frontiers in Ecology and the Environment. doi: 10.1890/080083

Waage, J.K., Mumford, J.D., Leach, A.W., Knight, J.D., Quinlan, M.M. 2007. Responsibility and cost sharing options for quarantine plant health. Report to Department for Environment, Food and Rural Affairs, London, United Kingdom. Centre for Environmental Policy, Imperial College London, Ascot, United Kingdom. 126pp.

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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

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

SERVICE CONTRACT NO 070307/2007/483544/MAR/B2

Policy options to minimise the negative impacts of IAS on biodiversity in Europe and the EU

ANNEXES

Annex 1 UPDATED INFORMATION ON INTERNATIONAL AND REGIONAL POLICY PROCESSES SINCE 2006

Part I: Binding international instruments

Binding Instrument	Relevant Provisions	COP Decision(s) since 2006	Ongoing or proposed work programme(s)
1. Convention on Biological Diversity (Rio de Janeiro, 1992) http://www.cbd.int	Article 8 In-situ Conservation: Each Contracting Party shall, as far as possible and as appropriate: (g) Establish or maintain means to regulate, manage or control the risks associated with the use and release of living modified organisms resulting from biotechnology which are likely to have adverse environmental impacts that could affect the conservation and sustainable use of biological diversity, taking also into account the risks to human health; (h) Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species. Also relevant: Article 14. Impact Assessment and Minimizing Adverse Impacts	Decision IX/4 (COP9, Bonn 19-31 May 2008) on 'In-depth review of ongoing work on alien species that threaten ecosystems, habitats and species' supports: • wider use by Parties of available risk assessment guidance; expansion of IAS coverage, consistent with mandate, by IPPC, OIE and FAO Committee on Fisheries, and stronger liaison with WTO; • stronger regional/subregional support for national strategy development, action and capacity-building, including for islands; improved cross-sectoral coordination, synergy and awareness-raising; • stronger pathway management mechanisms for inland water, marine and coastal ecosystems, including ratification of Ballast Water Convention; voluntary prevention schemes to be developed with stakeholders; • support IAS information networks and ensure inter-operability and facilitated access to data; • further research on climate change, land use change and other IAS drivers. As a CBD cross-cutting issue, IAS are, when appropriate, addressed by Decisions on other thematic programmes of work/cross-cutting issues. Recent decisions include: • IX/2 (Agricultural biodiversity: biofuels and biodiversity): calls for development of sound policy frameworks for sustainable production and use of biofuels, making use of available CBD tools including the Guiding Principles on IAS (adopted under Decision VI/23 in 2002); • IX/5 (Forest Biodiversity) identifies IAS as a major human-induced threat to forest biodiversity; • IX/21 (Island biodiversity) includes IAS and climate change adaptation and mitigation as priorities for programme of work; • IX/22 (Global Taxonomy Initiative): Operational Objectives in Annex 1 provide for development for assessment and monitoring of indicator species for island biodiversity, prioritising projects on impacts of climate change and IAS by 2012. Planned Activity 16 lists extensive measures for IAS taxonomic information-gathering: *Output 5.16.1:* Provide IAS lists/information for all countries by 2010. *Output 5.16.2:* Provide relevant taxonomic information (ID tools including keys and DNA-barcodes) for customs and quarantine services on IAS at national and regional levels by 2012. *Output 5.16.3:* Identify species with high potential to become IAS and prepare customs/quarantine information by 2012. *Output 5.16.4:* Complete the online information system for actual and potential invasive species for each continent and assess threats by future potential invasive species by 2010. *Output 5.16.8:* Correlate and manage updated taxonomy for all known invasive species following the call in the Global Invasive Species Programme (GISP) Global Strategy by 2010. *Output 5.16.9:* Develop protocols (including precision and rapidity) for IAS identification, preferably building on relevant standards under the IPPC already in place and being developed, to be agreed by 2010. *Output 5.16.10*: Produce and disseminate working identification keys for known IAS associated with at least one key invasion pathways by 2010.	Decision IX/4 mandates continued liaison between international organisations/other stakeholders pre COP-10 to: • meet identified capacity gaps, exchange best practices and develop practical tools; • develop international guidance for pathways (civil aviation, tourism, hull fouling, development aid) and continue gap-filling analysis, including options for guidance for non-plant pest animals; • support development and implementation of voluntary schemes, certification systems and codes of conducts for relevant industries and stakeholder groups, including specific guidelines for potentially invasive commercially important species (e.g., plants, pets, invertebrates, fish, terrarium/aquarium species); • continue collating information and consider (at SBSTTA) establishment of ad hoc technical expert group for guidance on pets, aquarium/terrarium species, live bait and food; • provide adequate and timely financial support to enable the Global Invasive Species Programme to fulfil its tasks. The CBD Secretariat co-convened (with GISP, IUCN ISSG) an expert workshop on Preventing Biological Invasions: Best Practices in Pre-Import Risk Screening for Species of Live Animals in International Trade (Notre Dame, USA, 9-11 April 2008: see UNEP/CBD/COP/9/INF/32/Add.1). Decision IX/4 contains multiple requests for development of practical tools: the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) may consider establishing an ad hoc technical expert group to develop practical guidance on tackling risks associated with introductions of alien species as pets, aquarium and terrarium species and as live bait and live food Technical meeting on regional cooperation for IAS in islands to be hosted by New Zealand. Mandate for continued collaboration between the scientific bodies of the biodiversity-related conventions and the Liaison Group of Biodiversity-related Conventions to address options for enhanced cooperation on cross-cutting issues, such as climate change and IAS (Decision IX/27).
2. Cartagena Protocol on Biosafety to the CBD (Montreal, 2000) http://www.cbd.int/biosafety/	Objective is to contribute to ensuring an adequate level of protection in the field of the safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and specifically focusing on transboundary movements. Articles 15 and 16. Risk Assessment Article 18: addresses the issue of handling, transport, packaging and identification of living modified	At MOP4 (Bonn, 12-16 May 2008): Decisions BS-IV/8-10 all address Handling, transport, packaging and identification of living modified organisms. BS-IV/9 supports use and development of internationally standardised approaches, including for sampling and detection, and information exchange via the Biosafety Clearing-House. Decision BS-IV/11: Risk assessment and risk management. Take account of findings of four regional and subregional capacity building workshops and the Norway-Canada Workshop on Risk Assessment for Emerging Applications of LMOs (UNEP/CBD/BS/COP-MOP/4/INF/13), extend the mandate of the (retitled) Ad Hoc Technical	Actions scheduled prior to MOP5: Online conference to identify relevant standards for LMO handling, transport, packaging and identification; identify gaps and options to fill them. Implementation of Art.18. 2(b-c) to be reviewed at MOP 6 following 2nd national reports. Ad Hoc Technical Expert Group on Risk Assessment and Risk Management to meet twice, supported by one real-time online conference per region, to develop road map and action plan pre MOP 5. Regional/subregional training courses in RA to be held.

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	organisms (LMOs). Article 27. Liability and Redress for damage resulting from transboundary movements of LMOs.	Expert Group on Risk Assessment and Risk Management. Specific tasks include development of further guidance on specific aspects, including for LMOs that are fish, trees, pharmacrops and viruses ; review of existing guidance documents; and training on the practical use of risk assessment and risk management in relation to LMOs. Decision BS-IV/12: Liability and redress under the Biosafety Protocol. No consensus reached on this mechanism despite significant progress (draft text developed by the Technical Expert Group is annexed to decision BS-IV/12).	Ad Hoc Working Group of legal and technical experts on liability and redress (5th meeting held May 2008); Group of the Friends of the Co-Chairs to reconvene in 2009 and 2010 to reach agreement on binding instrument for response mechanism to redress LMO damage to conservation and sustainable use of biodiversity.
3. United Nations Convention on the Law of the Sea (Montego Bay, 1982) http://www.un.org/depts/los/index.htm	**Article 196** States shall take all measures necessary to prevent, reduce and control pollution of the marine environment resulting from… the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes.	None found.	None found.
4. Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971) http://www.ramsar.org	No explicit provision but IAS are addressed as a cross-cutting issue under several Ramsar Resolutions and guidelines and Ramsar Parties are encouraged to apply CBD Guiding principles to wetland ecosystems.	Resolutions adopted at COP10 (Korea, 28 October-4 November 2008) provide: • X.21 **(**Guidance on responding to the continued spread of highly pathogenic avian influenza H5N1): guidance in annex covers risk assessment; • X.24 (Climate change and wetlands): nothing specific on IAS but guidance for increasing wetland resilience to climate change covers watershed protection and restoration and maintenance of ecological character of wetlands; • X.25 (Wetlands and biofuels): calls for assessment of potential impacts, benefits and trade-offs of proposed biofuel crop production schemes affecting Ramsar and sites and other wetlands; notes that potential impacts include differences between genotypes of the same crop type; recommends avoidance of biofuel crops that risk direct or indirect damage to wetlands.	Continued cooperation between AEWA-CMS-Ramsar eg Guidance on responding to H5NI (see under CMS below). No specific work on IAS currently proposed for 2009-2011. Ramsar Scientific & Technical Review Panel (14th meeting, Jan 2008, http://www.ramsar.org/strp/strp14_report.pdf) noted IAS as significant drivers of change in wetlands (site-level as well as regional/global impacts) and potential impact of climate change on invasive species. 36th Steering Committee noted importance of future IAS work under Ramsar: IAS added to Panel's agenda for next cycle.
5. Convention on the Conservation of Migratory Species of Wild Animals (CMS) (Bonn, 1979) http://www/cms.int	Article III (4) (c) Range State Parties of a migratory species listed in Appendix 1 shall endeavour: to the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to further endanger the species, including strictly controlling the introduction of, or controlling or eliminating, already introduced exotic species. Article V (5) (e) Where appropriate and feasible, each agreement (for Annex II) should provide for, but not be limited to protection of such habitats from disturbances, including strict control of the introduction of, or control of already introduced, exotic species detrimental to the migratory species.	Resolution 8.27 Migratory Species and Highly Pathogenic Avian Influenza. Resolution 9.8 Responding to the Challenge of Emerging and Re-emerging Diseases in Migratory Species, including Highly Pathogenic Avian Influenza H5N1(Dec.2008) supports: - fully integrated approaches, at both national and international levels, to address HPAI and other animal-borne diseases by bringing ornithological, wildlife and wetland management expertise together with those traditionally responsible for public health and zoonoses, including veterinary, agricultural, virological, epidemiological, and medical expertise; and - coordinated, well-structured and long-term monitoring and surveillance programmes for migratory birds to assess current and new disease risks, making best use of, and building on existing schemes, including those developed since 2005; - and calls on the CMS Secretariat and the FAO Animal Health Service to co-convene a new Scientific Task Force on Wildlife Disease, which should work with the Ramsar Scientific and Technical Review Panel in its guidance on responding to wildlife diseases of importance to people, domestic animals and wildlife that are dependent on wetlands.	Scientific Task Force on Avian Influenza and Wild Birds convened in 2005 (liaison mechanism for 14 organisations, chaired by CMS and FAO); held International Workshop (Aviemore, 26-28 June 2007) on Practical Lessons learned from HPAI outbreaks which developed guidance for response personnel, wildlife experts and protected area managers (http://www.aiweb.info/documents/Aviemore%20conclusions.pdf). Review of IAS threats to migratory species (2007) pursuant to Scientific Council Strategy Implementation Plan, to be published in CMS Technical Series.
6. Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) (The Hague, 1995) http://www.unep-aewa.org/	Article III(2)(g) Parties shall prohibit the deliberate introduction of alien waterbird species into the environment and take all appropriate measures to prevent the unintentional release of such species if this introduction or release would prejudice the conservation status of wild fauna and flora; when non-native waterbird species have already been introduced, the Parties shall take all appropriate measures to prevent these species from becoming a potential threat to indigenous species. Annex 3 Action Plan 2.5 Parties shall, if they consider it necessary, prohibit the introduction of non-native species of animals and plants which may be detrimental to the populations listed in Table 1. Parties shall, if they consider it necessary, require the taking of appropriate precautions to avoid the accidental escape of captive birds belonging to non-native species. Parties shall take measures to the extent feasible and appropriate,	Resolution 4.5 (Introduced Non-Native Waterbird Species In The Agreement Area) adopted at MOP 4 (Antananarivo, Madagascar, 15-19 September 2008) supports: • strengthening precautionary measures in order to prevent introductions, escapes and deliberate release of non-native waterbird species and, as appropriate, enforcement and improvement of national legislation for this purpose; • inclusion of non-native and hybrid waterbirds in existing waterbird censuses; regular reporting; • promotion of research, assessment of feasibility of control schemes and definition of priorities for action; • better regulation of the introduction of non-native populations of native waterbird species (for example for hunting purposes) in order to avoid the introduction of inappropriate genetic material; • internationally coordinated control and eradication for non-native waterbird species; • involvement of hunters in monitoring and control; • better monitoring and regulation of aviaries, pens and zoos, including ringing of captive birds. • restriction or prohibition on keeping and trade in species posing particular risks to native biodiversity.	**The AEWA Conservation Guideline on Avoidance of introduction of Non-native Species (Resolution 2.3) was re-examined in the light of the *Review of the Status of Introduced Non-Native Waterbird Species in the AEWA Area: 2007 Update* (Banks et al., 2008). All but 5 European States participated in the survey.** **The Review notes that most bird introductions have occurred in northern and western Europe, with fewer in other parts of the AEWA range. The vast majority of introduced waterbird populations derive from escapes from ornamental collections or deliberate introductions for ornamental reasons, therefore such introductions have occurred largely in affluent countries. The review's recommendations form the basis for Resolution 4.5.**

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	including taking, to ensure that when non-native species or hybrids thereof have already been introduced into their territory, those species or their hybrids do not pose a potential hazard to the populations listed in Table1.		
7. Convention on the Law of the Non-navigational Uses of International Watercourses (New York, 1997) http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf	**Article 22:** Watercourse States shall take all measures necessary to prevent the introduction of species, alien or new, into an international watercourse, which may have effects detrimental to the ecosystem of the watercourse resulting in significant harm to other watercourse States.	Still not in force.	Not applicable.
8. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Washington, 1973) http://www.cites.org	Permits and certificates granted under the provisions of Article III, IV and V are required for the trade in specimens of species included in Appendix I, II and III. Represents alternate model for regulating invasive species not already covered by the IPPC or other agreements. Convention intended to prevent harm in exporting country; however, can only be applied when species is endangered in exporting country and considered an invasive in importing country. Regulates only intentional movements.	COP14 (The Hague, 3-15 June 2007) amended Resolution 13.10 on trade in alien invasive species to eliminate the mandate to the CITES Secretariat to cooperate on specific IAS issues with the CBD Secretariat. The amended Resolution recommends that the Parties: a) consider the problems of invasive species when developing national legislation and regulations that deal with the trade in live animals or plants; b) consult with the Management Authority of a proposed country of import, when possible and when applicable, when considering exports of potentially invasive species, to determine whether there are domestic measures regulating such imports; and c) consider the opportunities for synergy between CITES and the Convention on Biological Diversity (CBD) and explore appropriate cooperation and collaboration between the two Conventions on the issue of introductions of alien species that are potentially invasive.	There is not longer a mandate for active cooperation between CITES and CBD Secretariats as CITES' ability to address threats from IAS and the practical utility of further work is considered limited (see eg report of Plant Committee 16/Animals Committee 22, July 2006). The CITES Secretariat recognises that a number currently included in the CITES Appendixes have been identified as invasive or potentially invasive eg the long-tailed macaque (*Macaca fascicularis*), the small Indian mongoose (*Herpestes javanicus auropunctatus*) and the monk parakeet (*Myiopsitta monachus*) (presentation by J.Barzdo, European Conference on IAS, Madrid 15-16 January 2008).
9. United Nations Framework Convention on Climate Change (UNFCCC) (New-York, 1992) http://www.unfccc.de	No specific provisions.	Decision 19/C.P.9 on 'Modalities and procedures for afforestation and reforestation project activities under the clean development mechanism in the first commitment period of the Kyoto Protocol' recognises that Parties evaluate risks associated with the use of potentially invasive alien species by afforestation and reforestation project activities. and that Parties included in Annex I evaluate, in accordance with their national laws, the use of temporary certified emission reductions and/or long-term certified emission reductions generated from afforestation and reforestation project activities that make use of potentially invasive alien species (Report of the COP on its Ninth Session, Milan, 1-12 December 2003 FCCC/CP/2003/6/Add.2)	IAS may be addressed through the joint liaison group composed of UNFCCC, CBD, UNCCD and the Collaborative Partnership on Forests. Currently, interlinkages between IAS and climate change are primarily addressed under CBD Decisions (see IX/4 above). See also under Ramsar Convention above (Resolutions X.24 and X.25 addressing climate change and biofuels).
10. United Nations Convention to Combat Desertification (UNCCD) www.unccd.int	No specific provisions.	No specific references found.	IAS may be addressed through the joint liaison group composed of UNFCCC, CBD, UNCCD and the Collaborative Partnership on Forests.
11. Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction (Washington, London and Moscow 1972) http://disarmament2.un.org/wmd/bwc/index.html	**Article I** prohibits parties from developing, producing, stockpiling, acquiring or retaining microbial or other biological agents which are not justified by exclusively peaceful purpose. **Article II** requires parties to destroy or divert to peaceful purpose all such agents within 9 months of entry into force of the Convention.	None found.	None found.
12. International Plant Protection Convention (IPPC) (Rome, 1951, Revised in 1997 by the FAO Conference) https://www.ippc.int/IPP/En/default.jsp	IPPC applies primarily to quarantine plant pests in international trade. Creates an international regime to prevent spread and introduction of pests of plants and plant products through the use of sanitary and phytosanitary measures. Parties have established national plant protection organisations with authority in relation to quarantine control, risk analysis and other measures required to prevent the establishment and spread of pests that, directly or indirectly, are pests of plants and plant products or that impact unmanaged systems.	The Third session of the Commission on Phytosanitary Measures (Rome, 7-11 April 2008) specifically considered Climate Change and IAS (keynote address). The CPM: • adopted *Procedure and criteria for identifying topics for inclusion in the IPPC standard setting work programme* : environmental criteria include 'utility in the management of non indigenous species which are pests of plants (such as some IAS)' and 'contribution to the protection of the environment, through the protection of wild flora, and their habitats and ecosystems, and of agricultural biodiversity; • adopted or amended 4 International Standards for Phytosanitary Measures (ISPMs) and approved an IPPC Standard Setting Work Programme for new standards, including: (high priority) *Minimizing pest movement by air containers and aircrafts* and *Minimizing pest movement by sea containers and conveyances*; and (normal priority) *Guidelines for the movement of used machinery and equipment*, *Handling and disposal of garbage moved*	Continuing tripartite cooperation under 2004 Memorandum of cooperation between secretariats of IPPC, CBD and Cartagena Protocol on Biosafety. Close IPPC-CBD liaison during in-depth review prior to CBD COP9. Creation of International Phytosanitary Portal (IPP) through which national reporting conducted; includes Help Desk facility and Pest Risk Analysis training material applicable to IAS. Creation of Open-ended working group on Building National Phytosanitary Capacity. May 2008: IPPC Standards Committee Working Group approved seven draft International Phytosanitary Measures (ISPMs) for member consultation which are particularly relevant to the CBD's programme of work on IAS. These draft ISPMs were posted on CBD website for consultation

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		internationally and *International movement of grain*. The CPM also approved modified recommendations of independent evaluation of IPPC to: • keep issues of linkage/consistency with the environment under review; • promote responsibility among Parties to implement IPPC standards and objectives, including reference to phytosanitary environment matters; • all Standards to include a statement regarding biodiversity considerations; when new ISPMs are being specified, or existing ones revised; • consideration of environmental and biodiversity concerns should be included in the specification, where appropriate. The CPM rejected a recommendation to establish a specific work programme to protect the environment and/or biodiversity. This is due partly to budgetary constraints. However, the role of IPPC is to be kept under review.	(20 June–30 September 2008). ISPMs in force include: • Principles of Plant Quarantine as Related to International Trade • Guidelines for Pest Risk Analysis • Code of Conduct for the Import and Release of Exotic Biological Control Agents • Requirements for the Establishment of Pest Free Areas • Glossary of Phytosanitary Terms (amended 2008) • Guidelines for Surveillance • Export Certification System • Determination of Pest Status in an Area • Guidelines for Pest Eradication Programmes • Requirements For The Establishment Of Pest Free Places Of Production And Pest Free Production Sites • Pest Risk Analysis For Quarantine Pests • Guidelines For Phytosanitary Certificates • Guidelines For The Notification Of Non-Compliance And Emergency Action • The Use Of Integrated Measures In A Systems Approach For Pest Risk Management • Guidelines For Regulating Wood Packaging Material In International Trade • Regulated Non-Quarantine Pests: Concept And Application • Pest Reporting • Guidelines For The Use Of Irradiation As A Phytosanitary Measure • Guidelines On Lists Of Regulated Pests.
13. Convention for the Establishment of the European and Mediterranean Plant Protection Organisation (EPPO) (Paris, 1951) http://www.eppo.org/	Under the International Plant Protection Convention (IPPC), EPPO is the regional plant protection organization (RPPO) for Europe. EPPO is an intergovernmental organization responsible for European cooperation in plant protection in the European and Mediterranean region.	EPPO Council recommendations include: *2006: Guidelines for the management of invasive alien plants (IAPs) or potentially invasive alien plants which are intended for import or have been intentionally imported (EPPO Standard PM 3/67)* • provides guidance on internal management measures such as publicity, surveillance, restrictions and/or codes of conducts on import, sale, holding, transport, etc. *2007*: *Council Recommendation on Plants for renewable energy and IAPs (September 2007)* • as part of energy strategies, several EPPO countries recommend planting bioenergy crops, including plants included in the EPPO List of IAPs; • NPPOs should liaise with the Departments/Ministries concerned in their countries to make them aware of risks posed by IAPs and warn them against such practices. The planting of IAPs for energy production should not be recommended. If IAS are planted as bioenergy crops, a risk-based approach to avoid the spread into unintended habitats should be adopted. Six invasive alien plants (from the EPPO IAP list of 34 plants) have been formally recommended for regulation due to their inclusion in the EPPO A2 list as Quarantine Pests locally present in the EPPO region. These are *Crassula helmsii; Hydrocotyle ranunculoides; Lysichiton americanus, Pueraria lobata, Solanum elaeagnifolium* and, since September 2008, *Eichhornia crassipes*). Countries endangered by these species should take measures to prevent further introduction/spread or manage unwanted populations (e.g. publicity, restriction on sale and planting, control).	Continued work of Ad hoc Panel on Invasive Alien Species: • EPPO's advisory List of IAPs (plants posing important threat to plant health, environment and biodiversity in EPPO region) currently includes 34 species. • EPPO Alert List for IAPs lists 13 species still absent/of limited distribution in EPPO Region to support early warning; • joint EPPO/Council of Europe Workshop on How to manage Invasive Alien Plants: case studies of *Eichhornia crassipes* (Mérida, Spain, 2-4 June 2008): participant recommendations for regulation as a quarantine pest (EPPO A2 List) and preparation of an EPPO Standard on National Regulatory Control Measures adopted by EPPO Council, September 2008. • joint EPPO/Council of Europe Code of Conduct on Horticulture and Invasive Alien Plants (completed 2008: joint Workshop on the Code held in Oslo, 4-5 June 2009 (full proceedings available at www.eppo.org); • database on 369 species of aquatic plants includes identification of origin and status of species; • EPPO reporting service has addressed certain IAS pathways (eg bird seed, see Reporting Service, June 2007); • PRA training course to be held in November 2008; • EPPO climate change prediction tool enables classification of areas by risk. A simplified version of the EPPO PRA Decision-Support Scheme is currently being revised and should be adopted in 2009.
14. Agreement concerning Co-operation in the Quarantine of Plants and their Protection against Pests and Diseases (Sofia, 1959) http://sedac.ciesin.org/entri/texts/quarantine.of.plants.1959.html	**Article VI**: Parties undertake to apply measures to prevent the introduction from one country into another, in exported consignments of goods or by any other means, of quarantinable plant pests and diseases and weeds specified in lists to be drawn up by agreement between the parties concerned. Annex contains List of the Principal Quarantinable Pests, Diseases and Noxious Weeds	None found.	None found.
15. The WTO Agreement on the Application of Sanitary and Phytosanitary Measures (Marrakech, 1995)	Supplementary agreement to the World Trade Organisation Agreement, provides uniform framework for measures governing 'sanitary/ phytosanitary measure' for human, plant and animal life or health (defined as any measure applied a) to protect human,	April 2008: WTO-SPS Committee adopted new transparency procedures encouraging members to notify all new or modified measures, including those based on international standards: aim is to provide further predictability to the trading system and help to monitor implementation of international standards globally.	WTO-World Bank Standards and Trade Development Facility (STDF) supports capacity-building for implementation of international standards (IPPC CPM/NPPOs may apply for support for PRA training (http://www.standardsfacility.org/). International Portal on Food Safety, Animal and Plant Health (http://www.ipfsaph.org/En/default.jsp)

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http://www.wto.org/english/tratop_e/sps_e/spsagr_e.htm	animal or plant life or health (within the Member's Territory) from the entry, establishment or spread of pests, diseases, disease carrying organisms; b) to prevent or limit other damage (within the Member's Territory) from the entry, establishment or spread of pests. WTO does not itself develop standards under the SPS Agreement. The Agreement encourages countries to use international standards, guidelines and recommendations where they exist, eg those developed by IPPC and OIE.		supports access to official information relevant to SPS Agreement.
16. International Convention for the Control and Management of Ships' Ballast Water and Sediments Adopted under the auspices of the International Maritime Organisation (IMO) on 13 February 2004: still not in force. http://www.imo.org/home.asp	Under Article 2 General Obligations Parties undertake to give full and complete effect to the provisions of the Convention and the Annex in order to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments.	The Convention needs 30 countries and 35 % tonnage to enter into force. 18 countries have ratified the Convention to date. The Convention applies to some EU Member States (but not to the EC itself). To date, Spain and France are the only MS to have ratified, though several other MS are undertaking preparatory studies. See also under International Maritime Organization below for progress on GloBallast Partnerships project.	IMO's Marine Environment Protection Committee at its 58th session (5-10 October 2008): • approved all guidelines to support the Convention, agreed on the Compliance Control Sampling Guideline (G2) and edited the Guideline on Approval of Ballast Water Management Systems (G8); • followed all recommendations of the GESAMP Ballast Water Group regarding Basic and FInal Approvals of Ballast Water Management Systems that make use of active substances. In October 2008, the situation on Basic and Final Approvals of Ballast Water Management Systems was as follows: • there were three certified systems, of which two follow the IMO requirements and one got a national certificate (Liberia); • two more systems had Final Approval and were due to be certified by their competent authorities by end 2008; • eight Ballast Water Management Systems had basic approval and were working towards final approval.
17. International Health Regulations (IHR) Initially adopted by the 22nd World Health Assembly in 1969. Latest amended IHR (IHR2005) adopted by the World Health Assembly on 23.05.2005) http://www.who.int/csr/ihr/	The purpose and scope of the IHR (2005) are to prevent, protect against, control and provide a public health response to the international spread of disease and which avoid unnecessary interference with international traffic and trade.	New IHR entered into force on 15 June 2007: provide a new framework to coordinate management of events that may constitute a public health emergency of international concerns and improve the capacity of all countries to detect, assess, notify and respond to public health threats. States Parties to the Regulations have two years to assess their capacity and develop national action plans followed by three years to meet the requirements of the Regulations regarding their national surveillance and response systems as well as the requirements at designated airports, ports and certain ground crossings.	Current WHO work on biorisk reduction seeks to ensure that current scientific knowledge regarding viral hemorrhagic fevers, epidemic-prone orthopox viruses, and emerging severe zoonotic diseases affecting humans, is maintained in order to apply the most appropriate guidance for treatment, control, and safety to mitigate risks regardless of the source of the disease event (http://www.who.int/csr/bioriskreduction/en/).
18. Convention on the Protection of the Marine Environment of the Baltic (HELCOM) http://www.helcom.fi/	HELCOM works to protect the marine environment of the Baltic Sea from all sources of pollution through intergovernmental co-operation. The Convention uses a definition of pollution that enables it also to deal with alien species: 'Pollution means introduction by man, directly or indirectly, of substances or energy into the sea, including estuaries, which are liable to create hazards to human health, to harm living resources and marine ecosystems, to cause hindrance to legitimate uses of the sea including fishing, to impair the quality for use of sea water, and to lead to a reduction of amenities'.	Baltic Sea Action Plan (goals and objectives based on ecosystem approach) approved 9.3.2006 and Task Force created to identify detailed actions to meet priority objectives, including halting habitat destruction and decline in biodiversity. 1 April 2008: Joint Notice to shipping from the Contracting Parties of HELCOM and OSPAR on General Guidance on the Voluntary Interim application of the D1 Ballast Water Exchange Standard (see IMO Ballast Water Management Convention above) in the North-East Atlantic and the Baltic Sea (developed pursuant to Article 13(3) BWM which requires "Parties with common interests to protect the environment, human health, property and resources in a given geographical area, in particular, those parties bordering enclosed and semi-enclosed seas, (to) endeavour, taking into account characteristic regional features, to enhance regional co-operation, including through the conclusion of regional arrangements consistent with this Convention. Parties shall seek to co-operate with the Parties to regional agreements to develop harmonized procedures" .	Baltic Sea Action Plan will provide pilot project in the subregion for implementation of the EU Marine Strategy This voluntary guidance will become binding on Parties once the BWM Convention enters into force.
19. Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention)	2003 Strategy of the OSPAR Commission for the 'Protection of the Marine Environment of the North-East Atlantic': Alien species is listed as one of the candidates of human activities for further analysis as regards actual or potential adverse effect on species and habitats or on ecological processes.	1 April 2008: Joint Notice to shipping from the Contracting Parties of HELCOM and OSPAR on General Guidance on the Voluntary Interim application of the D1 Ballast Water Exchange Standard (see IMO Ballast Water Management Convention above) in the North-East Atlantic and the Baltic Sea (see HELCOM above).	This voluntary guidance will become binding on Parties once the BWM Convention enters into force.

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	The Convention uses a definition of pollution, that enables the OSPAR to also deal with alien species: 'Pollution means the introduction by man, directly or indirectly, of substances or energy into the maritime area which results, or is likely to result, in hazards to human health, harm to living resources and marine ecosystems, damage to amenities or interference with other legitimate uses of the sea.'		
20. Convention Concerning Fishing in the Waters of the Danube (Bucharest 1958)	**Annex Part V Article 10** The acclimatization and breeding of new species of fish and other animals and of aquatic plants in the waters of the Danube to which this Convention applies may not be carried out save with the consent of the Commission.	None found.	None found.
21. Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979) http://www.coe.int/t/dg4/cultureheritage/conventions/Bern/	Article 11(2)(b) Each Contracting Party undertakes: to strictly control the introduction of non-native species.	Recent Recommendations adopted by Standing Committee to the Convention: • Recommendation No. 126 (2007) on the eradication of some invasive alien plant species; • Recommendation No. 125 (2007) on trade in invasive and potentially invasive alien species in Europe; • Recommendation No. 124 (2007) on progress in the eradication of the Ruddy duck (*Oxyura jamaicensis*); • Recommendation No. 123 (2007) on limiting the dispersal of the Grey squirrel (*Sciurus carolinensis*) in Italy and other Contracting Parties; • Recommendation No.134 (2008) on the Code of Conduct for Horticulture and Invasive Alien Plants Recommendation No. 133 (2008) on the Control of Water Hyacinth *Eichhornia crassipes*) invites Parties to: • prohibit its deliberate introduction, import, sale, trade, planting, possession and transport; • monitor introduced populations and share information with other countries, EEA and EPPO to facilitate preventive measures, early detection and rapid response in all European and Mediterranean states; and • for Parties where the species is present, urgently draft a national action plan to control and, if feasible, eradicate the plant, taking account of guidance annexed to this Recommendation as well as the draft EPPO standard on National regulatory control systems for *Eichhornia crassipes*; and • encourages Spain, Portugal and other affected Parties are invited to meet annually to discuss the problem in the appropriate framework. The Secretariat is considering a case relating to the introduction of the zebra mussel in the Ebro River, Spain (brought by the Spanish NGO Ebro Vivo-Coagret, see document T-PVS (2007) 4 - 4).	Continued operation of Group of Experts on Invasive Alien Species; support for national workshops on IAS (e.g. Bulgaria, 2008; Croatia and Ukraine, 2006), biennial meeting held in Croatia (May 2009). Expansion of cross-cutting work on IAS, eg by Bern Group of Experts on Biodiversity and Climate Change (Seville, 13-15 March 2008). Following joint development with European and Mediterranean Plant Protection Organisation (EPPO) of the Code of Conduct, joint *Workshop on the Code of Conduct on Horticulture and Invasive Alien Plants* held in Oslo, 4-5 June 2009: proceedings available at www.eppo.org.
22. Benelux Convention on Nature Conservation and Landscape Protection (Brussels, 1982) http://sedac.ciesin.columbia.edu/entri/texts/benelux.landscape.protection.1982.html	**Article 1** The present Convention aims to regulate the concentration and the cooperation between the three Governments in the field of the conservation, the management and the restoration of nature and landscapes. **Note**: on 17 June 2008, signature of new Treaty revising the Treaty establishing the Benelux Economic Union (3 February 1958). New Art.2.1 provides that "the purpose of the Benelux Union is to deepen and expand the cooperation between the High Contracting Parties so that it can continue its role as precursor within the European Union and strengthen and improve cross-border cooperation at every level."	Benelux Council of Ministers Decision 17.10.83. (Parties to prohibit the introduction of non-native animal species into the wild without authorisation from the competent national authority; pre-introduction assessment required; communications between parties about planned introductions) currently under review.	Preliminary discussions under way to revise 1983 IAS Decision. Early draft currently under review by Parties (Belgium, Netherlands, Luxembourg) to identify common positions and potential added value of joint action. Options under consideration could include requirement for Parties to review national legislation to prevent the introduction on their territory of non-native species that may become invasive and have adverse environmental impacts as indicated by risk assessment. Progress expected by mid-2009.
23. Protocol for the Implementation of the Alpine Convention in the Field of Nature Protection and Landscape Conservation	**Article 17** The Parties … , taking into account the characteristics of each protected area, shall … progressively take the measures required, which may include the prohibition on … the introduction of exotic species; (and) the regulation of any act likely to harm or	None found.	None found.

Binding Instrument	Relevant Provisions	COP Decision(s) since 2006	Ongoing or proposed work programme(s)
(Chambery, 1994) http://www.convenzionedellealpi.org/page1_fr.htm	disturb the fauna or flora, including the introduction of indigenous zoological or botanical species.		
24. Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (under the Barcelona Convention) (Barcelona, 1995) http://www.racspa.org/dl/invasive.pdf	Article 6 The Parties … taking into account the characteristics of each specially protected area (SPA) shall take the protection measures required, in particular: the regulation of the introduction of any species not indigenous to the SPA in question, or of genetically modified species, as well as the introduction or reintroduction of species which are or have been present in the SPA. Article 13 The Parties shall take all appropriate measures to regulate the intentional or accidental introduction of non-indigenous or genetically modified species to the wild and prohibit those that may have harmful impacts on the ecosystems, habitats or species in the area to which this Protocol applies. The Parties shall endeavour to implement all possible measures to eradicate species that have already been introduced when, after scientific assessment, it appears that such species cause or are likely to cause damage to ecosystems, habitats or species in the area to which this Protocol applies.	Revised implementation timetable for the Action Plan Concerning Species Introductions And Invasive Species in The Mediterranean Sea (2003) adopted at Barcelona Convention COP15 (Alméria, 15-18 January 2008) Decision IG 17/11 (Annex 3) provides for the following actions: 2008: preparation of national reports; creation of coordination mechanism, pathways inventory, experts' directory and education materials. 2009: creation of awareness-raising programmes for general public and target groups, including decision-makers; expert risk assessment group; inventory of marine IAS and public/private stakeholders whose activities may introduce alien marine species; Regional IAS information collection and exchange mechanism. 2010: launching procedures to enact or strengthen national legislation for control of alien species introductions. 2011: development of data collection and monitoring programmes; strengthening/setting up systems to control intentional import and export of alien marine species. 2012: developing and implementing risk assessment techniques; elaborating National Plans.	Revisions to Action Plan timetable were based on Progress Report compiled for MOP8 of Focal Points to the Protocol (Palermo, 6-9 June 2007), which noted severe delays due to budget constraints and too-tight timetable (UNEP(DEPI)/MED WG.308/Inf.9 dated 22 May 2007). All Parties invited to participate in the establishment of the Mediterranean Task Force (see under International Maritime Organisation below). The RAC/SPA Secretariat and REMPEC will act as joint Coordinating Unit for this 5-year project. Technical guidance on managing marine pathways adopted in 2008 (UNEP/MAP-RAC/SPA. 2008. Guidelines for Controlling the Vectors of Introduction into the Mediterranean of Non-indigenous Species and Invasive Marine Species. Ed. RAC/SPA, Tunis. 18 pp.)
25. Framework Convention on the Protection and Sustainable Development of the Carpathians http://www.carpathianconvention.org/index.htm	Article 4.3 states that the Parties shall pursue policies aiming at the prevention of introduction of IAS and release of genetically modified organisms threatening ecosystems, habitats or species, their control or eradication.	The Protocol on Conservation and Sustainable Use of Biological and Landscape Diversity (adopted at COP2 (Bucharest, 17-19 June 2008): • mandates cooperation between Parties on prevention of introduction of IAS which might threaten ecosystems, habitats or species native to the Carpathians, their control or eradication (Art.1.3.b); • requires Parties to pursue policies aiming at the prevention of introduction or release of IAS/GMOs likely to have adverse environmental impacts that could affect the Carpathian biodiversity, ecosystems, habitats or species, including early warning on occurrence of new IAS on its territory ; and to take measures on national territory to prevent such introductions/release and, if need be, control or eradication of such species (Art.13). • IAS defined as "non-native species introduced deliberately or unintentionally outside their natural habitats, where they become established, proliferate and spread in ways that cause damage to their receiving environment (Art.3.k); IAS listed as contributing factor to "degraded habitat" (habitat reduced in quality or value of ecological functions) (Art 3.f).	Decision 2/1 (2008) requests the interim Secretariat to coordinate preparation of a Strategic Action Plan to implement the Protocol. The first draft Plan prepared by a working group (accessed on 15 September) provides for: • development of national policies consistent with Article 22(b) of the habitats Directive or, if policies/strategies are already in place, evaluation of their effectiveness and implementation up to date (draft Art.10.1); • elaboration of suggestions/guidelines on necessary measures to be undertaken for prevention of introduction or release of species non-native to the Carpathians and/or GMOs considered as having the adverse environmental impacts, and, if need be, for control or eradication of such species in the Carpathians within each Party's national territory.

Part II: Non-binding international instruments and programmes

Institution/programme	Instruments/activities since 2006	Ongoing or proposed work programme(s)
1. IUCN - The World Conservation Union http://www.iucn.org	Continued operation of IUCN/SSC Invasive Species Specialist Group (http://www.issg.org/): • co-organised *Expert workshop on best practices for pre-import screening of live animals* (UNEP/CBD/COP/9/INF/32/Add.1) (Indiana, USA, 9-11 April 2008) with GISP and CBD Secretariat; • maintenance and expansion of Global Invasive Species Database http://www.issg.org/database/welcome/ • Cooperative Initiative on Invasive Alien Species on Islands http://www.issg.org/cii/ Hewitt, C.L., Campbell, M.L. and Gollasch, S. (2006). *Alien Species in Aquaculture. Considerations for responsible use* (IUCN Mediterranean Office). Dedicated IAS workshop at IUCN-organised *Conference on The European Union and its Overseas Entities: Strategies to counter Climate Change and Biodiversity Loss* (Réunion, 7-11 July 2008), organised with EC support. IAS thematic activities at IUCN World Conservation Congress (Barcelona, 6-10 October 2008); avoidance of species introductions identified as one of sustainability criteria for the Congress.	ISSG to organise two IAS Conferences in New Zealand in 2010: • Ecology of Insular Biotas II (Wellington, NZ, 1-5 January 2010); • Island Invasives: Eradication and Management (Auckland, NZ, 8-12 February 2008). Currently developing Global Register of Invasive Species (GRIS) which is intended to provide a one-stop reliable source of information about invasive species that may help States required to justify, using science, any restrictions imposed in movement of plants and animals that affect trade. Will be interlinked to GISIN (see http://www.issg.org/database/welcome/aboutGISD.asp).

Institution/programme	Instruments/activities since 2006	Ongoing or proposed work programme(s)
2. Global Invasive Species Programme (GISP) http://www.gisp.org/	GISP established as legal entity in April 2005 (founding members are IUCN, CAB International, The Nature Conservancy and the South African National Biodiversity Institute). Secretariat relocated to Nairobi, Kenya in 2007. Continued production of technical toolkits and training materials and organisation of training courses, including on: • Evaluation of Economic Impacts of Invasive Species Problems; • Drafting Legal & Institutional Frameworks for the management of invasive species. • Taxonomic needs in the management of invasive species. Active role at CBD COP9 eg issued guidance on *Biofuel Crops and the Use of Non-Native Species* (http://www.gisp.org/publications/briefing/index.asp).	Developing 'Biological Indicators for Invasive Species' under 2010 BIP project, funded by the Global Environmental Facility and executed by UNEP-WCMC.GISP. Extensive support tasks assigned to GISP under CBD IX.4, subject to funding, including • identifying information management networks, expertise and opportunities to enhance the work of regional organizations at the national level; • development of practical tools to facilitate COP decisions taking into account the Guiding Principles, existing tools and information submitted by Parties; • support for development and implementation of voluntary schemes, certification systems and codes of conducts for relevant industries and stakeholder groups, including specific guidelines for potentially invasives, commercially important species (e.g., plants, pets, invertebrates, fish, terrarium/aquarium species); • development of training materials in support of awareness-raising, organisation of practical workshops to strengthen capacity for the implementation of the Guiding Principles. CBD IX.4 reiterated invitation to the GEF, governments and other funding organisations to provide adequate and timely financial support to enable GISP to fulfil the tasks outlined in COP decisions. GISP collaborates with ICAO on development of best practice guidance for aviation pathways but this work is currently on hold due to lack of funding.
3. Global Invasive Species Information Network http://www.gisinetwork.org/	Continues to provide a platform for sharing invasive species information at a global level, via the Internet and other digital means; offer a central place for the reporting and tracking of new alien species sightings via email listserv; develop and share electronic information management tools to better identify, map, and predict the spread of invasive species at regional and global levels; build the capacity of network members in the development and use of information tools to integrate IAS databases. CBD IX.4 recognises GISIN role together with other information initiatives (IABIN I3N, ISSG – GRIS and GISD, CABI Invasives Compendium, NOBANIS, DAISIE).	Two technical data providers' workshops for first adopters of the GISIN System held (summer 2008) to discuss the data sharing models and improve the GISIN search prototype. Summaries available for download at http://www.gisinetwork.org/.
4. International Maritime Organisation http://www.imo.org See also International Convention for the Control and Management of Ships' Ballast Water and Sediments	GEF/UNDP/IMO GloBallast Partnerships project (Building Partnerships to Assist Developing Countries to Reduce the Transfer of Harmful Aquatic Organisms in Ships' Ballast Water) operational since 2007 to assist vulnerable countries and/or regions to enact legal and policy reforms to meet the BWM Convention's objectives. First GloBallast Regional Task Force Meeting, in cooperation with the UNEP/MAP's Specially Protected Areas/Regional Activity Centre (RAC/SPA) held 11-12 September 2008 (hosted by Croatia as 'Lead Partnering Country' for the Mediterranean) to form Task Force and agree on main elements to be included in a Mediterranean strategy on ship's ballast water management. All Contracting Parties to the Barcelona Convention are invited.	Having addressed the toxic side-effect of tributyl-containing antifouling paints (Antifouling Systems (AFS) Convention, open for ratification), the IMO has set up an intersessional discussion group to address biofouling pathways (species transport via hull-fouling of vessels) and discuss potential avoidance measures, management strategies and the format for any possible instrument (guideline, annex to existing conventions, new convention etc.). A written report will be presented to IMO´s Bulk Liquid and Gases Sub-committee at its 13th Session (1st Quarter 2009).
5. United Nations Commission on Sustainable Development (http://www.un.org/esa/sustdev/csd/review.htm) United Nations Conference on Environment and Development (UNCED)	Oversees delivery of goals set by the Johannesburg Plan of Implementation of the World Summit on Sustainable Development (Johannesburg 2002) which made IAS recommendations on IAS in relation to: • Maritime safety and protection of the marine environment from pollution, eg IAS **(**Chapter 34(b)). • Biodiversity conservation, IAS control **(**Chapter 44(i)). World Summit 2005 has no specific recommendation on IAS, but reiterated support for implementation of the CBD and the Johannesburg commitment for a significant reduction in the rate of loss of biodiversity by 2010.	Biodiversity selected as key theme for discussion in the 2012/2013 two-year CSD cycle.
6. Small Island Developing States (SIDS) Network http://www.sidsnet.org/	Mauritius Strategy for further implementation (MSI) of the 1994 Barbados Programme of Action (2005) includes "controlling major pathways for potential alien invasive species in SIDS" as a necessary measure to achieve MSI targets within agreed time frames, with necessary support from the international Community (§ 49(f)).	MSI currently being mainstreamed within the United Nations system (expert meeting held (New York, 27-28 April 2007), work in progress includes harmonisation with Millennium Development Goals.
7. International Council for the Exploration of the Sea (ICES) and the European Inland Fisheries Advisory Commission (EIFAC) http://www.ices.dk/indexfla.asp	Code of Practice on the Introductions and Transfers of Marine Organisms (2005) recommends practices and procedures to diminish risks of detrimental effects from marine organism introduction and transfer, including GMOs. Drafted in co-operation with the FAO European Inland Fisheries Advisory Commission (EIFAC) and also applicable to freshwater organisms. Requires ICES members to submit a prospectus to regulators, including a detailed analysis of potential environmental impacts to the aquatic ecosystem	Working Group on Introductions and Transfers of Marine Organisms (ongoing tasks include developing guidelines for rapid response and control options): http://www.ices.dk/iceswork/wgdetail.asp?wg=WGITMO Working Group on Ballast and Other Ship Vectors: http://www.ices.dk/iceswork/wgdetail.asp?wg=WGBOSV
8. Food and Agriculture Organisation of the United Nations (FAO) http://www.fao.org	Code of Conduct for the Import and Release of Exotic Biological Control Agents (1995) Code of Conduct for Responsible Fisheries (1995, http://www.fao.org/fishery/ccrf) contains several measures related to introductions and transfers of non-native aquatic organisms (Article 9.3). Recent FAO Technical Guidelines published under the Code includes:	Maintenance/expansion of IAS-relevant technical support and databases eg: • Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (since 1994: (http://www.fao.org/EMPRES/default.htm); • Global Early Warning System for Animal Diseases including Zoonoses (GLEWS) by FAO, OIE and WHO (since 2003); • FAO Database on Introductions of Aquatic Species (DIAS), covers freshwater fish, molluscs, crustaceans and marine fish

Institution/programme	Instruments/activities since 2006	Ongoing or proposed work programme(s)
	• Aquaculture development. 2. Health management for responsible movement of live aquatic animals (No. 5 Suppl.2, 2007).	(http://www.fao.org/fishery/dias). • IAS impacts on forests and forestry (http://www.fao.org/forestry/aliens/en/); • FAO Invasive Tree Species database http://www.fao.org/forestry/24107/en/) Continued discussion of FAO draft Code of Conduct on Biotechnology as it relates to Genetic Resources for Food and Agriculture (Eleventh Regular Session of the Commission on Genetic Resources for Food and Agriculture in 2007).
9. United Nations Environment Programme (UNEP)	Under Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (1995, http://www.gpa.unep.org): • National Programme of Action guidance issued in 2006 on *Protecting Coastal and Marine Environments from Land-Based Activities* lists IAS as a source of degradation (http://www.gpa.unep.org/documents/2006_npa_handbook_for_english.pdf)	Continuing work on TEMATEA (UNEP-WCMC Synergy Project - Issues-based Modules for the coherent implementation of biodiversity related Conventions). Commitments and obligations relating to IAS are organised into a logical issue-based framework consisting of seven sections (http://www.tematea.org/?q=node/14): • *Assessments:* including risk assessment, impact assessment, presence of IAS, identification, reporting and indicators. • *Legislative measures and national policies*: including national strategies. • *Management:* including the prevention and eradication of IAS, rehabilitation and restoration, and other non-legislative approaches. • *Economic instruments*: including incentives • *Provision of resources*: including funding activities and capacity building. • *Communication, education and public awareness*: including training • *Cooperation*: including coordination across sectors
10. World Organisation for Animal Health (known till 2003 as the Office International des Epizooties, still referred to as OIE http://www.oie.int/eng	Maintenance and updating of OIE Terrestrial Animal Health Code and the Aquatic Animal Health Code: • Contain standards, guidelines and recommendations designed to prevent the introduction of infectious agents and diseases pathogenic to animals and humans into the importing country during trade in animals, animal genetic material and animal products; • OIE identified in the WTO SPS Agreement as the reference body for international standards on animal health. OIE General Session (May 2008) addressed matters related to: regionalisation (promoting the use of disease free 'zones' (defined by geographical features) and 'compartments' (defined by management practices) to facilitate trade; capacity building and dispute mediation.	OIE maintains/contributes to: • Global Early Warning System for Animal Diseases; • World Animal Health Information Database launched in 2005 (http://www.oie.int/eng/info/images/Nouv_SIS_pdf_en.JPG). CBD Decision IX.4 requests OIE International Committee to note the lack of international standards covering IAS, in particular animals, that are not pests of plants under the IPPC, and to consider whether and how it could contribute to addressing this gap, including for example by: • expanding the OIE list of pathogens to include a wider range of diseases of animals, including diseases that solely affect wildlife; and • considering whether it may play a role in addressing invasive animals that are not considered as causative agents of diseases under OIE and whether, for this purpose, it would need to broaden its mandate.
11. International Civil Aviation Organisation (ICAO) http://www.icao.int	36th Assembly Session (Montreal, 18-28 September 2007) adopted **Resolution A36-21: Preventing the introduction of invasive alien species** (replaces earlier Resolutions on this subject). This recognises that international transportation, including civil air transportation, represents a potential pathway for the introduction of IAS and: 1. *Urges* all Contracting States to support one another's efforts to reduce the risk of introducing, through civil air transportation, potentially invasive alien species to areas outside their natural range; 2. *Requests* the ICAO Council to continue working with the appropriate organizations in this regard.	ICAO-GISP collaboration with GISP to develop guidance for aviation pathway management. GISP secured a small amount of funding in 2007 to undertake a pilot study of Airports in South Africa with a view to identifying the gaps and making recommendations as appropriate i.e. a needs assessment, including capacity building & training etc. Part of the pilot study (completed June 2008) was to develop guidelines that would form the basis of the GISP-ICAO joint initiative. However, significant funding is now required to bring the outputs from the pilot project up to a standard where they can be developed into 'Best Practice Guidelines' and taken forward.
12. The Pan-European Biological and Landscape Diversity Strategy (PEBLDS) http://www.strategyguide.org/	No specific decisions found.	No specific activities found.
13. Environment for Europe Ministerial Conference	No specific reference to IAS at Sixth Conference (Belgrade, 10-12 September 2007)	None found.
14. Nordic Council of Ministers	The North European and Baltic Network on Invasive Alien Species (NOBANIS) now has 18 participating countries of which 13 are EU-27 countries. http://www.nobanis.org/default.asp	NOBANIS continues to build on past risk assessment and training courses and now provides a gateway to information on alien and invasive species in North and Central Europe: covers marine, freshwater and terrestrial environments and provides • integrated database on introduced species in the region • catalogue of the regulation relevant to invasive species in participating countries • literature database connected to regional and global networks and projects of invasive aliens species. Building on the SEBI-2010 project and the EEA-commissioned EWS feasibility study, NOBANIS is currently developing a quarterly newsletter and a more interactive database: this involves standardisation of use of key terms (eg invasive) and taxonomic references and columns on arrival in an area, change of behaviour, abundance etc to make it possible to generate alerts through the portal. Cost-sharing to fund future operation of NOBANIS is currently under discussion amongst participating countries: no decision on long-term mechanism yet reached.

Institution/programme	Instruments/activities since 2006	Ongoing or proposed work programme(s)
15. Common Wadden Sea Secretariat (CWSS) established in 1987 to support cooperation between The Netherlands, Denmark and Germany. The trilateral Wadden Sea Forum acts as decision making body within framework of this collaboration and meets every 3-4 years.	Protection and conservation of the Wadden Sea (management, monitoring, research, policy). IAS threats addressed (briefly) in Policy Assessment Report (2005) presented to Tenth Trilateral Governmental Conference on the Protection of the Wadden Sea (Schiermonnikoog, November 3, 2005)	The Wadden Sea Forum has not undertaken specific IAS activities. The Quality Status Report 2004, which first documented IAS – and Pacific oyster in particular – in the Wadden Sea will be updated in November 2008 and contain a chapter on IAS. The Pacific oyster is now spreading throughout the Wadden Sea : in 2007, the CWSS held a workshop to obtain an up-to-date status of the Pacific oyster invasion and to assess the possible consequences for the ecosystem, as well as for monitoring and management http://www.waddensea-secretariat.org/news/ symposia/oyster2007/oyster2007.html)

Annex 2 UPDATED INFORMATION ON COMMUNITY INSTRUMENTS AND ACTIVITIES RELEVANT TO IAS

*** denotes new entries**

	Instrument	Main purpose	Extent applicable to IAS?	Policy developments since 2006	Recent evidence as to application/effectiveness?	Overseas Entities (application)
General/Community						
1	**Treaty establishing the European Community** **(Consolidated text of the Treaty on European Union and the Treaty establishing the European Community Official, Journal C 325/1 of 24 December 2002)** **http://eur-lex.europa.eu/en/treaties/index.htm**	Sets out the basic policies for operation of the European Community, including monetary policy, movement of goods, etc. Article 2 states that 'The Community shall have as its task, [...], to promote throughout the Community a harmonious, balanced and sustainable development of economic activities, a high level of employment and of social protection, [...], a high degree of competitiveness and convergence of economic performance, **a high level of protection and improvement of the quality of the environment, [...]**, and economic and social cohesion and solidarity among Member States. Articles 28 and 29 state that quantitative restrictions on imports and exports are prohibited. Article 174(2) states that 2. Community policy on the environment shall aim at a high level of protection [...]. **It shall 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 pay.**	No specific reference. May apply to trade pathways in very general terms. Article 30 states that 'The provisions of Articles 28 and 29 [which prevent MS imposing quantitative restrictions on imports or exports] shall not preclude prohibitions or restrictions on imports, exports or goods in transit justified on grounds of [...] the protection of health and life of humans, animals or plants [...]. Such prohibitions or restrictions shall not, however, constitute a means of arbitrary discrimination or a disguised restriction on trade between Member States.' This provision has been used to justify restrictions on movement of living organisms within the EC (see discussion of Danish bees case).	The Treaty of Lisbon amending the Treaty on European Union and the Treaty establishing the EC was signed on 13 December 2007 (not yet in force). Its main objectives are to make the EU more democratic; strengthen standards of accountability, openness, transparency and participation; and to make the EU more efficient and able to tackle today's global challenges such as climate change, security and sustainable development. It will constitute the European Union as a legal entity. No changes are specifically relevant to IAS issues. The Consolidated Version of the Treaty on European Union and the Treaty on the Functioning of the European Union was published in Official Journal C 115 of 9 May 2008.	Many MS (especially 2004 and 2007 MS) reduced the scope of import restrictions related to potential IAS on joining the EC, perhaps in the belief that such restrictions were not legally justified under the EC Treaty. The provisions of Article 30 in direct or indirect relation to IAS have been tested in two European Court of Justice cases (see lines 8 and 9 below). Some MS may have been excessively conservative in their interpretation of the requirements of the EC Treaty in relation to IAS: there is some evidence that MS actively developing IAS policies are more willing to consider trade-related controls as part of a suite of policy measures. However, there is still no explicit basis under EU legislation to regulate trade and movement in species invasive in their own right (except for tightly defined categories of species e.g. for aquaculture) which means that any determination of compliance has to be made on a case by case basis.	
2	**Environmental Impact Assessment Directive (85/337/EEC as amended by Directive 97/11/EC and Directive 2003/35/EC)** **'EIA Directive'** **http://ec.europa.eu/environment/eia/home.htm** **See also http://www.environment-integration.eu/content/view/165/231/lang,en/**	The Directive applies to the assessment of the environmental effects of public and private projects that are likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location.	No specific reference. The Directive could cover IAS impacts caused or exacerbated by a 'project' falling within its scope, because EIA addresses the direct and indirect effects of a project on human beings, fauna and flora and on soil, water and landscape (see requirements in Article 3). Some potential IAS pathways covered by mandatory EIA requirements (transport corridors and water transfer between river basins, Annex I.7-8, 12) or categories left to MS discretion depending on characteristics (eg afforestation and salmon aquaculture under Annex II.I.(d) and (g)).	In 2001, the European Commission published EIA Scoping guidelines and a checklist which includes a question on possible introduction of alien species through the proposed project (http://ec.europa.eu/environment/eia/eia-support.htm). DG Environment published guidance in 2008 to assist MS to interpret project categories and reduce uncertainty in implementation (http://ec.europa.eu/environment/eia/pdf/interpretation_eia.pdf). However, this focuses on defining what constitutes a 'project' and does not provide guidance or criteria for consideration of IAS-related pathway risks as part of an assessment.	Limited information on MS application in relation to IAS.	

	Instrument	Main purpose	Extent applicable to IAS?	Policy developments since 2006	Recent evidence as to application/effectiveness?	Overseas Entities (application)
3	**Strategic Environmental Assessment Directive (2001/42/EC)** **'SEA Directive'** **http://ec.europa.eu/environment/eia/home.htm**	The purpose of the SEA-Directive is to ensure that environmental consequences of certain plans and programmes are identified and assessed during their preparation and before their adoption (Article 5). The public and environmental authorities can give their opinion and all results are integrated and taken into account in the course of the planning procedure. After the adoption of the plan or programme the public is informed about the decision and the way in which it was made. In the case of likely transboundary significant effects, the affected Member State and its public are informed and have the possibility to make comments which are also integrated into the national decision making process.	No specific reference. IAS impacts may be covered as the Directive requires environmental assessment for all 'plans and programmes' for eg agriculture, forestry, fisheries, energy, industry, transport, waste/water management, tourism, town and country planning or land use and which set the framework for future development consent of projects listed in Annexes I and II to the EIA Directive or (b) which, in view of the likely effect on sites, have been determined to require an assessment pursuant to Article 6 or 7 of the habitats Directive. The assessment should consider significant environmental effects, and in particular, effects on sites designated under the habitats and birds Directives, or transboundary effects: these could include the impacts of IAS. "Plans and programmes" very broadly defined to cover some sectoral pathways eg. transport corridors	A 2005 study for DG Environment notes that overlaps between the SEA Directive and the EIA Directive are possible, but although experience in the application of the SEA Directive is still too limited to enable robust conclusions to be reached (Imperial College London Consultants (August 2005) 'The relationship between the EIA and SEA Directives', available on: http://ec.europa.eu/ environment/eia/final_report_0508.pdf). In 2007, studies on the application of the Environmental Impact Assessment and SEA Directives were launched and will include examination of the relationship between these directives and the EU Biodiversity Action Plan and the Habitats Directive. Experience with application of Strategic Environmental Assessment (SEA) to Structural Funds for 2007-2013 is progressing.	No specific information on application in relation to IAS.	
4	**Environmental Liability Directive (2004/35/CE)** **http://europa.eu.int/eur-lex/pri/en/oj/dat/2004/l_143/l_14320040430en00560075.pdf**	The purpose of the Directive is to establish a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage.	No specific reference but defines 'emissions' as 'the release to the environment, as a result of human activities, of substances, preparations, organisms or micro-organisms' which could include release of IAS. 'Environmental damage' is defined to include 'damage to protected species and habitats which is any damage that has significant adverse effects on reaching or maintaining the favourable conservation status of such habitats or species' as well as any damage that 'significantly adversely affects the ecological, chemical and/or quantitative status and/or ecological potential, as defined in Directive 2000/60/EC, of the waters concerned, with the exception of adverse effects where Article 4(7) of that Directive applies.' Potentially covers IAS where 'environmental damage' is caused/threatened by an occupational activity listed in Annex III (covers activities involving GMOs) or any other occupational activity if the operator has been at fault or negligent. However, there needs to be one or more identifiable polluters, the damage must be concrete and quantifiable and a causal link should be established between the damage and the identified polluter(s). Liability is not a suitable mechanism for pollution of a widespread, diffuse character where it is impossible to link the negative environmental effects with acts or failure to acts of certain individual actors.	None found.	Does not deal with specific vectors (unless GMOs are considered to be within scope of IAS) The Environmental Liability Directive came into force in 2004 and MS have 3 years to implement its provisions. No reports assessing the effectiveness of the Directive through national implementation were found. One MS (Hungary) has included IAS in implementing legislation for the Directive. Government Decree 91/2007 (VI.26) on *Determining the degree of natural damage caused and the rules for remedying the damage* includes IAS in its list of environmental elements to be monitored: "elements of the monitoring must be chosen particularly considering the following groups: ….g) the populations/associations of invasive non-indigenous species (IAS) which are incidentally spreading and endangering nature because of the changed circumstances due to the damage caused to the environment.	

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5*	**Directive 2008/98/EC of the European Parliament and of the Council on the protection of the environment through criminal law** **http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:328:0028:0037:EN:PDF**	To ensure a minimum level of protection of the environment under criminal law throughout the EU, improve compliance with Community environmental legislation and ensure through action at Community level that offenders cannot exploit the significant differences which currently exist between MS (elimination of 'safe havens' for environmental crime). To subject commission of offences to effective, proportionate and dissuasive criminal sanctions (for legal persons, these may be of a non criminal nature eg clean- up or remediation; possibility of stopping businesses from operating). The Directive sets out an approximation of the maximum penalties for natural persons and legal persons. MS are free to maintain or introduce more stringent protective measures. They should transpose the Directive by 2010.	No specific reference. The Directive establishes a minimum set of serious environmental offences (already prohibited by EU or national legislation) that should be considered criminal throughout the Community when committed intentionally or with at least serious negligence. Participation in and instigation of such activities should also constitute an offence. Two types of conduct that should constitute offences under the Directive, when unlawful and committed intentionally or with at least serious negligence (see Art.3), could involve IAS: §a: 'the discharge, emission or 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; §h: any conduct which causes the significant deterioration of a habitat within a protected site.	N/A The Directive could provide a basis for MS to create or strengthen legal sanctions on deliberate illegal introductions of IAS, notably in breach of provisions under the birds and habitats Directive. In addition, it might be possible to include IAS in the interpretation of potentially damaging "materials", treating them in effect as a type of biological pollution. However, the Directive leaves each MS full latitude to interpret key terms, including "materials", "substantial damage" and "significant deterioration", in the light of its traditions and legal system. It would be necessary for the prosecution to prove a particular threshold of damage (potentially difficult in the IAS context). This suggests that known damaging activities involving potential IAS (eg release of live alien bait into freshwater systems) are likely to fall outside the scope of this proposed legislation in its current version.	N/A	
6	**Communication from the Commission on the Precautionary Principle (COM(2000)1)** **http://ec.europa.eu/environment/docum/20001_en.htm**	The Communication aims to: outline the Commission's approach to using the precautionary principle; establish Commission guidelines for applying it; build a common understanding of how to assess, appraise, manage and communicate risks that science is not yet able to evaluate fully; and avoid unwarranted recourse to the precautionary principle, as a disguised form of protectionism. It also seeks to provide an input to the ongoing debate on this issue, both within the Community and internationally.	No specific reference. The Communication is relevant to IAS as it discusses the Community's right to establish the level of protection - particularly of the environment, human, animal and plant health that it deems appropriate. It states that applying the precautionary principle is a key tenet of its policy, and the choices it makes to this end will continue to affect the views it defends internationally, on how this principle should be applied.		Regulation 708/2007 concerning use of alien and locally absent species in aquaculture explicitly references the taking of measures based on the prevention and precautionary principles. A growing number of MS are developing risk assessment techniques to screen some categories of potential IAS for risks to native biodiversity prior to decision-making.	
7	**Sixth Environmental Action Programme (2001-2010) (Decision 1600/2002/EC of the EP and the Council of 22 July 2002** **http://europa.eu/scadplus/leg/en/lvb/l28027.htm**	This Decision establishes a programme of Community action on the environment. It addresses the key environmental objectives and priorities based on an assessment of the state of the environment and of prevailing trends including emerging issues that require a lead from the Community. It sets out the key environmental objectives to be attained. It establishes, where appropriate, targets and timetables. The objectives and targets should be fulfilled before expiry of the Programme, unless otherwise specified.	IAS are clearly within the scope of the 6EAP and are mentioned in Article 6 in a specific objective: 'halting biodiversity decline with the aim to reach this objective by 2010, including prevention and mitigation of impacts of invasive alien species and genotypes', and in a specific priority action: 'developing measures aimed at the prevention and control of invasive alien species including alien genotypes'.		The EC's current activity programme to develop an EU framework on IAS is based *inter alia* on this commitment under the 6EAP.	

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8	**Case law on IAS: Danish bees case (Case C-67/97)**	The case concerned the keeping of a non-indigenous species of bee on the island of Læsø. Danish law prohibited the keeping of nectar-gathering bees except the brown bee of Læsø. When the Danish government pursued a prosecution against an individual who was breaching the prohibition, he claimed that the law constituted a quantitative restriction on imports and was contrary to Article 28 of the EC Treaty. The Court found that the law was indeed a restriction, but that it was justified under Article 30 of the Treaty, for the protection of the health and life of animals.	Not specifically. But the case directly concerns the threat that non-native species may pose to natives. The Court referred to the existence of protected areas for biodiversity conservation under the Birds and Habitats Directives, and stated that the 'establishment by the national legislation of a protection area within which the keeping of bees other than Læsø brown bees is prohibited, for the purpose of ensuring the survival of the latter; constituted an appropriate measure.	N/A		
9*	**Case law relevant to IAS: Belgian animal welfare case (Case C-219/07: judgment delivered on 19 June 2008)**	The case concerned restrictions on holding of animals imposed under Belgian animal welfare legislation as amended in 1995, based on the Wildlife Trade Regulation 333/97 (see below). The Belgian Decree prohibited the holding of any animals <u>not</u> included in a regulatory list (i.e. a positive/white list), provided for certain derogations (zoos, laboratories etc.) and established a procedure for animal trading firms to apply to add new species to the authorised list subject to prior approval based on formal criteria. The Court found that the Decree was more stringent than the WTR Regulation and liable to restrict intra-Community trade for the purposes of Article 28 EC, but that it was justified under Article 30 of the Treaty, for the protection of the health and life of animals.	Not specifically, but the judgment provides generally applicable guidance on the criteria to be applied when assessing whether a national trade-restrictive measure is compatible with the Treaty. It is for the national court to determine whether: • the drawing up of a (positive) species list is based on objective and non-discriminatory criteria; • a procedure enabling interested parties to apply for species listing is provided for, readily accessible and can be completed within reasonable time; • relevant holding conditions are objectively justified and do not go beyond what is necessary to achieve the objective pursued by the national legislation as a whole. The competent authority may refuse applications only if the holding of the specimens of the species concerned poses a genuine risk to the protection of animal welfare and the environment. Its refusal must be based on a full assessment of the risk posed to such interests, established on the basis of the most reliable scientific data available and the most recent results of international research (§36-37). "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 (§38). Any refusal decision must be open to challenge before the courts. Note that in the specific case, the National Council for Animal Welfare had established objective scientific criteria for dealing with applications to add new animal species to the list. These criteria precluded listing of species that, if they escaped into the wild, could continue to exist there and might constitute an ecological threat. The ECJ noted (§29) with regard to this criterion that "the Court has consistently held that restrictions of the free movement of goods may be justified by imperative requirements such as the protection of the environment (see Case C-350-95 *Bettati* [1998] ECR I-4355 §62 and Case C-314-98 *Snellers* [2000] ECR I-8633 §55)". On proportionality, the ECJ noted (§30) that it was necessary when applying the principle to a case of this type, to "take into account the specific nature of the species concerned" as well as the general requirements for protection of animal welfare and the environment. "The fact that one Member State imposes less stringent rules than another Member State does not mean that the latter's rules are disproportionate and hence incompatible with Community law" (§31). The ECJ also noted that "a negative list system – which entails limiting the prohibition to the species of mammals included in that list – might not suffice to achieve the objective… Reliance on such a system could mean that, as long as a species of mammal is not included in the list, specimens of that species may be freely held even though there has been no scientific assessment capable of guaranteeing that that holding entails no risk to the protection of those interests and requirements" (§32).		
10*	**Case law relevant to IAS: Netherlands mussels case (Case C-249/07: judgment delivered on 4 December 2008)** **http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2009:019:0004:0004:EN:PDF**	The case brought by the Commission against the Kingdom of the Netherlands concerned a measure under domestic fisheries regulations. The ECJ declared that, by instituting a system of prior authorisation for the planting, in Netherlands coastal waters, of oysters and mussels coming lawfully from other Member States and being of species native to the Netherlands, the Kingdom of the Netherlands has failed to fulfil its obligations under Articles 28 EC and 30 EC.	The case is directly relevant to interpretation of Art 22, Habitats Directive. The Commission claimed that the prohibition on planting oysters and mussels in Dutch coastal waters without a permit amounted to a prior authorisation regime liable to restrict intra-Community trade and market access from other Member States. Whereas a permit was always required to plant oysters/mussels sourced from other Member States, even if those species were native to the Netherlands, a permit was not required in certain cases to plant oysters/mussels sourced within the Netherlands (planting in the Wadden Sea of stock originating from the Dutch part of that sea; planting in the western Escaut of stock originating from the western Escaut). It also claimed that the derogation for planting mussels from the western Escaut in the Wadden Sea was discriminatory because it benefited a large part of domestic mussel production. ECJ case law made clear that measures having equivalent effect to quantitative restrictions (prohibited under Art.28 EC) applied to any domestic measures liable to obstruct intra-Community trade, directly or indirectly, now or in the future. The regime in question affected oysters and mussels from other Member States differently to the majority of oysters and mussels in the Netherlands and could thus obstruct free trade by dissuading an importer to introduce or place products on the market in the State concerned. The Dutch government accepted that the permit regime could restrict free movement of goods but argued that such measures were justified for reasons of biodiversity protection and conservation of non-threatened fisheries species. It presented two arguments, based on the habitats Directive and on Art.30 EC respectively: • the permit regime was designed to prevent introduction of alien organisms attached to the introduced shellfish, which could threaten native fish and plant species in the waters concerned. The ECJ rejected the argument that such a measure was consistent with Art.22 of the Habitats Directive because that article only covered intentional introductions linked to a specific project and did not cover possible accidental introductions arising from the translocation of other species. The ECJ did not consider that foreseeable risk was enough to constitute 'intention' under Art.22 (c.f. ECJ case law that accepts a more subjective interpretation of 'intention' for activities involving harm to protected species in breach of Art.12 of the Directive); • second, the ECJ found that the measure was not justified on the grounds of protection of the life of animals under Art.30. It first noted that recourse to Art.30 was no longer possible once Community directives provided for harmonisation of measures to achieve the objective concerned (e.g. biodiversity protection on Member States' European territory) but that the Dutch measure aimed to protect non-threatened fisheries species that fell outside the scope of the habitats Directive. Recourse to Art.30 was thus legally possible: the Dutch government thus had		

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			to show that the measure adopted was appropriate, necessary to achieve the desired objective and proportionate. The ECJ found, however, that the government had not demonstrated how its permit regime operated, the criteria used to grant or refuse permit applications, the objective and non-discriminatory nature of its system of derogations or detailed risk analysis which was a necessary precondition to invoking the precautionary principle.			
Fresh Water						
11	**Water Framework Directive (2000/60/EC)** **http://europa.eu.int/comm/environment/water/water-framework/index_en.html**	Sets objective that a 'good status' (both ecological and chemical) must be achieved for all European waters by 2015 and that water use be sustainable throughout Europe.	No specific reference. The Directive refers to high, good, moderate, poor and bad 'ecological status' and specifies which biological elements must be taken into account when assessing status. The list of biological quality elements (Annex V) includes an assessment of taxonomic composition in comparison to undisturbed conditions. If IAS are present at levels that significantly alter taxonomic composition, this will affect the level of ecological status assigned to a water body.	The First Report on the Implementation of the WFD (COM(2007) 128 final "Towards Sustainable Water Management in the European Union"; accompanying Staff Working Document (SEC(2007) 362 final) does not mention IAS or taxonomic composition specifically. It notes that there are still important gaps in the development of assessment methods at MS level for some of the biological quality elements. This brings in uncertainty as to what extent the monitoring networks will bring in complete and comprehensive information on the status of water bodies. The report stresses that investment in monitoring can be extremely cost-effective as it can help taking well-informed decisions in the programme of measures, preventing investing potentially higher amounts in the wrong places. Water Information System for Europe (WISE) launched at the European Water Conference in 2007 (http://water.europa.eu/content/view/ 20/36/lang,en).	The Directive is still in the early stages of implementation. Some Member States have included an assessment of IAS as part of their initial characterisation of water bodies under the directive, to determine whether they are at risk of failing their environmental quality objectives (e.g. Ireland, UK). This could drive future management of IAS as Member States aim to achieve good ecological status for water bodies.	
12	**Water Framework Directive: Common Implementation Strategy Guidance** **http://forum.europa.eu.int/Public/irc/env/wfd/library?l=/framework_directive/guidance_documents&vm=detailed&sb=Title**	Sets out guidance for implementation of the WFD by Member States, particularly the intercalibration exercise to harmonise understanding of 'good ecological status' in all MS as well as the results of national assessments.	Specific reference included in three guidance documents: REFCOND, IMPRESS, and COAST. Technical intercalibration work is coordinated by the EC Joint Research Centre (Ispra, Italy) and carried out within 14 Geographical Intercalibration Groups (groups of MS that share ecological types of rivers, lakes and coastal/transitional waters, and can thus compare monitoring results between themselves). Examples of river, lakes and coastal Intercalibration Groups include "Mediterranean rivers", "Northern lakes" or " North-East Atlantic".			
13*	**Directive 2007/60/EC on the assessment and management of flood risks (OJ L288 of 6.11.2007)** **http://ec.europa.eu/environment/water/flood_risk/index.htm**	To reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity, in both inland and coastal waters across the whole territory of the EU.	No specific reference to IAS. Because certain IAS directly affect water regulation services, there is scope to consider IAS control and management in implementing the Directive. MS are required to: carry out a preliminary assessment by 2011to identify river basins and associated coastal areas at risk of flooding; draw up flood risk maps by 2013; and establish flood risk management plans focused on prevention, protection and preparedness by 2015. MS must coordinate flood risk management planning with river basin management planning under the water framework Directive and also in shared river basins, including with third counties. In solidarity, they must not undertake measures that would increase the flood risk in neighbouring countries. MS must also take into consideration long term developments, including climate change, as well as sustainable land use practices in the flood risk management cycle addressed in this Directive.	In 2008, a Floods Working Group was set up under the WFD Common Implementation Strategy.	None known.	
Wildlife/Nature Protection/Biodiversity						
14	**The Wildlife Trade Regulations (Council Regulation 338/97/EC and Commission Regulation 1808/2001/EC), as amended by Commission Regulation 252/2005** **http://ec.europa.eu/environmen**	Article 1 provides that the object of the Regulation is to 'protect species of wild fauna and flora and to guarantee their conservation by regulating trade therein […].	Specific provisions address trade pathways for proven IAS, into and within the Community. Article 4(6) provides that '[...] the Commission may establish general restrictions, or restrictions relating to certain countries of origin, on the introduction into the Community: (d) of live specimens of species for which it has been established that their	There have been no new IAS listings since 2006. Commission Recommendation of 13 June 2007 (2007/425/EC) identifying a set of actions for the enforcement of Regulation No 338/97 calls on MS to take actions to increase enforcement capacity for wildlife trade crime, including:	Effectiveness of the Regulations was reviewed in 2002 by Adrados and Briggs. The analysis concluded that the Regulations were not sufficient to deal with all problems related to IAS, and the Regulations were also not preventing ecological impacts from the two species that were listed under Article 4(6) at the time.	Outermost Regions are covered by this Regulation, though *O.jamaicensis* is native in Guadeloupe and

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	t/cites/legis_wildlife_en.htm		introduction into the natural environment of the Community presents an ecological threat to wild species of fauna and flora indigenous to the Community.' Article 9(6) provides that 'Under the procedure laid down in Article 18, the Commission may establish restrictions on the holding or movement of live specimens of species in relation to which restrictions on introduction into the Community have been established in accordance with Article 4 (6).' Four species continue to be subject to restrictions on import into the EC (under Article 4(6) but not to any intra-Community restrictions under Article 9(6): • red eared slider (*Trachemys scripta elegans*) • American bullfrog (*Rana catesbeiana*) • painted turtle *(Chrysemys picta)* • American ruddy duck *(Oxyura jamaicensis*).	• training/awareness raising for enforcement agencies, prosecution services and judiciary; • ensuring all relevant enforcement agencies have access to adequate training on Regulation 338/97 and on species identification; • provision of adequate information to public and stakeholders to raise awareness about negative impacts of illegal wildlife trade; • in addition to checks at border-crossing points required under Regulation 338/97, ensure in-country enforcement through regular checks on traders and holders (eg pet shops, breeders and nurseries); • systematic use of risk and intelligence assessments to ensure thorough checks at border-crossing points and in-country (Art.II.d-h) MS should also take actions (Art.III) to increase co-operation and information exchange, including: • procedures for coordinating enforcement among all relevant national authorities (eg through establishment of inter-agency committees, memoranda of understanding and other inter-institutional cooperation agreements); • facilitating access for relevant enforcement officers at all levels, including front line staff; to existing resources, tools and channels of communication for exchange of information; • appointing national focal points for exchange of wildlife trade information and intelligence; • sharing information about significant trends, seizures and court cases at regular meetings of the Enforcement Group and intersessionally; • co-operating with enforcement agencies in other MS on investigations of offences and supporting capacity building for application of the Regulation in other MS; • making available to other MS awareness-raising tools/materials aimed at the public/stakeholders.		Martinique (BirdLife International, 2006).
15	**The Habitats Directive (92/43/EEC)** **http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm**	Article 2 provides that the aim of the Directive is to contribute towards ensuring biodiversity through the conservation of natural habitats and of wild fauna and flora in the European territory of the Member States.	Specifically addresses IAS. Article 22.b (under Supplementary Provisions) provides that Member States shall 'ensure that the deliberate introduction into the wild of any species which is not native to their territory is regulated so as not to prejudice natural habitats within their natural range or the wild native fauna and flora and, if they consider it necessary, prohibit such introduction. [...]. Article 6 sets out MS obligations in relation to Special Areas of Conservation (areas that make up the Natura 2000 network established under the Directive). These include avoiding deterioration of natural habitats and disturbance of species, both of which could be driven by IAS in specific circumstances. Plans or projects (which could include release of new species) should be subject to appropriate assessment of implications for the conservation objectives of Natura 2000 sites.	Guidance document on application of Article 6(4) published in January 2007 provides clarification on assessment requirements, including the concepts of alternative solutions, imperative reasons of overriding public interest, compensatory measures and overall coherence. Updated version of Interpretation Manual of European Union Habitats – EU-27 published in July 2007 (takes account of the accession of Bulgaria and Romania and of "Guidelines for the establishment of the Natura 2000 network in the marine environment: application of the Habitats and Birds Directives" (May 2007)). Guidance for the management of selected habitats for Natura 2000 launched by Commission on 4 July 2008.	The latest round of Article 17 reports prepared by MS, covering 2001-2006, were filed in the first half of 2008. The majority of MS (16 out of the 23 reports examined) did not report on implementation of Art.22.b even though several of them are pursuing active IAS policies or management programmes. MS that did report on this provision took different approaches (species/habitat-specific impacts c.f. general information). NB The report form requests information on: • Annex I habitat types affected by the introduction; • Annexes II, IV or V species concerned; • Introduction period; • Regulation measures take to avoid threats/damages; • General description of the main measures taken. (see http://ec.europa.eu/environment/nature/ knowledge/ rep_habitats/ index_en.htm#csa). NB: For some habitat types, non-native species are included in the EU Habitats Interpretation manual as characteristic species (eg 3150, which includes Azolla, an introduced water fern that is subject to control in some places). The Austrian report references *Pacifastacus*	

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					leniusculus (threat to *Austropotamobius pallipes, Austropotamobius torrentium*) and notes that a legal exemption of *Orconectes limosus* was made from the full protection of all crayfish species to allow for selective elimination of that species.	
16	**The Birds Directive (79/409/EEC) as amended** **http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm**	Covers the protection, management and control of wild birds, and lays down rules for their exploitation.	Specifically addresses IAS. Article 11 provides that MS shall 'see that any introduction of species of bird which do not occur naturally in the wild state in the European territory of the Member States does not prejudice the local flora and fauna. In addition, MS have obligations to manage sites under the Directive, including avoiding deterioration of habitats or any disturbances affecting the birds, in so far as these would be significant having regard to the objectives of this Article. Member States are also obliged to avoid deterioration of habitats outside the protection areas. IAS can be drivers of habitat deterioration and disturbance, so IAS management may be included in measures needed to implement the Directive. Some species alien to the whole of Europe are protected through inclusion in the Annexes to the Directive: eg. the known IAS Canada goose *Branta canadensis* (Annex II/1). Some species that are alien/established in some MS are also listed in Annex II/1; eg. • *Anser anser* (alien/established in Austria, Belgium and Germany); • *Anser fabalis* (alien/established in Finland) ; • *Anas penelope* and *Anas strepera* cryptogenic/established in Belgium, Estonia, Great Britain; • *Columba livia* (alien/established in Austria, Belgium, Denmark, Estonia, Finland, Hungary, Latvia, Lithuania, Netherlands, Poland, Spain, Sweden); • *Streptopelia decaocto* (alien/established in Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden. See species-specific factsheets produced through DAISIE (http://www.europe-aliens.org/speciesFactsheet)	In 2008, the Commission updated its Guidance document on hunting under the birds Directive, issued under the Sustainable Hunting Initiative which aims to improve understanding of the legal and technical aspects of the Directive's provisions on hunting and support scientific, conservation and awareness raising measures to promote sustainable hunting under the Directive. The Guidance mentions Art.11 very briefly, in terms of threats that introduced species may post to rare and more widespread species, including those subject to hunting. However, it does not address hunting as a pathway in its own right for introductions of alien species (eg stock replenishment). See http://ec.europa.eu/environment/nature/conservation/wildbirds/hunting/index_en.htm)	Reporting on introduced species has not been consistent through the period of application of the Directive, despite a specific question in the reporting format. Several MS have reported issues with specific introduced birds, eg Ruddy duck, monk parakeet, rose-ringed parakeet, Canadian goose, Egyptian goose. The most recent Report from the Commission on the implementation of the Directive COM/2006/ 0164 final dated 12 April 2006) reported for EU-15 that "No new introductions are reported. The Ruddy duck features most frequently in national reports, as a non-native species (Ireland, Spain, Sweden and UK). In Spain, control measures appear to have been effective with no hybrids sighted for over a year; in Sweden and Ireland hunting is a means of controlling numbers; in the UK, a limited control trial is underway to establish whether it is feasible to eradicate the species entirely. A number of other species are causing some concern, notably geese in the UK and Ireland. Monitoring schemes are in place for non-native species in Italy (110 non-native species) and the UK (introduced species with small breeding populations; non-native, non-breeding waterfowl and hybrids)".	
17	**Council Directive 1999/22/EC of 29 March 1999 relating to the keeping of wild animals in zoos**	The objectives of this Directive are to protect wild fauna and to conserve biodiversity by providing for the adoption of measures by Member States for the licensing and inspection of zoos in the Community, thereby strengthening the role of zoos in the conservation of biodiversity	IAS could be considered in the context of Article 3 that states that MS should take measures to prevent the escape of animals in order to avoid possible ecological threats to indigenous species and preventing intrusion of outside pests and vermin. This is relevant to preventing unintentional introduction of animal IAS (including alien diseases and pests) from zoos.	None found.	No information found.	

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18	**Biodiversity Communication and Action Plan (COM (2006) 216 Final)** **(Communication on Biodiversity: Halting the Loss of Biodiversity by 2010 - and Beyond (22 May 2006)** Endorsed by Committee of the Regions of 6 December 2006 CdR 159/2006 fin; Opinion of the European Economic and Social Committee of 15 February 2007 NAT/334 - CESE 205/2007 fin DE/Ho/hn; Committee on the Environment, Public Health and Food Safety (Rapporteur: Adamos Adamou), European Parliament, 28.3.2007	The Communication identifies four key policy areas for action to 2010 and beyond. It then sets out priority objectives related to each of the four policy areas and explains their scope. NB The Communication builds on the Message from Malahide (2004) http://ec.europa.eu/environment/nature/biodiversity/policy/pdf/malahide_conf_report.pdf)	A priority objective in Policy Area 1 (Biodiversity in the EU) is 'to reduce the impact on EU biodiversity of invasive alien species and alien genotypes'. The EU Action Plan for 2010 and Beyond (Annex 1) includes specific actions for IAS, including developing a Community Strategy to address IAS which may contain measures to fill gaps; and establishing an early warning system for the prompt exchange of information between countries on the emergence of IAS and cooperation on control measures across national boundaries. The Council's Conclusions on COM(2006)216 of 18 December 2006, call on the Commission: • to assess gaps in the current legal, policy and economic framework for IAS prevention, control and eradication; • in cooperation with MS, to prepare an EU strategy and an effective early warning system, taking into account biogeographical regions, on the basis of the CBD Guiding Principles, taking into account the Bern Convention European Strategy on Invasive Alien Species and recognizing the efforts made by relevant Conventions and Organisations such as IPPC and EPPO.	In early 2008, DG ENV created a dedicated IAS webpage (http://ec.europa.eu/environment/nature/invasivealien/index_en.htm) and ran an online policy consultation in which: • 91% of respondents agreed on urgent need for new measures to prevent the spread of IAS; • 85% agreed on the importance of preventing the introduction of IAS in the wild; • 90% supported an EU-wide early warning system; • 86% thought that MS should be legally obliged to take action against the most harmful IAS; • 90% considered that lack of public awareness would constitute a barrier to launching more stringent policies, and that it was therefore important to raise the profile of the issue (77%). DG ENV organised consultations with Member State representatives, Stakeholders and Commission Services from June 2007-June 2008 and developed a joint Discussion Paper that has been used to inform development of the Commission Communication on IAS, due November 2008. The Commission jointly organised the European Conference on Invasive Alien Species with the Biodiversity Foundation of the Spanish Ministry of the Environment (Madrid, 15-16 January 2008) which produced recommendations to support development of IAS policy at European and national levels (Fundación Biodiversidad, 2008).	The Communication calls on MS to develop and implement national IAS strategies and to ratify and implement the International Convention for the Control and Management of Ship's Ballast Water and Sediments, adopted under the auspices of the International Maritime Organisation. As of 1 October 2008: • 7 MS have a specific IAS Strategy (or have completed their draft strategies and expect endorsement by end 2008); • 5 MS are developing specific IAS strategies; • 10 MS include IAS-related measures (level of detail varies) in their National Biodiversity Strategy or equivalent; • One MS (Spain) has ratified the BWM Convention; four others indicate that preparatory work is well advanced.	Working session on IAS included in IUCN-EC Conference on The European Union and its Overseas Entities: Strategies to counter Climate Change and Biodiversity Loss (Réunion, 7-11 July 2008).
Sanitary/Phytosanitary						
19	**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.** **The 'Plant Health' Directive** **http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32000L0029:EN:HTML** **Rules for allocation of a financial contribution from the Community for plant-health control laid down by Regulation (EC) No 1040/2002 of 14 June 2002 and for inspection infrastructure by Regulation (EC) No 998/2002 of 11 June 2002**	This Directive concerns protective measures against the introduction into the MS from other MS or third countries of organisms which are harmful to plants or plant products. The general principles are based upon provisions laid down in the International Plant Protection Convention concluded under the auspices of the United Nation Food and Agriculture Organisation and, in the World Trade Organisation Agreement on the Application of Sanitary and Phytosanitary Measures.	No specific reference to IAS (consistent with IPPC terminology, the terms "alien" or "non-native" are not used). The Directive applies to those categories of IAS that are included in its definition of 'harmful organisms' (pests of plants or of plant products, which belong to the animal or plant kingdoms, or which are viruses, mycoplasmas or other pathogens). Pests may be direct or indirect (eg weeds of cultivation). The definition of "plants" is not restricted to cultivated plants, so the Directive may apply to organisms that could harm wild (unmanaged) plants. The Directive requires phytosanitary certificates for specified plants/plant products entering from third countries, plant passports for certain plants/plant products in intra-Community trade and prohibition of import or introduction of certain organisms (detailed lists are contained in Annexes to the Directive). Specific 'protected zones' may be established within MS in relation to particular harmful organisms. Certain organisms must be targeted for eradication or control if detected. The Commission's Food and Veterinary Office manages EUROPHYT, an electronic rapid alert system between the Commission and Member States,	The Working Party of Chief Plant Health Officers (COPHS, represents MS National Plant Protection Organisations) has periodically considered phytosanitary aspects of IAS since 2002 when it found that most of the CBD Guiding Principles were already covered by the Directive and that IAS "which are harmful to plants in an area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled, are quarantine pests and should be subjected to measures according to IPPC provisions and standards" (SN 4411/02, 19.12.2005). In 2005, it "agreed that a joint exchange of views with DG SANCO and DG Environment might be useful in the near future in order to clarify the links between plant health and environmental legislation" and noted the importance of Pest Risk Analysis in this context (15634/05, 21.12.2005). In 2007, it stated that "despite the importance the IPPC assigns to the subject of invasive alien plants, the activities and recommendations from EPPO, and the support for these activities by the COPHS, not a single invasive alien plant is regulated in the framework of the Directive 2000/29/EC up to now." (10985/07, 3.7.2007). 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,	MS appear to have been active in implementing the Directive which is the binding legal instrument used to implement the IPPC within the EU. However, as noted (preceding column), this does not currently list any invasive alien plant in its annexes. Some MS have incorporated measures for certain invasive alien plants in their plant protection/agricultural legislation, aligned with EPPO recommendations with regard to invasive alien plants eg Latvia.	There are specific references to the French overseas departments and the Canary Islands in art 1. The Directive does not apply to Ceuta or Melilla (art 1(3)).

	Instrument	Main purpose	Extent applicable to IAS?	Policy developments since 2006	Recent evidence as to application/effectiveness?	Overseas Entities (application)
				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 developed.		
20*	**Forest Reproductive Materials Directive (Council Directive 1999/105/EC)** **http://ec.europa.eu/food/plant/propagation/forestry/index_en.htm**	To ensure the plentiful supply of high quality forestry reproductive material of the species concerned within the Community by stipulating that forest reproductive material may not be marketed unless it is of one of four categories specified by the Directive. Forest reproductive material coming from third countries may only be marketed within the Community if it provides the same assurances as Community material.	References biological diversity of forests as one of goals. "Forest reproductive material of tree species and artificial hybrids which are important for forestry purposes should be genetically suited to the various site conditions and of high quality; the conservation and enhancement of biodiversity of the forests including the genetic diversity of the trees is essential to sustainable forest management".	Information on units of approval of basic material approved on a MS territory is held in a national register, including information about the area(s) in which the material is found or the exact geographic location (depending upon the category). This is crucial for determining whether any particular forest reproductive material is suitable for a site under consideration. A Community list is drawn up on the basis of the national lists, in order to ensure that the scheme operates smoothly across the whole of the Community. The unique register reference, shown on the master certificate issued by official bodies after harvesting, is central in the provision of information and the tracing of material.	Commission Decision 2003/122/EC, in view of difficulties in obtaining information from 3rd countries and to prevent trade patterns from being disrupted, provided MS with time-limited authority to decide which forest material from 3rd countries could be marketed. MS were required to notify the Commission of decisions taken.	
21	**The species-specific and general Directives containing precautions against animal disease introductions. There are a large number of these Directives and also Regulations These relate to specific types of animals and animal products, and are too numerous to list individually here** **Co-financing of measures in the animal health sector by the European Community currently regulated by Council Decision 2006/965/EC.**	The Directives contain a suite of measures relating to reporting of, prevention of entry of, eradication of, etc of animal diseases and pathogenic agents in the EC.	The Directives do not mention IAS, but regulate trade in animals and animal products to control animal diseases and pathogenic agents, some of which may also be IAS. The various instruments typically contain the following types of measures: control measures against major epizootic diseases to be taken as soon as disease is suspected; eradication and monitoring programmes for diseases already in the Community which are subject to national programmes co-financed by the EU; application of the concept of "regionalisation" in case of disease occurrence; registration of farms, identification of animals and establishment of a computerised system linking 2500 offices of the central and local veterinary authorities throughout the EU (ANIMO), which enables advance notification of the trade in animals and their products. Occurrence of the most important diseases must be notified to the Commission and the other MS, via the computerised Animal Disease Notification System, which now also involves many other European countries (EU acceding and candidate countries, Iceland, Norway, Switzerland, etc.); contingency plans in each MS for dealing with epizootic diseases; EU and national reference laboratories to ensure uniformity of testing and expert support to the Commission and the MS.	**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** addresses avian influenza risks posed by third countries' imports. It was adopted on the basis of an assessment by the European Food Safety Authority (Panel on Animal Health and Welfare) of the risks posed by imports of birds caught in the wild and captive bred birds from third countries. The Regulation sets conditions for approved breeding facilities, animal health certification, marking (leg rings/microchips), transport, quarantine and monitoring. It does not apply *inter alia* to captive bred species reared or kept in captivity for eg 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.	http://europa.eu.int/comm/food/animal/diseases/index_en.htm	
22*	**Communication laying down the Action Plan for the implementation of the EU's Animal Health Strategy for 2007-2013** **COM(2008) 545 final adopted on 10 September 2008** **http://ec.europa.eu/food/animal/diseases/strategy/documents_en.htm**	The EU Animal Health Strategy is based on the principle, "Prevention is better than cure". It covers 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.	The Strategy and Action Plan cover animal diseases and pathogenic agents that may also be IAS. The Action Plan sets out key actions and an indicative timetable structured around 4 pillars: • prioritisation of EU interventions (categorisation of animal-related threats); • EU animal health framework (single EU Animal Health Law proposed by 2010; legislative proposal for harmonised EU framework for responsibility and cost-sharing in detecting and eradicating diseases planned by 2011; • Prevention, surveillance and crisis preparedness (legislative proposal for better border biosecurity			

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			to be adopted by 2010; reinforcement of on-farm biosecurity; fuller use of Community funds when addressing actions that will have positive impact on animal health. disease surveillance and traceability strengthened by 2011); • science, innovation and research (stronger emphasis on cooperation, including European Food Safety Authority and Joint Research Centre).			
23	**Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety** **http://www.efsa.europa.eu/EFSA/efsa_locale-1178620753812_home.htm**	Mandate to contribute to a high level of protection of human life and health, and in this respect take account of animal health and welfare, plant health and the environment, in the context of the operation of the internal market.	Powers to conduct PRA and to deliver or obtain scientific opinions that will serve as the scientific basis for the drafting and adoption of Community measures in the fields falling within its mission. EFSA, the Commission and MS shall cooperate to promote the effective coherence between risk assessment, risk management and risk communication functions (Art.22). The Scientific Committee and permanent Scientific Panels shall be responsible for providing the scientific opinions of the Authority, each within their own spheres of competence Art.28.4(c). shall provide opinions on multisectoral issues falling within the competence of more than one Scientific Panel, and on issues which do not fall within the competence of any of the Scientific Panels	Permanent Scientific Panels include Panels on plant health, plant protection products and their residues, animal health and welfare and on biological hazards.	in 2007 the European Food Safety Authority (EFSA) reviewed Pest Risk Assessments (PRA) for 3 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 to the authors concerned for further assessment.	
Genetically Modified Organisms						
24	**Directive on the contained use of genetically modified micro-organisms (90/219/EC)** **http://europa.eu.int/eur-lex/lex/LexUriServ/LexUriServ.do?uri=CELEX:31990L0219:EN:HTML**	To lay down common measures for the contained use of genetically modified micro-organisms for the purposes of protecting human health and the environment.	No specific reference, but focus of the Directive is on reducing the risks related to unintentional release of GMOs (some of which may be IAS). The Directive includes provisions for: classification and risk assessment; notification and approval system; accidents; enforcement; public consultation and information; accident and emergency plans; ; waste disposal, etc.	EU Policy on Biotechnology published by DG ENV in 2006 (see http://ec.europa.eu/environment/biotechnology/index_en.htm).	Fifth Summary Report on the experience of Member States with Directive 90/219/EEC, as amended by Directive 98/81/EC, for the period 2003 – 2006 issued on 30 November 2007(SEC(2007)1636). For updated information, see http://ec.europa.eu/environment/biotechnology/index_en.htm.	
25	**Directive on the deliberate release into the environment of genetically modified organisms (2001/18/EC)http://europa.eu.int/eur-lex/lex/LexUriServ/LexUriServ.do?uri=CELEX:32001L0018:EN:HTML**	The main aim of this Directive is to make the procedure for granting consent to the deliberate release and placing on the market of GMOs more efficient and more transparent, to limit such consent to a period of ten years (renewable) and to introduce compulsory monitoring after GMOs have been placed on the market. It also provides for a common methodology to assess the risks associated with the release of GMOs (the principles applying to environmental risk assessment are set out in Annex II to the Directive) and a mechanism allowing the release of the GMOs to be modified, suspended or terminated where new information becomes available on the risks of such release.	No specific reference, but focus of the Directive is on reducing the risks related to intentional release of genetically modified organisms (some of which may be IAS). The Directive makes public consultation and GMO labelling compulsory. A system of exchange of information contained in notifications is maintained. The Commission is obliged to consult the competent scientific committees on any question that may affect human health and/or the environment. The Directive requires registers to be established for the purpose of recording information on genetic modifications in GMOs and on the location of GMOs.	EU Policy on Biotechnology published by DG ENV in 2006 (see http://ec.europa.eu/environment/biotechnology/index_en.htm).	Second Report from the Commission to the Council and the European Parliament on the experience of member states with GMOs placed on the market under Directive 2001/18/EC issued in March 2007 (COM(2007) 81 final) and Annexes to the Report (SEC (2007) 274). For updated information, see http://ec.europa.eu/environment/biotechnology/index_en.htm.	

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26	**European Parliament and the Council Regulation on transboundary movements of genetically modified organisms (EC 1946/2003)** http://ec.europa.eu/environment/biotechnology/pdf/regu1946_2003.pdf	The objectives of this Regulation are to establish a common system of notification and information for transboundary movements of genetically modified organisms (GMOs) and to ensure coherent implementation of the provisions of the Cartagena Protocol on Biosafety on behalf of the Community. 'Transboundary movement' means the intentional or unintentional movement of a GMO between one Party or non-Party of the Cartagena Protocol and another Party or non-Party of the Protocol, excluding intentional movements between Parties within the Community.	No specific reference, however the Regulation applies to the transboundary movements of all GMOs that may have adverse effects on the conservation and sustainable use of biological diversity, also taking into account risks to human health. Yes, when the IAS in question are GMOs.	EU Policy on Biotechnology published by DG ENV in 2006 (see http://ec.europa.eu/environment/biotechnology/index_en.htm).	None found	
27	**Council Regulation setting up a Community regime for the control of exports of dual-use items and technology (EC 1334/2000) (amended by Regulation (EC) No 1183/2007 of 18 September 2007)** http://trade.ec.europa.eu/doclib/docs/2006/march/tradoc_127868.pdf	The Regulation sets up a Community system of export controls for dual-use items. 'Dual-use items' mean items, including software and technology, which can be used for both civil and military purposes, and shall include all goods which can be used for both non explosive uses and assisting in any way in the manufacture of nuclear weapons or other nuclear or explosive devices.	No specific reference to IAS. The Regulation applies to the exportation of micro organisms/GMOs that could be used for military purposes (Annex 1 of the Regulation) and could be relevant to IAS that are GMOs that could be used in military purposes.	On 11 September 2008, the Commission adopted a proposal for a Council Regulation amending and updating the list of dual use items set out in Annex I in conformity with the relevant obligations and commitments that Member States had accepted as a member of the international export control arrangements (see http://ec.europa.eu/trade/issues/sectoral/industry/dualuse/index_en.htm).	None found.	
European Funds						
28*	**Regulation on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) (EC) No 1698/2005)** **http://europa.eu/scadplus/leg/en/lvb/l60032.htm**	The Regulation's main purpose is contribute to the promotion of sustainable rural development throughout the Community in a complementary manner to the market and income support policies of the common agricultural policy, to cohesion policy and to the common fisheries policy.	No specific reference. MS are required to produce national strategic plans for 2007-2013 in line with Community strategic guidelines and national priorities, implemented through rural development programmes which specifically address measures to improve the environment and the countryside. Several activities related to IAS management are within the scope of the Fund, in relation to agri- and forest- environment payments.	The EAFRD has been operational since 1 January 2007. However there were delays in submission of national programmes by MS (by August 2007, out of 94 national and regional programmes, 87 had been sent to the Commission and 18 approved by the management committee). It is too early to make an overall assessment of the extent to which biodiversity objectives – including possible IAS control measures - are prioritised and promoted in these plans (European Commission 2008a).	Some MS are using their rural development programmes linked to EAFRD to support IAS control as part of land management (see Annex 3): Examples include: Hungary: EAFRD subsidies for biofuel plantation subject to conditions to prevent species spread. Slovakia: Order No. 160/2008 Coll. requires elimination of invasive alien plant species as one of the conditions for direct payments in agriculture (Rural Development Programme for 2007-2013). United Kingdom: IAS control for invasive weeds included in GAEC conditions for cross-compliance; control of grey squirrel, *Rhododendron ponticum* and other invasive plants under Woodland Grant scheme administered by Forestry Commission; multiple other grant mechanisms linked to EAFRD funding.	
29*	**Council Decision 2006/144/EC on Community Strategic Guidelines for Rural Development (programming period 2007-2013) (OJ L.55/20 25.02.2006)** **http://europa.eu/scadplus/leg/en/lvb/l60032.htm**	The guidelines aim to: identify and agree the areas where the use of EU support for rural development creates the most value added at EU level; make the link with the main EU priorities (Lisbon, Göteborg) and translate them into rural development policy; ensure consistency with other EU policies, in particular in the fields of cohesion and environment; accompany the implementation of the new market-oriented common agricultural policy (CAP) and the necessary restructuring it will entail in the old and new Member States.	No specific reference. The Guidelines state that resources devoted to axis 2 should contribute to three EU-level priority areas: biodiversity and the preservation and development of high nature value farming and forestry systems and traditional agricultural landscapes; water; and climate change. Measures available under axis 2 should be used to integrate these environmental objectives and contribute to the implementation of the agricultural and forestry Natura 2000 network, to the Göteborg commitment to reverse biodiversity decline by 2010, to the objectives laid down in the Water Framework Directive 2000/60/EC and to the Kyoto Protocol targets for climate change mitigation. This could include measures to address IAS where they are compromising the chances of halting loss of biodiversity by 2010.			
30*	**Regulation (EC) No 614/2007 of the European Parliament and of the Council of 23 May 2007**	The Regulation establishes the financial instrument for the environment ("LIFE+"). The general objective of LIFE+ shall be to	No specific reference. IAS are clearly within the scope of LIFE+. Annex I	2 LIFE+ components are relevant to IAS: - 'Nature and Biodiversity' covers a wide range of	1992-2006: 187 IAS-related projects supported under earlier LIFE instruments (mainly LIFE NATURE) at cost of €44 million. 28 projects focused entirely on IAS	

	Instrument	Main purpose	Extent applicable to IAS?	Policy developments since 2006	Recent evidence as to application/effectiveness?	Overseas Entities (application)
	concerning the Financial Instrument for the Environment (LIFE+) (OJ L149 of 9.06.2007) **http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32007R0614:EN:NOT** **See generally http://ec.europa.eu/environment/life/**	contribute to the implementation, updating and development of Community environmental policy and legislation, including the integration of the environment into other policies, thereby contributing to sustainable development. In particular, LIFE+ shall support the implementation of the 6th EAP, including the thematic strategies, and finance measures and projects with European added value in Member States.	contains measures that may be eligible for funding if they satisfy the criteria in Articles 3(2) and (3) in relation to added value. The list of measures includes: capacity building; networking; information and communications actions; and site and species management. These measures could be applied to IAS.	activities, not solely linked to the implementation of the habitats and birds Directives. The main criteria for selecting projects is the presence of innovative or demonstration measures to test/demonstrate biodiversity conservation objectives of the EC Communication Halting the loss of biodiversity by 2010 – and beyond (which explicitly mentions the need for measures against IAS); - 'Information and Communication' covers awareness raising campaigns related to implementation, updating and development of EU environment policy and legislation and could be used to cover IAS campaigns. The 2008 call for proposals was launched on 15 July 2008 and the final decision on projects for co-financing will be made in July 2009.	(€28.6 million) c.f. 159 projects had at least one IAS component (€15.4 million). Average of 12 IAS-related projects per year during LIFE programming period for average cost of €230,000 (ie nearly 3 million €/year). Alien plants addressed by 62.6% projects, alien animals by 27/8%, 9.6% projects targeted both groups (Scalera 2008). For compilation of LIFE-supported IAS projects, see: http://ec.europa.eu/environment/life/themes/animalandplants/lists/alienspecies.htm.	
31*	**Council Regulation (EC) No 1198/2006 of 27 July 2006 on the European Fisheries Fund (OJ L 223, 15.8.2006).** **http://europa.eu/scadplus/leg/en/lvb/l66004.htm**	The Regulation establishes a European Fisheries Fund and defines the framework for Community support for the sustainable development of the fisheries sector, fisheries areas, and inland fishing.	No specific reference. IAS could be within the scope of two provisions. Article 29 provides that the Fund shall support investments in aquaculture that contribute to 'diversification towards new species' and/or to 'implementation of aquaculture methods substantially reducing negative impact or enhancing positive effects on the environment when compared with normal practice in the aquaculture sector'. The Fund may also be used to support broader measures in the common interest to protect and develop aquatic fauna and flora (Article 36).	It is still too early to determine to what extent the new European Fisheries Fund is being used to benefit biodiversity. The collection of basic scientific information to support periodic assessments of the progress of the CFP in incorporating environmental protection requirements, in particular biodiversity, should be covered under the Data Collection Regulation, currently under revision (European Commission 2008a).	None found.	
32*	**Regulation (No 1080/2006) for the European Regional Development Fund (OJ 210/1 of 31.06.2006)** **http://ec.europa.eu/regional_policy/sources/docoffic/official/regulation/pdf/2007/feder/ce_1080(2006)_en.pdf** **See generally http://ec.europa.eu/regional_policy/index_en.htm**	The ERDF shall contribute to the financing of assistance towards the reinforcement of economic, social and territorial cohesion by reducing regional disparities and supporting the structural development and adjustment of regional economies, including the conversion of declining industrial regions. In so doing, the ERDF shall give effect to the priorities of the Community, and in particular the need to strengthen competitiveness and innovation, to create sustainable jobs, and to promote environmentally sound growth. The mechanism is identified under the Biodiversity Action Plan as a key mechanism to reinforce compatibility of regional and territorial development with biodiversity in the EU.	No specific reference. IAS could be within the scope of the new structural funds programme for 2007-2013. The Regulation provides that funds can be used for environmental risk prevention, and specifically: stimulating investment for the rehabilitation of contaminated sites and land, and promoting the development of infrastructure linked to biodiversity and Natura 2000 and contributing to sustainable economic development and diversification of rural areas. Possibilities for financial support could include the development of regional IAS risk management plans and monitoring systems (stand-alone or part of a wider regional framework for risk management) which could be useful tools in addressing threats related to possible intentional or unintentional introductions of IAS, including IAS control and possibly complemented with restoration measures involving native species.	The evaluation of the new structural funds programmes (ERDF and Cohesion Funds) for 2007-2013 is largely complete. MS have reported an allocation of sums of €2700 million and €1090 million for spending on measures to promote biodiversity and nature protection (including Natura 2000) and for the protection of natural assets respectively. Around 80 % of these allocations are available in those regions benefiting from convergence status (EC 2008a, based on DG REGIO compilation of data from member states as at 12/11/2007).	INTERREG programmes funded by the ERDF are part of EU Cohesion Policy and support the objective of European territorial cooperation. Programmes cover three types of cooperation: cross-border, transnational and/or interregional. Some MS indicate that IAS management actions have been included in past or ongoing INTERREG-financed projects eg: INTERREG Quark Archipelago National Park project (Finland, 2001) for trapping of mink on islands; INTEREG IIIA: Within the Initiative "Neighbourhood Programme" (HU-SK-UA 2004–2006), Slovakia addressed IAS in its project: "Development of the Biomonitoring Network Supporting the Effective Management of Protected Areas"; INTERREG IIIB (Baltic Sea Region): Sweden produced information materials for fishery stakeholders on dealing with alien species in the aquatic environment; INTERREG IIIB : within HARBASINS project, report on status of the Pacific oyster invasion and possible consequences for the Wadden Sea ecosystem commissioned and international workshop (Denmark, Germany, Netherlands, UK) held on 22 March 2007 to develop management and research recommendations (see www.waddensea-secretariat.org). INTERREG IV: Netherlands (Noord-Brabant) and	

	Instrument	Main purpose	Extent applicable to IAS?	Policy developments since 2006	Recent evidence as to application/effectiveness?	Overseas Entities (application)
					neighbouring countries for IAS control in shared water catchments.	
33*	**Council Regulation No. 1084/2006 establishing a Cohesion Fund (OJ 210/79 of 31.07.2006)** **http://ec.europa.eu/regional_policy/sources/docoffic/official/regulation/pdf/2007/cohesion/ce_1084(2006)_en.pdf**	The Regulation establishes a Cohesion Fund for the purpose of strengthening the economic, social and territorial cohesion of the Community in the interests of promoting sustainable development.	No specific reference. Dealing with IAS could be within the scope of the fund, but only where linked to other major projects that contribute to the aims of the fund.	Budget for Structural and Cohesion Funds for 2007-2013 set at €347 billion (81.5% to be spent in the "Convergence" regions).		
Marine & Fisheries/Aquaculture						
34*	**Marine Strategy Framework Directive (Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy)** **http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0056:EN:NOT**	The Directive establishes a framework for MS to develop Marine Strategies designed to achieve good environmental status in the marine environment by 2020 at the latest, ensure the protection and preservation of that environment, prevent its deterioration and restore marine ecosystems in areas where they have been adversely affected. It promotes an ecosystem-based approach to management of human activities. "Environmental status" means the overall state of the environment in marine waters, taking into account the structure, function and processes of the constituent marine ecosystems together with natural physiographic, geographic and climatic factors, as well as physical and chemical conditions including those resulting from human activities in the area concerned.	IAS are clearly within the scope of the Directive. MS must make an initial assessment of the environmental status of their European marine waters in order to identify measures that must be taken to achieve 'good environmental status', which could include control/eradication of IAS. IAS are referenced in two annexes: Annex I (Qualitative descriptors for determining good environmental status): non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems. Annex III (indicative list of characteristics, impacts and pressures). Table 1 (biological characteristics) requires an inventory of the temporal occurrence, abundance and spatial distribution of non-indigenous, exotic species or, where relevant, genetically distinct forms of native species, which are present in the marine region or subregion. Table 2 (Biological Disturbance') includes Introduction of microbial pathogens, introduction of non-indigenous species and translocations.	N/A	The Directive mandates cooperation between MS sharing a marine region or subregion to ensure a coherent approach. For certain regions (Baltic, North-East Atlantic, Mediterranean etc.), some MS are already engaged in cooperative marine activities that cover some IAS pathways.	
35*	**Council Regulation concerning use of alien and locally absent species in aquaculture (No.708/2007 of 11 June 2007) (OJ L168/1 of 28.06.2007)** **http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:168:0001:0017:EN:PDF**	The Regulation establishes a framework governing aquaculture practices in relation to alien and locally absent species to assess and minimise the possible impact of these on the aquatic environment and in this manner contribute to the sustainable development of the sector.	IAS are the focus of this Regulation which refers to alien and locally absent species. It builds on the ICES and EIFAC Codes (see Annex I). The Regulation covers all aquaculture activities within MS jurisdiction (it does not apply to keeping of ornamental aquatic animals or plants in pet-shops, garden centres, contained garden ponds or aquaria). Each MS is required to designate a competent authority which may appoint an advisory committee. A permit is required for all routine movements (low risk): for non-routine movements, an environmental risk assessment (ERA) is additionally required and a permit may only be granted if, with mitigation measures, this shows low risk to the environment. The competent authority decides who bears the cost of ERA. The Regulation provides for contingency planning and monitoring for two years following release into open aquaculture facilities. There is no reference to liability or sanctions for environmental damage. The permit requirement does not apply to species listed in Annex IV (currently 10). MS that wish to restrict their use on their territory must comply with	The Regulation establishes a procedure for adding additional species to Annex IV (conditions include that species must have been used in aquaculture for a long time in certain parts of the Community with no 'adverse effects'). Commission Regulation (EC) No 535/2008 of 13 June 2008 lays down detailed rules implementing the conditions necessary for adding species to Annex IV to Regulation 708/2007 and for the development of a specific information system concerning permits for introductions/translocations of alien and locally absent species in aquaculture. 'Adverse effect' is defined to mean a case where scientific evidence shows that an aquatic species, after its introduction in a certain MS, cause *inter alia*, significant: (i) habitat degradation; (ii) competition with native species for spawning habitat; (iii) hybridisation with native species threatening species integrity; (iv) predation on native species' population resulting in	The Regulation will enter into force on 1 January 2009. It is not yet clear how MS will build awareness of this instrument within the aquaculture sector. Data requirements to carry out a risk assessment of new alien species and to conduct post-introduction monitoring are extremely detailed (as under the voluntary ICES/EIFAC Codes). The technical and cost implications of this requirement may deter aquaculture operators from considering new alien species for their operations. Certain aspects (eg determination of 'locally absent') are likely to require an increase in biological expertise, especially taxonomy (pers. comm., S.Gollasch, 16 September 2008). At present, the UK and Ireland are the only MS following the voluntary requirements proposed in the updated ICES Code of Practice (2005). Swedish law prohibits the introduction of certain alien aquatic species. The Code is not in use in MS such as Spain, Italy, Germany, Belgium and France (pers. comm., S.Gollasch, 16 September 2008).	The proposal specifically refers to transfers 'to, from or between the non-European territories of a Member State'.

	Instrument	Main purpose	Extent applicable to IAS?	Policy developments since 2006	Recent evidence as to application/effectiveness?	Overseas Entities (application)
			risk assessment procedures (Art.9). The Regulation requires prior consultation for proposed introductions that may affect neighbouring MS: the decision is then taken by the Commission after consulting the Scientific, Technical and Economic Committee for Fisheries (STECF) (established under Regulation (EC) No 2371/2002) and the Advisory Committee for Fisheries and Aquaculture (established by Decision 1999/478/EC) (Art.11).	their decline; (v) depletion of native food resources; (vi) spread of disease and novel pathogens in wild aquatic organisms and ecosystems. MS are required to establish and keep up to date an information system containing details of all requests for permits to introduce an alien species or to translocate a locally absent species (information sheets to contain data and follow format indicated in the Annex to this Regulation) and set up a website containing information specified in the Annex by 31 December 2009.		
36*	**Integrated Maritime policy for the European Union (the 'Blue Book') (COM(2007) 575 final) and its Action Plan (SEC(2007) 1278) adopted by the European Commission on 10 October 2007** **http://ec.europa.eu/maritimeaffairs/policy_documents_en.html**	The Policy and Action Plan support action towards integration of maritime affairs across the EU, use of tools for integrated policy-making, improved maritime surveillance, links between maritime spatial planning and integrated coastal zone management, maritime research and the operation of a European Marine Observation and Data Network. They address marine and air pollution by ships, implementation of the ecosystem approach in European fisheries and measures for mitigation and adaptation to climate change.	No specific reference. There is clearly scope to include IAS (especially marine pathways and vectors for alien species introductions) in the national integrated maritime policies that MS are required to prepare in collaboration with stakeholders. However, neither the Policy nor the Action Plan refer to alien species introduction vectors in the aquatic environment. Specifically, there is no reference to the BWM Convention or generally to ballast water.	The Action Plan requires the Commission to propose guidelines in 2008 for national integrated maritime policies and to report annually on EU and Member States' actions in this regard from 2009. The Commission will also organise a stakeholder consultation structure, feeding into further development of the maritime policy and allowing exchange of best practices.	N/A	The Action Plan supports the full integration of the 7 Outermost regions in an EU Maritime Policy. It proposes the participation of ORs and other islands in the networking activities under the *Regions for Economic Change* initiative in 2008.
Ongoing Research						
37*	**Seventh Framework Programme for Research and Technological Development (RTD)** **http://ec.europa.eu/research/fp7/index_en.cfm**	The Seventh Framework Programmes (FP7) for Research and Technological Development (RTD) sets out the Community RTD priorities and activities and aims to support the objectives of the Lisbon agenda (EU to become the 'most dynamic competitive knowledge-based economy in the world'). It supports transnational research in thematic areas, including environment. Key themes are 1) prediction of climate, ecological, earth and ocean systems changes, 2) tools and technologies for monitoring, prevention and mitigation of environmental pressures and risks including those that affect health, and 3) tools and technologies for the sustainability of the natural and man-made environment.	Projects totally or partly addressing IAS that meet FP7 criteria may be funded (see eg PRATIQUE below). EU research can contribute directly to the need to increase knowledge and understanding of the threats posed by IAS through the emphasis on horizontal approach that can cut across different policy areas. FP7 (2007-2013) has total budget of € 53 billion and provides for the creation of a European Research Council.	The first call for proposals covered three biodiversity topics, related to development of the ecosystem services concept. The EEA commissioned a pilot study (Scalera 2008) to assess the contribution of IAS project costs supported by RTD Programme to developing an indicator under SEBI-2010 for EU response action to IAS threats. A cost indicator of this type could help a provide rationale for creating IAS policies and allocating funds to prevention, control and research.	1996-2006: 90 IAS-related projects funded under 4th, 5th and 6th RTD Framework Programmes at total cost of €88 million: • 70 projects focused exclusively on IAS at a total cost of €81.3 million, of which 69% funded by EC; • 20 projects included an IAS component, at total cost €7.4 million. • Average of 7 IAS-related research projects funded per year (yearly budget of € 7 million). • Five additional FP6 projects (budget nearly €2.5 million) began in 2007 (Scalera 2008). Some RTD-funded research contribute directly to IAS information mechanisms and policy development eg DAISIE, ALARM, IMPASSE, INCOFISH, EFFORTS. Others focused on specific IAS or groups. 35% (€35 million) covered phytosanitary research; 10% (€18.7 million) animal health and spread of epizooties, some of interest to human health. The EU has also contributed to administrative support for coordination of IAS-related projects funded under COST (Concerted action projects regarding international cooperation in the field of scientific and technical research) (2 projects on biological control) and under ERA-NET (*EUPHRESCO - Coordination of European Phytosanitary (Statutory Plant Health) Research*: funded by DG SANCO) (Scalera 2008).	
38*	**Enhancements of pest risk analysis techniques**	The purpose of PRATIQUE is to address the major challenges for pest risk analysis (PRA) in	IAS are specifically addressed by PRATIQUE which will produce the first structured inventory of	PRATIQUE began in June 2007 and will run for 39 months, coordinated by the Central Science Laboratory		

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	(PRATIQUE) **https://secure.csl.gov.uk/pratique/index.cfm**	(a) predicting the entry and establishment of new plant pests, diseases and IAS in the EU, (b) estimating potential economic, environmental and social impacts and (c) preventing eradicating, containing and controlling invasions. This will be achieved through improvements to the functionality and user-friendliness of the current EPPO-PRA decision support scheme and a new decision support scheme to combat pest outbreaks.	PRA datasets for the whole EU and undertake targeted research to improve existing procedures and develop new methods for: • the assessment of economic, environmental and social impacts; • summarising risk in effective, harmonised ways that take account of uncertainty; • mapping endangered areas; • pathway risk analysis and systems approaches; • guiding actions during emergencies caused by outbreaks of harmful pests.	(UK). Results will be tested with a representative range of the major pests and IAS affecting EU cultivated and uncultivated habitats and will be independently validated by phytosanitary experts. The deliverables will be provided as protocols, decision support systems and computer programs with examples of best practice made available to pest risk analysts through modules and direct links to the PRA scheme hosted by the European and Mediterranean Plant Protection Organization (EPPO).		
39*	**Development of new diagnostic methods in support of plant health policy** **CALL 2B: KBBE-2008-2B**	The long-term objective is to enable DNA-barcode identification for all quarantine plant pests or pathogens of statutory importance to significantly help tackle increasing risks to EU plant health from exotic pests linked to increased globalisation of trade in plants/products. The project will support better cooperation between EU diagnostic laboratories and potential moves towards reference laboratories by providing central approaches and a standardised and vouchered resource for using DNA/RNA sequence data in diagnostics for quarantine plants pests and pathogens.	Relevant to IAS that are pests of plants and plant products: identification techniques developed may have relevance to broader categories of potential IAS. Key work will include: obtaining or producing relevant vouchered sequence data for individual pests or pest groups and position them in a correct taxonomic context, developing generic diagnostic tools based on these barcode sequences; linking vouchered sequence information to published biological information; developing strategic approaches and methodologies to enable the establishment of DNA banks and access to digital voucher specimens	N/A		
40*	**IMPASSE (Environmental impacts of alien species in aquaculture)** **http://ec.europa.eu/research/fp6/ssp/impasse_en.htm**	IMPASSE will develop guidelines for environmentally sound practices for introductions and translocations in aquaculture, covering quarantine procedures, risk assessment protocols, and procedures for assessing the potential impacts of invasive alien species in aquaculture.	IAS are the sole focus of the project, which involves a review of the economic importance of aquaculture-related introductions and translocations, and the assessment of genetic interactions with wild populations. It is coordinated by the Joint Research Centre.	Outputs to project end (December 2008) included: • review of the importance of alien species in aquaculture operations and aquaculture-based restocking practices; • report on the spread of novel pathogens and disease resulting from alien species; • reports on the social, ecological and economic impacts on ecosystems caused by the introduction of alien species; • review of risk assessment protocols (environmental, fish disease, social, economic); • report on mitigation-remediation procedures and contingency plans; • a report on risk-assessment protocols and decision-making tools; • Guidelines for environmentally sound practices for introductions and translocations.		
41*	**Effective Operations in Ports (EFFORTS) (EC Contract No. FP6-031486)** **http://www.efforts-project.org/**	This FP-6 DG Research Integrated Project aims to improve the competitiveness of European port operations and the quality of the ports labour conditions and market.	The Project's component on 'Ports and Environment' notes that "invasive aquatic species are one of the four greatest threats to the world's oceans, and can cause extremely severe environmental, economic and public health impacts". Work Programme 2.2 covers pollution risks related to ship reception in ports ("Ballast waters pollutions during ships reception" and "Aluminium pollution related to the protection of ports infrastructures/quay"). Outcomes will include recommendations for treatment methods approval consistent with IMO criteria and to help port authorities regarding control activities and to	Project duration is 1 May 2006-1 November 2009. Project information notes that ports are currently not assessing the impact from ballast water but need to be aware of the current status and impact of different harmful aquatic organisms in ballast water and eliminate or at least reduce negative consequences. In case of economic, health or ecologic disaster, the ports liability (and not only of ship owners) could be at stake. At EU level, there is currently no treatment which complies entirely with the last IMO conditions (MEPC 55 10/2006).	Institutions from several MS are contributing to this integrated research in collaboration with the EC Joint Research Centre.	

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			prevent ecological impacts through harmful aquatic organisms in ballast water. Beneficiaries will include ports, citizens, the environment and all industries dependent on an intact aquatic biosphere like the fishing and the tourist industry.			
42	**Delivering Alien Invasive Species Inventories for Europe (DAISIE) Research Project.** **http://www.europe-aliens.org/**	DAISIE's aims are to: • create an inventory of invasive species that threaten European terrestrial, fresh-water and marine environments; • structure the inventory to provide the basis for prevention and control of biological invasions through the understanding of the environmental, social, economic and other factors involved; • assess and summarise the ecological, economic and health risks and impacts of the most widespread and/or noxious invasive species in Europe; • use distribution data and the experiences of individual MS as a framework for considering indicators for early warning.	The sole focus is on IAS. DAISIE's outputs included a European one-stop-shop for information on biological invasions in Europe, the European Alien Species Expertise Registry: the European Alien Species Database: including all known established alien species in Europe, species distribution maps and spatial analysis; a breakdown by taxonomic groups and pathways/vectors; and a list of Europe's worse Invasive Alien Species. DAISIE's primary focus was on species and it does not cover all pathways for introduction (eg import into the Community) or certain categories of potential IAS (eg there is no information on human disease).	DAISIE was completed in 2008 (concluding conference on 'Biological invasions in Europe and the DAISIE initiative: current threats and future perspectives', Portoroz, Slovenia 23 January 2008). Building on the information resources developed and interlinked through DAISIE, the EEA launched a feasibility study for Developing a European Early Warning System for invasive alien species which is currently being conducted by DAISIE collaborators.	Research institutions from twelve MS participated in the DAISIE project, coordinated by ISPRA–Italy.	
43	**Assessing Large scale Risks for biodiversity with tested Methods (ALARM) Research Project** **http://alarmproject.net/alarm**	ALARM project goals are to: • develop an integrated large scale risk assessment for biodiversity as well as terrestrial and freshwater ecosystems as a part of environmental risk assessment, and to focus on risks consequent on climate change, environmental chemicals, rates and extent of loss of pollinators and biological invasions; • establish socio-economic risk indicators related to the drivers of biodiversity pressures as a tool to support long-term oriented mitigating policies and to monitor their implementation; • provide a contribution to objective based politics, to policy integration and to derive outcome-oriented policy measures in the field of biodiversity preservation by contributing to the integrated assessment of socio-economic drivers affecting biodiversity and integrated, long-term oriented means to mitigate them.	IAS are specifically addressed by the project's Biological Invasions module to develop and test protocols to help prevent the introduction and spread of invasive species to European ecosystems. A range of taxonomic groups are being analysed using global and European databases. Risk analyses cover: the pathways of invasions; the invasibility of European ecosystems; characteristics of successful invaders; environmental drivers of invasion related to climate, land cover and population density; and the testing and integration of the elements named above where traditionally, these factors have been assessed separately. Impacts being taken into account include impact on: the gene pool of native species; the decline of native populations; the richness and functioning of ecosystems; socio-economic pressures (such as declines in agricultural, silvicultural or fishery yields); the management of invasive species, ie what is the effort of removing an invader from a system; and the integration of the previous analyses.	ALARM is contributing to the development of risk and impact assessments of biological invasions, in parallel to the IMPASSE project which focuses on aquaculture.	The biological invasions module of ALARM has produced deliverables such as: • Comparative analysis of the pathways of biological invasions in Europe (eg Hulme et al, 2008) • Predictive models of the susceptibility of representative European ecosystems to invasion • Risk index for non-native species and ecosystems in Europe. Deliverables are available through the project website.	
44	**Streamlining European 2010 BioDiversity Indicators (SEBI-2010)** **Information on the project is available at http://biodiversity-chm.eea.eu.int/information/indicator/F1090245995**	SEBI-2010, led by European Environment Agency, was set up in 2005 to select biodiversity indicators and maximise streamlining with national, regional and global indicators. It is linked to the CBD initiative to develop IAS indicator, coordinated by GISP.	The SEBI-2010 *Expert Group on Trends in IAS in Europe* has outlined strategy for development of IAS indicator, composed of 5 specific indicator elements to be further developed: • Cumulative number of alien species established in Europe since 1900 • Worst IAS threatening biodiversity in Europe • Impacts/abundance of IAS • Policy development • Cost	Phase 1 (2005-7): first two indicator elements developed and proposed for inclusion in the set of European biodiversity indicators. Information to be broken down by major ecosystems (terrestrial, freshwater and marine) and selected taxonomic groups: vertebrates, invertebrates and plants (vascular plants, algae and fungi). Pilot project commissioned on Indicator 5 (Cost) (Scalera, R. 2008. EU funding for management and research of invasive alien species in Europe: Contract no. 3603/B2007.EEA.53070).	EEA indicated (Feb.2008) that the Expert Group is still in existence but is not currently funded. An EEA assessment report on general progress towards the 2010 target will be published in 2009. A specific chapter on IAS will be included in a new EEA report, 'Signals', published early 2009. EEA is currently negotiating with NOBANIS to obtain an expanded dataset for the indicator 'Cumulative numbers on invasive species establishing in Europe'. Indicator 4 (Policy development) does not have precise criteria: one option under discussion is to link this to IAS reporting requirements under the Bern Convention to cover national implementation of the European Strategy on IAS more concretely. Discussions are under way on	Data from Overseas Entities should be included, but at present it is unclear whether this will occur.

	Instrument	Main purpose	Extent applicable to IAS?	Policy developments since 2006	Recent evidence as to application/effectiveness?	Overseas Entities (application)
					how IAS should be reflected in the EEA Work Programme for 2009.	
Climate change/Renewable energies						
45*	**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** http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF	To establish a common framework for the promotion of energy from renewable sources. It sets mandatory national targets for the overall share of energy from renewable sources in gross final consumption of energy and for the share of energy from renewable sources in transport.	No reference to IAS but energy generated from biofuels and bioliquids may only count towards Community targets and be eligible for financial support if consistent with sustainability criteria (see Art.17), including: • Raw materials not to be obtained from specified categories of land of high biodiversity value (17.3), high carbon stock (17.4) or peatland (17.5); • agricultural raw materials cultivated in the Community and used for the production of biofuels and bioliquids to be obtained consistent with requirements of 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.	N/A	N/A	
46	**EU biomass action plan (COM (2005) 628 adopted on 7 December 2005)** **http://ec.europa.eu/energy/res/biomass_action_plan/**	Action plan is designed to increase the use of energy from forestry, agriculture and waste materials.	No specific reference to IAS. Relevant to IAS in the context of intentional introduction of plant species for biofuel production.	The Commission launched a public consultation on the preparation of a report on requirements for a sustainability scheme for energy uses of biomass (August-September 2008)	None found	Applicable
47*	**White Paper "Adapting to climate change in Europe – options for EU action" (COM (2009) 147 final) adopted by the European Commission on 1 April 2009** **http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52007DC0354:EN:NOT**	Sets out a two-phase strategic approach to strengthen EU resilience in coping with climate change. The first phase of the Strategy will run until 2012 and will lay the groundwork for preparing a comprehensive EU adaptation strategy from 2013. Phase 1 will focus on four pillars of action: 1) building a solid knowledge base on the impact and consequences of climate change for the EU, 2) integrating adaptation into EU key policy areas; 3) employing a combination of policy instruments (market-based instruments, guidelines, public-private partnerships) to ensure effective delivery of adaptation and 4) stepping up international cooperation on adaptation.	No specific reference to IAS. White Paper 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. In future it may be necessary to consider establishing a permeable landscape in order to enhance interconnectivity of natural areas.	On 1 April 2009, the Commission also presented three discussion papers on water, coasts and marine, agricultural and health issues based on the framework set out in the White Paper. The White Paper provides that most adaptation measures will need to be taken nationally and regionally, with Member State actions supported through an integrated and coordinated approach, particularly in cross-border issues and policies which are highly integrated at EU level. An Impact and Adaptation Steering Group will be established and, by 2011, a Clearing House Mechanism to exchange information on climate change risks, impacts and best practices.		Réunion recommends stronger reference to, or inclusion of, the ORs and OCTs
Forestry						

	Instrument	Main purpose	Extent applicable to IAS?	Policy developments since 2006	Recent evidence as to application/effectiveness?	Overseas Entities (application)
48*	**Communication on an EU Forest Action Plan (COM(2006) 302 final of 15.06.2006)** **http://ec.europa.eu/agriculture/fore/action_plan/com_en.pdf**	The EU Forest Action Plan (building on the 1998 EU Forestry Strategy) establishes a framework for forest-related actions at Community and Member State level and serves as an instrument of coordination between Community actions and the forest policies of the Member States. Its overall objective is to support and enhance sustainable forest management and the multifunctional role of forests	IAS are specifically addressed in **Key action 9: Protection of EU Forests** which notes that global trade and climate change have increased the potential vectors for harmful organisms and invasive species. The Commission's commitments include: • further analysis of factors affecting forest condition in Europe (including forest fires); • encouraging MS to form groupings to study particular regional problems with the condition of forests (NB this could include IAS that are forest pests with transboundary impacts); • support for research on protection of forests and phytosanitary issues under the 7th Research Framework Programme. MS may, with support from the EAFRD and LIFE+: • promote Natura 2000-forest measures and schemes for forest owners to engage in voluntary environmental commitments; • review and update broader protection strategies against biotic and abiotic agents, including studies on risk assessment in relation to harmful organisms and invasive species.	N/A	None found	N/A
Soil						
49	**Proposed Soil Thematic Strategy COM(2006)231 final of 22.09.2006)** **http://ec.europa.eu/environment/soil/pdf/com_2006_0231_en.pdf**	The proposed Strategy supports a common framework and principles for protecting soils across the EU, within which Member States will be in a position to decide how best to protect soil and how use it in a sustainable way on their own territory.	No reference to IAS in current text.	N/A		
Development cooperation and external assistance						
50	**EU Development Policy: Joint statement 'The European Consensus on Development' (2006/C 46/01)** **http://europa.eu/scadplus/leg/en/lvb/r12544.htm**	The Joint Statement on Development sets out a framework of common objectives, values and principles for development co-operation within the EU. It puts poverty eradication in line with the UN Millennium Development Goals (MDGs) as the overriding objective of the EU policy.	No specific reference. Addressing IAS can fall within the general biodiversity related scope of the Joint Statement, which commits the Community to support the efforts undertaken by its partner countries to incorporate environmental considerations into development, and help increase their capacity to implement multilateral environmental agreements, eg Convention on Biological Diversity. Additionally, protection of the environment must be included in the definition and implementation of all Community policies, particularly in order to promote sustainable development.	The Commission's Environmental Integration Manual, designed to assist in mainstreaming of environmental issues across all relevant policy areas, was completed in 2006. Advice covers integration of environmental considerations into Country Environmental Profiles which are the basis for programming much of EC external assistance. Annual Report 2007 on the European Community's Development Policy and the Implementation of External Assistance in 2006 (COM(2007) 349 final of 21 June 2007) highlights rolling 2006-2007 programme of 'Policy Coherence for Development' which plays a central role in reinforcing the EU contribution to developing countries progress towards the Millennium Development Goals. The aim is to maximise the positive impact of these policies on partner countries and to correct incoherence.	None found	Applicable (with possible exceptions)

	Instrument	Main purpose	Extent applicable to IAS?	Policy developments since 2006	Recent evidence as to application/effectiveness?	Overseas Entities (application)
51	**EU External Action: Thematic Programme For Environment and Sustainable Management of Natural Resources including Energy (COM(2006) 20)** **http://europa.eu/scadplus/leg/en/lvb/l28173.htm**	A thematic programme for the environment and sustainable management of natural resources, including energy, is proposed to address the environmental dimension of development and other external policies as well as to help promote the European Union's environmental and energy policies abroad. The programme is delivered through a set of six instruments for Community external assistance under the Financial Perspectives 2007 to 2013 (see below).	Role of healthy and fully functional ecosystems providing several goods and services, eg resilience against IAS, is mentioned in the context of key environment and sustainable natural resource issues which are of concern to the EU (Annex 2). Addressing IAS can fall within the general biodiversity-related scope of the thematic programme. The thematic programme supports existing environmental initiatives such as the implementation of the Rio Conventions on climate change, biodiversity and desertification.	€120 million has been allocated to biodiversity-related matters under 2007-2010 ENRTP, including a component for climate change and biodiversity.	See under EDF below (South Atlantic project).	Applicable (with possible exceptions)
52*	**EU External Action: Regulations for the instruments for external assistance in 2007-2013:** 1638/2006/EC for European Neighbourhood Partnership Instrument (ENPI); 1905/2006/EC for Development Co-operation Instrument (DCI); 1717/2006/EC for Instrument for Stability (IfS); and 1257/96/EC on humanitarian aid). Council Regulation (EC) No.1257/96 concerning humanitarian aid Regulations on Macro Financial Assistance http://europa.eu/scadplus/leg/en/s05031.htm	In the context of the Financial Regulation, these six regulations provide the 'basic acts' for the relevant budget appropriations under Heading 4 'The EU as a Global Player' of the future Financial Perspectives.	No specific reference, although IAS could be addressed under the general environmental component of certain instruments. For example: the ENPI instrument states that Community assistance shall be used to support measures which pursue one or more of the following objectives […] promoting environmental protection and good management of natural resources [...] supporting crossborder cooperation to promote sustainable economic, social and environmental development in border regions; the Development Cooperation and Economic Cooperation instrument states that the supported measures shall relate inter alia to [...] environmental protection.	N/A	None found	Applicable to a certain extent (ie some instruments)
53	**Action Plan to accompany the EU Strategy on Climate Change in the Context of Development Cooperation – Action Plan 2004-2008** (adopted by the General Affairs and External Relations Council at its meeting on 22 November 2004) http://ec.europa.eu/development/icenter/repository/env_cc_com_2003_85_en.pdf	The Action Plan provides a tool for the EU Member States and the Commission to actively assist partner countries in their efforts to address Climate Change and implement the UNFCCC and the Kyoto Protocol.	No specific reference to IAS. The implementation of the Action Plan supports coherence/synergies with the CBD. This should cover aspects related to IAS ie assessment of risks associated with choice of potentially invasive species in afforestation projects for carbon sinks.	The Communication on Building a Global Climate Change Alliance between the European Union and poor developing countries most vulnerable to climate change (COM(2007) 540 final of 18.9.2007) will spend €60m in 2008-10 to create awareness and jointly address climate change between the EU and the most vulnerable developing countries. IAS could be integrated into funded projects in view of the recognised links between climate change and biological invasions.	None found	Applicable
54	**European Neighbourhood Policy (ENP) – strategy paper COM(2004)373)** http://ec.europa.eu/world/enp/documents_en.htm#1	The ENP is designed to give new impetus to cooperation with the EU's neighbours following enlargement. The policy applies to Algeria, Armenia, Azerbaijan, Belarus, Egypt, Georgia, Israel, Jordan, Lebanon, Libya, Moldova, Morocco, the Palestinian Authority, Syria, Tunisia and Ukraine.	No specific reference In principle, IAS could be addressed under the general environmental objective of the strategy, eg as apart of the EU-ENP cooperation activities.	The 2007 report on implementation (COM(2007) 774 final, 5.12.2007) commits the Commission to deepen its climate change dialogue and increase support for efforts to achieve a cleaner environment in the neighbourhood. IAS components could be integrated into certain areas proposed for stronger cooperation (eg the Danube Black Sea Task Force) and in general measures to promote shared environmental information systems, EIA, integrated coastal zone management and sustainable tourism throughout the region.	None found.	Not applicable

	Instrument	Main purpose	Extent applicable to IAS?	Policy developments since 2006	Recent evidence as to application/effectiveness?	Overseas Entities (application)
55	**The Cotonou Agreement between the ECP countries and the EC** (signed on 23 June 2000) **http://ec.europa.eu/development/geographical/cotonouintro_en.cfm**	The Cotonou Agreement is a global and exemplary agreement that creates the basis for the ACP-EU cooperation. It is based on five interdependent pillars with the underlying objective of the fight against poverty: an enhanced political dimension, increased participation, and a more strategic approach to cooperation focusing on poverty reduction, new economic and trade partnerships and improved financial cooperation.	No specific reference to IAS. **Addressing IAS as a cross-cutting issue within ACP cooperation could fall under the general provisions related to environment:** Article 1 on objectives of the partnership; 'The principles of sustainable management of natural resources and the environment shall be applied and integrated at every level of the partnership.'; Article 49 on trade and environment: 'The Parties reaffirm their commitment to promoting the development of international trade in such a way as to ensure sustainable and sound management of the environment, in accordance with the international conventions and undertakings in this area and with due regard to their respective level of development.' **Areas of cooperation under the Agreement can include aspects of IAS:** Article 22: Cooperation on environmental protection and sustainable utilisation and management of natural resources shall aim at […] supporting specific measures and schemes aimed at addressing critical sustainable management issues and also relating to current and future regional and international commitments concerning mineral and natural resources such as […]tropical forests, water resources, coastal, marine and fisheries resources, wildlife, soils, biodiversity; protection of fragile ecosystems (e.g. coral reef); renewable energy sources notably solar energy and energy efficiency; sustainable rural and urban development; desertification, drought and deforestation; developing innovative solutions to urban environmental problems; and promotion of sustainable tourism.	None found.	None found	Applicable
56	**Decision of the ACP-EC Council of Ministers on the Compendium providing policy guidelines in specific areas or sectors of cooperation (adopted in General Affairs Council meeting on 22-23 January 2001)** **http://ec.europa.eu/development/policies/legislation/policypapers_en.cfm**	The compendium of texts on co-operation strategies is intended to provide detailed reference texts as regards objectives, policy orientations and operational guidelines in specific areas or sectors of co-operation, as provided for in article 20(3) of the ACP-EC Partnership Agreement. These orientations and guidelines will be developed and applied within the framework of the integrated approach for cooperation strategies as set out in the Agreement and on the basis of the provisions on development finance co-operation.	Relevant to IAS in the context of animal health: [….] cooperation should provide support for improved animal health and campaigns to control zoonoses, including, where justified, the development of infrastructure for that purpose. **IAS could be addressed under the cross-cutting environmental objective**, eg on preventive approach on the basis of the precautionary principle aimed at avoiding harmful effects on the environment as a result of any programme or operation. **Specific areas of cooperation under the Agreement can include aspects of IAS, for example:** Co-operation in the forestry sector shall give, for example, to improving sustainability of interventions in forest conservation and management […] support locally adapted re-afforestation and forest management activities […].Cooperation in the fisheries sector assistance, for example, [...] for the formulation and implementation of sectoral fisheries policies that comply with the FAO Code of Conduct [...]		None found	Applicable

	Instrument	Main purpose	Extent applicable to IAS?	Policy developments since 2006	Recent evidence as to application/effectiveness?	Overseas Entities (application)
57	**EU Strategy for Africa: Towards a Euro-African pact to accelerate Africa's development (COM(2005) 489)** **http://europa.eu/scadplus/leg/en/lvb/r12540.htm**	The purpose of the EU Strategy for Africa is to give the EU a comprehensive, integrated and long-term framework for its relations with the African continent. The principal objective is to promote the achievement of the UN Millennium Development Goals (MDGs) in Africa.	Yes, work on IAS mentioned as one of the areas to be supported by the EU in the context of environmentally sustainable future and conservation of biodiversity in Africa (Chapter 3.1.3.2). Yes, **IAS is one of the areas to be supported to conserve biodiversity in Africa.**	Communication on Interconnecting Africa: the EU-Africa Partnership on Infrastructure [COM(2006) 376 final)□The Partnership, based on the EU Strategy for Africa, is the EU's response to the AU-NEPAD Infrastructure Action Plan, will receive €5.6 billion from the 10th European Development Fund (EDF, 2008-13) and be supported by a new EU Infrastructure Trust Fund for Africa set up with the European Investment Bank (EIB). IAS considerations could be considered during the design of Partnership programmes to improve continental and regional infrastructure for transport networks and water, as these can open up new pathways for introductions between bioregions.	None found.	Applicable
58	**A stronger partnership between the European Union and Latin America – strategy for the EU-Latin America partnership (COM(2005)636)** http://ec.europa.eu/external_relations/la/index_en.htm	The strategy analyses the current challenges of EU-Latin America partnership and makes practical recommendations for revitalising the partnership. The recommendations put forward in the strategy include stepping up political dialogue between the two regions, stimulating economic and commercial exchanges, encouraging regional integration, tackling inequality and tailoring its development and aid policy.	No specific reference to IAS. **IAS could fall under the strategy's objective to develop effective environmental dialogues** with a view to promoting sustainable development. Biodiversity and implementation of CBD is one of the focal areas mentioned in this context (Chapter III-3.5).	Regional Programming Document 2007-2013 published on 12 July 2007 notes that additional regional integration measures could be taken in line with the EU Development Cooperation Initiative, giving particular attention *inter alia* to biodiversity (implementation of the Biodiversity Convention).	None found.	Not directly applicable
59	**An EU-Caribbean partnership for growth, stability and development (COM(2006) 86)** http://europa.eu/scadplus/leg/en/lvb/r12548.htm	The strategy aims to provide a foundation for the EU-Caribbean partnership. The objectives of the strategy are to create a political partnership based on shared values, address economic and environmental opportunities and vulnerabilities in the Caribbean and promote social cohesion and combating poverty.	No specific reference to IAS. **IAS could be addressed under the general environmental objective of the strategy.** The strategy states that 'the EU will support the current efforts of the Caribbean to engage into a proactive agenda to jointly manage structural environmental challenges such as […] biodiversity […]' (Chapter 4.2.)	None found.	None found	Applicable
60	**Europe and Asia: A Strategic Framework for Enhanced Partnerships (COM(2001)469)** **http://europa.eu/scadplus/leg/en/lvb/r14202.htm**	The Communication established a strategic framework for EU-Asia relationships and its subregions. The core objective is to core objective of strengthening the EU's political and economic presence across the region, and raising this to a level commensurate with the growing global weight of an enlarged EU.	No specific reference to IAS. One of the objectives for EU-Asia partnership is to strengthen the joint efforts on global environmental issues. In principle, IAS could fall under this broad scope.	None found.	None found	Not applicable
61	**New partnership with South-East Asia (COM(2003)399)** http://europa.eu/scadplus/leg/en/lvb/r14211.htm	The Communication established a strategic framework for the relationship between the EU and South-East Asia. This Communication identifies the strategic priorities for cooperation and outlines actions by which the EU's relationship with the Association of South East-Asian Nations (ASEAN) and the countries of South-East Asia could be improved.	No specific reference **IAS could be addressed under the general environmental objective of the strategy.** The strategy states that the Commission will continue to support bilateral and regional natural resource conservation and natural resource management projects and programmes, eg on biodiversity.	None found.	None found	Not applicable
Trade						
62	**Sustainability Impact Assessment (SIA)** **As based on the Commission's Communication on Impact Assessment (COM (2002) 276) and guided by Handbook for Trade SIA**	Sustainability Impact Assessment (SIA) is a process undertaken during a trade negotiation which seeks to identify economic, social and environmental impacts of a trade agreement. The purpose of an SIA is to integrate sustainability into trade policy by informing negotiators of the possible social, environmental and economic consequences of a trade agreement. An SIA should also provide	No specific reference to IAS. Issues related to trade and transport pathways for potential IAS could be considered as a part of the SIA environment/biodiversity related dimensions. According to the SIA Handbook, a detailed assessment of the impacts of a trade agreement on the three pillars of sustainable development can be	The Commission is conducting SIAs for all planned regional and bilateral free trade and partnership agreements. These studies will include an assessment of potential impacts on biodiversity (eg as a result of trade liberalisation in biofuels) and will identify possible preventive or mitigation measures. The SIA for the planned EC-Mercosur Free Trade Agreement will cover case studies in relation to the effects of trade liberalisation in agricultural products and biofuels. This	None in relation to IAS found	n/a

	Instrument	Main purpose	Extent applicable to IAS?	Policy developments since 2006	Recent evidence as to application/effectiveness?	Overseas Entities (application)
	http://europa.eu.int/comm/trade/issues/global/sia/faqs.htm	guidelines for the design of possible accompanying policy measures. Such measures may go beyond the field of trade as such, and may have implications for internal policy, capacity building or international regulation. Accompanying measures are intended to maximise the positive impacts of the trade negotiations in question, and to reduce any negative impacts.	undertaken if the preliminary overview on potential negative and positive impacts of outcome scenarios so suggests. This detailed assessment can include biodiversity related aspects (namely ecosystem, protected areas and species related objectives). If needed, it might be possible to address IAS as a part of this framework.	could provide an opportunity to screen biofuel pathways for IAS-related risks. From a biodiversity perspective, the Commission notes that in all cases, a key challenge will be to ensure that the recommendations made in these studies inform the negotiations, i.e. that they are translated into concrete policy measures, be they trade or non-trade related (EC 2008a).		
Overseas Countries and Territories (OCTs)						
63	**Council Decision of 27 November 2001 on the association of the overseas countries and territories with the European Community ('Overseas Association Decision') (2001/822/EC)** **http://ec.europa.eu/development/policies/legislation/octsleg_en.cfm**	The Decision sets the basis for the association of the OCTs with the Community basing on the purpose set out in Article 182 of the Treaty, namely to promote the economic and social development of the OCTs and to establish close economic relations between them and the Community as a whole. It shall pursue the objectives laid down in Article 183 of the Treaty in accordance with the principles set out in Articles 184 to 188 of the Treaty by focusing on the reduction, prevention and, eventually, eradication of poverty and on sustainable development and gradual integration into the regional and world economies.	No specific reference to IAS The Decision states that the Community shall cooperate with the OCTs in the conservation, sustainable use and management of their biological diversity taking into account the Community Action Plan on biological diversity. Addressing IAS can fall within the general biodiversity related scope included in the Decision, eg supporting the implementation of CBD and the elaboration, updating and implementation of national biodiversity strategies and action plans.	The sixth OCT-EU Forum (Brussels, 27-28 November 2007) discussed the future OCT-EU Green Paper and general issues, including the islands' exceptionally high biodiversity and threats related to climate change (http://ec.europa.eu/development/icenter/repository/oct_forum_2007_report_en.pdf). The EC Biodiversity Communication (2006) emphasises 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 is currently out to consultation (1 July-17 October 2008). The consultation document does not mention IAS but notes that all OCTs are characterised by a biodiversity that is much richer than in continental Europe as a whole and that these insular and isolated countries and territories constitute privileged locations for the development of endemic species. OCTs' environmental concerns merit special attention given their fragility in the face of climate change and their potential based on their biodiversity. The preservation of the OCTs' biodiversity is considered of major importance for the Community and for the world at large, but the current Overseas Association Decision does not confer any responsibilities on the OCTs to engage effectively in environmental protection and conservation activities according to Community standards. (http://ec.europa.eu/development/icenter/repository/1_EN_ACT_part1_v8.pdf)	The interlinkages between IAS, biodiversity management and climate change adaptation have been addressed by: • France (le Grenelle de l'Environnement): broad public consultation programme in 2007 which proposed a specific environmental programme devoted to French DOMs and OCTs (strategic fields include natural resources and biodiversity, with detailed IAS coverage); • UK (2006-2009 project coordinated by the Royal Society for the Protection of Birds *Increasing regional capacity to reduce the impacts of invasive species on the South Atlantic United Kingdom Overseas Territories:* funding of €2 million through EDF-9, Commission's EuropeAid Cooperation Office); • EDF funding provided through EuropeAid Cooperation Office to regional project on IAS in the Caribbean (*Management Needs of Nature-Protected Areas to support Sustainable Economies*) (Scalera 2008).	Applicable
64	**Commission Regulation on implementing Council Decision 2001/822/EC on the association of the overseas countries and territories with the European Community ('Overseas Association Decision') (No 2304/2002/EC)** **http://ec.europa.eu/development/policies/legislation/octsleg_en.cfm**	The Regulation lays down the procedures for the programming, implementation and control of the Community financial assistance to the OCT managed by the Commission under the This Regulation lays down the procedures for the programming, implementation and control of the Community financial assistance to the OCT managed by the Commission under the Ninth European Development Fund (EDF) covering the period 2003–2007, in accordance with the provisions of the Overseas Association Decision and the EDF Financial Regulation (EDF).	No provisions to address IAS directly or indirectly. However, the Regulation states that the Commission shall appraise the proposal for the OCT Single Programming Documents (SPD) to determine whether it contains all the elements required and is consistent with the aims of the Overseas Association Decision, this Regulation and the relevant Community policies.			
	Outermost Regions					
65	**Commission Communication of 26 May 2005 "A stronger partnership for the Outermost Regions" COM/2004/0343 final** **http://europa.eu/scadplus/leg/en/lvb/g24237.htm**	The Communication recognises the remoteness, insularity, small size, difficult topography and climate, as well as economic dependence on a few products, faced by ORs and proposes measures consistent with European cohesion policy	No reference to IAS. The Communication notes environmental and climatic difficulties (including cyclones, volcanic activity and earthquakes) and the preservation of biodiversity: measures should concentrate on improving environmental conditions, the treatment of waste and taking into account the additional costs generated by particular climatic conditions.	None found.	None found.	Applicable.

Annex 3 UPDATED INFORMATION ON MEMBER STATE INSTRUMENTS AND ACTIVITIES RELEVANT TO IAS

1. AUSTRIA

Legislation: There is no general Federal legislation in place in relation to IAS, although the Austrian Law on Plant Protection (1995) covers IAS that are plant pests and the issue is under regional federal states (Länder) jurisdiction (Lebensministerium (Austria) 2005). The introduction of alien plants is restricted in eight of nine federal states, introduction of animals is restricted in all nine federal states. In some federal states, there is an exception for species introduced for fisheries, agricultural and forestry purposes.

Policy: Austria published a National Action Plan on IAS (2004) ('Aktionsplan Neobiota'). It is structured in four thematic fields, which cover 1) education and awareness rising, 2) capacity building, 3) research and monitoring, and 4) legal and organisational implementation. In each thematic field, actors, objectives, and measures have been addressed and prioritised. This Action plan is part of the revised Austrian national biodiversity strategy.

Research: Some research projects (eg inventory on IAS in Austria, ecological and economic impact of selected species, research on IAS under climate change in Austria) have been financed by governmental and research bodies. Austria is participating in the DAISIE, NOBANIS, ALARM and SEBI2010 projects. Austria hosted the 4th NEOBIOTA European Conference on Biological Invasions and a national conference on IAS and climate change is scheduled for 2009.

A risk assessment scheme (black list) to evaluate risks posed by IAS to native biodiversity project team has been developed by the Austrian Environment Agency in collaboration with the German Nature Conservation Agency. This is not legally binding, but will be used as a guiding instrument with results to be published online (possibly on www.neophyten.de). It is hoped that federal nature conservation authorities will use it as a decision-making tool with regard to applications to import or release animals and plants. The criteria used focus on documented negative impacts on native biodiversity, without reference to economic impacts. In accordance with the European Strategy on IAS (Genovesi and Shine, 2004), the scheme provides for different lists (black list, grey list) according to the certainty (or uncertainty) of the impact. The methodology has recently been approved by the German Agency for Nature Conservation and will be published by end 2008, followed by translation into English. Species lists will be developed separately for Germany and Austria. The system is currently being tested with selected plant and fish species to see how it works.

Eradication/control programmes: Eradication and control programmes, including monitoring, are underway for selected species (eg plants such as *Acer negundo, Ailanthus altissima, Fallopia japonica, F. sachalinensis, Fraxinus pennsylvanica, Heracleum mantegazzianum, Impatiens glandulifera, Populus x canadensis, Robinia pseudacacia, Solidago canadensis, S. gigantea*; animals such as *Anoplophora*

glabripennis, Fascioloides magna). Control is almost exclusively in protected or ecologically important areas (eg National Parks, pannonic dry grasslands). Hunting is allowed for some introduced animal species, and some pest species are under chemical control (especially pests of agriculture and forestry).

Other activities (botanic gardens and horticulture): In 2007, guidelines for actions related to alien plant species in botanic gardens[1] were jointly adopted by the *Verband Botanischer Gärten e.V* (the botanic garden federation of German-speaking countries) and the *AG Österreichische Botanische Gärten* (Austrian Botanic Gardens Working Group). These specify that botanic gardens have to take responsibility for informing the public (eg, by flagging ornamental plants potentially creating problems or by organising informative exhibitions) and raise awareness of the IAS problem generally and that they must take actions to reduce the risk of introducing new species that are potentially invasive in a region. For example, the Botanic Garden of the University of Vienna has eliminated Poison Ivy (*Toxicodendron radicans*) from its open area display to avoid the potential escape of this species (which causes serious allergic reactions) into the wild.

As part of implementation of the Global Strategy for Plant Conservation targets in Austria, the Austrian Ministry of Agriculture, Forestry, Environment and Water Management is currently supporting the establishment of a website at the site of the Austrian Botanic Gardens Working Group (linked inter alia to the corresponding sites at the Austrian Environmental Agency and the CBD-Focal Point). The site is intended to collect information about potential invasiveness of species cultivated at botanic gardens or newly reported as occurring in Austria as well as providing relevant links and documents. A trial online version will be operational from September 2008.

Challenges/limitations: Constraints to addressing all IAS issues identified in Austria are availability of sufficient funding and to some extent also the decentralised political and governmental structure, influencing cooperation on IAS at national and supranational level (Lebensministerium (Austria) 2005). One key improvement would be the establishment of a permanent national monitoring system for alien species. From the knowledge point of view, the information about alien species differs widely between different taxonomic groups.

2. BELGIUM

Legislation: At the Federal level, there are legal measures in place related to import, export and transit of non-indigenous wild bird species (*Arrêté royal portant des mesures relatives à l'importation et au transit de certaines espèces d'oiseaux sauvages non indigènes* of 26 October 2001, Art 3 §1) with an exception if the birds were bred in captivity. The deliberate introduction of alien species to the marine environment is forbidden (Royal Decree on the protection of species in the marine waters under Belgian jurisdiction, 2001). In addition, the Belgian Law of 20.01.1999 on the protection of the marine environment in marine areas under Belgian

[1] Kiehn M., Lauerer M., Lobin W., Schepker H., Klingenstein F., 2007. Grundsätze im Umgang mit invasiven und potentiell invasiven Pflanzenarten in Botanischen Gärten. Gärtn. Bot. Brief 169: 39-41.

jurisdiction forbids the intentional introduction of non-indigenous species in the marine environment without special licence (Art. 11, §1). The unintentional introduction of non-indigenous species via ballast water of ships can be prohibited by Royal Decree (Art. 11, §2), but is not currently addressed. Measures can also be taken (by Royal Decree and after scientific consultation) for the extermination of non-indigenous nuisance species (Art. 11, §3). The Law also prohibits the intentional introduction of genetically modified organisms into marine areas (Art. 11, §4).

Most activity in relation to IAS in Belgium is focused at the level of the three regions.

- In the Flemish Region, it is prohibited to introduce animals and plants without a permit (Forest Decree) in both public forests and forest reserves. The introduction of alien animal species is prohibited, and there is a legal base for measures to control and eradicate alien animal species. Measures can also be taken to control or prohibit the transport of animal species and their carcasses (Decree on Nature Conservation). A Decision describes what species of fish can be used as fish bait (only native fish species are allowed).

- In the Walloon Region: the introduction of non-indigenous species or indigenous species of non-indigenous origin in nature is prohibited except for species used for agriculture and forestry.

- In the Brussels Capital Region: it is prohibited to introduce non-indigenous species of birds into the wild.

Policy: Action 18 of the 2nd Belgian Federal Plan for Sustainable Development is devoted to biodiversity and focuses on sectoral integration of biodiversity in key Federal sectors (transport, economy, development cooperation, and scientific policy). The Action Plan for 'integration of biodiversity in the economic sector' (in preparation, adoption excepted end 2008) will address IAS. Actions foreseen in this action plan include:

- consultation of key sectors to increase awareness and understanding of the issue and identification of the most appropriate measures (eg labelling, substitution, information, etc.)
- review/updating/extension of existing legislation at federal level to prevent introduction of IAS in Belgium.

The National Biodiversity Strategy (adopted in October 2006 by the Interministerial Conference Environment) identifies the following strategic and operational objectives directly related to IAS:

- Strategic objective n°3: Maintain or rehabilitate biodiversity in Belgium to a favourable conservation status (operational objective n°3.7.: "*Avoid the introduction and mitigate the impact of invasive alien species on biodiversity")*;

- Strategic objective n°5: Improve the integration of biodiversity concerns into all social and economic sectoral policies (operational objective n°5.7.: "*Consider the potential impact on biodiversity, and in particular the invasiveness of species, in making import and export decisions")*. For the time being, this provision has not

yet been implemented and is thus not taken into consideration in Belgium's import and export policies, but the legal possibilities are currently being studied in detail as this constitutes a formal engagement at the national level[2].

The 'Belgian Forum on Invasive Alien Species (BFIS)'[2] is the Belgian node of the IUCN Invasive Species Specialist Group and the NOBANIS network. It aims to provide and gather scientific knowledge about invasive alien species in order to reduce threats to natural ecosystems.

Research: Several significant research projects relating to IAS have been undertaken in Belgium. These include: 'Invasive plants in Belgium: patterns, processes and monitoring' (INPLANBEL)[3]; alien crustaceans and molluscs in Belgium, 1996-ongoing, RBINS-MUMM; invasive species in the Walloon watercourses CRNFB, MRW-DCENN and FSAGx; 'Bijzondere Broedvogels Vlaanderen Project' (Flemish Special Breeding Bird Project). Research includes investigation of control of *Fallopia japonica* and *Heracleum mantegazzianum* in nature reserves.

Belgium has published a black list of invasive alien species based on a standardised impact assessment protocol (ISEIA). This list is the responsibility of members of the Belgian Forum on Invasive Species. It is not exhaustive and will be progressively completed. Species profiles including description, habitat preferences and detrimental impact are currently in development (see: http://ias.biodiversity.be).

Belgium participates in the ALARM project. The Walloon Region is funding a project dedicated to the identification of best management practices for the control of invasive plants (see http://www.fsagx.ac.be/ec/gestioninvasives/pages/Accueil.htm). Other ongoing research programs include:

- Alien impact: biodiversity impacts of highly invasive alien plants: mechanisms, enhancing factors and risk assessment ("Science for sustainable development" research programme 2007-2009, Belgian Federal Science Policy Service (Belspo);

- Modirisk : aims to study biodiversity of mosquitoes and monitor/predict changes, thus actively preparing to address issues related to the impact of biodiversity change with particular reference to invasive species and the risk of introducing new pathogens (Belspo).

Eradication/control programmes:

Control of IAS to protect dykes:

The Belgian regions are trying to eradicate both the muskrat and coypu, mainly to protect dikes. For this purpose, two international projects have been set up to address muskrat control: one between East- and West-Flanders and Zeeland (NL), another between West-Flanders, the North of France and the Walloon Region. A third project, aimed at coypu control, is now being established and will involve the Belgian and Dutch provinces of Limburg, and Germany.

A brochure on *Fallopia japonica, Heracleum mantegazzianum, Impatiens glandulifera* and *Senecio inaequidens* containing recommendations for the eradication

[2] Pers.comm., Claire Collin, Belgian federal Ministry for Health, Food Chain Safety and Environment.

or control of these species is available at the Ministry of the Walloon Region. Eradication/control programmes for these species are actively implemented along some river basins.

In Flanders there is active eradication of the Black cherry (*Prunus serotina*) in some areas and a programme to control the presence of floating pennywort (*Hydrocotyle ranunculoides*) in waterways. A localised but increasing population of an Asian squirrel species (*Callosciurus erythraeus*) was actively controlled in the spring of 2008: preliminary results indicate that this was very successful.

Other activities (reducing risk from invasive species by promoting use of natives): In the Flemish Region, subsidies are paid for planting and reafforestation with native trees and shrubs under the 'Bosdecreet' (Besluit Vlaamse Regering du 27/06/2003 on subsidies for managers of private and public forests). The Flemish Institute for Nature and Forestry (INBO) has an advisory role and ensures that such native trees are used in appropriate locations. This legislation forms an integral part of Flemish forest policy which is different from the policy in place in the Walloon Region. However, subsidies for tree planting on agricultural land (Besluit Vlaamse Regering of 28/03/2003) are available for some exotic species (including larch (*Larix decidua)*, Locust tree (*Robinia pseudoacacia*), Red Oak (*Quercus rubra*); Corsican pine (*Pinus nigra subsp. Laricio*); Douglas fir (*Pseudotsuga menziesii)* and poplar) which are promoted on economic grounds of more rapid and higher profitability.

Challenges/limitations: Belgium lacks effective coordination of its national and regional programmes (Royal Belgian Institute of Natural Sciences 2005). There is also a lack of a regulation tool for the introduction of biocontrol agents in Belgium. A legal framework and a risk assessment procedure must be developed at the federal level, taking into account the results of the ongoing research project by SPF_FOD (methodology in risk analysis for the registration of bio control agents-macro-organisms).

The Federal Public Service Health, Food Chain Security and Environment - DG Environment commissioned a survey on the legal aspects of IAS in 2006. The survey analysed all relevant Federal legislation, identified gaps and proposed legal options to be considered in order to regulate import, transit and trade of IAS[4].

2 See: http://www.biodiversity.be/bbpf/.
3 See project website at www.fsagx.ac.be/ec/inplanbel.
4 Information from Marianne Schlesser, Belgian representative at BEG 13 June 2006.

3. BULGARIA

Legislation: The Biological Diversity Law 2002 (amended most recently in 2007) defines regulation of the introduction of non-native and the reintroduction of native plant and animal species into the wild as one of its specific objectives (Article 2.4).

Article 67 provides that the introduction into the wild, import, breeding and raising of non-native animal and plant species shall only be permitted where this is not detrimental to natural habitats or to native species of wild flora and fauna or to any populations thereof. The authorisation of such activities, on the basis of an elaborated programme, is subject to a positive scientific expert assessment commissioned by the competent authority and a favourable decision of the National Council of Biological Diversity. The competent authority is the Head of the State Forestry Agency (tree, bush and game species) or the Minister of Environment and Water (all other species).

Conditions for the issue of permits by the respective authorities are laid down by *Regulation No.14 on the conditions and order for issuance of permits for introduction of non-native or reintroduction of native tree, bush and game species and giving of the public opinion* (SG 88/2005) and by *Regulation No.4 on the conditions and order for issuance of permits for introduction of non-native or reintroduction of native animal and plant species into the wild* (SG 65/2003).

The competent authority may also issue an order prohibiting the introduction into the wild of any non-native species that would threaten natural habitats or native species and/or the import, breeding and raising of non-native animal and plant species whose accidental introduction into the wild would threaten the existence of any native species of wild flora and fauna (Art.67). No such prohibitions have been issued to date (but see under Research below).

The introduction of plant and animal species not characteristic of the region is prohibited in protected natural territories (national and nature parks, reserves and protected sites) pursuant to Articles 21 and 31 of the Protected Territories Law 1998 (amended most recently in 2008).

The introduction of alien species and the repeated introduction of local species of fish and other aquatic organisms into inland, coastal and marine waters must be conducted in accordance with the Biological Diversity Law (Art.9.2, Fishery and Aquaculture Law 2001 as amended in 2005). This Law designates the Minister of Environment and Water and the Ministry of Agriculture and Food Supply as responsible authorities for preservation of biodiversity of fish resources.

Phytosanitary requirements for the import, export, transit, production and transfer within the country of plants, plant products and other products and specification of border control points are laid down by the Plant Protection Law (State Gazette of 28 March 2003) and by Regulation No.1/1998, SG No 82/1998 (amended by No 91/1999, No 8/2002, No 18/2003, No 7/2006) which implements the legal regulations of EC Directives 77/93, 92/90 and 92/105. The competent authority is the Ministry of Agriculture and Food Supply.

Policy: The National Biodiversity Conservation Strategy (1998), currently implemented through the National Biodiversity Conservation Action Plan 2006-2010, identifies IAS as one of the main threats to national biodiversity. Aquatic ecosystems are considered to be the most sensitive and endangered. A National IAS Strategy and Action Plan for the management of IAS affecting Bulgarian fauna, flora and mycota and the limitation of their impact on natural ecosystems is being developed, building on the European Strategy on Invasive Alien Species (Genovesi and Shine, 2004). A National seminar on "Alien Species in Bulgaria" will be held in October 2008 to contribute to preparation of the future Strategy.

Funding of IAS-related activities includes the following sources: State Budget Resources; European environment-related funding; bilateral collaboration, intergovernmental agreements and other donor funding; and private sources.

Research: Bulgaria participates in the EU-backed DAISIE and ALARM projects. Several significant research projects related to the IAS are being developed or have been completed in Bulgaria in recent years.

In 2007, an Assessment of Invasive Species in Bulgarian Fauna, Flora and Mycota and Measures to Control their Impact on the Native Species and Ecosystems (funded by the Ministry of Environment and Waters) was completed. This project provides the scientific data to prepare national lists of alien and invasive species of vascular plants, fungi and animals. The project included a public awareness component (preparation of brochures and posters concerning alien and invasive species). A key finding is the tripling of the number of introduced species in the Black Sea in the period 1990-2002 in comparison with the previous 10 years, mainly through shipping and ballast water but also through unintentional introductions linked to escapes from mariculture (around one third of the earlier acclimatised species). The study also noted the high level of threat posed by insects. A Scientific Conference on "Alien Arthropods in South East Europe – crossroad of three continents" will be held in Sofia in September 2008.

Other research projects include:

- Population genetics of a highly invasive insect pest, SEE-ERA.NET, EU-funding;
- Non-indigenous insects and their threat to biodiversity and economy in the Balkans (www.cabi.org), SCOPES Program of the Swiss government;
- CONTROCAM "Sustainable Control of the horse chestnut leafminer, *Cameraria ohridella* (Lepidoptera, Gracillariidae) a new invasive pest of *Aesculus hippocastanum* in Europe", Sixth Framework Programme of EC, EU-funding;
- Assessment of Zebra Mussel (*Dreissena polymorpha*) Infestation Risk Using GIS for Water Basins in the North-West Bulgaria (funded by the International Research Office of the U.S. Army Engineer Research and Development Center, ERDC);
- Biology and Ecology of Invasive Gobiid Species (Gobiidae, Pisces) in the Lower and Middle Danube River (together with the Czech Academy of Sciences, funded by the National Science Fund - Ministry of Education and Science and Czech Grant Agency);

- Genetic, Biochemical, Morphological and Biological Characteristics of Populations of *Carassius gibelio* (Bloch, 1782) in Bulgarian Water Basins (funded by the National Science Fund - Ministry of Education and Science);
- Zebra Mussel (*Dreissena polymorpha*) - wild and invasive areas of distribution - recent knowledge, methodology and further investigations. (together with Austria, Romania, FIR of Macedonia, funded by the Austrian Federal Ministry of Science and Research);
- Assessment of the alien species influence on the native populations of Mugil spp. (pisces) in the Mediterranean region in connection with parasite communities (together with Spain, funded by EU, program INTAS;
- Invasive and native species of crustacea (together with Spain, funded by EU, program CSIC);
- Investigation and control of species of the genus *Ambrosia* (Asteraceae) causing allergy in Bulgaria.

Eradication/control measures: The Ministry of Environment and Water is required to organise and manage activities for the removal of introduced alien species, including sub-species and varieties, which could threaten natural habitats or native species of wild flora and fauna (Art.67a Biological Diversity Law, introduced in 2007). Currently, most control measures are implemented for IAS with detrimental economic consequences (eg *Dreissena polymorpha, Rapana tomasiana, Cameraria ochridella* etc.) but the results from the 2007 assessment of the non-native species in Bulgaria (see above) will determine the future strategy and actions in this area.

Management plans for some protected areas provide for measures to control the spread of invasive plant species such as *Amorpha fruticosa, Fallopia japonica* etc. Measures of this kind are mainly implemented in sensitive territories along the Danube river and the Black Sea coast.

Challenges/limitations: There is a lack of effective practical control and application of legal procedures on the import of alien species destined for breeding (including under controlled conditions) because of the insufficient scientific basis and experience for carrying out risk analysis.

Future activities need to concentrate on strengthening prevention, reducing the detrimental impact of some species on technological processes, insect pest control, controlling plants that threaten natural habitats and/or potentially dangerous to public health and carrying out monitoring and control on the most probable pathways for introduction of alien species.

4. CYPRUS

Legislation: The existing legislation in Cyprus was reviewed during the process of harmonisation with the EU directives. New legislation on nature-related issues was introduced in Cyprus in 2003. The Ministry of Agriculture, Natural Resources and Environment stated in its annual report for 2004 that national environmental policy had been revised as a result of the process of harmonisation with the European Union

acquis communautaire.

Law Nº 153(I)2003 on the protection and management of nature and wildlife constitutes the main framework for biodiversity protection setting provisions (among others) for appropriate assessment, fauna and flora protection, special areas of conservation and the implementation of CITES-related provisions. Article 30 provides that the release in the natural environment of any non-native species of flora or fauna is prohibited unless a Ministerial permission is obtained. There are no other provisions dealing specifically with IAS.

The use of invasive non-native species in aquaculture is now managed in accordance with the Commission Regulation 708/2007 concerning the use of alien and locally absent species in aquaculture. Legal procedures are currently under way to incorporate the Regulation into national legislation.

The import of aquatic species in general is controlled by the Fisheries Law and Regulations, which states that no aquatic animal can be imported into Cyprus without a written permit from the Director of the Department of Fisheries and Marine Research. However, the grant of a fisheries permit is not currently subject to risk assessment or other type of screening.

Policy: Cyprus does not yet have a national biodiversity strategy but is currently in the process of preparing the terms of reference for tendering the preparation of the biodiversity strategy. The main policy of the Forestry Department is reforestation with native species and for roadside planting. Availability of native plants has been promoted in Forestry Department nurseries.

Promotion of native species through forest policy in Cyprus

In the beginning of the 20th century when Cyprus state forests were placed under systematic management, the British Colonial Authorities introduced hundreds of different alien species for increased wood production, ornament and soil protection. These species included mainly eucalypts, acacias, casuarinas, pines and various other drought resistant tree and shrub species. After independence, the Forestry Department gradually reduced the number and intensity of use of exotic species.

At present, plantings in major forest areas include only native species. Exotic species are used by the Forestry Department only in urban areas, roadside plantations and Parks in inhabited areas. Recently, the policy of the Department is to encourage the use of native species everywhere. For this purpose the range of native species produced in nurseries has increased substantially: several other incentives are given to the public, including local authorities, in favour of native species. These incentives include provision of planting material free of charge and provisions of the Rural Development Plan which finances forest plantations only if native species are used.

However, there are no legal instruments to prevent the import, production and use of alien species, even of confirmed IAS, by commercial private nurseries and other non-state enterprises or organisations. The Department of Forests has recently issued a guide addressed to local authorities and the general public for the use and the promotion of native species.

Research: The Department of Fisheries and Marine Research (DFMR) carries out monitoring studies and research on the distribution of invasive alien species in the Cyprus marine environment.

An inventory of the most invasive animals for Cyprus is being prepared by the Environment Service, suggesting the prohibition of import for these animals in Cyprus under a Ministerial decree aimed at the protection of biodiversity.

Eradication/control programmes: Management programmes for the eradication/control of feral dogs have been established as well as a programme for the eradication of *Acacia saligna* at a Natura 2000 site. Wild boar control programmes have been ended, following the successful eradication of these animals from the island.

Challenges/limitations: Not found.

5. CZECH REPUBLIC

Legislation: Czech nature conservation legislation, (Ministry of Environment Act No. 114/1992 Coll. on Nature and the Landscape Protection as amended), includes some basic measures focused on IAS (or alien species generally). No alien species can be deliberately introduced, planted or farmed in landscape without a permit of the nature protection authority (but there is no sanction procedure to enforce this obligation). In the protected areas (national parks, landscape protected areas and nature reserves), the intentional introduction of alien species is prohibited. However, some exceptions exist eg for woody species planted in forestry (there are special forestry management plans proved by the nature protection authority as a whole) or exceptions from the prohibition in protected areas. Some other general legal tools (namely § 66, 68, 69) could also be used to manage IAS.

Other legislation also addresses the issue of IAS, mainly legislation on plant health, fisheries and game-keeping (see Plesník and Stanková 2001) and water management (Act. 254/2001 Coll. on Water). Exceptions for introduction of fish may be granted by the nature and landscape protection authorities: in addition, approval of the water management authority is required for introduction of any aquatic species. The Council Regulation (EC) No 708/2007 concerning use of alien and locally absent species in aquaculture is valid in the Czech Republic but the implementation structure is still not properly adjusted.

The Game Management Act No.449/2001 of 27 November 2001 contains provisions for import and introduction of non-native animal species. Their introduction must be authorised by nature conservation and game management organisations (Article 4(2)). Exceptions for release of game species may be granted by state game-keeping authorities with the approval of the nature and landscape authorities. Certain regulations largely inhibit use of effective measures of eradication of some alien animals (e.g. American mink, racoon). These animals may be hunted only by a very limited number of hunters (game managers).

The Phytosanitary Act (No. 326/2004) lists species that may not be imported into the country. The list is focused on agricultural weeds and pests. Article 10 of the Act requires the State Phytosanitary Service to monitor IAS included in this list. The most recent list (Order no. 215/2008 Coll., replacing order no. 330/2004 Coll. as amended by order no. 493/2006 Coll.) has significantly restricted the number of IAS for

monitoring to species which were covered by EPPO pest risk analysis in 2006 i.e. *Hydrocotyle ranunculoides* and *Lysichiton americanus*[3].

Policy:
There is no national plan in relation to IAS, but IAS are addressed in the National Biodiversity Strategy (http://www.chm.nature.cz).

Research:
There is intensive research in IAS in the Czech Republic, especially in the field of plant invasions. However, other species groups (insects, crustaceans etc.) are studied as well. The established centres of research on invasions are mostly based at the Institute of Botany, the Academy of Sciences (Průhonice), the Faculty of Sciences (Charles University, Prague) and Masaryk University (Brno), which participate in international EU-funded projects (ALARM, DAISIE) and from 2008, PRATIQUE. Coordination between several levels of bodies responsible for dealing with IAS (NGOs, research centres, nature conservation agencies) was stimulated by organising the conference of the Czech Botanical Society in September 2007 and the European Conference NEOBIOTA (September 2008). There are several supported projects under way focused on biological invasions eg on assessing the risk and potential spread of invasive plant species, as well as several focused on selected species such as *Harmonia axyridis*, *Heracleum mantegazzianum*, *Pinus strobus* and *Fallopia* sp.

Eradication/control programmes: There have been no changes in planning and management of eradication and control programmes of IAS in the last year. The major effort invested in eradication and control is at the regional and local levels where local bodies and voluntary organisations have their IAS control programmes. In 2008, a project was launched to update information on distribution of *Heracleum mantegazzianum* at the national level. Other important invasive species are monitored and controlled if appropriate at landscape protected areas.

Financial aspects: There are several financial resources (subsidies) that include IAS issues. The main programme, running since 2008, is the "Operational programme ENVIRONMENT" coming out of EU Structure funds. This offers possibilities for bigger eradication projects, but administration and all requirements are complicated. State subsidies for NGOs may also be available for projects focused on mapping of IAS occurrence and on eradication (small scale projects). Regional subsidies programmes also provides some opportunities for IAS focused projects. However, the **t**otal costs that are invested into eradication programmes are not as well known as the amount spent on IAS research.

Voluntary and non-regulatory initiatives: Some public awareness campaigns are running at local or regional level operated mainly by NGOs, but also by the National parks administrations etc. A campaign at larger (national) scale was recently started by part of the Czech Union for Nature Conservation (the biggest Czech environmental NGO) which includes an information website, educational competition for students

[3] The earlier list included *Acer negundo* L., *Ailanthus altissima* (Mill.) Swingle, *Aster* sp.div. (North American species), *Helianthus tuberosus* L., *Heracleum mantegazzianum* Sommier et Levier, *Impatiens glandulifera* Royle, *Lycium barbarum* L., *Pinus strobus* L., *Reynoutria japonica* Houtt., *Reynoutria sachalinensis* (Friedr. Smidt) *Nakai*, *Reynoutria ×bohemica* Chrtek et Chrtková, *Robinia pseudacacia* L., *Solidago canadensis* L., and *Solidago gigantea* Ait.

and other activities.

Certain codes of conduct (guidelines for use of alien species) are part of the Forest Stewardship Council (FSC) standard used in the Czech Republic. Almost 20,000 ha of forests have recently received FSC certification.

Limitations/challenges:
No Act lists environmental weeds or pests that must not be imported to the country.

6. DENMARK

Legislation: §30 of the Nature Protection Act (Lovbekendtgørelse no. 749, updated on 21 June 2007) establishes rules for species protection. Implementing regulations (Statutory order no. 901 of 11 July 2007) protect a number of defined species as well as all species of reptiles, amphibians, Anthericum spp., Orchids, and Orobranchacea. As this blanket provision could entail legal protection of some IAS (eg bullfrog), the Statutory Order provides that the Danish Forest and Nature Agency may authorise alien species considered to be a threat to native species to be eradicated (§§ 7 and 8).

§31 of the Nature Protection Act establishes a general prohibition on releasing non-native animals into the wild without permission. However, the Environment Minister may establish rules about the release of specific animals that are not found 'naturally free-living in nature' (§ 31.1). This provision has been used as the basis for regulating the introduction of fish, crustacea and molluscs to freshwater systems. The Danish Forest and Nature Agency has produced a guidance note on introduction of such organisms that takes account of EU veterinary rules. Two species lists were published in an appendix to statutory order 1065 of 5 December 1996 : a 'white list' (species that may be released without applying for a permit) and a 'black list' (introduced species occurring in the wild in Denmark for which any further release is subject to permit). These requirements are binding, but it is difficult for the Ministry of the Environment to know how much is done without permission.

The introduction of fish for mariculture purposes is regulated by the Fishing Act (828/2004). Chapter 12, Article 63, of the Fishing Act states that the deliberate introduction of fish and eggs or brood thereof into nature without permission is not allowed (any introduction of alien species into the wild requires a permit). The Minister of Food, Agriculture and Fisheries must approve the species to be introduced as well as a plan for the introduction. Mariculture is specifically mentioned by the Fishing Act which states that the Minister of Food, Agriculture and Fisheries must approve the breeding of fish on Danish fishing territories (chapter 13, articles 66 and 67).

The Hunting Act (no 114/1997) regulates the introduction of game animals, including alien species such as animals from fur farms (American mink, musk rat etc). The Act regulates alien game animals that are deliberately introduced or have unintentionally escaped captivity and which have established self-reproducing populations in the wild (article 2, para1). According to the Hunting Act (Article 6, paragraph 1) the Environment Minister may issue a prohibition against deliberate introductions of

certain game animals. The Hunting Act is supplemented by a statutory order on hunting methods and hunting gear (Statutory Order no. 870/2007). Under certain conditions, the statutory order allows breeding and release of Partridge (*Perdix perdix*), Mallard (*Anas platyrhynchos*) and the introduced Pheasant (*Phasianus colchicus*).

The Statutory order on keeping fur animals and import and transit of fur animals (1987/78) provides that import and transit of living or dead fur animals or products thereof may only take place on conditions specified by the Veterinary Directorate. The import of muskrat (*Fiber zibethicus*) and grey squirrel (*Sciurus carolinensis*) is prohibited (Art.2.3).

This is complemented by a Statutory Order on eradication of muskrats (819/1987). All owners or users of real estate/real property that see or assume that muskrats are present on the estate or lakes or streams bordering the estate are required to notify this. This obligation to notify still applies even if the owner/user has shot or otherwise killed the animal or animals (Art.1). The owner/user is obliged, consistent with recommendations from the 'pest animal laboratory', to perform or help in eradication, including inspection of the estate according to specific instructions (Art.3).

The introduction in the wild of alien wild-growing plants may be regulated under §31.2 of the Nature Protection Act, but to date the Environment Minister has not used these powers to regulate deliberate introductions of alien plants.

Alien species are not explicitly dealt with under the Forestry Act but some statutory orders issued under this Act set out lists of accepted species of trees/shrubs for use in connection with subsidised plantings in forests and hedges. Use of these species is voluntary but preference is generally given to listed species. The Danish authorities have removed alien plants from the lists which now contain only native species and a small number of alien species that have proved not to be invasive.

The Management of Agricultural Land Act entitles authorities to require the eradication of 'unwanted plants' on private land if an official eradication plan has been adopted in the specific geographical area. This is not a phytosanitary instrument and the list of unwanted plants includes at least one species (Giant Hogweed (*Heracleum mantegazzianum*)) that is not a problem for agriculture. Under this Act, Statutory Orders on management of *Avena fatua* and *Heracleum mantegazzianum* have been adopted.

Legislation for local authority action to eradicate an invasive alien plant

The Statutory Order on eradication of giant hogweed (17/2006) authorises communes to develop and adopt an action plan for all or part of the commune, to require owners of areas where giant hogweed grows to eradicate the plant (Art.1). Development of a communal eradication plan is voluntary: about 25-33% of communes have done so to date. Communes that adopt a plan may charge landowners a fee if they do not eradicate *Heracleum* and may enter private property to carry out the necessary control actions.

Policy: Denmark was among the promoters of NOBANIS through the Nordic Council of Ministers on Alien Species. Public awareness campaigns have been carried out by the Danish Forest and Nature Agency on the Giant hogweed, American mink, Iberian

slug and introduction of pets into nature.

Denmark has finalised a national IAS strategy, due to be confirmed by the Minister of Environment in autumn 2008. The state budget for 2008 allocates 2 million DKK for IAS measures : this is the first time that a specific budget line has been earmarked for this purpose. For the next two years, 8 million DKK will be allocated for IAS measures.

Research: Denmark has developed an IAS database available at www.skovognatur.dk/natur/invasive_arter/images/introarter.xls. It participates in NOBANIS and is represented in the ALARM project team.

A joint report (Denmark, Norway and Sweden) to review national legislation and guidelines concerning the import of *Homarus americanus* and to prevent introductions of new lobsters in the Nordic sea areas was published in 2004 by the Nordic Council of Ministers.

Eradication/control programmes: Statutory Orders are in place for management of *Avena fatua* and Giant Hogweed (*Heracleum mantegazzianum*) (see above). Hunting is allowed year-round on some introduced species as a means of control.

Denmark has also started research and development projects on the best eradication measures for Canada goldenrod (*Solidago canadensis*), American mink (*Mustela vison*) and American crayfish (*Pacifastacus leniusculus*). Campaigns have also been carried out to control Spanish slug (*Arion lusitanicus*). Information material on eradication of a number of invasive plants and the Spanish slug has been made available and continuously updated on the Danish Forest and Nature Agency homepage. A booklet on eradication of Rugosa rose (*Rosa rugosa*) has been produced and a home page for reporting specific alien species will be available autumn 2008. The Danish Forest and Nature Agency acts as national focal point for information on all IAS occurring in the country and is the largest landowner active in eradication of giant hogweed (*Heracleum mantegazzianum*), ruddy duck (*Oxyura jamaicensis*) and others.

The Danish Forest and Landscape Research Institute co-ordinated the Giant Alien Project. The project was financed by the European Commission within the 5th Framework Programme.

Challenges/limitations: Challenges identified by Denmark in relation to IAS include: open borders, sector integration, trade, tourism, transport, and lack of awareness.

7. ESTONIA

Legislation: According to the Nature Conservation Act (adopted in 2004; amended in 2007), ”it is prohibited to introduce live specimens of non-native species in the wild, and to plant or sow non-native plants in the wild”[4]. However, raccoon dog

[4] An English translation of the Nature Conservation Act is available at http://www.legaltext.ee/et/andmebaas/ava.asp?tyyp=SITE_ALL&ptyyp=I&m=000&query=looduskaite

(*Nyctereutes procyonoides*) and American mink (*Mustela vison*) may be kept in fur farms under special conditions laid down by Regulations issued in 2008 which aim to minimise escapes to the wild. Permits for such farms may be issued by the Minister of the Environment. To date, only one permit has been issued (for a mink farm) but there are several farms with no permits in Estonia.

Secondary legislation providing for a regulatory List of Invasive Alien Species was issued in 2004 under the Nature Conservation Act and updated in 2007. It contains a list of species that may not be imported into Estonia: 13 plant species and 30 animal species (c.f. 2 plant species and 19 animal species in 2004).

Species prohibited for import into Estonia (Invasive Alien Species Regulation)

Plants:

1) *Heracleum mantegazzianum*
2) *Heracleum sosnowski*
3) *Acroptilon repens**
4) *Ambrosia spp.**
5) *Bidens frondosa**
6) *Impatiens glandulifera**
7) *Solidago canadensis**
8) *Solidago gigantea**
9) *Reynoutria japonica (Fallopia japonica, Polygonum cuspidatum)**
10) *Reynoutria sachalinensis (Fallopia sachalinensis, Polygonum sachalinense)**
11) *Reynoutria x bohemica**
12) *Egeria densa**
13) *Elodea nuttallii**

Animals, birds and fish (vertebrates):

1) *Castor canadensis;*
2) *Cervus nippon;*
3) *Dama dama;*
4) *Lutra canadensis;*
5) *Mustela vison;***
6) *Nyctereutes procyonoides;***
7) *Odocoileus virginianus;*
8) *Ondatra zibethicus;*
9) *Oryctolagus cuniculus;*
10) *Ovis ammon;*
11) *Sciurus carolinensis;*
12) *Oxyura jamaicensis*
13) *Umbra pygmaea**
14) *Pseudorasbora parva**
15) *Opsariichthys uncirostris**
16) *Ameiurus nebulosus**
17) *Ameiurus melas**
18) *Lepomis auritus**
19) *Lepomis gibbosus**
20) *Lepomis macrochirus**
21) *Perccottus glenii**
22) *Neogobius fluviatilis**
23) *Neogobius gymnotrachelus**

Invertebrates:

1) *Astacus leptodactylus;*
2) *Orconectes limosus;*
3) *Pacifastacus leniusculus;*
4) *Globodera rostochiensis (Wollenweber) Behrens;*
5) *Bursaphelenchus xylopilus (Steiner ja Buhrer);*
6) *Hyphantria cunea Drury;*
7) *Megachile rotundata (Fabricius) (syn. Apis pacifica Panzer).*

* Species added to the List in 2007
** Exceptions can be made to *Mustela vison* and *Nyctereutes procyonoides* whose specimens can be brought into Estonia only for gene pool refreshment for licensed fur farms

The Fisheries Act (1995; amended in 2007) provides that introduction of alien fish species or species of other aquatic organisms is allowed only by written permission from the Minister of Environment. There is also a law in place in relation to environmental surveillance (Environmental Surveillance Act 2004) for organisms potentially harmful to human health or the environment.

The Environmental Register Act (2003, amended 2005) contains an obligation to create a national environmental database of natural resources and protected natural objects, including alien species and genetically modified organisms. The Estonian Environment Information Centre is responsible for maintaining an alien species database. Currently work is under way to create this database and make it interoperable with existing databases.

Research: Estonia participates in the NOBANIS and ALARM projects. There is no specific programme for monitoring of all IAS in Estonia, but some species are monitored, eg the populations of *Heracleum sosnowskyi*, and some bird species (*Branta canadensis, Columba livia*). Estonia also takes part in the Baltic Sea Alien Species Database.

IAS have been identified in different groups of organisms (plants, vertebrates, terrestrial and water invertebrates) and the vectors identified. Estonia has published a review of the current situation regarding invasive species (available on the Internet at www.envir.ee). A database on alien species in Estonia is available at: http://eelis.ic.envir.ee/voorliigid/eng/?a.

There is no systematic approach to IAS research in Estonia. Some research activities in different Estonian Universities are going on, but these are usually the by-product of other projects and not specialised IAS research. Although several students and even PhD students have carried out work on IAS, this work is scattered and results are not widely distributed.

Eradication/control programmes: In December 1998-April 2000 the American mink was eradicated from Hiiuma Island in order to establish a safe area for the European mink (*Mustela lutreola*). The programme carried out by Foundation Lutreola and the Zoo of Tallinn, in co-operation with Oxford University, was financially supported by the LIFE programme.

There is a national strategy in place to eliminate poisonous giant and Sosnowskyi hogweed (*Heracleum manegazzianum and H. sosnkowskyi*). Eradication of the latter species has been going on for 3 years. This is financed by government and ca. 100 ha of population has been managed annually.

A management plan for raccoon dogs (*Nyctereutes procyonoides*) is now in progress and will be ready by the end of the year 2009. It is also planned to make the management plan for American mink (*Mustela vison*), but due to lack of funding, this work will start not earlier than the end of 2009.

Other activities: The Ministry of the Environment has arranged meetings with different institutions and organisations, scientists and surveillance bodies. Cooperation is considerably better than it was some years ago.

Emergency situations caused by IAS are included in the Ministry of Environment's Emergency Plan that regulates actions during emergency situations that could be caused by rapid spread of IAS.

Voluntary codes of conduct for alien species will be ready in the end of the year 2008.

Challenges/limitations: There is no strategy on IAS in Estonia. The IAS issue is not perceived as a priority by the authorities. Money allocated for collecting data and eradication programmes is not sufficient. Unfortunately, due to very limited funding, it is not possible to produce management plans for IAS more intensively than one plan per one/two years.

Estonia has not yet ratified the IMO Ballast Water Convention, but the first steps have been taken for this purpose. The Ministry of the Environment has arranged a meeting for the stakeholders who will be responsible for implementing the convention. Estonia has already specified areas where it is allowed to change ballast waters. However, the use of those areas is still voluntary and no monitoring is carried out in those areas.

8. FINLAND

Legislation: The Nature Conservation Act (1096/1996) restricts the introduction of alien species in Finland. Alien plant species are not to be planted or sown outside gardens, fields or other sites designated for special purposes[5]. In addition, if an alien plant or animal species is known to spread rapidly in the wild, and there is a reasonable cause to suspect that it might constitute a health hazard or have a detrimental effect on indigenous Finnish species, the Ministry of Environment may issue any regulations necessary to prevent the spread of such species.

In accordance with the Hunting Act (615/1993, 1268/1993), wild birds or mammals of foreign origin cannot be imported or introduced into the wild without permission from the Ministry of Agriculture and Forestry.

[5] With the exception of tree species planted for forestry purposes.

Introduced game species as a resource:

White-tailed deer were introduced to Finland about 70 years ago, and have become the second most important game animal in economic terms. The official policy with regard to management of species such as white tailed deer is to undertake systematic management through regulated hunting. No attempts will be made to prevent such control of game species, or to promote the expansion of these species' distributions into new areas. Any proposals for introducing game species will be considered extremely critically. Imports and introductions of alien species have not been permitted in recent years

The Plant Protection Law (1203/1994) lays down provisions to prevent the introduction of pests and diseases of plants into Finland. In addition, pests and pathogens which are present in Finland as native or introduced, but which are not widely distributed, can be controlled in order to prevent their further spread. Secondary legislation lays down detailed provisions for import, monitoring, eradication, control and containment, and is enforced by a central authority, the Plant Production Inspection Centre.

The Law for Animal Diseases (55/1980 and subsequent amendments) provides the legislative framework for preventing the introduction and outbreaks of animal pathogens in Finland, eg alien pathogens. The law and related secondary legislation include, for example, provisions for prevention, early detection and eradication of animal diseases and are enforced by the Finnish Food Safety Authority.

Policy: Finland published a review of the current situation regarding invasive alien species in 2001 (see Nummi 2001). This report does not consist of a plan of action, but it does recommend measures to reduce observed impacts, as does a report on the same issue prepared by the Nordic Council of Ministers in 2000. Such measures are jointly planned by the ministries concerned, according to the need to target specific invasive species.

In 2002, the Finnish Ministry of Agriculture and Forestry, the Central Union of Agricultural Producers and Forest Owners (MTK) and the Finnish Forest Industries Federation (Metsäteollisuus ry) jointly developed a crisis action plan to be used in case the pinewood nematode (*Bursaphelenchus xylophilus*) appeared in Finland.

A comprehensive Finnish Plant Protection Strategy for the years 2004-2013 was prepared in 2004. One of the central targets addressed in the Strategy is to prepare crisis action plans for other potentially invasive forest pests.

In June 2008, the preparation of a National IAS Strategy and Action Plan was initiated. The process is being led by the Ministry of Agriculture and Forestry with the aim of involving all relevant stakeholders. The strategy is scheduled to be completed by the end of 2010.

Research: Finland's Ministry of Transport and Communications participated in the Academy of Finland's Baltic Sea Research Programme during the period 2003–2004. A research project on Invasive species in the Baltic Sea, jointly funded by the Ministry and the Academy, examined how invasive species get into the waters of the Baltic, and assessed their ecological significance, particularly with regard to plankton communities, algal blooms and zoobenthic communities in the Gulf of Finland. Finnish institutes are participating in the FP6 ALARM project, and Finland is part of

NOBANIS. In addition, a number of Finnish institutes and ports are part of the ongoing FP6 project "Effective Operations in Ports" (EFFORTS)" that, among other things, aims to improve methods for ballast water treatment in order to prevent the spread of IAS.

Research is also ongoing in relation to the introduced raccoon dog which is an important vector of diseases (eg rabies) and parasites: studies are investigating its social system and dispersal, and possible competition (food and habitat use) between the introduced raccoon dog and the European badger.

As regards animal and plant diseases/pests, related research is carried out by eg the Finnish Food Safety Authority and MTT Agrifood Research Finland. Current research activities include studies related to potato blight (*Phytophthora infestans*), Colorado beetle (*Leptinotarsa decemlineata*) and bird influenza.

Monitoring: There is no unified national monitoring system for IAS in Finland, but some ecosystem-/species group-specific initiatives exist. For example, the Finnish Institute for Marine Research (FIMR) carries out regular monitoring of the Baltic Sea environment and the status of a number of known IAS (eg *Mnemiopsis leidyi*) in the Baltic is increasingly addressed as part of monitoring activities[6]. In addition, the general public can inform the Finnish Environment Institute about their possible IAS observations and citizens are also encouraged to record their IAS sightings into the open access database hosted by the Finnish Museum of Natural History (University of Helsinki).

Information exchange mechanism: There is no general protocol or mechanism for exchanging information on IAS at national level. However, cooperation on specific IAS issues has been established between some relevant national institutes, including the Finnish Environment Institute and the Finnish Museum of Natural History.

Eradication/control programmes: It has been decided that Canadian beavers (*Castor canadensis*) should be exterminated within the Lapland Game Management District, to stop the species spreading into Norway and Sweden. Elsewhere in Finland, measures are being taken to prevent the spread of Canadian beavers into areas still occupied by European beaver (*Castor fiber*). In the Archipelago Sea, Metsähallitus and local hunters have been working for several years to exterminate American minks (*Mustela vison*), which have negative impacts on seabird colonies. During 2001, a project involving the trapping of mink in the outer islands of the Quark Archipelago in Western Finland was begun by Metsähallitus and local hunters, as part of the Quark Environment INTERREG project. Trapping was later expanded to islands nearer the mainland, and is still continuing in both the Quark, and islands in the Archipelago National Park of SW Finland.

A two-year campaign began in 2001 to intensify hunting and trapping of two invasive small predatory mammals – *Mustela vison* and raccoon dog (*Nyctereutes procyonoides*). In 2002 a special project was started to intensify the trapping of mink and raccoon dogs in wetlands in the Helsinki region. Over the two-year project, a total

[6] But note that no systematic IAS monitoring has been carried out to date.

of 300 raccoon dogs and 27 mink were caught. A related research project has been assessing the effects of such trapping on nesting birds' breeding success rates.

In addition, a number of projects have been initiated to eradicate / control giant hogweed (*Heracleum mantegazzianum* and *H. persicum*) at regional level (eg in Karjala and Kainuu regions).

Funding: There are no special funding instruments dedicated to financing activities for IAS prevention, eradication and control. Existing eradication and control initiatives have been funded from a number of different sources (eg national and regional public funding). In addition, voluntary actions (eg by regional and local NGOs) have contributed to IAS control activities.

In this context, no examples could be found of supporting IAS prevention, eradication or control through the EU funds for rural or regional development (EAFRD and EFRD). Similarly, there are no known cases of compensating IAS-related losses or costs of control actions.

Awareness-raising: Efforts to raise public awareness about IAS in Finland have increased during the past few years. For example, the Finnish Environment Institute has been active in informing the public on threats posed by several invasive plants. Information on a number of invasive plant species (eg instructions for their identification and eradication) have been made available on the Institute's WebPages[7] and regular press releases on topical IAS issues and threats have been issued. Species addressed include giant hogweed (*Heracleum* sp.), Himalayan balsam (*Impatiens glandulifera*), Rugosa rose (*Rosa rugosa*) and Japanese knotweed (*Fallopia sp.*). Additionally, IAS information has been provided though a Nordic communication project on biological diversity ("Nordic Nature – trends towards 2010") coordinated by the Finnish Environment Institute.

Other issues: There are no known examples on using environmental impact assessments (EIA) and strategic impact assessments (SEA) to address threats posed by potential introduction of IAS.

Challenges/limitations: There are unresolved problems related to the presence of invasive species in ships' ballast water and also managing the introduction of IAS as biocontrol agents. In addition, it is foreseen that increasing interest in production of bioenergy can contribute to escalating IAS problems in Finland.

There is also an apparent need to improve national and regional cooperation between different relevant stakeholders, in particular to clarify respective areas of responsibility. It is anticipated that the forthcoming national strategy will aim to address these issues. It is also hoped that the strategy will clarify and/or appoint new funding sources for IAS management actions. Finally, there is a need to develop a European-Global Early Warning System and also to enhance information exchange at the European level. The NOBANIS project has proved to be an important network for information exchange between participating countries.

[7] http://www.ymparisto.fi/default.asp?node=722&lan=fi.

9. FRANCE

Legislation: There are a number of legal instruments related to IAS in France. The import of all species of game birds is prohibited without authorisation except for six species (*Arrêté du 20 décembre 1983*) (*Code de l'environnement*, articles L.424-10 and L.424-11, Annex I.c).

The *Code de l'environnement* prohibits the introduction of new aquatic species in France (Article L.432-10, Annex Ie) without Ministerial authorisation. There are also other specific restrictions in place in relation to the introduction of aquatic organisms (fish, crustacea, frogs etc) (Nepveau and Saint-Maxent 2002).

Under Article L.411-3 of the *Code de l'environnement*, the introduction, trade, transport and/or use of listed invasive alien species may be prohibited. No lists have been adopted to date, although work is under way to complete a list of invasive alien plants for regulation on France's mainland territory. Specific prohibitions apply to two plants species.

Plant Protection legislation is also used to control invasive alien species, in particular through secondary legislation focused on control of harmful organisms (*Arrêté du 31 juillet 2000 établissant la liste des organismes nuisibles aux végétaux… soumis à des mesures de lutte obligatoire*).

Specific measures prohibit trade in two animal species: *Trachemys scripta elegans* and *Rana catesbeiana*.

There is a national list of pest species (both plant and animal species) for which control activities are obligatory. In addition, every year regional *Département* makes a list of the animal species that are classified as 'pests'. Species classified in this way may be hunted all year round.

France has developed a legal framework for ratification of the BWM Convention (provision in the Water Act of December 2006, followed by adoption of an Act on 23 May 2008 authorising the country to ratify the Convention).

Policy: Under the National Action Plan for Natural Heritage (2005), Objective 1.2 provides for strengthening actions against invasive alien species by preventing their introduction both in mainland France and in French overseas territories, carrying out awareness campaigns, renewing legislation, setting up a research programme and an observatory on IAS and developing mitigation campaigns.

The national multi-stakeholder environment forum held in 2007 (*Grenelle de l'environnement)* specifically addressed IAS issues and proposes control programmes and actions for future years (commitment n°74, article 20 of the draft 'Grenelle Act').

Research: France is represented on the DAISIE and ALARM project research teams. There is ongoing research on invasive ambrosia (common ragweed). An exhaustive

report on introduced fauna was published in 2003[8]

Eradication/control programmes: Programmes are underway in France in relation to control of some invasive species, eg *Caulerpa taxifolia, Ludwigia sp.*, African sacred Ibis, American mink and American bullfrog (*Rana catesbeiana*)[9].

Challenges/limitations: Not found.

10.GERMANY

Legislation: The Federal Nature Conservation Act (Bundesnaturschutzgesetz BNatSchG) requires the federal states (Länder) to take suitable measures to reduce the impact of IAS on indigenous flora and fauna and to enact regulations governing approval of their release into the wild. Under Article 41(2) of the Bundesnaturschutzgesetz, the release of alien species is subject to approval. However, species used in agriculture or forestry, for hunting or fishing purposes, in biological plant protection and all species that are already present are exempt from this regulation.

Possession and trade may only be regulated at federal level. Currently, possession of and trade in four invasive species (American beaver *Castor canadensis*; two turtles *Chelydra serpentina* and *Macroclempys temminckii*; Grey squirrel *Sciurus carolinensis*) are prohibited throughout Germany (Article 52, BNatSchG).

The Act defines alien species as 'any species of fauna or flora which does not occur in the wild in the area concerned or has not occurred in the area concerned for more than 100 years. This definition is not useful in the context of IAS as it excludes alien species that are already present on national territory i.e. established alien species are considered for legal purposes as 'native' and the definition can only apply to 'not yet occurring' species. Efforts to amend the definition have so far been unsuccessful, although there are proposals for other solutions in the draft for a revised BNatSchG. Reasons for opposition[10] include:

- resistance to strengthening national possession/trade restrictions c.f. EU-harmonised approaches in the plant protection sector (Ministry for Agriculture);
- preference for already-introduced species to be considered as native (fisheries, forestry and other land use sectors);
- concern amongst hunters that hunting rights could be restricted if the definition of non-native species was broadened to cover already-introduced species (eg pheasant, sika deer and mouflon are 'native' under the current definition in the BNatSchG: the hunting legislation does not define this term).

[8] Pascal M., Lorvelec O., Vigne J.-D., Keith P. & Clergeau P. (coordinators), 2003. *Évolution holocène de la faune de Vertébrés de France : invasions et disparitions.* Institut National de la Recherche Agronomique, Centre National de la Recherche Scientifique, Muséum National d'Histoire Naturelle. Rapport au Ministère de l'Écologie et du Développement Durable (Direction de la Nature et des Paysages), Paris, France. Version définitive du 10 juillet 2003 : 381 pages.

[9] See http://www.grenouilletaureau.net/.

[10] Pers.comm, F.Klingenstein, Germany Federal Agency for Nature Conservation.

The Plant Protection Act (Articles 3 and 4) contains the basis for measures and prohibitions, some of which are defined in greater detail in the Plant Inspection Ordinance. The Plant Inspection Ordinance is based on the EU 'Quarantine Directive' 2000/29/EC. At present the system is primarily concerned with unintentional introductions, but measures for preventing deliberate introduction of invasive alien species in the plant sector are under discussion.

The EC Aquaculture Regulation 708/2007 is implemented by the Ministry for Agriculture.

Policy: Suggestions for specific targets and measures to bring about improvements in the legal situation and strengthen cooperation between relevant sectors were made within a research project related to the preparation of a National Strategy on Alien Species. Discussions are still under way on whether an overarching national strategy or separate sectoral approaches (eg introduction of a specific definition of 'invasive' into conservation legislation) would be more suitable.

A National Biodiversity Strategy was published in November 2007 which outlines specific targets for IAS, one being the preparation of a National IAS Strategy. The problem of IAS introductions will probably also be addressed in the National Strategy for the Protection and Sustainable Use of the Seas' which is in production at present.

Sectoral plans and programmes for surveillance of introduction pathways and protection against the spread of invasive alien species already exist in the plant protection sector. A detailed analysis for implementation of the CBD Guiding Principles has been undertaken for the plant quarantine sector.

Many of the Guiding Principles are already being implemented in activities initiated by the nature conservation sector. Voluntary codes of conduct are in place for botanic gardens since 2007[11] and the horticultural sector since 2008 (http://www.g-net.de/download/Empfehlung-Invasive-Arten.pdf).

Germany took part in the development of the Ballast Water Convention of the International Maritime Organization and is currently involved in the preparation of relevant guidelines. In the context of the International North Sea Conference and the OSPAR Convention, Germany is involved in investigating whether it is possible to comply with the requirements of the Ballast Water Convention for ballast water exchange under the conditions that exist in the North Sea and the Baltic. No legally binding requirements are currently in place.

Germany is also active in two ICES working groups which deal with aquatic alien species: (a) ICES WGITMO, and (b) ICES/IOC/IMO WGBOSV. The Groups' terms of reference include the preparation of a rapid response and early warning tool and also measure to address hull fouling of vessels as species invasion vector.

[11] Kiehn, M.; Lauerer, M.; Lobin, W.; Schepker, H.; Klingenstein, F. (2007): Grundsätzen im Umgang mit invasiven und potentiell invasiven Pflanzenarten in Botanischen Gärten des Verbandes Botanischer Gärten und der AG Österreichischer Botanischer Gärten. - Gärtnerisch-Botanischer Brief 169 (4): 39-41.

Research: Germany and adjacent countries have a long tradition of research on alien species. Funded by the German Environment Protection Agency, the first European ballast water study was undertaken 1992 to 1995 in a joint effort of the Universities of Kiel and Hamburg. In 1999, German scientists founded the NEOBIOTA working group on biological invasions (www.tu-berlin.de/~neobiota) that aims to enhance communication and research on applied and basic aspects of invasions. It now operates as a European group and holds bi-annual meetings: the next one will take place in September 2008 in Prague (http://www.ibot.cas.cz/neobiota/). Germany is represented in the DAISIE, ALARM and IMPASSE project teams and is part of NOBANIS.

The BioTeam research programme of the Federal Ministry of Education and Research includes research related to the assessment of the threats that IAS may pose to native ecosystems. Many of the harmful organisms dealt with in the plant quarantine sector can have adverse effects on ecosystems, habitats or species. Risk assessment here is undertaken as standard practice in the context of phytosanitary risk analyses.

The German Nature Conservation Agency is currently collaborating with the Austrian Environment Agency on development of a risk assessment scheme (black list) to evaluate risks posed by IAS to native biodiversity.

Cost estimates:

A German study has found that 20 alien plant and animal species cost EUR156 million per year in Germany. *Ambrosia artemisiifolia* is most costly, contributing at least EUR20 million to the cost of asthmatic disease in Germany every year (Reinhardt et al 2003).

In the aquatic environment, the three most impacting species in German coastal waters are the Zebra mussel *Dreissena polymorpha*, the ship-worm *Teredo navalis*, and the Chinese mitten crab *Eriocheir sinensis*. For the latter two, a tentative economic impact is calculated as follows. The damage caused by the shipworm in the Baltic alone is calculated as 25 Mio € since 1993. The total damage along all German coastal waters is estimated as 50 Mio € since 1993 (Hoppe, pers. comm.). For the Chinese mitten crab it was calculated that the monetary impact caused to German waters has totalled approximately €80 million since 1912 when the crab was first recorded in German waters (Fladung @ Gollasch pers. comm.)[12].

Eradication/control programmes: The Federal Agency for Nature Conservation (BfN) raises public awareness on the issue and advises local authorities in addressing IAS problems. The majority of control efforts fail due to a lack of information, even though an estimated € 6 million annually is spent for control of invasive plants by community authorities alone. Under www.neophyten.de, Germany has developed an Internet manual for identifying and managing about 40 invasive plant species, in order to provide the Länder and administrative districts and other active bodies with basic information and hints on effective prevention and management measures.

Certain animal species are identified in the federal Bundesjagdgesetz as unrestricted and free for hunting. A summary of aquatic invaders is available at www.aquatic-aliens.de.

[12] Gollasch, S. & Rosenthal, H. (2006): The Kiel Canal. 5-90 pp. In: Gollasch, S., Galil, B.S. & A. Cohen (eds.) (2006). Bridging Divides – Maritime Canals as Invasion Corridors. Springer, Dordrecht, The Netherlands. 315 pp.

Challenges/limitations: Controlling imports of IAS would involve large inputs of human resources and is possible only to a limited extent due to the free market. One of the main challenges in Germany is to achieve better coordination of the fragmented legal competencies and bring about political agreement on objectives between the interest groups concerned. Nature conservation authorities and the plant protection system could achieve much by cooperating more, for which there is not really a tradition. More recently, the Federal Agency for Nature Conservation and the Federal Research Centre for Cultivated Plants – Julius Kuehn Institute communicate regularly on IAS issues.

Legislation within the conservation sector only covers intentional introductions (half of established alien plant species) so measures that focus on the prevention of unintentional introductions have to be developed. For ornamental plants (25% of all introductions[13]), ongoing secondary releases are the main reason for their spread c.f. natural spread from already inhabited areas[14]. Article 41 BNatSchG, which regulates this, suffers severely from too many exceptions: the permit requirement laid down by the article does not apply to agriculture, forestry or areas within settlements. In addition, due to the inadequate definitions of "alien" and "native", all established alien species (= all invasive species) that were established more than 100 years ago are regarded as native and therefore do not need release permits. Lastly, nature conservation authorities often do not have the necessary resources, expertise, and overview to take well-founded decisions on release permits.

11.GREECE

Legislation: Article 20 of Law 1650/1986 on the Protection of the Environment obliges protection of indigenous flora and fauna. Under paragraph b. of Ministerial Decision n° I 1B/2000/19 on quarantine, the Sanitary Committee can decide to control introduced animal species. Import of all alien species to be farmed/used as baits is prohibited by Presidential Decree 109/2002.

Greece is a signatory party to the CITES convention and the trade of some alien species (eg pets) is controlled under CITES requirements and the customs offices are applying the relevant rules. Greece has also signed and is applying the IMO (International Maritime Organisation) relevant provisions regarding ballast invaders. However, no specific national legislative instruments are at place.

Greece also participates in the work of the Protocol for Specially Protected Areas and Biological Diversity in the Mediterranean of the Barcelona Convention under which an Action Plan Concerning Species Introductions And Invasive Species in the Mediterranean Sea was adopted in 2003.

Research: As regards marine invasive alien species, the Hellenic Centre for Marine Research (HCMR) has performed a lot of work. A network of marine researchers

[13] Klotz, S., Kühn, I. and Durka, W. (2002): BIOFLOR - eine Datenbank mit biologisch-ökologischen Merkmalen zur Flora von Deutschland. - Schriftenreihe für Vegetationskunde 38, 334 S.

[14] Kowarik I. (2003): Human Agency in Biological Invasions: Secondary Releases Foster Naturalisation and Population Expansion of Alien Plant Species. - *Biological Invasions* **5** (4): 281-300.

working on marine invasive species has been set up under the name ELNAIS (http://elnais.ath.hcmr.gr/) including nine research institutes/universities and over 34 Greek scientists currently carrying out relevant research. The list of marine alien species in Greek waters is constantly updated, taking into account new findings (published and unpublished data), which are stored in the HCMR database (private use) as well as in the ELNAIS webpage (http://elnais.ath.hcmr.gr). HCMR research staff participate in the SEBI 2010 project (Streamlining European Biodiversity Indicators, 2010), specifically in Working Group 5 for the indicator of cumulative trends in alien marine species in Europe.

Marine invasive species in Greece:

By August 2007, the number of marine alien species had increased from 128 (known until the end of 2005) to 155. Most of them are zoobenthic species (69), followed by fish (39) and macroalgae (30) (Pancucci et al, 2005, 2006, 2007; Zenetos & Streftaris, 2008). A multi-annual analysis revealed an important increase of alien species during the last years. This can be attributed to the increased interest of the scientific community, but also to the gradual warming of the area, resulting in more favourable climatic conditions for the establishment of tropical-subtropical species. Their main pathway of introduction seems to be the Suez Canal followed by shipping, and aquaculture, while the Straits of Gibraltar and the Dardanelles appear to play a less important role. The study of their geographic distribution showed that their majority is present in the south-eastern Aegean (Dodecanese, with a peak of 80 species, an increase of about 16% in the 2006-2007 period). A huge increase was also observed in the Saronikos Gulf area (Young et al., 2007). Moreover a colonization trend of the alien species against the recession of autochthonous species has been detected. Since the majority of alien species have subtropical to tropical affinity (species of tropical Atlantic and of Indo-Pacific origin), the hypothesis of a tropicalisation phenomenon in the Mediterranean Sea has been put forward (Bianchi, 2007) as a result of four different phenomena: Atlantic influence, lessepsian migration, species introduction by humans and sea-water warming, e.g. the crab *Percnon gibbesi*, originating from the western tropical Atlantic, has been found progressively in the Tyrrhenian Sea, Sicily Island, Ionian and South Aegean Seas. Similarly, lessepsian immigrants established in the Levantine basin have spread into the eastern basin (Aegean Sea, Ionian Sea) and have even penetrated into the western basin (*Bursatella leachii, Cerithium scabridum, Fistularia commersoni*).

An on-going project funded by the Ministry of Research and Technology and Port authorities (initiated in 2003) aims at studying the introduced species via shipping (hull fouling) in major Greek ports (Peiraias, Thessaloniki, Heraklion, Kalamata).

A compilation of freshwater alien biota has revealed approximately 47 species, the majority of which (26 species) are fish introduced for aquaculture that have established self-sustaining populations (Zenetos et al, in preparation).

As regards terrestrial invasive alien species, individual researchers have carried out research projects (21 are included in the expertise registry of the European project Delivering Alien Invasive Species for Europe). A survey of the alien plants of the country was undertaken as part of this project. For this purpose, a thorough investigation of the existing literature was made. Information derived was compiled in a database with all the alien plants. The data collected concern taxonomy, status, life and growth form, habitat, origin, distribution etc. (Kokkoris et al. 2007). Data on 325 *taxa* reported for Greece have been compiled in this database, of which approximately 40% are naturalized. *Graminae*, *Compositae* and *Leguminosa* are the richest families in number of *taxa* comprising 30% of the total, while *Amaranthus* is by far the richest genus consisted of 17 species. As far as their life form is concerned, the majority of the alien plants are therophytes followed by phanerophytes and hemicryptophytes.

Chorological analysis shows that most of the taxa are of American origin (39%), followed by those of Asiatic (19%). As expected, most of the alien taxa grow in disturbed and man-made habitats such as cultivations, fallow lands, roadsides, wastelands, around and within inhabited areas. The alien flora of Greece is not yet fully studied, since several regions and habitats likely to host such species are under-sampled (Bazos et al. 2007).

Eradication/control programmes: There seems to be limited national legislation or policy related to IAS control or eradication. Nevertheless, actions have recently been undertaken by the Hellenic Ornithological Society targeting the eradication of rats from islets of the Aegean region, under a LIFE project for the protection of *Falco eleonorae*[15].

Challenges/limitations: National instruments to address IAS are very limited. A national plan to register, monitor and control the introduction of non-indigenous species and to mitigate their negative impact has not yet been elaborated. It is evident that more national funds should be allocated to studies on the increase of knowledge and control of IAS in a comprehensive manner and in such a framework (spatial and temporal) that sound assessment can be made and conclusions can be drawn.

Literature cited:

Bazos I., Y. Kokkoris, A. Zikos, P. Andriopoulos, P. Delipetrou, K. Georghiou, A. Yannitsaros and M. Arianoutsou. 2007. The alien vascular flora of Greece: floristic analysis and chorology. XII Optma meeting, Pisa, Italy, 10-16 Sept. 2007.

Bianchi, C.N., 2007. Biodiversity issues for the forthcoming tropical Mediterranean Sea. *Hydrobiologia,* 580:7–21.

Kokkoris, Y., Bazos, I. & Arianoutsou M. 2007. Naturalised alien plant taxa of Greece: origin and Habitat. Origin and evolution of Biota in Mediterranean Climate Zones An Integrative Vision. 14-15 July 2007, Institute of Systematic Botany, University of Zurich.

Pancucci-Papadopoulou MA, Kevrekidis K, Corsini-Foka M and Simboura N (2005) Changes in species: invasion of exotic species. In: Papathanassiou E and Zenetos A (eds) State of the Hellenic Marine Environment, Athens, HCMR Publications, pp 336-342

Pancucci-Papadopoulou MA, Zenetos A, Corsini-Foka M, Politou Ch-Y (2006) Update of marine aliens in Hellenic waters. Medit Mar Sci 6(2):147-158[2005]

Pancucci-Papadopoulou MA, Corsini-Foka M, and Zenetos A, 2007. Monitoring Marine Alien species in the Hellenic Seas**:** Status and trends**.** Communication presented at 1st Pan-Hellenic Meeting on Aquatic Invasive Species in the eastern Mediterranean. Irakleio, Kriti, 5–6 Nov 2007

Young L, Polychronidis L and Zenetos A (2007) Saronikos Gulf: Hot spot for alien mollusca. Communication presented at 1st Pan-Hellenic Meeting on Aquatic Invasive Species in the eastern Mediterranean. Irakleio, Kriti, 5–6 Nov 2007

Zenetos A. & N. Streftaris, 2008. National overview on vulnerability and impacts of climate change on marine and coastal biodiversity: Greece. Contract RAC/SPA.

Zenetos A., Pancucci-Papadopoulou AM., A. Economou, Zogaris S. & Vardakas L., in preparation. Towards an Inventory of aquatic alien species in Greece (status in 2008).

12.HUNGARY

Legislation: Hungary established a strict system on controlling invasive alien species in the 20th century, including obligatory control of certain aliens, border control and

[15] For further information, see: http://www.ornithologiki.gr/life/falcoel/en/news/show_article.php?artID=184&locale=en.

quarantine. Formerly (prior to EU membership), several alien organisms were checked through border control of shipments and cargos by plant protection and veterinary services with obligatory control of several species listed under relevant legislation.

The following laws contain provisions relevant to IAS[16].

Act No. LIII of 1996 on Nature Conservation in Hungary:

- Article 8(4) introduces the concept of alien referred to the phytogeographical and zoogeographical perspective. Time scale is also considered in Article 8;
- Article 8(4) defines 'harmful introduced species' to cover any living organism which does not qualify as native from the phytogeographical or zoogeographical point of view, and in case it establishes and adapts itself, it may be capable of modifying the natural processes of the Hungarian wildlife communities unfavourably for the native species;
- Article 8(2) defines 'native organism' to mean any wild creature which lived or still lives in the natural geographical region of the Carpathian Basin in the last two thousand years - and not as a result of introduction (be it intentional or not).
- Article 9(4) provides that the introduction of any new organism (new to Hungary from a phytogeographical or zoogeographical aspect) may only be authorised if this colonisation does not harm natural processes within Hungary's communities for the disadvantage of native species;
- Article 13(2) provides that introductions of alien wild animal species which are not declared as game species, or reintroduction of wild animal species, need to be authorised by the Minister (granted with the approval of the Minister of Agriculture).
- Article 13(3): The authority responsible for hunting may oblige game-licence holders to reduce or liquidate the populations of harmful introduced wild animals by hunting techniques;
- Article 13(4): Subject to the exception specified in 13(2), in order to introduce any alien living organism or to reintroduce any living organism it is necessary to hold an authorisation of the Minister (which is granted with the approval of the Minister of Agriculture);
- Article 14 prohibits the introduction of alien fish species into natural or near-natural waters as well as their transfer from fish farms into any other wetland;
- Afforestation of habitat with native tree species (if possible) is considered in article 16(3) while reforestation in protected natural areas (Article 33(3)b) must be carried out exclusively with native species exception in "forest stands not able to naturally regenerate or consisting of alien species and being of a maximum block size of 3 hectares" (Article 33(5)a); and
- Efforts to establish close-to-natural conditions are to be made in forests of alien tree species in protected natural areas by replacing, complementing and changing the tree species and by regulating the species composition (Article 33(7)).

[16] The following laws, except for Act No. CLIV of 1997 on Public Health, are described in the report to the Convention on the Conservation of European Wildlife and Natural Habitats, Group of experts on Invasive Alien Species, Horta (Azores, Portugal), 12 October 2002 (T-PVS (2002)11).

Act. No. LIV of 1996 on Forests and the Protection of Forests:

- Article 2(1): forests should be used, exploited in a manner and at a rate, which allow the prospects of forestry to endure for future generations as well (hereinafter: lasting (sustainable) forestry) so that the forests preserve their biological diversity and naturalness, fertility, regenerability, viability, furthermore, that they satisfy the criteria of defence and economy in harmony with the requirements of society, and fill in their role serving the purpose of nature and environment conservation, health and welfare, tourism and research and education;
- Article 25(2)a): In the course of preparing the district forestry plan, priority should be given to the restoration of natural (indigenous) forest conditions when determining the tasks of afforestation;
- Article 35(2): Where the conditions of the habitat permit, the creation of close to natural forest biocoenosis shall be given preference in the preparation of the plantation-implementation plan by applying indigenous tree species;
- Article 38(2): The liquidation of the plantation can be ordered by the forest authority in case the growing stock planted without permission or not in compliance with the permission would be harmful to the habitat or the neighbouring forest-lands; and
- Article 41(3): Where the conditions are provided for the natural afforestation from seed of indigenous tree species suiting the habitat, this shall be applied. . In case of artificial afforestation only propagating stock of the species set forth in the district forest plan and of the quality specified under a separate legal rule may be used.

The Forest and Forest Protection Act 1996 is being revised during 2008. The new Act will contain lists and regulations of invasive tree and herbaceous plant species.

Act No. LV of 1996 on the Protection of Game, Game Management and Hunting:

- Article 33(2): introduction of non-indigenous game species for hunting purposes must be authorised by the hunting authority.
- Implementing Decree 79/2004 (V.4.) of the Ministry of Agriculture and Rural Development contains a list of game species with a year-round hunting season. Three invasive species are on the list: muskrat (*Ondatra zibethicus*), raccoon dog (*Nyctereutes procyonoides*) and raccoon (*Procyon lotor*).

Act No. XLI of 1997 on Fisheries and Angling:

- This Act regulates and requires a permit for stocking all fish originating from abroad to natural waters and fishponds. It means that also in the case of indigenous fish species, a permit is required if the specimens come from abroad.
- There is no special regulation on the use of live bait.

Act No. LIII of 1995 on the General Regulations Concerning Environmental Protection:

- Sections 23(1), (2) and (3) contain general measures concerning protection of biodiversity;
- Section 67 and 68 (EIA);
- Section 69 and 70 (Preliminary Environmental Study);
- Section 71 (In-depth Environmental Impact Study).

Act No. CLIV of 1997 on Public Health (Article 35, 36, 56, 73)

Act No. XXXV of 2000 on Plant Protection contains provisions to the following effect:

- Article 1: aim is to protect plants, especially crops and plant products from any pests and to prevent and avoid risks …. to nature conservation;
- Article 4(1): plant protection activities should aim at preventing introduction or spread of pests;
- Article 5(1)a: the land user and producer are required to destroy the quarantine and the regulated non-quarantine pests, to prevent their introduction, establishment, spread, …;
- Article 6(1): official treatment can be provided for if a non-quarantine pest has been recorded in the country ….;
- Article 7(1): an appeal against the decision ordering treatment of public interest has no postponing effect on the execution;
- Article 8: contains details on phytosanitary inspections;
- Article 19(3): studies with a plant protection product containing a viable organism not native in Hungary may only be conducted, even for laboratory purposes, with the permission of the Ministry [of Agriculture and Regional Development], issued observing the statement of the body designated by the Ministry of Health and of the Ministry of Environment[17].

A series of decrees adopted in 2007 specifically address IAS that may impact on Hungarian biodiversity.

Government Decree 71/2007 (IV.14.) of the Ministry of Agriculture and Rural Development on the Establishment of Energy Plantation of Arboreal Species[18] provides that energy plantation (including invasive species) in nature protected areas and Natura 2000 sites may be only authorised with the consent of the nature conservation authorities. Under Article 3§(4), the establishment of energy plantation as arboreal invasive species in protected natural areas and non-protected Natura 2000 sites may only be authorised in accordance with the procedure laid down by Ministerial Decree 45/2007.

This Government Decree is implemented through Decree 45/2007 (VI.11.) of the Ministry of Agriculture and Rural Development which lays down detailed rules regarding the establishment of energy plantation of arboreal species: in particular,

[17] Data requirements on the origin and other ecological properties of living organisms in the registration dossiers for pesticide regulation are contained in Ministerial Order No. 6/2001 FVM on release of pesticides (Annex 1 and 2)).

[18] The term ‘tree’ is not used to avoid confusion with forestry instruments.

Article 2 (4) establishes that introduction of *Robinia pseudoacacia* must not be authorised for planting in protected natural areas and non-protected Natura 2000 sites.

The list of species under Ministerial Decree 45/2007 (VI.11.) consists of the following species: *Populus alba, Populus nigra, Populus x canescens, Populus tremula, Salix alba, Salix viminalis, Alnus glutinosa, Fraxinus excelsior*, *Fraxinus angustifolia*, *Acer platanoides* and three non-indigenous species that are already widespread in forestry plantations in Hungary, *Robinia pseudoacacia, Quercus rubra* and *Juglans nigra*. The most problematic of these species is *Robinia pseudoacacia* which, as indicated, may not be authorised for planting as bioenergy plantation in protected or Natura 2000 sites (Article 2(4)). In any other cases, during the administrative procedure, it is possible to apply for subsidy for bioenergy plantation of arboreal species. Decree 72/2007 (VII.27) of the Ministry of Agriculture and Rural Development sets out rules for obtaining EAFRD subsidy for the establishment of bioenergy plantation of woody plant species. Applicants are required to have all necessary permits from the authorities (e.g. permission of nature conservation authorities if the plantation is situated in a protected area and/or Natura 2000 site). The authorities may make decisions on the choice of species during that administrative procedure when the client applies for permissions to establish an energy plantation.

In parallel, Decree 71/2007 (VII.27.) of the Ministry of Agriculture and Rural Development sets out rules for obtaining EAFRD subsidy for the establishment of energy plantation of perennial (energy grass) plant species. Under Article 4(8), the applicant is required to prevent (localise) the spontaneous spread of the plantation. Annex 1 to this Decree specifies which plant species may be planted: (1) *Agropyron* and *Elytrigia* genus, except the protected native species *Agropyron elongatum* and *Elytrigia repens;* (2) the *Miscanthus* genus.

The Agricultural and Rural Development Agency (operating under supervision of the Ministry of Agriculture and Rural Development) is responsible for monitoring and carries out 'on-the-spot' controls. If officials find that the applicant did not respect these conditions, they may require repayment of the full amount of the subsidy. It is of course not possible to check every applicant, but ARDA regularly checks the landowners.

Government Decree 91/2007 (VI.26.) on *Determining the degree of natural damage caused and the rules for remedying the damage* provides that invasive alien species must be taken into consideration during identifying the environmental elements to be monitored (Article 12(4)). This is a very new government decree and no available data is available yet for last year on how it worked in practice. This Decree mainly applies the provisions of the environmental liability Directive 2004/35/EC, but the text of article 12.4(3b) provides that "elements of the monitoring must be chosen particularly considering the following groups: ….g) the populations/associations of invasive non-indigenous species (IAS) which are incidentally spreading and endangering nature because of the changed circumstances due to the damage caused to the environment".

Government Decree 269/2007 (X.18.) on detailed rules of maintenance of Natura 2000 grasslands has an appendix containing 15 invasive plant species: (1) Woody invasive species and non-native plant species: *Robinia pseudoacacia, Fraxinus*

Americana, Ailanthus altissima, Elaeagnus angustifolia, Pinus nigra, Pinus silvestris, Amorpha fruticosa, Prunus serotina, Acer negundo; (2) Perennial invasive plant species: *Phytolacca americana, Fallopia spp., Solidago canadensis, Solidago gigantean, Ambrosia artemisiifolia, Asclepias syriaca, Echinocystis lobata.*

Amendment 81/2003 (VII.9.) to Decree 5/2001 (I.16.) of the Ministry of Agriculture and Rural Development provides regulations for the eradication and prevention of *Ambrosia artemisiifolia* and *Asclepias syriaca.* These species are included on the list of dangerous weed species in Decree No. 50/2008 (IV.24.) of the Ministry of Agricultural and Rural Development on conditions for the maintenance of proper Agricultural and Environmental Status for some rural development subsidies.

Most recently, Act No. XLVI of 2008 on the Food Chain and its Supervising Authorities (in force since 1 September 2008) will amend other decrees applying to the common ragweed (*Ambrosia artemisiifolia*).

A new Government Decree on keeping and transfer of ownership of pets is under preparation. One of the articles will contain a list of 15 species which ecologically endanger native wildlife and natural habitats of Hungary: specimens of these species must not be traded, offered to sale, kept or bred. The list is still under negotiation but mostly contains reptiles and mammals.

Policy: Hungary has started to develop a national strategy based on the European Strategy on Invasive Alien Species and on Decision VI/23 of the CBD. The National Biodiversity Strategy and Action Plan states that proposals should be elaborated on how to limit or suppress the spreading of invasive alien species.

Control of invasive alien species is incorporated into the National Nature Conservation Master Plan (chapter 5.4.1.2.5), into the National Biodiversity Strategy and Action Plan, and into some sectoral programmes such as common health, plant protection and animal husbandry.

Awareness-raising with specific stakeholder groups:

In spring 2008, the Ministry of Environment and Water took part in a popular exhibition (FEHOVA - Exhibition of Gun, Hunting and Angling) in Budapest and published a small leaflet about live baits for educational purposes that recommended anglers:

- not to use non-indigenous fish species as live bait;
- if used, not to release the bait into the wild at the end of angling;
- if anglers caught a non-indigenous fish species, not to release it back into the wild.

Research: The most dangerous invasive plant species for Hungarian habitats were listed (35 species) during a symposium in 1998[19]. In 2008 Hungary started to compile a new list of IAS (excluding pest species) which now consists of 40 terrestrial and 22 aquatic plant species and 73 animal species. The first version was based on data collected from researchers and conservation managers and compared to other international lists. The Ministry of the Environment then held a meeting for colleagues in the Inspectorates of Environment, Conservation and Water

[19] See Report to Bern Convention Group of Experts on IAS (T-PVS (2002) 11).

(conservation authorities). The list, still under discussion with experts and nature conservation authorities, will be advisory and is intended to provide a starting point to help the development of focused legislation and also to raise public awareness.

The state nature conservation organisation has initiated several programmes for the mechanical control of invasive plant species in protected areas. The government and non-governmental organisations launch programmes for ragweed (*Ambrosia artemisiifolia*) control. The Hungarian Biodiversity Monitoring System monitors five invasive plant species (*Ailanthus altissima, Amorpha fruticosa, Asclepias syriaca, Solidago gigantea, Solidago canadensis*) since 1998. The research of invasive alien plant species in aquatic ecosystems received more emphasis in the allocation of grants in 2007-2008.

The Authority for Nature Conservation, Ministry of Environment and Water published a book 'Invasive Alien Species in Hungary' in 2003, containing actions against IAS at international, European and national level and also information about invasive plant and animal species, followed by a book on invasive alien plant species in Hungary in 2004.

Scientific reports on invasive alien plant species were in progress in 2004 while some reports on invasive fishes and mammals were already been prepared but not published (Report on Implementation of Programme of Work for the Global Taxonomy Initiative Annex to Decision VI/8).

Eradication/control programmes: IAS are now covered by species action plans and in the management plans of protected natural areas (detailed management plans exist for 113 protected areas and for 59 planned protected areas). Control is under way for several alien invertebrate species, microorganisms and weeds eg common ragweed (*Ambrosia artemisiifolia*).

Inter-ministerial coordination and financial mechanisms for control of *Ambrosia artemisiifolia*

In 2004 an inter-ministerial committee was set up to deal with legal and financial aspects of the control of *Ambrosia artemisiifolia*. The Ministry of Agriculture indicates that prevention and protection against ragweed is an administrative procedure of authorities. Land users are obliged to protect their property (land, garden etc.) from ragweed before 30 June in a given year.

Land Registries Offices after 30 June hold inspections (on-site examinations) in three different cases: from duty, at the request of other authorities or following a notification from a member of the public (e.g. a complaint from a neighbouring landowner). Following the on-site examination, the Land Registry Office hands the case to the Plant and Soil Protection Directorates of County MGSZH (MGSZH=Central Agricultural Office) which then carries out the administrative action according to the following steps:

A) If the land user is known and there is evidence of failure of protection, the directorates (as authority) may make 3 different decisions:

1. Adjudicates an obligatory protection (due to public interest)
2. Adjudicates a fine (because of failure of protection)
3. Adjudicates a payment (cost of the protection, because in this case the authority does it instead of the land users).

B) If the land user is not definitely known, the authority still has to adjudicate an obligatory protection due to public interest.

C) If land user is unknown and the land owner is unknown, the authority will cancel the administrative action and does not make a decision of fine or payment of the cost, although in this case the state budget (from budget estimates) finances costs of the protection.

In addition, there are effective prevention actions: published brochures about ragweed and protection, public website and campaigns in media organised by the Ministry of Agricultural and Rural Development, and a so-called "hot-line" service at the Soil and Plant Protection Authorities to manage complaints and notices from the public.

Since 2004, 1% of personal income tax may be offered for ragweed protection by a taxable person. The Ragweed Committee (the inter-ministerial committee established in 2004) makes a proposal for spending the payments received from 1% income taxes, and the proposal (budget) is approved by the Ministry of Agriculture and Rural Development each year.

According to the Hungarian Act of Annual State Budget Act, as it concerns the Ministry of Agriculture and Rural Development, there are two budget lines which determine resources for ragweed measures (protection measures in the public interest; work of the inter-ministerial committee). These estimates can cover the cost of work, campaign programmes, brochures etc.

Most Hungarian national parks reported control programmes or other activities in connection with eradication of invasive alien species in 2007.

The Environment and Energy Operational Programme of the New Hungary Development Plan gives opportunity to finance measures aiming to reduce populations of IAS within habitat rehabilitation and restoration projects.

Challenges/limitations: One limitation identified in Hungary's report to the CBD was that there is no priority governmental interest in solving this issue. However, 6 new decrees were issued in 2007 that reference IAS species lists and control, and 1 decree and 1 act relating to this issue are under preparation in 2008.

Within the European Community the trade of certain invasive species is not regulated and the import of these species may have considerable negative effect on the native flora (eg ornamental use of *Solidago gigantea*).

The Ministry of Water and Environment has translated the European Strategy on Invasive Alien species and published it in 2007. From the beginning of 2008 more intensive work started on species list of IAS of Hungary and developing the national strategy. However, collaboration with other ministries and creating a strong basis for the new strategy will be a big challenge and will require continuous conciliations and good coordination in the near future, although the first experiences are positive.

13.IRELAND

Legislation: There are several alien species prohibited by law both in the Republic and Northern Ireland. For example, in the Republic, *Berberis vulgaris* has been classified as a 'noxious weed' since 1958 and it has been systematically eliminated; in Northern Ireland, the 1985 Wildlife Order makes it an offence to plant or cause to grow in the wild *Heracleum mantegazzianum*, *Fallopia japonica* and all species of *Spartina*.

The Wildlife Act 1976 and the Wildlife (Amendment) Act 2000 are the primary pieces of legislation containing provisions in relation to IAS. It is prohibited, without licence :

- to release, wilfully cause to escape or transfer within the State for the purpose of establishment in the wild any species of wild animal or spawn and any wild bird or the eggs thereof;
- to transfer any species of wild animal or wild bird or the eggs of such a wild bird from any place in the State to any other place in the State for the purpose of establishing it in a wild state in such other place
- to plant or otherwise cause to grow in a wild state in any place in the State any species of flora, or the flowers, roots, seeds or spores thereof.

The Wildlife (Amendment) Act, 2000 strengthened the legal basis for controlling the introduction of potentially invasive alien species. The Minister may issue regulations prohibiting possession or introduction of any species of wild bird, animal or flora, or part, product or derivative thereof that may be detrimental to native species. Where an alien species has been introduced, measures can be taken, as far as feasible and appropriate under the Wildlife Act, to ensure that such introductions do not pose a potential hazard to native species.

Under the Regulation on the Control of Importation of Wild Animals and Wild Birds, 1989, the importation of live wild animals or birds is subject to licence by the Minister.

A review of legislative provisions relating to invasive species and their enforcement in the Republic of Ireland and Northern Ireland was undertaken by the "Invasive Species in Ireland Project" (see under Policy below) and completed in May 2008. This makes recommendations for improvements and may result in the development of dedicated invasive species legislation but no decisions have been taken at this stage.

Recent developments in legislation include the review of the Wildlife Order 1985 in Northern Ireland which proposed a wide range of additions of invasive species to Schedule 9. In response to confirmed reports of muntjac deer in Co. Wicklow, the Minister signed Regulations - the Wildlife (Wild Mammals) (Open season) (amendment) Order 2008, (SI no.27 of 2008) - declaring an open season on muntjac deer. NPWS is also examining the appropriate regulatory measures to be taken to control the possession and dispersal of ecologically harmful and invasive species of plants and animals in Ireland. It is expected that this issue will be addressed in regulations to be made under the Wildlife Acts 1976 and 2000 later this year.

When introducing alien marine species for targeted fisheries, Ireland follows the principles and risk-reducing measures as outlined in the ICES Code of Practice on the Introductions and Transfers of Marine Organisms.

Policy: Proposals for addressing the impact of IAS on native biodiversity were published in The National Biodiversity Plan for Ireland (2002- 2006). For example:

- Action 28: ‘Prepare strategies, in consultation with Northern Ireland, to control

introduced species and to prevent, or minimise, future (accidental or deliberate) introduction of alien species, which might threaten biodiversity. Unless clearly safe, all deliberate introductions of alien species into Ireland will require a risk assessment'.

- Action 29: 'All public bodies will endeavour to use native species, landraces and breeds and the public will be encouraged to do so'.
- Action 30: 'Ireland will seek to ensure that relevant laws and instruments, including those concerned with trade, - both within the EU and internationally - do not contribute to the problem posed by alien species and Ireland and will support the development of specific international instruments to address alien species'.

The same proposal of collaboration was included in Recommendation 48 of Biodiversity in Northern Ireland.

The National Biodiversity Plan, published in 2002, is under review and invasive species are a key theme that will receive particular attention. A new Plan is due for publication by the end of the year.

In 2004 a report on the situation of IAS in Ireland was carried out by Quercus jointly to the Environment & Heritage Service of the Department of Environment (Northern Ireland) and the National Parks and Wildlife Service of the Department of Environment, Heritage and Local Government (Republic of Ireland). A strategy is under development to implement the recommendations.

Sectoral policies: voluntary quality control schemes having an impact on alien species are in place for the sector of aquaculture. The refusal of the quality mark is given for non-compliance.

Under the Global Strategy for Plant Conservation and to fulfil its commitment to the CBD, a Stakeholder Meeting in 2005 adopted 16 targets. Target 10 of Ireland's National Plant Conservation Strategy deals with IAS (Management plans in place for at least 10 major alien species that threaten plants, plant communities and associated habitats and ecosystems in Ireland: see www.botanicgardens.ie/gspc/gspc.htm). Reported actions include:

- Draft new lists of prohibited weeds in consultation with Northern authorities to ban the sale, introduction, introduction or movement, especially of aquatics. Maintain vigilance on emerging threats.
- Review of national phytosanitary legislation to be harmonised with international and regional provisions by 2006.
- Develop priority list of 10-12 species; Implement efficient management programmes and Species Action Plans for at least 10 established invasive plant species by 2008.
- Develop and implement mechanisms for early detection and rapid action against potentially new invasive species including a manual of procedures for border control by 2007. Prepare documents for horticulturists to enable guidelines to be developed to prevent the establishment of new invasive aliens in the country.
- Evaluate existing all-Ireland Species Action Plans for Alien species, and modify as appropriate, by 2009.
- Assess and monitor the risk of genetic pollution of native plant species and

populations from introductions of foreign 'Wild Flower seed' by 2009.

Milestones & Indicators:

- Develop an efficient target-10 webpage, as part of the GSPC page, which will co-ordinate actions and organisations in highlighting or controlling problem species.
- Leaflets warning of the dangers of alien plants especially aquatics such as *Crassula helmsii*.
- Noxious Weeds act extended to cover an increased list of prohibited species.
- *Hydrocotyle ranunculoides* exterminated in its two localities.

Ireland is developing and implementing measures to tackle IAS in partnership with the Northern Ireland administration. A review of invasive species in Ireland was jointly commissioned by National Parks and Wildlife Service and the Environment and Heritage Service. This report was presented to both Ministers in March 2004 and it was agreed that both agencies (Environment and Heritage Service in Northern Ireland, National Parks and Wildlife Service in the Republic of Ireland) would work together and with other stakeholders to tackle the IAS problem. In response to the recommendations of this report the 'Invasive Species in Ireland' project started in May 2006 and runs until May 2009.

'Invasive Species in Ireland' project

Aims of the Invasive Species in Ireland project:

1. Reducing the risks of invasions of new species
2. Developing contingency plans in conjunction with stakeholders
3. Producing management plans to help control and manage new and established invasive species and vectors
4. Engaging key stakeholders
5. Developing codes of good practise in conjunction with stakeholders
6. Raising public awareness
7. Recommending surveillance, monitoring and recording programmes
8. Reviewing legislation

Full details of the project can be found on www.invasivespeciesireland.com. The budget for this project is £262,000.

An extensive stakeholder engagement programme has been underway for two years, one element of which is the All-Ireland Invasive Species Forum. This forum meets annually and has over 100 organisations involved including central and local Government, state agencies, industry, academia and the NGO sector. There are four technical working groups on marine, freshwater, terrestrial invasive species and education and awareness. Details on Forum membership and activities can be found on the Invasive Species in Ireland website.

Education and awareness materials have been produced and are available for download from the site. In addition, IAS will be the focus of Ireland's biodiversity awareness campaign Notice Nature (www.noticenature.ie) in 2008. Materials for schools and the construction, business and tourism sectors are being developed.

A progress review was undertaken in 2008 to identify future options for tackling invasive species on the island of Ireland. Its outputs will be considered at a conference in November.

A risk assessment protocol has been developed and over 600 risk assessments have been carried out on established and potential invasive species to identify those species

that pose the greatest threat to biodiversity on the island of Ireland. Exclusion strategies, contingency plans and management strategies are being prepared for these species (see below). The highest risk to biodiversity in Ireland is from freshwater invasive species, in particular ornamental pond plants and fish.

Research: The National Research Centre for Biodiversity and Conservation Biology in Northern Ireland (Quercus) (http://www.quercus.ac.uk) has some projects on IAS: 'All-Ireland review of introduced species' (a cross-border project) and 'Impacts of invasive aquatic amphipods'. A report on the situation of IAS in Ireland was carried out by Quercus (2004). Ireland is represented in the DAISIE and ALARM project teams.

The Environmental Protection Agency, as part of the Science, Technology, Research & Innovation for the Environment (STRIVE) Programme 2007–2013, has funded a €280,000 project on alien invasive species in Irish waterbodies. This project will address the knowledge gap identified under the Water Framework Directive for IAS in Ireland's River Basin Districts, and produce a monitoring and reporting strategy. This will be achieved by: literature review of impacts on natural ecosystems, vectors, spread potential and control options; analysis of impacts of selected invasive species on structure and function of natural ecosystems (primarily by innovative studies of impacted and non-impacted food webs using stable isotopes in exemplar waterbodies); and preparation of an archived GIS-based database of aquatic aliens in Ireland. This project is being carried out by a consortium of Queens University Belfast, EnviroCentre, the Central Fisheries Board and the National Biodiversity Data Centre.

Research is also being carried out into the impacts of curly leaved waterweed (*Lagarosiphon major*) in Lough Corrib (Central Fisheries Board), control of giant rhubarb (*Gunnera tinctoria*) on Clare Island (National Botanical Gardens) and on the zebra mussel invasion and impacts on Irish lakes (multiple projects ongoing). The Invasive Species in Ireland project will put a research page on the website as a source of information on who is doing what relating to IAS research and control in the coming months.

Eradication/control programmes: Exclusion strategies and contingency plans have been prepared for non-native crayfish species, wild boar and non-native deer (muntjac, Chinese water deer and roe deer) and Japanese kelp. Some control measures have been undertaken in Killarney National Park where introduced Sika deer have interbred with Red deer. Eradication is not feasible for Grey squirrel and bank which have reached pest status in some localities.

Management plans have been prepared for the invasive tunicate *Didemnum*, chub, floating pennywort (*Hydrocotyle ranunculoides*) and ruddy duck. Management plans currently in preparation include those for invasive mammals on seabird islands, giant rhubarb, Hottentot fig, New Zealand pigmy weed, fringed water lily, parrot's feather and Chinese mitten crab.

There are a number of widely established species for whom island wide eradication is impossible so best practice management guidelines have been prepared along with templates for the development of site specific management plans. These include

Japanese knotweed, Himalayan balsam, giant hogweed and Rhododendron ponticum and cherry laurel. All strategies and guidance documents are available on the website. Active control programmes for *Rhododendron ponticum* and *Heracleum mantegazzianum* are in place.

Control programmes are underway for *Lagarosiphon major, Hydrocotyle ranunculoides* and zebra mussels. There are smaller site-specific control projects, many of which are now being undertaken by local authorities in Ireland. In relation to *Lagarosiphon major*, NPWS has funded the purchase by the Central Fisheries Board (CFB) of a weed cutting boat to be dedicated exclusively to removing the invasive species from Lough Corrib in County Galway. Additional funding of €200,000 has also been provided by the NPWS to the CFB in 2008 for work involving the removal and control of the species in the lake.

In addition a project is underway to investigate measures for the control of *Gunnera tinctoria* on Achill Island in Co. Mayo. The project is funded by Mayo County Council and by NPWS through the Biodiversity Fund, which is administered by the Heritage Council. *Gunnera tinctoria* is a large herbaceous plant that forms dense colonies that shade out and suppress native vegetation. This species is a vigorous seeder and also has the ability to spread vegetatively, so intense effort is required for its control.

Other activities: Codes of Practice are also being developed in conjunction with relevant sectors. The Horticulture Code is complete and Codes for the aquaculture sector and recreational water users are in development.

Challenges/limitations: It seems there are problems with enforcement of legislation related to IAS in the Republic of Ireland (Stokes et al 2004). Powers of access to private land if needed for control of IAS are not in place.

14.ITALY

Legislation: There has been a review of the Italian legal/policy framework in relation to IAS. The Decree of the President of the Republic (DPR no 357 of 1997) and its amendments (D.P.R. no. 120 of 2003) contain provisions prohibiting the introduction of alien species in Italy. The Decree transposes the habitats Directive, and states in Article 12(3) that introductions of 'non-local' species require the authorisation of the Ministry of Environment under the condition that the proposed introduction will not threaten biodiversity. Article 12 of the DPR 120/03 prohibits any introduction of alien species in Italy.

Guidelines for the application of this provision have been produced (*Linee guida per l'immissione di specie faunistiche*" – Guidelines for the translocation of wildlife species (AA. VV., 2007)). A proposal to incorporate them into a Ministry of Environment Decree has not yet been approved and is under discussion.

Law n° 157/1992 applies to all mammal and bird species of which wild populations are permanently or temporarily established on national territory. The definition

includes non-native as well as native species, which means that the protection/control measures outlined in the Law are applicable to potentially invasive alien species (though no clear reference to IAS is made). Article 20 regulates the import from abroad into Italian territory of live mammals and birds for reintroduction and genetic improvement and clearly mentions the prohibition on using non-native species. An import permit is required from the Ministry of Agriculture and Forestry together with an advisory opinion from the Italian Wildlife Institute (I.N.F.S.). Article 19 establishes an authorisation procedure for control of mammals and birds, including non-native species.

In Italy, each of the twenty regions can adopt internal legislation. There are some Regional Laws that have provisions on IAS. The Lombardia region provides one example of a subnational legal approach to IAS. The new Regional Law (n° 10/31 March 31 2008) bans the introduction of alien invertebrates, herps or plants into the natural environment, with the exception of species released for biological control if authorised by national legal framework (there is no reference to releases for other purposes. Offenders may be fined € 200-2000 and obliged to eradicate the introduced species if applicable. The law also includes a black list of species to monitor, control or eradicate. A list has been circulated (made without PRA): the current version includes *Anoplophora chinensis, Dreissena polymorpha, Procambarus clarkii, Orconectes limosus, Astacus leptodactylus, Rana catesbeiana, Leptoglossus occidentalis, Trachemys scripta* and about 20 plants[20]

There is also a specific Law (150/92) which contains provisions on the keeping of potentially dangerous alien species.

The Decree laying down phytosanitary measures concerning the importation of plants belonging to the *Chamaecyparis* Spach and *Pinus* L. species originating in Japan introduces some phytosanitary and quarantine measures in order to prevent the dissemination of pests which might arise from the importation into Italy from Japan of the plants specified in article 1. Prior to the exportation from Japan, the plants shall be subject to inspection to be carried out by the Japanese phytosanitary authorities (art. 2), so as to guarantee that they are free from the diseases defined under article 2 (2) and they meet the requirements established therein. The plants shall also be accompanied by the certificate referred to in article 3 and, upon arrival into Italy, shall be subject to the quarantine measures contained in article 4. An authorisation granted by the Ministry of Agricultural and Forestry Policies is compulsory as well (art. 5).

Policy: Monitoring and mitigation programmes for invasive alien species are among the criteria of management for Natura 2000 sites.

Bilateral cooperation on *Ambrosia artemisiifolia* (Italy, Croatia)

A partnership was established in January 2008 between the Venice Region (Regional Agency for Environmental Protection (ARPAV)) and the Croatian region of Slavonia (Slavonia regional development agency (RRASB) to facilitate cross-border cooperation to address the growing human health impacts and associated socio-economic impacts caused by the pollen of this invasive plant. The Veneto Region Brussels Office held a joint press conference, with ARPAV and RRASB, in Brussels on 6 October, supported by Members of the European Parliament (ENVI Committee).

[20] http://www.provincia.milano.it/export/sites/default/polizia_provinciale/documenti/L.r._31_marzo_2008_n_10.doc

Research: Italy is participating in the DAISIE and ALARM projects. The new technical advisory body ISPRA (which merges the Italian Wildlife Institute (INFS), the ICRAM and the APAT) is implementing a database of alien species, with the financial support of the Ministry of Environment. ISPRA is also carrying out projects such as identification and distribution of alien species in Italian seas.

Other actions include: Inventory of Alien mammals and birds, Study on distribution and impact of *Rapana venosa*, Inventory of alien species in Italian Seas, Inventory of alien plants in Sardinia, a pilot study is being carried out in the Trieste and Milazzo harbours in order to identify species and monitor the ballast waters, Atlantic and Lessepsian Immigrant Environmental Noises project, etc.

LIFE projects play an important role in the management of IAS. In 2003, 64 per cent of Italian projects funded through the LIFE mechanism had as their main objective the eradication and control of IAS (IP/03/1202 Date: 05/09/2003). In the period 1994-2002 the following alien species were targeted through 27 LIFE projects:

Plant species:
Abies cephalonica, Acacia cianophylla, Acer negundo, Ailanthus altissima, Amorpha fruticosa, Caulerpa taxifolia, Cedrus sp., Eucaliptus sp., Laserpitium niger, Lonicera japonica, Mesembryanthemum acinaciforme, Nelumbo nucifera, Pinus halepensis, Phytolacca americana, Pinus pinaster, Platanus spp., Populus hybrida, Prunus serotina, Pseudotsuga menziesii, Quercus rubra, Robinia pseudoacacia, Solidago canadensis, Solidago gigantean.

Animal species:
Canis lupus familiaris, Carassius carassius, Ctenopharyngodon idella, Dama dama, Ictalurus melas, Lepomis gibbosus, Myocastor coypus, Procambrus clarkii, Rana catesbeiana, Silurus glanis, Trachemys scripta.

Italy is also a member of the trilateral ballast water management sub-commission for the Adriatic Sea (Italy-Slovenia-Croatia) which deals with the problem of introduction of harmful organisms from ships in the area.

Eradication/control programmes: The Ministry for the Environment and Territory has produced an action plan for freshwater fishes (2003), and guidelines for *Myocastor coypus* (2001) and *Sciurus carolinensis* (2001). Also other eradication and control programmes have been undertaken in Italy.

Guidelines for exotic mammal and bird management were published in 2001 by the same Ministry (Andreotti A., N. Baccetti, A. Perfetti, M. Besa, P. Genovesi, V. Guberti, 2001 - *Mammiferi ed Uccelli esotici in Italia: analisi del fenomeno, impatto sulla biodiversità e linee guida gestionali*. Quad. Cons. Natura, 2, Min. Ambiente - Ist. Naz. Fauna Selvatica).

Challenges/limitations: There is currently no precedent in national legislation for regulating domestic trade in invasive alien species: for example the grey squirrel *Sciurus carolinensis* is still freely traded. The Region of Lombardia has requested approval of a trade regulation for this species: the matter is currently being considered

by the Ministry of Environment.

The inadequate legal basis also affects the effectiveness of mitigation programmes (eg attempts to eradicate grey squirrel). In particular, Article 2 of Law n° 157/1992 implies that alien species of mammals and birds, if established in the wild, are protected by national legislation. This can create problems for IAS management because even though Article 19 of the Law references species control measures, there is no explicit reference to eradication and control of IAS. In addition, control measures may only be carried out by agents authorised by local administrations.

Although a draft national Decree containing Guidelines for re-introductions of wild species on national territory was prepared, this has apparently been halted.

Major problems arise from the lack of legislation at Community level regulating the import into the community of exotic alien species that have been proven to threat European habitats and species. Such EC-level legislation would provide a sound basis for creating national legislation in this area.

15.LATVIA

Legislation: The Law on Protection of Species and Habitats (16.03.2000) provides for control of pathways for introduced species (Chapter IV: Species Introduction and Reintroduction). Annex 1 to the Law on Environmental Impact Assessment provides that for introduction of wild species not native to the territory of Latvia, impact assessment is required. After positive assessment, introduction of certain species for economic or social use may be possible. Relevant regulations of the Cabinet of Ministers set a procedure of introduction and reintroduction.

The Law on Plant Protection lays down regulations for import and export of plants. Amendments in the law were introduced on 2 November 2006. Articles 18.1 and 18.2 establish the following provisions:

- criteria for inclusion of plant species in the list of invasive species and procedure for inclusion.
- prohibition on the introduction (import) into the country of invasive species;
- prohibition on the cultivation of listed invasive species. The landowner is responsible for eliminating such plants on his property and penalties apply to land owners that do not comply with control requirements.;
- State control on distribution and control of invasive plant species is vested with the State Plant Protection Service (SPPS);
- control measures should be carried out in all invaded areas;
- in accordance with an order of the Cabinet of Ministers, local governments may be involved in control actions for invasive plant species;
- local governments in cooperation with SPPS may organise control measures if this is not done by the land owner:
- The SPPS monitors invasive plant distribution in agriculture lands. Other state institutions are responsible for data submission to SPPS on the distribution of

invasive plant species in other categories of land use;
- The SPPS is the nominated data keeper on invasive plant species: data is free for public access.

To date, one invasive plant (*Heracleum sosnowskyi*) has been included in this list. There are currently no proposals to list additional species but any EPPO-listed species may be included. Only limited support for control is available at present, due to general budgetary constraints[21].

National legislation prohibits use of alien tree species for forest restoration or afforestation.

Policy: The National Programme on Biological Diversity (NPBD) sets numerous goals for control of invasive species in all relevant sub-programmes. Those dealing with control of pathways are described in the box below.

Goals on IAS in Latvian National Programme on Biological Diversity

In agriculture:
14.8. Contain the distribution of introduced species.
14.8.1. Allow the introduction of agricultural crops only after rigorous testing and experience in other countries. Observe precautionary principle when making decisions on cultivation of introduced species.
14.8.3. Control the distribution of aggressive species, especially by their removal from natural communities.
14.8.4. Develop and implement regulations on introduction of new crops, and stipulate grower responsibility for damages ensued to local species and communities.

In inland waters:
1.6.1. Ensure a ban on introduction of alien species into natural waters, and restrictions on their growing in fishponds
15.3. Prevent entry of foreign fish species or other organisms into the natural environment
15.3.1. Control and combat the already widespread aggressive species.
15.3.2. Assess the safety of the utilised technologies for fish growing in existing aquacultures, and the impact of possible release of the grown foreign species in natural ecosystems.
15.3.3. Exclude the introduction of genetically modified aquatic organisms in nature.

In marine and coastal areas:
1.6.2. Control the use of ballast waters.
2.1.8. Encourage use of local species for dune stabilisation, and prohibit planting of alien species on dunes.
2.1.9. Restrict distribution of expansive species (for example, roses *Rosa rugosa*, sea buckthorn and *elaeagnus*) on dunes.

In forests:
4.4.3. Monitor distribution of alien species in forests and combat expansive species.
13.9. Control the distribution of foreign tree species in forests.
13.9.1. Utilise specific tending methods in forests with high densities of foreign tree species in plant communities.

In urban ecosystems:
10.1. Identify the trends in expansion of distribution of species in human environments, with the appropriate monitoring.
1.1.1. Control the expansion of aggressive weeds, and hunting.

[21] Pers.comm, Vilnis Bernards, Ministry of the Environment.

16.5. Prevent the impact of introduced species on natural populations.
16.5.1. Promote hunting of introduced predator species.
16.5.2. Monitor the population dynamics of introduced predator species.
16.5.3. Develop legislation on introduction of foreign species, and ensure compliance.

Research: A list of the most important and aggressive alien species has been made, including 15 species. The Latvian State Centre of Plant Protection and Institute of Biology of Latvia, Laboratory of Botany took part in a EU 5th Framework Programme project: 'Giant Hogweed (Heracleum mantegazzianum) a perilous invasive weed: developing sustainable strategy for alien invasive plant management in Europe'. Studies on Heracleum sosnowskyi (genetics, ecology) were carried out in the frame of this project. Researchers of the Latvian University of Agriculture carried out project on biology of Giant Hogweed in 2001-2002. Studies on distribution of alien species in coastal habitats of Latvia have been also carried out (Faculty of Biology, University of Latvia, 2002), involving mapping of alien species along the coast of the Baltic Sea. A State Plant Protection Service was established in 1998.

Regional cooperation on alien invasive species is ongoing with the Nordic and Baltic countries through the NOBANIS project. Latvia's alien species list home page, established on http://lv.invasive.info is contributing to information transfer.

Eradication/control programmes: One of the main threats to habitats and species in rural areas is *Heracleum sosnowskyi*. This expansion of this species is controlled by measures supported by Single Programming Document (2004-2006). A Programme for control of Giant Hogweed (2006-2012) has been adopted by Cabinet of Ministers Order (06.06.2006).

Challenges/limitations: Most of the invasive species do not have national strategies or plans for minimising their distribution. Although the main trans-regional distribution pathways are controlled to prevent invasion of new species, distribution of invasive species within the country is not sufficiently controlled. There is a lack of financial resources available for monitoring of invasive species. Other challenges identified were lack of capacity (specialists), knowledge and funding.

16. LITHUANIA

Legislation: The Law on Wild Flora (1999), the Regulation of the Ministry of Environment on import of new plant and fungi species (2000), and Law on Protected Plant, Animal and Fungi Species and Communities (1997, amended 2001) and related regulations provide control for pathways for introducing species. The Law on Plant Protection (1995, amended in 2003) states regulations for import and export of plants. According to national legislation it is prohibited to use alien species in afforestation.

The Ministry of Environment approved an Order on Introduction, Reintroduction and Relocation, the Order on Control and Eradication of Invasive Species Organisms and Composition of Committee on Invasive Species Control (Order No 352) issued in July

2002 (amended in June 2008)[22]. In 2004, the list of Invasive Species was approved by Ministerial Order No D1-433.

When importing live alien animal species into the country, a permit from the Ministry of Environment is required. The importer must apply to the Ministry, and get conclusions and recommendations from the Committee on Invasive Species Control to confirm that the distribution of such species in the wild will not have adverse ecological or economic effects, or negative effects on human health. The permit will be issued only if the Committee has approved the application. There are also provisions for quarantine of potential IAS. The same legislation also contains provisions to prohibit trade in invasive species, and allows for potential IAS that are known to cause harm elsewhere to be treated as dangerous (import prohibited etc).

Control of IAS is performed by the State Food and Veterinary Service, State Plant Protection Service, Customs Department, the Ministry of Health and the Ministry of Environment. The competence of each of these organisations is described in the Order on Control and Eradication of Invasive Species Organisms.

In 2002 the Ministry of Environment approved the Programme on Introduction, Reintroduction and Relocation, and a related Action Plan. In the Programme there are guidelines how to prevent and stop spread of invasive species and in the Action Plan there are detailed actions, together with responsible actors and provisions for financing.

Policy: The Lithuanian Biodiversity Strategy and Action Plan (1998) sets a goal and actions related to IAS. The goal is to protect locally characteristic species and natural populations by preventing the spread of adventitious and invasive species, and by enhancing research. The action is to prepare a study on introduced and invasive species and their ecological role.

Among various activities set in this Action plan (for 2002-2007) the following have particular relevance for invasive species :

- strengthening of institutional capacities for prevention of introduction, trade and relocation of harmful alien species
- creation of data base on alien bacteria, fungi, plant and phytoviruses;
- creation of data base on alien dendroflora in forest ecosystems;
- creation of data base on alien Baltic sea species;
- creation of data base on animal species;
- creation of consolidated data base on all alien species and integration of this database into international information networks on alien species;
- incorporation of monitoring of alien species into National monitoring programmes;
- preparation of specific monitoring programmes and implementation to track and control spreading and habitats of specific alien species;
- control of adventitious dendroflora in Lithuanian forest ecosystems;
- evaluation of introduced tree species in Lithuanian forests (inventory of tree

[22] Available at: http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=179371&p_query=introdukuotos%20rūšys&p_tr2=0.

species, preparation of catalogue, estimation of spreading, evaluation of ecological and economical damage or benefit);
- creation of the list of invasive species;
- identify invasive species origin, distribution, spreading routes and ways;
- preparation of maps of invasive species distribution;
- preparation of control and eradication plans for invasive species;
- creation of information system for public, education and awareness-raising.

The National Environment Monitoring Programme for 2005-2010 includes the following goal: a) To halt the loss of biodiversity till 2010 assessing the main tendencies of biodiversity changes… *to assess, forecast and control spread of the most dangerous fauna and flora invasive species to Lithuanian biodiversity*.

In 2010 it is planned to create a website on IAS in Lithuania.

Lithuania has not developed any voluntary or non-regulatory initiatives (eg codes of conduct, public awareness campaigns etc.).

Research: Lithuania is represented on the DAISIE and ALARM project teams and participates in NOBANIS.

Eradication/control programmes: Prevention and control plans for *Heracleum sosnowskyi* and *Orconectes limosus* species are currently being prepared. 15,000 Lt have been allocated for research on *Perccottus gleni* population and the preparation of action plan, and 40,000 Lt for investigation of *Nyctereutes procyonoides* population and preparation of action plan in 2008.

In 2008-2009, there will be assigned 500,000 Lt for estimation of implementation costs and preparation of action plans for population regulation and control activities for 7 invasive species (*Mustela vison, Nyctereutes procyonoides, Perccottus glenii, Orconectes limosus, Heracleum sosnowskyi , Acer negundo L., Lupinus polyphyllus Lindl.)*. In 2010-2013, financial resources will be allocated for implementation of above mentioned action plans.

Challenges/limitations: Lack of capacity and funding.

17.LUXEMBOURG

Legislation: There is no specific piece of legislation concerning IAS in Luxembourg. However, the Act of 19 January 2004 on the Protection of Nature and Natural Resources as amended sets out several provisions that are relevant to IAS[23].

Article 30 prohibits the import and introduction of alien species into the wild without

[23] This Act repeals the earlier Act on the Protection of Nature and Natural Resources of 11 August 1982 (See: http://www.legilux.public.lu/leg/a/archives/2004/0102901/0102901.pdf?SID=c3243b613dc6a330ed0eb304bb73463f#page=2).

Ministerial authorisation. Permission may only be given if species are harmless for natural habitats and native fauna and flora and after a process of consultation with the Superior Council for the Protection of Nature and Natural Resources. Decisions are made on a one-off basis i.e. no 'black list' has been compiled.

Articles 26 and 27 prohibit the unjustified exploitation, damaging, capture and/or possession of wild native and alien flora and fauna. Article 27 also applies to trade in wild animal species and the provisions of the Article can also be used to control trade in and possession of IAS. On the other hand, these Articles may imply that the eradication or control of IAS might need a clear legal justification. This might hinder a quick response to prevent the establishment of IAS in the country.

A review of the legal framework is under way to determine whether it is sufficient and whether improved measures to control the most invasive plant species are necessary. In this context, it should be noted that Luxembourg will be bound by the Benelux decision under development requiring Parties to review national legislation "to prevent the introduction on their territory of non-native species that may become invasive and have adverse environmental impact as indicated by risk assessment".

There are some legal measures in place to prevent introduction and distribution of muskrat (*Ondatra zibethicus*) and raccoon (*Procyon lotor*). Development of hunting legislation is under way to enable hunting for control of alien species if necessary.

Policy: Luxembourg adopted its National Plan for Nature Conservation (*Plan National Protection de la nature* (PNPN 2007-2011) in May 2007. The Plan addresses IAS issues and provides that action plans may be prepared for IAS that threaten native biodiversity or public health (action is discretionary). The List of Priority Species annexed to the Plan includes the following invasive/problematic species in different taxonomic groups, with different priority levels assigned:

Taxonomic group	**Species**	**Priority level**
Plants	***Heracleum mantegazzianum*** Somm. et Lev.	**1**
	Fallopia japonica (Houtt.) Ronse Decraene	2
	Fallopia sachalinensis (F. Schmidt Petrop.) Ronse Decraene	2
	Helianthus tuberosus L.	2
	Impatiens glandulifera Royle	2
	Senecio inaequidens DC.	2
	Ambrosia artemisiifolia L.	2
Reptiles	***Pseudemys scripta***	**1**
Amphibians	*Rana catesbeiana*	2
Mammals	***Capreolus capreolus***	1
	Ondatra zibethicus	**1**

Research: Non-native mammals are monitored through an ongoing project to determine their status and distribution on the territory, assess their impact on native fauna and flora and develop guidelines for their management. The same is being done for selected non-native plant species by the National Natural History Museum. (see related website: http://mnhnl.lu/cgi-bin/baseportal.pl?htx=/projects/neophytes/intro).

Eradication/control programmes: Several species of plants and animals are the target of control or eradication programmes, including *Ondatra zibethicus* (in relation

to increased predation on pearl mussels (*Margaritifera margaritifera*), *Ovis ammon* and *Syringus vulgaris*.

Challenges/limitations: Not found.

18.MALTA

Legislation[24]**:** Under the primary legislation - the Environment Protection Act (EPA) (Chapter 435, Act XX of 2001, as amended)[25] - Regulation 9.2.k(iii) empowers the Minister responsible for the environment to make regulations which, in relation to the protection of biodiversity, may 'declare any species to be an invasive species and establish rules for its control'. Various pieces of subsidiary legislation that address alien species have been enacted under the EPA and are mentioned below. The competent authority for implementing this legislation is the Malta Environment and Planning Authority (MEPA).

The Trees and Woodland Protection Regulations 2001 (LN 12 of 2001)[26] confer protection on native species listed under Schedule I (strictly protected trees), Schedule II (protected trees) and Schedule III (protected trees of more than 50 years of age). To further contribute to the protection of these species and of trees occurring in protected areas, Regulation 10(1) empowers the Minister to "indicate a list of alien invasive species, as listed in Schedule V to these Regulations, which cannot be propagated, sown, planted, imported or sold in Malta". Schedule V lists six plant species that are invasive in Malta (*Acacia saligna, Acacia karoo, Ailanthus altissima, Albizzia lebbek, Ricinus communis* and *Schinus terebinthifolius*). Under Regulation 10(2), the Director for the Protection of the Environment may take steps to order the uprooting of Schedule V listed species. Regulation 14 states that "the Director may stop the importation of trees which in his opinion may endanger the biological identity of Malta, or for any other reason in the national interest".

No stop orders have been issued for Schedule V-listed tree species since the Regulation was adopted, according to MEPA's records, nor have there been any requests for importation of such trees. It should be noted that these six species are not being actively used in landscaping, since the Regulations were drafted in collaboration with garden shops, nurseries, botanic gardens, the University of Malta and relevant governmental and non-governmental institutions and organisations, which are aware of the invasive nature of these species in the Maltese islands.

The above Regulations (LN12/01) are due to be replaced by new proposed Regulations currently undergoing public consultation. These amendments aim to:

- bring the Regulations in line with recent administrative changes;
- take account of new scientific knowledge; and
- improve the previous Regulations from a number of perspectives following a

[24] For the exact wording of cited regulations, please refer to the indicated links in this section.
[25] See http://www.mepa.org.mt/environment/legislation/chapt435_2001_E.pdf
[26] See http://www.mepa.org.mt/environment/legislation/LN_12_2001_E.pdf.

seven-year experience in their implementation.

Possible changes to the provisions on invasive alien tree species are also undergoing discussion. The related schedules for the public consultation are available at the following link: http://www.mepa.org.mt/planning/factbk/GNs/gn682_08.pdf.

Regulation 6(1) of the Trade in Species of Fauna and Flora Regulations 2004 (LN 236 of 2004)[27] enables the CITES Scientific Authority and Management Authority to advise the Minister to prohibit the import, export, re-export and possession of any species of fauna or flora, if, in the opinion of the said authorities, such transactions or possession would endanger the biological identity of any ecosystem or any species of flora or fauna in Malta. Regulation 6(2) places the responsibility on "… the person, who is seeking to import or is in possession of any live specimen, to obtain the necessary information from the Management Authority…", in order to establish whether such specimen is of any species referred to in Regulation 6(1).

The CITES Management Authority (within MEPA), with the assistance of the CITES Scientific Authority, has compiled a list of species the entry of which is prohibited into Malta. This is updated every time MEPA processes species-import-lists that are submitted to the CITES Management Authority. Species are 'blacklisted' on the basis of Regulation 6(1) of the Trade in Species of Fauna and Flora Regulations (LN236/04).

A system is in place for controlling importation from non-EU countries. An import licence, issued by the Trade Services Directorate in accordance with Regulation 3 of the Importation Control Regulations 2004[28] (LN 242 of 2004, as amended by LN 230 of 2005) is required before animals listed in Schedule II of the said regulations, can be imported from non-EU countries. Importation of plant species from non-EU countries currently does not require an import licence; nonetheless, importation must be done in conformity with national legislation.

The Flora, Fauna and Natural Habitats Protection Regulations 2006 (LN 311 of 2006)[29] address alien species under Part V (Introduction and Reintroduction of Species). Regulation 28 addresses several issues related to the control of alien species including *inter alia*:

- the possibility to regulate the importation and/or keeping of any species of flora and fauna, if deemed that such importation and/or keeping may harm or lead to the endangering of biodiversity of Malta (see Reg. 28[1]);
- regulation of the deliberate release of those species that are invasive or deemed to be invasive as referred to in Regulation 28(3) (see Reg. 28[5]);
- the possibility to develop eradication or control plans and related programmes for established alien species, invasive species and those alien species with a potential to become established and subsequently invasive (see Reg. 28[6]).

[27] See http://www.mepa.org.mt/environment/legislation/LN_236_2004_E.pdf

[28] http://www.doi.gov.mt/EN/legalnotices/2004/04/LN242.pdf

[29] Which repeal a number of legal notices including L.N. 257 of 2003 (see http://www.mepa.org.mt/Environment/legislation/LN_311_2006.pdf).

- Regulation 28(7) states that 'The Competent Authority may issue guidelines on the keeping, monitoring, prevention, control, and eradication measures of established alien species'.

In the past, some development applications were assessed on the basis of their landscaping considerations: in some cases, these were adjusted to the Maltese scenario in line with the MEPA Guidelines on Trees, Shrubs and Plants for Planting and Landscaping in the Maltese islands adopted in 2002 (available at http://www.mepa.org.mt/Planning/factbk/policies/Guide_Trees_Plants.pdf).

In specific cases, a development application may be refused on the basis of the impact resulting from IAS. In one recent case a development application was refused for a number of reasons, including the fact that the species proposed was considered invasive.

Under Regulation 18 (Restrictions on Operations and Activities) of the Flora, Fauna and Natural Habitats Protection Regulations (LN311/06), certain activities or operations can be refused or granted permission to take place. In line with this obligation, a request for the removal of the invasive Agave species within the Rdum tal-Madonna Special Area of Conservation and Special Protection Area was granted.

Policy: The recently adopted Sustainable Development Strategy for the Maltese Islands 2006-2016[30] identifies the need to "adopt an official [national] policy on the introduction and eradication of alien species" as one of the main strategic directions under the policy sub-theme "Nature & Biodiversity". The development of a strategy of alien species is under way and is intended to address the issue of alien species in Malta with respect to nature conservation and in relation to international and regional treaties.

Research: The Malta Environment and Planning Authority (MEPA) has commissioned two studies aimed at setting up lists of alien flora and alien fauna that have been introduced to the islands. Such lists will be made publicly available. The information obtained through the studies includes various details, including their distribution, source of introduction, level of invasiveness, and ease of eradication.

Maltese scientists are also working with other countries on projects such as the CIESM PORTAL project[31] which deals with marine alien species in the Mediterranean.

Eradication/control programmes: Preliminary efforts have been undertaken or are ongoing and are aimed at controlling the spread of specific terrestrial invasive plants from earmarked areas in the Maltese Islands (such as the removal of *Carpobrotus edulis* from certain sand dune ecosystems).

A project has also been successfully completed which aimed *inter alia* at eradicating *Rattus norvegicus* from Saint Paul's Islands, a protected area known to harbour the only population of the endemic sub-species of Maltese Wall Lizard – *Podarcis*

[30] http://www.mepa.org.mt/environment/index.htm?sustainable_development/mainframe.htm&1
[31] http://www.ciesm.org/marine/programs/portal.htm.

filfolensis kieselbachi. In total, €4991.39 were spent on rodent eradication and monitoring over two years. This included assessment, treatment, monitoring and transport costs to the islands. The benefit of the eradication exercise was that the islands have been certified as under control. Regular monitoring and treatment as required have ensured that rodents are not allowed to re-establish. This rat eradication was part of a larger project, which involved other management measures on the islands.

Challenges/limitations: Combating the spread of alien species requires human and financial resources which are currently limited. More action needs to be undertaken nationally to address marine invasives and to control their introduction. Marine invasive aliens are much more challenging and even at times impossible to control and/or eradicate in view of the marine environment they are in. Coordination between various entities is also a pre-requisite for the effective interception and timely response to new potential invasives.

19.THE NETHERLANDS

Legislation: The Flora and Fauna Act 1998 (Article 14) prohibits releasing animal species into the wild, and also prohibits planting or sowing of certain assigned plant species without permission. The only plant species currently assigned is *Hydrocotyle ranunculoides* (Floating Pennywort). In addition, two species are currently restricted in terms of possession, trade and import and/or export: *Hydrocotyle ranunculoides* and *Muntiacus reevesi* (Reeve's Muntjac).

Article 67 of the Flora and Fauna Act contains provisions for the abatement of assigned species. The Article offers the possibility to limit the population size of species. It allows the use of 'normal' (legally defined) hunting methods, provided that 'other satisfying options' to control or limit the population size are not available (de Groot and Gerrits 2003).

Assignment of species under Article 67 can be for reasons of safety (eg at airports, dikes); to prevent economic damage; or to prevent damage to native flora and fauna. The execution of these measures is decentralised. Each of the twelve Provinces has the authority to grant permission for abatement in its own territory. Nationwide coordination is absent.

Under the Hunting Act 1954, Regulations adopted in 1995 provide extra possibilities for control of the following alien mammals and birds, including species which may threaten ecosystems, habitats or species: *Mustela vison, Procyon lotor, Myocastor coypus, Nyctereutes procyonoides, Ondatra zibethicus, Alopochen aegyptiacus, Oxyura jamaicensis, Tamias sibericus*.

In accordance with the CITES-related EU council regulation 338/97 (L 61) and commission regulation 1988/2000 (L 237), the import of *Rana catesbeiana* and *Trachemys scripta elegans* into the Netherlands from third countries is prohibited.

Since 1986 the provinces have the responsibility by law for reducing the muskrat

(*Ondatra zibethicus*) populations in the country.

Policy: Legal responsibility for prevention of ecological damage by invasive species lies with the Ministry of Agriculture, Nature and Food Quality, which submitted the draft Policy on alien invasive species in relation to biodiversity to Parliament in October 2007. This policy document applies the three-stage hierarchical approach. Prevention is preferred as IAS control is costly and less effective when the species are able to establish populations and disperse. If entry has already taken place, actions should be undertaken to prevent the establishment and spread of alien species. The preferred response is then to eradicate the populations when small and feasible. If not, control measures should be implemented to minimise dispersal of the species in question. In the phase of eradication and control, the Netherlands will consider the feasibility of the eradication or control programme (efficiency and effectiveness), the negative side effects on the environment (including other species) and whether the species poses serious threats to native biodiversity. The policy document also describes the need for education, public awareness and (voluntary) cooperation with relevant sectors.

In June 2008, the draft Policy was discussed in Parliament with NGOs and the Minister for Agriculture, Nature and Food Quality.

In parallel to the development of the National IAS Policy, it was originally proposed to establish a Commission on Invasive Alien Species to carry out related tasks within the Ministry (COIE; *coordinerend orgaan invasieve exoten*). In June 2008, however, it was decided instead to set up an extensive and flexible network of specialists and interest groups regarding invasive species[32]. This will be the first policy support structure to deal with all IAS issues affecting biodiversity, across forests, inland water and marine systems. Civil servants in the Ministry's invasive species team will use this network to advice the Minister how to deal with invasive species. The invasive species team will co-operate with the network on issues like early detection and risk analysis of IAS. If necessary, the Ministry will play a role in the coordination of management actions.

With regard to marine alien species, the Netherlands signed the IMO Ballast Water Convention in February 2004. Preparations for ratification and implementation are under way.

Research: The Netherlands is represented on the ALARM project team.

No criteria have been developed for using risk assessment to assess risks to biodiversity in general, but there have been criteria developed for use in inland water systems.

Eradication/control programmes: The two largest rodents in The Netherlands are exotic: the muskrat (*Ondatra zibethicus*) and the coypu (*Myocastor coypus*). They are considered pest species and there is a national control programme. Examples of other control programmes include:

[32] Pers.comm. Lysbeth van Brederode, Ministry of Agriculture, Nature and Food Quality.

- eradication of floating primrose-willow (*Ludwigia peploides*) in the Biesbosch;
- control of muskrat (30 million euro a year);
- control of water pennywort *Hydrocotyle* (ca. 3 million euro a year);
- monitoring of Swinhoe's Striped Squirrel (*Tamiops swinhoei*) in the Noord-Brabant province;
- cooperation with neighbouring countries on a LIFE/INTERREG IV project to control problem species in shared water catchments/shared land areas.

Other activities: These include:

- discussion meeting on policy with relevant actors; and
- drafting of voluntary agreements (covenants, not yet signed) between the Minister and the aquatic plant trade and birdseed sectors to promote the substitution of high-risk exotic species by other species (eg for birdseed, to replace seeds of *Ambrosia* by other seeds of other species). These will not involve any provision of financial incentives to the sectors concerned will be provided.

No payments have so far been made under EU funding instruments to assist landowners in controlling IAS on their lands.

Challenges/limitations: Not found.

20.POLAND

Legislation: At least three pieces of Polish legislation regulate intentional introductions of alien species. The Nature Conservation Act (2004) regulates introductions of all alien species, except for fish. According to this Act, the introduction of alien species has to be approved by the Minister responsible for environmental issues. Obtaining consent from the Minister responsible for the environment is also necessary for importing alien species whose introduction into the environment could pose a threat to native species. However, the criteria for recognising alien species as particularly dangerous are not specified.

The existing Nature Conservation Act is currently being revised. As of September 2008, the new draft legislation contained – for the first time in Polish legislation – a definition of alien species. In addition to the existing permit requirement for import or introduction into the wild of an alien species, the new legislation establishes a legal basis for prohibiting possession of and trade in alien species that may pose a threat and provides for the publication of a list of such species through ministerial decree. This would overcome the gap in the existing legislation which does not specify how to define which alien species pose a threat.

Introduction of alien fish species into freshwater is regulated by the Inland Fisheries Act (1985) and subject to approval by the Minister responsible for Agriculture. Introductions of alien fish into seas is controlled by the Fisheries Act (2004) which provides that carrying out breeding, fish farming and fish hatchery in Polish marine areas requires permission and prior approval from the Ministry of Agriculture. If the

planned investment would be dangerous for the marine environment, permission will not be given. Threat or danger may include as the possibility of fish escaping from the farm. The permission may be cancelled if the investment is carried out against the rules stated in the permission or the enterprise causes harm to the marine environment.

The Hunting Law also covers the introduction of alien species to the extent that some introduced game species (eg pheasant) are alien. There may be some discrepancy between its provisions and those of the draft revised Nature Conservation Act 2008[33].

With regard to alien animal species already introduced and established in Poland, the number of alien game species is controlled in accordance with the Ordinance of the Minister of the Environment on the list of game species and close seasons for those animals (2001, as amended in 2005). Two alien species of crayfish and three alien species of fish are subject to control in accordance with the Ordinance of the Ministry of Agriculture and Rural Development of 2001 on fishing and conditions for raising, breeding and catching other organisms living in water.

There is a comprehensive organisational-legal system for phytosanitary and veterinary protection in Poland (supervised by the Ministry of Agriculture and Rural Development) and for forests (supervised by the Ministry of the Environment). Tasks performed by those bodies indirectly pertain to reduction of adverse effects of alien species on native natural diversity.

Use of alien species in forestry is regulated and controlled through forest breeding principles, which regulate share of alien species. There is a ban on using American black cherry in undergrowth. Wider use of alien species is acceptable in post-industrial areas or buffer zones where they constitute a fore-crop, preparing the soil for indigenous species.

Policy: In 2007 the Council of Ministers adopted the National Strategy for Conservation and Sustainable Use of Biological Diversity with the Action Plan for 2007-2013, in which the needs and priorities for enforcing the CBD Guiding Principles were partly identified:

- Recording and monitoring of alien species and exploring the sources and routes of their expansion, impact on native species and ecosystems special and economic effects of that impact.
- Working out the principles and programme for preventing introductions, elimination, control of spreading and control of numbers of alien species, in particular those which pose the most serious threat to native resources of biological diversity.
- Implementation of the programme for preventing introductions, elimination, control of spreading and control of numbers of alien species, in particular those which pose the most serious threat to native resources of biological diversity.

Under the National Strategy, institutions taking part in activities aiming at reduction in adverse effects of alien species and possible sources of financing those activities

[33] Pers.comm, Wojciech Solarz, Polish Institute of Nature Conservation.

were identified, and institutions coordinating them (Ministry of the Environment) were indicated.

Estimated costs of IAS action to conserve biodiversity in Poland:

Under the National Strategy for Conservation and Sustainable Use of Biological Diversity, the Action Plan adopted by the Council of Ministers in 2007 estimates the costs and possible sources of financing tasks related to reducing the threat posed by IAS in the period 2007-2013 at approx. 3,500,000 PLN (approx. € 1,200, 000).

In 2005, the Institute of Nature Conservation, Polish Academy of Sciences, commissioned by the Ministry of Environment, developed a Code of conduct for Alien species in Poland. This included listing of alien species that are expanding and invasive in Poland, with suggested methods of control. This Code may become the basic element of the future Polish strategy on IAS.

Research: Work has continued on developing the database on alien species including basic characteristics and a portal with detailed information on about 120 species (see Box). The Committee for Nature Conservation of the Polish Academy of Science organised a special session dedicated to invasive species, which was the basis for preparing the above-mentioned publication by the Institute of Botany, PAS.

Polish IAS Database and Portal

In 1999 the Institute of Nature Conservation commissioned by the Ministry of the Environment developed the database "Alien Species in Poland". The first version of the database included some 250 most important alien species in Poland. Among others the scale of threat each of the species posed to biological diversity in Poland was determined and it was assessed whether it was necessary to control its population numbers specifying the methods for the species control. In 2003, thanks to the grant of the US Department of State, a part of the data in the database was translated into English and published on the Internet (www.iop.krakow.pl/ias). In 2003-2008 the information in the database was supplemented and there are over now 800 alien species in it. The work on the new database structure complying with the recommendations of the Global Invasive Species Program (GISP) and Invasive Species Specialist Group (ISSG) is under way. In the future, the database will be included in the developing Global Invasive Species Information Network (GISIN). In 2004-2008 also the database of Polish experts dealing with alien species was developed.

In 2008 a portal on alien animal species in Poland was developed at the Institute of Nature Conservation (http://www.iop.krakow.pl/gatunkiobce/default.asp) with comprehensive information on approximately 120 alien species. Based on this information, in a book will be published in Polish and English in 2009.

Since 2004 Poland has been participating in NOBANIS (North European and Baltic Network on Invasive Species). Poland also participates in the ALARM and DAISIE projects.

Eradication/control programmes: Alien species of phytosanitary or veterinary concerns are controlled at the national level. For alien species threatening nature, the only control programmes coordinated at the national level concern alien species listed in the hunting laws (raccoon, raccoon dog, American mink).

At the local level, there are numerous actions to combat biological invasions, including in national and landscape parks. A survey in 2007 showed that at least 1 alien species is controlled in 41% of these areas. In total, 96 control actions of 28

alien species were reported. Control was mainly for invasive plants (51% of all reported cases), mammals (19%) and fish (16%). The most often-controlled species were: *Padus serotina, Nyctereutes procyonoides, Cameraria ohridella, Robinia pseudacacia, Heracleum sosnowskyi*). The number of bottom-up initiatives of local communities to control aliens is increasing, particularly for *C. ohridella*.

Challenges/limitations: Lack of effective methods for counteracting adverse effects, restraining invasions and eliminating alien species. Finding appropriate financial means and very low social awareness with respect to the issue of invasive species are also important constraints to effective implementation of Article 8(h).

The fact that so far there has been no single definition of an alien species or introduction at all had led to considerable arbitrariness in interpretation of the existing regulations, making the applied measures less effective. In addition, introductions are regulated by three different laws (separate for alien inland water fish, alien marine fish, all other alien species, hunting). Another important gap in the legal system is a provision that renders introductions of alien plants used for establishment and maintaining green areas and in forestry practically unregulated. The lack of any provisions concerning the criteria for recognising species as dangerous or harmless in the legal regulations is yet another gap that has made the ban on import of possibly dangerous alien species to Poland unenforceable, although this should be addressed in the new draft Nature Conservation Act. Control of some IAS (eg Canada goose) is hampered by the fact that they are not included in the law on game species.

Outside phytosanitary and veterinary sectors, there are no procedures to follow if a new invasion is detected. There is no comprehensive monitoring system for invasions.

21.PORTUGAL

Legislation: The Portuguese framework Environment Act (Lei de Bases do Ambiente (Law 11/87 of 7 April 1987, Article 15(6)) provides for the development of adequate legislation regarding the introduction of exotic flora (Article 16(3)) and the adoption of control measures to control the introduction of animal species.

Portugal has adopted specific legislation to control the introduction of alien species (Decree-Law nr 565/99 of 21 December 1999). The Decree-Law provides for listing of alien species in two categories:

- those identified as ‘invasive’ (Annex I): *species already introduced in national territory whose introduction is a cause of threat for the biological diversity in a given territory*. An Action Plan for control and/or eradication must be prepared be each invasive species;

- those considered as entailing an ‘ecological risk’ (Annex III): *species with negative potential, sensitive impact of threatening the biological diversity in a given territory*. Normally, species classified as ‘ecological risk’ have already been introduced in Spain or elsewhere and are causing problems. The category may also include species already introduced in Portugal that might cause problems in

the future.

The Decree-Law currently regulates the following actions for both categories of species:

- introduction and possession (with the exception of non-living parts or in the absence of propagules) except for scientific/educational purposes (NB although it is impossible to prohibit imports, the competent authority formally advises against the import of these species as their possession is not legal;
- breeding, cultivation or detention in a confined space;
- use as ornamental species or as pets;
- purchase, sale, offer for sale and transport.

Articles 4 and 5 regulate the economic exploitation of alien species in a non-confined space, namely aquaculture and apiculture. Article 17 prohibits restocking with IAS. Unintentional introductions are addressed in Article 7, and security measures for prevention are provided in Articles 6 and 9-15 and for ballast waters in article 16.

Mitigation measures are not provided but Article 18 provides for the development of a national action plan (no progress to date). The Decree-Law provides for sanctions (article 21) and remediation of damage (Article 25°). The Law does not contain any provisions as regards export.

As of September 2008, this Decree-Law was being revised in order to address problems that arose during its period of implementation. Priority areas for revision include:

- review of the procedures relating to licensing the detention of alien species and to improve safety measures to prevent the introduction of invasive and ecological risk species; and
- to review the annexes related to invasive and ecological risk species.

Specific legislation has been adopted in each of Portugal's two Autonomous Regions (Madeira, Azores) which have the status of EU Outermost Regions.

Regional Decree No.27/99/M regulates the keeping, import and dissemination of exotic fauna species into the territory of the Autonomous Region of Madeira. It consists of 6 chapters and 1 annex establishing: general provisions (chap. 1); imports and dissemination requirements (chap. 2); licensing (chap. 3); administrative and scientific authority including Scientific Commission competencies (chap. 4); sanctions (chap. 5) and final provisions (chap. 6). The annex lists animal species not included in this legislation. This is a 'white list' type of system: regulatory controls apply to all alien animals not listed under the Regional Decree.

For the Azores, Resolution nº 148/98 of 25 June 1998 aims to limit the possibility of dissemination through the escape of specimens of non-native animal species. A proposed legislative regional Decree to regulate the import, detention and introduction of specimens of non-native species in the Azores region is currently waiting for approval and publication, but no further information is available.

Policy: The national strategy for Nature Conservation and Biodiversity (2001) contains a set of measures concerning IAS in the fields of integrated policy, scientific research, management, education, and public awareness.

The Ministry of Environment (in collaboration with the Ministry of Agriculture) is developing a national plan to control or eradicate IAS already present in nature. This plan is undergoing an approval process and its provisions have not been implemented in practice except for *Eichhornia crassipes*.

Research: Portuguese authorities are participating in the research project INVADER (www.uc.pt/invasoras) which aims to evaluate control methodologies. Portugal is represented in the ALARM project team.

The Regional Governments of Madeira and Azores participated together with regional Spanish authorities in a cooperative project for 'the Control of Invasive Vertebrates in Islands of Spain and Portugal'.

Eradication/control programmes: A number of regional programmes have been established in order to control or eradicate IAS (in particular plan species). These programmes are often located in conservation areas. The Nature Conservation and Biodiversity Institute, had one LIFE to control IAS like Acacias, and the Azores have the LIFE-funded Priolo programme.

Portugal is working on the Plan for control and eradication of Water Hyacinth (*Eichhornia crassipes*). Following the EPPO/Council of Europe Workshop on How to manage Invasive Alien Plants: The case studies of *Eichhornia crassipes* and *E. azurea* (Mérida, 2-4 June 2008) (see Annex 1), the Portuguese authorities have established some contacts with Spanish. Portugal organised a workshop on the subject and colleagues of Mérida were present. It was a first step for the *Eichhornia crassipes* National Plan. The two countries face the same common problems especially on Guadiana River, and any measures have to be taken in cooperation with Spain.

The Azores Regional Government has published a Regional Plan for the Eradication and Control of Flora Invasive Species in Sensitive Areas (Resolution nº 110/2004, 29th July) that will be implemented until 2009. The plan foresees the eradication and control of 16 species of flora invasive species in sensitive areas in every island of the Azores archipelago (*Pittosporum undulatum, Hedychium gardnerarum, Hydrangea macrophylla, Arundo donax, Gunnera tinctoria, Clethra arborea, Carpobrothus edulis, Lantana camara, Ailanthus altíssima, Polygonum capitatum, Drosanthemum floribundum, Acacia melenoxylon, Ulex europaeus, Ipomoea indica, Rubus ulmifolius, Pteridium aquilinum*).

In the Azores, the LIFE-funded Priolo (*Pyrrhula murina*) project for management of the biotope[34] includes:

- removal of *Hedychium gardneranum* in the principal area of distribution of the Priolo and in a belt of exterior transition included in the buffer zone (SPEA);

[34] http: //www.spea.pt/ms_priolo/pt/.

- chemical and manual removal of *Hedychium gardnerianum*, arboreal Clethra, *Pittosporum undulatum* and *Gunnera tinctoria*;
- chemical methods for eradication of *Hedychium gardnerianum* in the project area are still being tested .

The Azores is currently preparing a control plan for eradication of the marine invasive species *Caulerpa webbiana*.

Eradication of *Acacia longifolia* is underway in some places in Portugal, and there are programmes for eradication of invasive species to support restoration of the Azores bullfinch and the endemic Zino's petrel *Pterodroma madeira*. In 2004-2005, regional authorities followed the implementation of the control and eradication projects for (1) the conservation of Zino's Petrel (2) restoration of the terrestrial habitat of Selvagens Islands and (3) control of the invasive plant species in the laurel forest of Madeira.

Challenges/limitations: Constraints in financial and human resources have delayed the application and implementation of existing measures relating to IAS.

22.ROMANIA

(Report reproduced from Miller et al, 2006: no updated information provided).

Legislation: There is no law concerning IAS belonging to 'CORMOPHYTA' ('superior plants'). There is, however, a law for pests ('inferior plants' and microorganisms). There is no coherent strategy or action plan focused on IAS.

However, there are some laws that include articles referring to IAS, including:

- Law 192/19.04.2001 which forbids the introduction of fish species in rivers.
- Law 103/23.09.1996 regarding hunting stipulates that the introduction of animal species in hunting areas can be done only with the approval of some state organisations.
- Law 137/29.12.1995 regarding environmental protection forbids the introduction of animal, plant and microorganism species without the approval of the central authority of the Environment Protection which has to consult the Romanian Academy of Sciences.
- Order 322/16.03.2000 regarding the import of animal and plant species from wild fauna, stipulates that the import of alien animal and plant species can be done only with the necessary approvals of the Romanian Government and the Romanian Academy of Sciences.
- Law 58/13.07.1994 which implements the CBD in Romania. Article 8 stipulates that the signing bodies will prevent, control or eradicate the introduction of alien species that are potentially dangerous.

Policy: Not found.

Research: There are two national projects, aiming at developing control programmes and publishing a list of alien species in Romania:

- CNCSIS grant in the University of Bucharest;
- Neobiota in Romania coordinated by Babes-Bolyai University from Cluj-Napoca.

Additionally, the financing programmes of the Ministry of Research have IAS as one of their priority topics of research.

Control/eradication programmes: In some area, the forests are affected by invasive alien species. However, there is no strategy or coherent action plan focused on alien invasive species. Major problems are caused in the Danube Delta and floodplain by *Amorpha fruticosa*, *Fraxinus pennsylvanica, Fraxinus americana,* clones of Euro-American poplars and *Populus nigra* hybrids. Controls on ballast water in the Black Sea ports are in place. There are laboratories for the identification of invasive species, especially insect leaf miners, at all ICAS branches in the country. There is a Central Laboratory of Phytosanitary Quarantine with strict regulations.

Challenges/limitations: Lack of adequate technologies, restrictions in the use of chemicals. High costs of eliminating the invasive *Amorpha fruticosa* and other species from the Danube delta and floodplain.

23.SLOVAKIA

Legislation: The Slovak law (Act No. 543/2002 Coll. on Nature and Landscape Protection) provides a framework for protection of native species and ecosystems. The Act makes it prohibited to import, possess, grow, reproduce and trade in both IAS and their parts or products thereof that could cause spontaneous dissemination of IAS. However, according to the Order of the Ministry of the Environment No. 24/2003 Coll., the provision applies only to 7 plant species (the most problematic): *Fallopia japonica, Fallopia × bohemica, Fallopia sachalinensis, Heracleum mantegazzianum, Impatiens glandulifera, Solidago canadensis, Solidago gigantea*.

In 2007, the first regulations were adopted to require the elimination of invasive alien plant species. Under the Order of the Slovak Government No.81/2007 Coll (Conditions of agricultural support under the single area payment scheme), maintenance of good agricultural and environmental conditions (GAEC) is a basic mandatory condition for farmers to receive payments. From April 2008, for the new programming period for the Rural Development Programme 2007-2013, the Order of the Slovak Government No. 160/2008 Coll. includes elimination of invasive alien plant species as one sub-condition of the GAEC. This scheme was developed in cooperation between the Environment and Agriculture Ministries. For the time being, the regulatory requirement is limited to the seven invasive plant species listed under the Act on Nature and Landscape Protection (see above). However, a proposal has been finalised to expand the list of invasive plants covered, either as part of

amendments to that Act or through new legislation[35].

Figures are not yet available on the level of take-up of this condition by farmers. The Agricultural Payments Agency (APA), which is responsible for the payments under the Rural Development Programme, has a control system for implementation of GAEC by farmers. One component of this system is direct control of farmland that is divided according to the land parcel identification system (LPIS). APA is only able to do a limited number of direct controls per year but based on experience in 2007 and so far in 2008, it indicates that farmers accept this condition and have at least tried to control IAS. In one example provided by APA, a farmer in the region of Zvolen (Central Slovakia) is trying to control *Fallopia japonica* (one of the IAS listed in Slovakia) occurring near his farm even though the species has not yet occurred on his farmland included in the LPIS.

The Order of the Ministry of Environment No.110/2005 Coll prohibits possession of alien birds of prey (*Falconiformes*) and owls (*Strigiformes*), and Red-eared slider (*Trachemys scripta elegans*);

Slovakia currently has no clear methodology for risk assessment to address threats of IAS to biodiversity.

Policy: The National Biodiversity Strategy of Slovakia covers the issue of IAS. It was approved by the Slovak Government and the National Council of Slovakia in 1997, and was followed by the development of an Action Plan for the implementation of the National Biodiversity Strategy for 1998 – 2010. In 2002 the Action Plan was amended for 2003-2010.

Work is continuing on a specific National Strategy on Invasive Alien Species, based on the Global/European Strategy on Invasive Alien Species. The Strategy will include measures to prevent the introduction of, control or eradicate all invasive alien species in Slovakia. The first draft has completed cross-sectoral consultation.

There are currently no voluntary and non-regulatory initiatives with regard to IAS.

Slovakia has not yet made a special budget allocation for IAS coordination and projects. The following table provides information of money by the Ministry of the Environment and its technical organisation, the State Nature Conservancy, on IAS mapping and control measures. This does not include money spent on IAS management in other sectors, such as the Ministry of Agriculture for agriculture and forestry.

[35] Pers.comm, Ema Gojdičová, State Nature Conservancy.

Financial aspects of control of IAS in Slovakia:

Year	IAS mapping		Control measures	
	Budget of SNC* (SKK/Euro)	Other sources** (in SKK/Euro)	Budget of SNC* (in SKK/Euro)	Other sources** (in SKK/Euro)
2002	150 000/5 000	300 000/10 000	100 000/3 300	300 000/10 000
2003	200 000	-	400 000/13 300	-
2004	-	260 000/8 7000	400 000/13 300	-
2005	100 000/3 300	-	689 000/ 22 888	-
2006	-	-	350 000/11 700	-
2007	-	-	300 000/10 000	-

Comment: the exchange rate for the Slovak Crown and Euro was taken as in May 2008 approximately 30 SKK = 1 Euro

Budget of SNC* means: budget of the State Nature Conservancy of SR
Other sources** means: Ministry of the Environment of SR from:

- Action Plan for Implementation of the National Biodiversity Strategy (2002)
- Structural Funds (2004).

Research: In 2002, List of Alien, Invasive Alien and Expansive Native Vascular Plant Species of Slovakia was published. From other systematic groups: fishes, mammals, invertebrates, only major species of concern have been identified. Lists of IAS (major species of concern) in the other systematic groups are being developed. Since 1997, alien vascular plant species have been mapped. Some alien animal species have been mapped since 2003.

The State Nature Conservancy of Slovak Republic in cooperation with the Slovak research and scientific institutions has promoted and carried out research on the vulnerability of ecosystems or habitats to invasion by alien species, the impact of alien species on biodiversity, and the development of environmentally friendly methods to control and eradicate invasive alien species.

Slovakia has developed and made available technical tools and related information to support efforts for the eradication and/or control of invasive alien plant species. Other relevant tools are under development, however, more information on prevention, monitoring, and particularly on early detection (programmes or systems) is needed. Slovakia has applied to become a member of the NOBANIS project and portal (official letter signed by the Minister of the Environment of SR confirming the interest of Slovakia to participate in the project and to provide the Slovakian data on IAS) but some details of cooperation still have to be completed.

Information exchange mechanism: Slovakia does not yet have a special IAS dedicated website. The State Nature Conservancy has its own website: www.sopsr.sk and there is a proposal to create a special link for IAS, however the website is still under development, so the link with the appropriate IAS information has not been developed yet.

Eradication/control programmes: Management measures follow the results of invasive alien vascular plant species mapping and they are concentrated in protected areas. In Forestry, measures for control of black locust (*Robinia pseudoacacia*) are implemented at the local scale.

Slovakia lacks a comprehensive system of risk analysis. However, some watercourses (wetland habitats) mostly in southern parts of Slovakia (Protected Landscape Areas: Latorica, Dunajské luhy, Záhorie) have been assessed for impact of alien fish species on native fish species. Increased attention is given to reptiles (mostly *Trachemys scripta elegans*), birds of prey (mostly hybrids). As for vascular plants, some assessments of the risk posed by 28 identified invasive alien species to habitats/ecosystems have been done (eg *Heracleum mantegazzianum, Fallopia japonica, Fallopia* × *bohemica, Solidago canadensis* etc.).

Awareness-raising: The East Slovakian Museum in Košice was a partner of the project for "Development of the Biomonitoring Network Supporting the Effective Management of Protected Areas" within the INTEREG III A Initiative (Neighbourhood Programme HU-SK-UA 2004–2006. The Museum's 2005 exhibition on "*Unwanted invaders – invasive alien plant species around us*" is still very popular and has been installed in many places throughout Slovakia. The exhibition has been followed by a series of talks addressing the invasive alien plant species issues. These have been organised with the cooperation of local authorities in Eastern and Southern Slovakia and have significantly contributed to public awareness.

Challenges/limitations: Challenges include:

• lack of coordination of work on invasive alien species;
• lack of cross-sectoral consideration
• limited awareness amongst the public and decision-makers;
• limited involvement of relevant stakeholders; and
• limited financial sources (Ministry of Environment 2005).

24.SLOVENIA

Legislation: Import and export is supervised by customs. Until May 2004, all imports of wild animals of alien species were subject to a permit which was issued only after the competent Authority was satisfied that such import would not pose the threat to native flora and fauna (Nature Conservation Act 1999). This provision ceased to be valid when Slovenia became a full member of the European Union. The main problem that arises from this suspension of IAS import controls is that Slovenia no longer has information on the amount and species composition of imported live alien species[36].

The revised Nature Conservation Act (ZON-UPB2; Uradni list RS, No. 96/04) regulates introduction of alien species into the wild in Slovenia. The measures relate to introduction, reintroduction, repopulation and captive breeding of alien species.

[36] Pers.comm., Branka Tavzes, Ministry of the Environment.

Detailed regulations under the Nature Conservation Act were introduced in 2002 by the Rules on the carrying-out of the assessment of risk to nature (Uradni list RS, No. 43/02). These Rules lay down the conditions and methods for the assessment of risk to nature prior to the introduction or repopulation of alien plant and animal species in the wild or the breeding of alien wild animal species. This provides a mechanism to control intentional introductions of alien species but does not address control of unintentional introductions.

In 2007, new Rules were issued under the Nature Conservation Act on wild animal species not requiring a permit for captive breeding (Uradni list RS, No. 62/2007) (http://www.uradni-list.si/1/objava.jsp?urlid=200762&stevilka=3356). These contain a list of alien organisms[37] for which there is no need to make an assessment of the risk as they do not pose any threat to native species. The list contained in Article 2 includes:

- mammals: *Chinchilla spp.* (only for specimens of domesticated breeds), *Dama dama*; game species that are addressed under wild game and hunting regulations and are bred in game pens with special purpose (it is prohibited to keep those alien species that could change the genetic composition of native species in case of escape);
- birds : *Perdix perdix, Anas platyrhynchos, Phasianus colchicus, Geopelia cuneata, Struthio camelus* (except for populations from certain countries), Passeriformes included in Annex 1 and Psittaciformes included in Annex 2 and not bred for commercial purposes;
- fish: *Oncorhynchus mykiss, Salvelinus fontinalis, Cyprinus carpio, Ctenopharyngodon idella, Hypophthalmichthys molitrix, Aristichthys nobilis*;
- invertebrates: non protected species used for scientific, educational or biomedicinal purposes or for animal feed; non protected native marine species.

Article 3 states that a permit is not required for terrestrial or freshwater animals, except for birds, whose natural distribution is between 20 degrees of northern and southern latitude.

Risk assessment must be carried out by an individual or legal person duly accredited for this purpose in accordance with the 2002 Rules on the carrying-out of the assessment of risk to nature and on the obtaining of authorisation. A risk assessment should be provided by any person submitting an application to introduce, repopulate or breed alien species.

Other relevant legal measures include:

- the Environmental Protection Act (1993, 2004);

- the Forestry Act (Uradni list RS, No. 30/93) provides for forest management plans to define guidelines for conservation or reintroduction of autochthonous species and their habitats. It is thus implicit that non-native species commonly planted all over Slovenia should be replaced by native species;

[37] http://www.uradni-list.si/1/objava.jsp?urlid=200762&stevilka=3356.

- the Freshwater Fisheries Act (Uradni list RS, No. 61/06) aims to prevent introduction and spread of alien species in inland waters. It prohibits the release of alien species, regulates sustainable breeding of fish stocks in specific catchment areas and prohibits relocation of living organisms between different catchments. The implementing Regulation on Fishing Species in Inland Waters (Uradni list RS, No. 46/07) lists fishing species by river basin and specifically names alien species of fish and crayfish;

- the Plant Health Act (Uradni list RS, No. 62/2007) implements Council Directive 2000/29/EC and the International Plant Protection Convention (IPPC). The Phytosanitary Administration of the Republic of Slovenia (FURS) is the central responsible body for plant health in Slovenia. FURS provides for safety of the food of plant origin and the health and quality of agricultural plants, enabling the optimal plant production and regulating the trade in plants and plant products at national and international level in conformity with international standards and requirements.

Policy: In accordance with the National Environment Programme (2005), a strategy on alien species is being prepared. This will involve a review of legislation and provide a comprehensive list of priorities for action with regard to IAS. Progress on strategy development was slowed down partly due to preparation for the EU presidency. The need for stronger institutional cooperation is recognised and will be addressed through the development of the Strategy.

Research: The Marine Biological Station (MBP-NIB) in Piran has carried out some relevant activities to assess the risk posed by some marine alien species. Slovenian institutes are participating in DAISIE and ALARM.

Some studies have been carried out in implementation of the Water Framework Directive. For example, the report on human induced impacts includes information on alien species in lakes and rivers, coastal sea and brackish waters. Some research has also been done on the invasive alien species in the Slovene sea.

Eradication/control programmes: Not found.

Limitations/challenges: Lack of a systematic approach, finances and institutional interest. There are less potential controls on IAS post-EU accession. An overview of legislation on alien species has been undertaken. No major gaps were found, however the implementation of existing legislation is inadequate. The main constraints are in institutional organisation and division of responsibilities, and not in lack of legislative measures.

25.SPAIN

Legislation: The new Natural Heritage and Biodiversity Act (Law No. 42/2007) defines “invasive alien species” as a species that is introduced or established in a natural or semi-natural ecosystem or habitat and is an agent of change and threatens native biodiversity, either because of its invasive behaviour or because of the risk of genetic contamination (*la que se introduce o establece en un ecosistema o hábitat*

natural o seminatural y que es un agente de cambio y amenaza para la diversidad biológica nativa, ya sea por su comportamiento invasor, o por el riesgo de contaminación genética (Art.3.13).

Art. 61 provides for the creation of a National Catalogue of Invasive Alien Species, although the implementing regulations have not yet been adopted. The Ministry of the Environment is responsible for listing an IAS in the Catalogue, based on the advice of the National Commission for Natural Heritage and Biodiversity. Any person or organisation may propose a species for inclusion or deletion from the Catalogue, based on scientific and technical information. An Autonomous Community that considers that an alien species is potentially invasive in part of the country may propose its inclusion in the Catalogue (Art.61.4).

It is prohibited to possess, transport, trade in, import or export specimens, parts or propagules of IAS listed in the Catalogue, whether live or dead[38]. Exceptions to this rule may only be made under administrative permit for reasons of research, public health and safety (Art.61.3). Breach of this prohibition constitutes an administrative infraction for which fines range from 500-5,000 € (minor offences) to 200,001-2 million € (very serious offences) (Arts. 76-77).

Breaches of the Act generate administrative responsibilities but these are not mutually exclusive with criminal liability (Art. 75.1)[39]. Unlawful introductions of non-native species are punishable according to Article 333 of the Penal Code[40] which provides that introducing or releasing alien species with adverse effects for ecological balance, in breach of nature protection legislation or regulations, is punishable with a prison sentence of 6 months to 2 years or probation of 8 to 24 months. The unauthorised introduction of a species included in the National Catalogue of IAS is considered a 'severe' or 'very severe' infraction depending on the damage it causes (less than 100,000 € = severe; more than 100,000 € = very severe).

The Ministry and the Autonomous Communities are required to develop strategies and management guidelines for the control and possible eradication of IAS listed in the Catalogue, giving priority to IAS that present a serious risk to threatened native species and habitats and paying particular attention to island biodiversity. These strategies must be approved by the cross-sectoral Committee for the Environment (Art 61.5).

An Autonomous Community may also develop an IAS Catalogue for its own territory and define additional prohibitions and actions for control of such species (Art.61.6).

Art. 74.2.i establishes a National Biodiversity and National Heritage Fund to support actions to prevent forest fires and other activities to eliminate other serious impacts on biodiversity and the environment, specifically including control and eradication of IAS. The percentage of funds assigned to each type of activity will probably depend on political priorities and will be partly managed by the autonomous communities.

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[38] The prohibition refers to "comercio exterior".

[39] "Las acciones u omisiones que infrinjan lo prevenido en la presente Ley generarán responsabilidad de naturaleza administrativa, sin perjuicio de la exigible en vía penal, civil o de otro orden a que puedan dar lugar".

[40] Organic Law 10/1995 of 23 November as amended in 2003 (Organic Law 15/2003 of 25 November).

Funds will usually distributed by means of tenders. The Fund will be financed with state funds and may also use community funds that could be used for the same objective, and through other mechanisms that could be established in the future (Art 74.1).

Article 62.3.e of the Act prohibits the introduction of alien species for hunting or fishing; in the case of accidental introductions the exploitation of these species will not be allowed. However, these activities also appear to be subject to earlier legislation which was not repealed by the Act:

- Law 1/1970 of 4 April on hunting requires authorisation for the import, export, transfer and release of game species;
- introductions and restocking of hunting and fishing species are made conditional on the authorisation of competent authorities to guarantee the genetic diversity and conservation of native hunting and fishing species. (Royal Decree 1095/1989 of 8 September which identifies hunting and fishing species and provides rules for their protection);
- a permit is required from the administration to import marketable living hunting and fishing species. For non-native species, an authorisation may only be given a) when measures to avoid their escape are guaranteed or b) when there are no risks for biological and genetic conservation of native species in the case they are imported for releasing into the environment (Royal Decree 1118/1989 of 15 September which identifies marketable hunting and fishing species and provide rules on the subject).

It should be noted that regulation of introductions for angling and fishing varies widely between Autonomous Communities: some promote their introduction and permit fishing while others have established prohibitions. For example, in the case of *Pacifastacus leniusculus*, some Autonomous Communities actively introduced the species until 2001, permit fishing and establish limitations in the number of daily catches, minimum sizes and close periods for fishing. Size limitations are also in use for some species of fish. Restocking with some alien fishes (e.g. *Oncorhynchus mykiss*) is carried out by regional authorities.

The Royal Decree 1803/1999 of 26 November (corrected in BOE Nº 13 of 15 January 2000) lays down regulations and general criteria for the management of National Parks. In chapter 3.2(c) measures to prevent and minimise impact of IAS are provided by prohibiting introductions of non-native taxa and encouraging efforts to eradicate established alien populations. Exceptions could be made for alien species that already form part of the natural processes where their eradication could impair the conservation of native species.

Law 31/2003 of 27 October on the conservation of wild fauna in zoological parks compels zoos to put in place measure to avoid escapes of animals and particularly potentially invasive species (Article 3 (d)) and sets fines for illegal, negligent and intentional releases (Article 14).

On the basis of this national legal framework, the governments of the Autonomous Communities have developed their own legislative tools (see eg Box for the Canary Islands).

IAS-related measures in the Canary Islands

The *Estatuto de Autonomía de Canarias* (Articles 31.3 and 32.12) confers exclusive competence for internal trade on the Canaries Autonomous Community. This regulatory power is interpreted to cover restrictions on possession and trade within the Canaries but not regulation of trade with mainland Spain. Within the Canaries, possession of and trade in certain species (eg *Procambarus, Caulerpa,..)* is already regulated. A decree is being developed under environmental impact legislation (*Ley 11/1990, de 13 de julio, de prevención del impacto ecológico* which covers human, plant and animal health as well as biodiversity conservation) to specify the list of species that may be lawfully sold in pet shops. This involves collaboration with several government departments (commerce, agriculture, justice). The first list will focus on animals and some algae. The possibility of mandatory microchips for identification of animals covered by such regulations is under consideration.

Any species purchased in mainland Spain can be legally brought into and kept in the Canaries, regardless of potential invasiveness. In August 2008, an inhabitant of Lanzarote Island purchased a specimen of *Bufo marinus* by internet and a king snake *Lampropeltis getula* (recently established as an invader in Gran Canaria Island) in a pet shop in Bilbao (Spain). These were detected on arrival at the airport and the veterinary service of the Agricultural Council informed. The accompanying documentation was correct but the animals were temporarily placed in a zoo while the Environmental Service was asked to assess the invasive potential of the species. This assessment was used by the veterinary service of the commune concerned to reject the entry of these animals in the Municipal Register of Domestic Animals (ie application of local council regulations to regulate holding of exotic pets).

The Service is working on a specific regulation on *Lampropeltis getula* and is funding eradication efforts in Gran Canaria: however, it remains legal to purchase specimens by internet to keep at home.

The Autonomous Communities have competence for hunting regulation and management. Existing hunting legislation protects species included on the list of game species, including three IAS (mouflon *Ovis aries*, Barbary sheep (*Ammotragus lervia*) and rabbit (*Oryctolagus cuniculus*). On the other hand, many protected area management plans and species recovery plans specifically target these species for control and eradication. Amendment of the Canaries hunting law is considered a priority.

A specific IAS pathway instrument (*Orden de 6 de agosto de 2001, por la que se establecen medidas generales y urgentes, con carácter provisional, para el tratamiento de arenas procedentes de continente africano, destinados al uso de la construcción, asfaltado o cualquier otro, con excepción del utilizado para la regeneración de playas*) was developed under environmental legislation to address IAS risks associated with the import of sand from Africa for beach replenishment in the late 1990s. The Order was a good initiative but the treatments established were difficult to apply and its application by the Councellery of Industry was low.

Two phytosanitary instruments address IAS that impact on threatened native plants. The Order of 24 March 2006 declares *Rhynchophorus ferrugineus* a plague and establishes phytosanitary measures for its eradication and control (Boletín Oficial de Canarias No. 61). The Order APA/94/2006 (26 January 2006) establishes a phytosanitary procedure for the import, export and transport of vegetables and vegetable (plant) products, to prohibit the import of species of palms (Palmae) in the Canary Islands

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

Policy: Policy initiatives in Spain include the following:

- a national action plan on IAS was developed in 2006: this provided a diagnosis of IAS in Spain to provide a basis for developing a national strategy[41];

[41] Capdevila-Argüelles L., Iglesias García A., Orueta J.F. & Zilletti B. (2006) *Especies Exóticas Invasoras: diagnóstico y bases para la prevención y el manejo.* Organismo Autónomo Parques Nacionales – Ministerio de Medio Ambiente, Madrid. 287 pp.

- the 2nd National Conference on IAS was held in November 2007[42];
- Spain has ratified the IMO Ballast Water Convention;
- as a contracting party to the Barcelona Convention, Spain has adopted the Action Plan Concerning Species Introductions and Invasive Species in the Mediterranean Sea;
- Spanish representatives are part of the Group of Experts on IAS of the Bern Convention and of the SEBI-2010 EG5 on trends in IAS;
- several Autonomous Communities are developing their own strategies on IAS eg in 2004, the Andalucian government launched a regional Plan for the control of IAS, including the identification and control of the most dangerous IAS;
- regulations for the Ebro Hydrological Confederation to control and prevent the spread of *Dreissena polymorpha* were adopted in 2002;
- the protocol of elimination of feral animals in the island of La Gomera (Canary Islands) was approved in 2006.

Research: Spanish institutions participated in the EPIDEMIE project related to exotic plants in Mediterranean ecosystems, the ALARM and the DAISIE project. In addition, specific research projects have been undertaken related to control of IAS at specific sites or to deal with impacts of some invasive species (eg *Mustela vison, Carpobrotus edulis, Cortaderia selloana, Eichhornia crassipes, Azolla filiculoides, Linepithema humile, Procambarus clarkii, Oxyura jamaicensis*).

Several institutions have adopted different approaches to establish databases on IAS. These include, for example, the following: InvasIber (IAS of the Iberian Peninsula, Ministry of Science and Technology of Spain, Special Action REN2002-10059-E), database of exotic species in Canary Island (Canary Islands Government), database of exotic bird species (Group of Alien Birds, SEO/BirdLife) and the Virtual Herbarium of the Western Mediterranean[43]. Additionally, distribution maps have been produced for some groups (mammals, birds, fish amphibians and reptiles), an atlas of invasive alien plants was published by the Ministry of Environment.

IAS databases are managed by regional administrations or by institutions and some of them are under development. The Ministry of Environment produced a very preliminary national database on IAS within the framework of the elaboration of the National Action Plan (2003-2005) which is not on line. The main problem is that data are not updated regularly and merged into a national database/clearing house mechanism.

Eradication/control programmes: The Governments of Spain and Morocco have developed an action plan to control *Oxyura jamaicensis* (Ruddy duck) in the latter country, because such ruddy ducks detected in the wetlands of Morocco could threaten the Iberian population of *Oxyura leucocephala* (White-headed duck).

Some projects relating to the control and eradication of IAS have been undertaken in Spain (*Mustela vison, Caulerpa taxifolia, Rhynchophorus ferrugineus, Oxyura jamaicensis, Dreissena polymorpha, Carpobrotus edulis*), mainly in relation to protected areas. These include the project on 'Control of invasive invertebrates on

[42] http://geib-en.blogspot.com/2007/11/eei-2006-2nd-national-conference-on.html.
[43] http://herbarivirtual.uib.es/eng-med/index.html.

Spanish and Portuguese islands'. Work is underway to eradicate Ruddy duck from Spain, as this species is a threat to the endangered endemic White headed duck. Likewise mitigation efforts are in place for the American mink and Caulerpa. Eradication of Carpobrotus sp. has been carried out in Menorca (Balearic Islands) in the framework of the LIFE 2000NAT/E/7355.

At subnational level there is a control programme for *Eichhornia crassipes* in Extremadura, and the Government of Canary Islands has responded to the invasion of the Red palm weevil (Rhynchophorus ferrugineus). The Government of Andalucia has developed and implemented an IAS control plan.

Additionally, LIFE projects play an important role to fight IAS in Spain:

LIFE99 NAT/E/6392: *Oryctolagus cuniculus, Felis catus, Rattus, Nicotiana glauca*
LIFE00 NAT/E/7299: *Mustela vison, Populus hybrida*
LIFE00 NAT/E/7311: *Oxyura jamaicensis*
LIFE00 NAT/E/7330: *Azolla filiculoides, Pinus sp., Populus híbrida, Eucalyptus sp.*
LIFE00 NAT/E/7335: *Mustela vison, Populus hybrida*
LIFE00 NAT/E/7355: *Carpobrotus edulis*
LIFE02 NAT/E/8604: *Mustela vison*
LIFE92 ENV/E/0067: *Caulerpa taxifolia*

Challenges/limitations: CBD definitions are not used in the Spanish legislation. The fragmentation of responsibilities and limited cooperation between different departments at national and sub-national level constitute one of the main weak points together with the lack of harmonisation in the legal field. The new law does not fully harmonise legislation on IAS (legislation on animal and plant health remains separate from environmental legislation) but does supports closer cooperation. Article 7 of Act 42/2007 provides that public administrations should cooperate on biodiversity-related issues and should exchange information. A consultative and cooperative body assembling national and autonomous (regional) authorities is created by the new law.

The main efforts are devoted to mitigation. There is a relatively low level of effort in relation to IAS prevention, which is focused on the National IAS Catalogue and does not cover use of risk analysis for entry pathways (to prevent unintentional introductions) and species. Rapid response to incursions of IAS that are not considered pests is hampered by lack of rules, although funds for IAS eradication and control may be made available through the new National Biodiversity and Natural Heritage Fund.

Transboundary aspects of biological invasions are not kept in account (eg liability).

The new Act, combined with the amended Penal Code, has significantly increased penalties for unauthorised introductions of species included in the National IAS Catalogue. However, it should be stressed 1) that the damage caused by IAS could take a long time (sometimes years) before it becomes evident; 2) the difficulty to evaluate biodiversity loss in financial terms; and 3) fines are established only for IAS that are included in the National catalogue but not for species that are not included.

26.SWEDEN

Legislation: There is no general legislation on invasive alien species in Sweden. The various sectors that may deal with invasive alien species includes the forestry, agricultural, maritime, fisheries, hunting, biological control and environmental sectors. These sectoral laws and regulations include[44]:

- the Environmental Code (section 8 on Protection of animal and plant species);
- the Hunting Law and Ordinance on Hunting (1987:905): section 41 prohibits the introduction of mammals and birds into the wild without permission from the Environmental Protection Agency;
- the Act on Import of Living Animals (SFS 1994:1830) regulates the entry and spread of animals to prevent the introduction of animal diseases and the transplantation of alien animal species that may harm indigenous fauna.;
- the Ordinance on Fishing, Aquaculture and Fishing Industry (SFS 1994:1716) prohibits the introduction of fish into the wild without permission from the county administrative board;
- Law on Plant Protection (SFS 1995:681), Ordinance on Plant Protection and Measures Against the Spread of Plant Pests (SFS 1995:94) regulates the control and limits the spread of plant pests, which can seriously damage plant cultures, forests, other land or plants.

Policy: The Swedish parliament has approved a set of 16 environmental quality objectives to be achieved by around 2020. The implementation of targets is supported by three action strategies. The objectives include several targets relevant to IAS that relate to objectives for biological diversity, agriculture, freshwaters, wetlands, forests, and mountains. These objectives address the intentional introduction of alien species and genetically modified organisms into natural habitats, whereas the unintentional introduction of such organisms, and the pathways involved, are not addressed explicitly. Various sector authorities, such as the Environmental Protection Agency and the National Fisheries Agency, have had policies for invasive alien species in place since 1996 and 2001 respectively.

The Swedish Maritime Administration and the Swedish Environmental Protection Agency have investigated the consequences of implementation of the International Convention for the Control and Management of Ships Ballast Water and Sediments in a report to the government (SOU 2008[45]). Their recommendation is that Sweden should ratify the Convention as soon as possible, but with a reservation that Sweden will not require shift of ballast water for traffic internal to the Baltic Sea due to its geophysical limitations (the Baltic is too shallow and does not meet the criteria in the Convention for minimum depth and distance from shore).

National needs for the implementation of the CBD Guiding Principles on IAS were identified in a 2004 review of national legislation, measures and procedures for

[44] More specific information can be found at http://www.biodiv.se/eng/intr-art/lagar.htm, see also www.nobanis.org/Regulations_SE.asp.

[45] *Barlastvattenkonventionen – om Sveriges anslutning. Betänkande av Barlastvattenutredningen. Statens Offentliga utredningar* SOU 2008 :1. In Swedish with a English summary.

dealing with alien species by the Swedish Biodiversity Centre, in cooperation with relevant government agencies. Identified needs included changes in legislation; developing a national IAS strategy; developing an organisation, plan and funding for dealing with newly discovered IAS; and developing methods for analysing and managing risks involved with IAS[46].

Development of a National Strategy for invasive alien species is now underway in a joint project by the competent authorities and was presented for the government on 1 July 2008. An IAS action plan is also being prepared and will be presented on 1 December 2008. As a part of this action plan, it is intended to produce a follow-up report in autumn 2008 to the 2004 report on Swedish legislation relevant to IAS to see where legislation is missing and how these "gaps" can be filled. Both the Strategy and the draft action plan will be presented for consultation to a reference group in October 2008.

The 2008 follow-up report will include a thorough analysis on administrative roles and responsibilities (what authorities are responsible for taking appropriate decisions and/or making action plans for individual species, who has the "operational" responsibility to act when needed). IAS issues are currently addressed through a wide range of measures and bodies. For example, the Swedish Plant Protection Inspectorate is charged with controlling the pathways of introduction of pests and pathogens that threaten agricultural crops and forest trees. The Swedish Environmental Protection Agency and the National Maritime Board are engaged with preventing the introduction of invasive alien species through ballast water and hull fouling. The National Board of Fisheries works with preventing the introduction of pathogens and pests through the importation of water-living plants and animals. The Swedish Veterinary Agency works with preventing the introduction and spread of diseases and invasive alien species that threaten domestic and wild animals' health and biological diversity.

Research: *AquAliens* (www.aqualiens.tmbl.gu.se) was a research programme (2002-2007) aimed at increasing knowledge about the ecological impacts of IAS in the aquatic environment and developing methods and procedures for assessing the risks posed by introduced aquatic species. Methods for assessing the effects of invasive alien species on society, economic value and human health were also developed within this project.

Research projects on the effects of spreading alien populations within forestry, wildlife and fisheries management on biological diversity at the genetic level have been carried out in cooperation between Stockholm University and the Swedish Environmental Protection Agency.

Other smaller research projects have concentrated on ecological effects of specific invasive alien species such as *Marenzelleria neglecta, Arion lusitanicus, Mnemiopsis leidyi* and various terrestrial plant species. Sweden has also participated in the EU research programmes DAISIE, ALARM and FORTHREAT.

[46] See: http://www.cbm.slu.se/pdf/regeringsuppdrag/frammandearter/IASRapport.pdf, for the Swedish Biodiversity Centre report.

Sweden completed a preliminary assessment of the risks posed to ecosystems or species by the introduction of alien species in three reports published by the Swedish Environmental Protection Agency in 1994, 1997 & 1999 and by the Nordic Council of Ministers in 2000. In 2007, an economic impact assessment report was published entitled "Calculation of costs of alien invasive species in Sweden – technical report" which covers both damage costs and control costs[47].

There is still a need for continued development and enhancement of risk assessments protocols and methods for all taxonomic groups and pathways of introduction. Adequate risk assessment procedures and methods are only in place for pests of plants and animal health.

Sweden together with Denmark coordinates the NOBANIS project, which is funded by the Nordic Council of Ministers since 2002. Sweden also participates in regional work within the North Sea Conference, OSPAR and HELCOM with regard to implementing the IMO Ballast Water Convention.

Information exchange mechanism: An Internet portal on alien species in the Swedish marine environment has been developed in cooperation with the Swedish Environmental Protection Agency and the County Administration Boards Information Offices (www.frammandearter.se). Most of the information is in Swedish with a shorter summary in English and the species list and facts sheets are available in English. Information on invasive alien species in Sweden is also found on Sweden's Biodiversity Clearing House Mechanism at www.biodiv.se.

There are plans to include alien species in the existing reporting system (Species Gateway at www.artportalen.se/default.asp) whereby anyone (the general public, scientists, organisations and authorities) may submit reports for observations. Alien species will be included and "tagged" in this already existing system, permitting species-specific summary reports on distribution and relative abundance within the country to be developed[48].

The draft National Strategy proposes the creation of a dedicated Swedish website which in one place would collect and make available all information concerning alien species in Sweden. This website will be a tool for concerned authorities, a hub for the dissemination of information and a communication centre from which all work with alien species within the country would emanate.

Eradication/control programmes: To-date, very few species have so far been targeted for management, although this will be addressed in the IAS Strategy and the Action Plan for this autumn. Policies and programmes are under joint development by several actors, eg the Swedish Environmental Protection Agency, Swedish University of Agricultural Sciences, the National Board of Fisheries, and the Swedish Biodiversity Centre (www.cbm.slu.se).

Eradication programmes are in place in certain Swedish County Administrative

[47] Gren, I.-M., Isacs, L., Carlsson, M., (2007). Calculation of costs of alien invasive species in Sweden – technical report. Swedish University of Agricultural Sciences (SLU), Department of Economics, Working Paper Series 2007:7.

[48] Pers.comm, Helena Höglander, Ministry of Environment.

Boards for the American mink (*Mustela vison*), the Giant hogweed (*Heracleum mantegazzianum*), the Japanese rose (*Rosa rugosa*), *Impatiens glandifulera* and *Fallopia japonica*. In Västra Götalands län a programme has been developed for eradicating a newly discovered marine algae (*Gracilaria vermiculophylla*).

Awareness-raising: The AquAliens research programme produced a popular science brochure (in Swedish) about aquatic alien species. In Sjuhärad, a leaflet has been produced about problems with alien species in the aquatic environment in the region and how fishermen can help and avoid spreading these species (http://www.sjuharad.info/files/Aliens.pdf). The leaflet is published in Swedish but will be translated to English and German. This project is partly financed by the European Union via the Baltic Sea Region INTERREG IIIB.

Challenges/limitations: The strengths of the existing framework lie in the control of intentional introductions, whereas there is a clear weakness when it comes to unintentional introductions. Pathways of introduction need more attention. Another difficult area is the concept of risk analysis. Very few regulations call for such analyses, and the protocols applied are not well developed. The scientific basis for risk analysis still requires development, as well as the practical application of risk analysis procedures.

Responsibility for managing IAS is currently divided between at least eleven separate central government authorities and the many regional and local authorities. There is a clear lack of coordination between the fields of activities of these agencies. The Swedish legislation on IAS is also scattered in very many different laws and regulations. Funding for prevention of introduction and control of invasive alien species is limited. Acute eradication and control measures are hindered by lack of funding, clear definition of areas of responsibility, coordination between the authorities and rapid response plans. Most of these limitations/challenges will be addressed through the draft Strategy and Action Plan.

27.UNITED KINGDOM

Legislation: The main piece of domestic legislation regulating the introduction of alien species in Great Britain is the Wildlife and Countryside Act 1981. The Act contains measures for preventing the establishment of alien species that may be detrimental to native wildlife. It prohibits the introduction into the wild of animals of any kind that are not ordinarily resident in Britain or are not regular visitors in a wild state, or that are listed in Schedule 9 to the Act, and also the planting of plants listed in Schedule 9 to the Act.

Through the Natural Environment and Rural Communities Act 2006 (England and Wales) and the Nature Conservation (Scotland) Act 2004 (Scotland), two new provisions were added to the 1981 Act. These are:

- a power to prohibit the sale of live specimens of specified non-native species (plants or animals, including seeds, eggs etc). The changes also make it a criminal offence to advertise an intention to buy or sell any specified species and

to possess or transport such species for the purpose of sale;

- a power to issue codes of practice (or "guidance" in Scotland), or approve codes of practice issued by others, concerning non-native species. The content of such guidance must be taken into account by a court in any enforcement proceedings to which the guidance seems relevant[49].

In Northern Ireland, the Wildlife Order 1985 (Northern Ireland), Article 15 contains similar provisions to those contained in the Wildlife and Countryside Act 1981 referred to above.

In Scotland provisions have been included in the Nature Conservation (Scotland) Act 2004, but no information is available on their efficacy.

Keeping of certain fish species is restricted under the Import of Live Fish Act 1980, and section 30 of the Salmon and Freshwater Fisheries Act 1975, which prohibits the introduction of any fish or fish spawn into English or Welsh waters, without written consent from the water authority. In Scotland, the Import of Live Fish Scotland Act 1978 and Prohibition of Keeping or Release of Live fish (Specified Species) Scotland Orders prohibit or licence the import, keeping or release of non-native fish species

Policy: The UK's Department for Environment, Food, and Rural Affairs (Defra) carried out a non-native species policy review in 2003. A key recommendation of this Review was that the UK Government should designate or create a lead coordinating organisation to ensure consistency of application of IAS policies across Britain. The Review also supported the three tier hierarchical approach. Defra has now put in place a Non-native Species Programme Board to coordinate work on non-native species in Britain, supported by a Secretariat based at the Central Science Laboratory in York. One of the first aims of the Programme Board was to develop a Great Britain-wide strategy on non-native species. The "Invasive Non-native Species Framework Strategy for Great Britain" was launched on 28 May 2008 and can be accessed here: http://www.nonnativespecies.org/.

A similar review to that carried out by Defra in 2003 has been undertaken in Northern Ireland in coordination with the Government of Ireland. This All-Ireland Review has recently been published. This has enabled improved coordination of non-native species work in the island of Ireland.

When introducing alien marine species for targeted fisheries, the UK follows the principles and risk reducing measures as outlined in the ICES Code of Practice on the Introductions and Transfers of Marine Organisms.

With regard to the UK Overseas Territories, the Joint Nature Conservation Committee published Non-native species in UK Overseas Territories: a review (Karen Varnham (2006), JNCC Report 372) which summarises what is known of the presence of non-native species in these territories.

Exploring synergies with the Water Framework Directive: As part of the

[49] Full text of the Natural Environment and Rural Communities Act 2006 is available at http://www.opsi.gov.uk/acts/acts2006/ukpga_20060016_en.pdf.

characterisation of River Basin Districts required for implementation of the European Union's Water Framework Directive, the possible impacts on the water environment have been assessed for the ten most invasive alien aquatic species covering rivers, lakes, estuaries or coastal waters. Further assessments of other invasive alien aquatic and riparian species will be undertaken as and when information becomes available through routine monitoring (although this is not specifically aimed at alien species) and from other sources.

Defra, the Scottish Government and the Welsh Assembly Government have involved industry and the public in several ways, for example through the policy review and public consultations, to ensure they are fully aware of the consequences of their actions in relation to IAS. They developed and published a Code of Practice in partnership with the horticultural industry in 2005 to raise awareness of the threats posed by invasive plants escaping from gardens, and the risks of imported plants carrying invasive pests and diseases. A similar Code of Practice for companion animals is partly developed. These both pre-date the new GB Strategy and will be re-visited under a new strategic media and communications plan being developed by a working group.

In 2008, two new country-based IAS working groups were also established (in Wales and England) to complement the existing group in Scotland.

Research: The UK has supported research to establish an effective risk assessment methodology. The first structured framework for evaluating the potential for any alien organism, whether intentionally or unintentionally introduced, to enter, establish, spread and cause significant impacts in all or part of the UK has been developed. In conjunction with the Scottish Government, a second project to test and peer review the assessment was taken forward and a third project to refine the methodology based on the recommendations of the peer review will be completed in 2008.

In addition, Defra, among others, has contributed to a project by CABI investigating the potential for biocontrol of Japanese knotweed. Two agents that appear to be very specific to this plant have been identified under this project.

Other projects have included a fact-finding assessment of responsibilities relating to IAS across central and local government and government bodies and research into methods of managing monk parakeets. Possible projects for the future include a public awareness survey concerning the issue of IAS to help inform a communications strategy, a study of IAS economic impacts, some horizon scanning for potential problem species and possible field-testing of the efficacy of a technique for detecting the presence of America bullfrog from DNA in water bodies.

There is a large body of other research underway in the UK in relation to invasive species. Institutions with a particular focus on IAS include the Natural Environment Research Council, the Central Science Laboratory and other institutes such as CABI Bioscience. A UK institution is leading the DAISIE project, and the UK is represented in the ALARM project team.

Eradication/control programmes: There are many examples of IAS control programmes in Britain and Northern Ireland. These are often carried out by statutory

conservation agencies, the Environment Agency and local authorities in conjunction with voluntary groups and landowners. Action is also being taken to control pathogens threatening plants. For example there is a control programme to eradicate *Phytophthora ramorum* or the similar *Phytophthora kernoviae* in areas where this threatens native trees.

Eradication programmes for coypu (*Myocastor coypus*) and muskrat (*Ondatra zibethicus*) have been successfully completed.

Use of EU funding mechanisms to support IAS control and management in the United Kingdom

LIFE Nature funds:
UK work has been undertaken to identify and quantify the threat posed by the Ruddy Duck. The Ruddy Duck is present in large numbers in the UK, having been accidentally introduced. It poses little conservation threat domestically, but is known to migrate to Spain where it interbreeds with the globally-threatened white -headed duck, threatening its long-term survival. The UK initiated a control trial to assess whether eradication was feasible and subsequently launched a five year UK eradication programme for ruddy duck in September 2005, supported by a successful LIFE bid to the European Commission to support this work.

The Hebridean Mink Project was set up in 2001 as a five-year conservation initiative with the aim of eradicating non-native American mink (*Mustela Vison*) from the islands of North Uist, Benbecula and South Uist, and significantly reducing their numbers in Harris in a bid to protect internationally significant populations of ground nesting birds. Following the end of the LIFE funded project, work has continued and it is anticipated that by the end of the year the entire island chain will have been trapped at least once reducing the population of mink by around 80%. Trapping will then start in South Harris once again, moving through the island three times a year with the aim of completely eradicating mink from the Outer Hebrides by 2011.

Rural Development Programme measures under the EAFRD:
The Forestry Commission has adopted a formal Grey Squirrel Policy and Action Statement (see http://www.forestry.gov.uk/forestry/infd-6l4fdh). Some funds are provided under the England Woodland Grant Scheme (http://www.forestry.gov.uk/forestry/INFD-6DFKLB) to support management of grey squirrel populations and of some invasive species that impact on woodland (especially *Rhododendron ponticum*).

Under the previous England Rural Development Programme (2000-2006) the Countryside Stewardship (CS) and Environmentally Sensitive Areas (ESA) Schemes had scrub control options that would primarily have been used to control species such as bracken, but were invariably also used to control IAS. Under the Rural Development Programme for England (2007-2013) Environmental Stewardship, the replacement for these 'classic' schemes has a Higher Level Stewardship strand that contains a specific option (HR4) for the control of invasive plant species. To date, 118 agreement holders have taken up this option covering an area just over 1,100ha. (pers. comm., William Pryer: see also http://www. defra.gov.uk/erdp/schemes/hls/handbook/appendix1-r.htm#hr4).

The Rural Payments Agency includes a specific IAS measure as part of the GAEC requirements under cross-compliance (to avoiding deterioration of habitats)*. The aim of these requirements is to "control the spread of injurious and invasive weeds that can damage habitats and agricultural land". Participants with such weeds on their land are required to take all reasonable steps to prevent the spread of the following species on their land and onto adjoining land and must not unreasonably fail to comply with a notice served on them under the Weeds Act 1959:

- **injurious weeds**: common ragwort (*Senecio jacobaea*); spear thistle (*Cirsium vulgare*); creeping or field thistle (*Cirsium arvense*); broad-leaved dock (*Rumex obtusifolius*); curled dock (*Rumex crispus*); and
- **invasive weeds**: rhododendron (*Rhododendron ponticum*); Japanese knotweed (*Reynoutria japonica*); giant hogweed (*Heracleum mantegazzianum*); Himalayan balsam (*Impatiens glandulifera*).

Schemes operated by English Nature (the predecessor to Natural England) included the **Reserves Enhancement Scheme** (for Wildlife Trusts) and the **Wildlife Enhancement Scheme** (open to the National Trust, Royal Society for the Protection of Birds, other NGOs and private landowners) which paid a percentage of the capital costs of IAS control within Sites of Special Scientific Interest or where IAS impacted on Biodiversity Action Plan species. These two grant schemes have been subsumed into the Higher Level Scheme.

The National Trust makes extensive use of available funding mechanisms, particularly for rhododendron clearance and control of invasive aquatic plants in river catchments. In certain cases, the **Environment Agency** may provide limited funds to pay for one-off works in rivers, steams and lakes. Under the **Land Fill Tax** grant, Land Fill Providers charge a premium to dump rubbish. A percentage of this is made into grants that can be accessed by conservation bodies. The Trust used this funding source to carry out research into stem injection for Japanese knotweed.

*
http://www.rpa.gov.uk/rpa/index.nsf/vContentByTaxonomy/RPA%20Schemes**Single%20Payment%20Scheme**Cross%20Compliance**Farmer%20Guidance**Guide%20to%20Cross%20Compliance%20in%20England**GAECs**GAEC%2011**?OpenDocument

With regard to the UK Overseas Territories, plans are in place and operating in respect of some invasive species threatening endemic species, but not all, because of limited resources (Defra 2005). There have been some major successes, however, any attempt at organized eradication, and even small-scale removal of species has often been met with popular outcry. This response has extended to invasive flora (eg *Casuarina equisetifolia* which is prized for its shade and whistling needles) and even to feral chicken eradication.

Limitations/challenges: Challenges recorded include coordination of both policy development and programmes of action, lack of success in enforcement/ implementation of current domestic legislation, lack of comprehensive information on IAS and focal point on the subject, lack of risk assessment expertise and lack of adequate resources. However, recent progress (eg establishment of the Non-native Species Programme Board and the launch of the GB Strategy) is intended to address these issues through a strong partnership approach with a range of key stakeholders.

Annex 4 IAS FRAMEWORKS IN OTHER COMPLEX JURISDICTIONS: MECHANISMS USED AND LESSONS LEARNT

The following table provides an overview of IAS frameworks developed in three complex jurisdictions where competence for prevention and management is shared between different tiers of government (federal/Commonwealth; subnational/state/province). Sources referenced include:

- national reports submitted as part of the CBD in-depth review of IAS activities (http://www.cbd.int/invasive/assessments.shtml);
- websites maintained by Invasive Species Australia and AusBIOSEC[50], Environment Canada[51] and the National Invasive Species Council, United States (NISC))[52]; and
- personal communication with Jonathan Miller and Bronwyn Shirley (Department of the Environment, Water, Heritage and the Arts, Australia), Mark Richardson (Environment Canada), Françoise Labonté (Department of Fisheries and Oceans, Canada) and Lori Williams, Richard Orr and Melinda Wilkinson (NISC).

Country	IAS actions
Coordination, strategy and funding	
Australia	The **Australian Biosecurity System for Primary Production and the Environment (AusBIOSEC)** is being developed to promote whole of government and cross-sector management of biosecurity (thus extending and integrating the fairly comprehensive existing arrangements for primary industry to cover less economic threats to native biodiversity or 'society'). This will involve signature of an Intergovernmental Agreement (IGA) by the Department of Agriculture, Fisheries and Forestry, the Department of Environment, Water, Heritage and the Arts and all state and territory governments. Once the IGA is signed (expected November 2008), coordination will be through a new National Biosecurity Committee reporting to both the Natural Resource Management and the Primary Industry Standing Committees: the Committee will engage stakeholders from relevant environmental groups depending upon the threat/issue being dealt with. National efforts to strengthen inter-jurisdictional cooperation on prevention have delivered results on cost-sharing for rapid response and will now address–better data sharing in interoperable formats, detection and reporting, post-border surveillance, etc.. Two non-binding frameworks promote coordinated approaches to prevention and management (and notionally come under AusBIOSEC): • the **Australian Weeds Strategy** (revised November 2006) sets out the country's overarching policy for weed management. It aims to prevent new weed problems, reduce the impact of existing priority weed problems and enhance national capacity and commitment to solve weed problems. Strategy implementation is led by the Australian Weeds Committee (AWC) which provides an inter-governmental mechanism for identifying and resolving weed issues at a national level and includes

[50] http://www.environment.gov.au/biodiversity/invasive/index.html; http://www.environment.gov.au/biodiversity/invasive/ausbiosec.html.
[51] http://www.cbin.ec.gc.ca/issues/ias.cfm?lang=e.
[52] http://www.invasivespeciesinfo.gov/council/main.shtml.

	representatives from all states and territories, the Commonwealth Scientific and Research Organization (CSIRO) and the Australian Government. State and territory governments provide the institutional and legislative framework, regulating the spread and control of targeted weed species and assigning responsibilities for control. • the **Australian Pest Animal Strategy** (endorsed May 2007) aims to provide leadership and inter-agency coordination to prevent the establishment of new pest animals, manage the undesirable impacts caused by exotic vertebrate animals that have become pests in Australia and implement a communication strategy and consultation mechanism. An Implementation group will investigate the feasibility of consistent legislation and policy approaches in all jurisdictions, including development of a priority pest animal list, identification of nationally significant environmental assets to be protected and development of a national pest information system to inform a range of management actions of key vertebrate pests. Work is also continuing to improve the risk assessment process for the import and keeping of exotic animals.
Canada	The **Invasive Alien Species Strategy for Canada** was approved by federal, provincial and territorial Ministers for wildlife, forests, fisheries, aquaculture and endangered species in 2004 and aims to establish a coordinated national policy and management framework to minimise IAS risks to the economy, environment, and society. The federal government is charged with the first three priorities under the strategy - prevention, early detection and rapid response. Provincial governments also share in the early detection and rapid response priorities although the majority of their direct responsibility is for management once the species is well established. Progress under Phase 1 of the Strategy was aided by the 2005 Federal Budget, which allocated $85 million over 5 years for new measures to address IAS threats (to 31 March 2010). Phase 2 of the Strategy (2010-2015) is under development: IAS governance will be addressed as a priority issue, closely tied to regulatory and policy ability. A National IAS Web Portal is being developed cooperatively with an expected launch date in January 2009 and will be the first point of contact for IAS information in Canada. A **Leadership and Coordination Committee** was established to support Strategy implementation. This is a federal and provincial committee, chaired by EC, with representation open to all departments with an interest/stakehold in IAS. It meets (by teleconference) several times a year to discuss progress on IAS issues and activities. It has no budget or authority to make decisions. The Committee's original role was to provide input on individual provincial actions and on those of relevant federal departments. However, engaging the Committee proved challenging for the same sectoral and jurisdictional barriers faced by other large jurisdictions. Environment Canada recognises that IAS are a very horizontal issue facing many levels of government, industry and society, with no single agency/department tasked with the management/prevention of invaders: funding and policy continue to be the primary barriers for implementation of the Strategy. Provided that these constraints are addressed, the Committee mechanism is considered to provide a very effective mechanism for delivery of IAS programming in Canada. The **Invasive Alien Species Partnership Programme (IASPP)** is an important component of Strategy implementation focused on engaging the general public, with a budget of $5 million over 5 years. It is managed jointly by Environment Canada (EC), the Canadian Food Inspection Agency (CFIA) and the Department of Fisheries and Oceans (DFO) and administered by EC. A Memorandum of Understanding (2006-2010) outlines roles and responsibilities of participating departments. By end 2007, IASPP had provided grants and/or contribution funds to support 76 projects run by a wide range of stakeholders and provincial and territorial governments (eg communication products, educational courses, workshops, monitoring programmes, help for establishing provincial or regional Invasive Species Councils, research). In November 2007, Environment Canada has established an IAS Secretariat to coordinate communication and the IASPP. The following frameworks support coordinated action on specific categories of IAS in line with the national Strategy: • the **Action Plan for Invasive Alien Terrestrial Plants and Plant Pests** (2005) developed by the inter-jurisdictional Terrestrial Plants and Plant Pests Working Group on IAS (co-chaired by Ontario Ministry of Food and Agriculture and the CFIA). The CFIA and Natural Resources Canada were respectively allocated $50 million and $10 million over 5 years to support implementation. The Plan lays out roles, responsibilities and timelines for implementation of key initiatives covering eg leadership and coordination, legislation and regulation, risk analysis (for Phase 2, see http://www.inspection.gc.ca/english/plaveg/invenv/action/phase2e.shtml).

	• the **Canadian Action Plan to Address the Threat of Aquatic Invasive Species** (2004) was developed by the federal-provincial National Aquatic Invasive Species Committee, co-chaired by DFO Science Sector and the Ontario Ministry of Natural Resources and approved by the Canadian Council of Fisheries and Aquaculture Ministers. The Committee provides a forum for information exchange and enhanced national and interjurisdictional planning and cooperation to maximise the combined efficiencies of jurisdiction (provincial/territorial) activities, reduce duplication/overlap of effort and ensure economies of scale wherever possible. Budget 2005 provided DFO with $10 million over 5 years to assist with implementation of the aquatic component of the national Strategy (with a particular focus on early detection, monitoring, development of a test emergency response plan and development of a national regulatory framework). An additional $10 million over 5 years was allocated for sea lamprey control. • the **National Forest Pest Strategy** (2007), developed under the 2003-2008 National Forest Strategy, supports research into management of forest IAS in line with the National Strategy on Invasive Alien Species with a focus on: techniques for risk mapping information to improve science-based policy recommendations and advice; development of a national early warning system and diagnostic network; predictive models for new threats; and a framework for ecological risk analysis.
United States	The **National Invasive Species Council** (NISC) was established by Presidential Executive Order 13112 in 1999 to provide coordination, planning and overall leadership for over 40 federal invasive species programmes. It is co-chaired by the Secretaries of Agriculture, Commerce, and Interior: other members include the Secretaries of State for Defence, Homeland Security, Treasury, Transportation and Health and Human Services, the U.S Trade Representative and the Administrators of the Environmental Protection Agency, the U.S. Agency for International Development and the National Aeronautics and Space Administration. Through monthly meetings, IAS focal points from NISC member agencies coordinate activities and discuss current IAS issues. NISC is advised by the **Invasive Species Advisory Committee** composed of 30 non-federal stakeholders representing state, tribal, local and private concerns: in 2006, its members issued a white paper interpreting the Executive Order's definition of invasive species (http://www.invasivespeciesinfo.gov/docs/council/isacdef.pdf). Since 2004, NISC has established an Invasive Species Performance Budget for each fiscal year. Its purpose (overseen by the Office of Management and Budget) is to : • deliver more efficient allocation of resources through enriched inter-agency cooperation; • promote interagency performance-based approaches to address specific invasive species issues; • provide a clear and comprehensive overview of invasive species issues and efforts across the federal government. The most recent budget (Fiscal Year 2007) includes two sections: • **General Categories:** compilation of all (reported) federal expenditures for invasive species in seven categories. Overall total is US$ 1229.48 million (increase of 5.9% on previous year), with increase for Early Detection and Rapid Response of nearly 20% and Restoration of nearly 34%); and • **Specific Initiatives** (6 species-specific initiatives, 4 programme-based initiatives: ballast water, aquatic area monitoring, rapid response and innovative control technologies: total performance budget US$ 43.76 million). NISC is mandated to develop a national invasive species plan. The first plan (2001) has now been replaced by the **2008-2012 National Invasive Species Management Plan** (approved 1 August 2008). It will direct Federal efforts (including overall strategy and objectives) to prevent, control and minimise invasive species and their impacts on the environment, the economy and health of the United States. It may be updated more frequently to reflect changes in circumstances, agency plans and priorities. The Plan establishes a targeted set of priority strategic action plans with objectives, implementation tasks and 87 performance elements, for implementation by 35 entities within member departments and agencies. More than 24 states now have invasive species coordination councils. Non-binding guidance on the approach and model provisions for individual State IAS laws has been prepared (ELI 2002, ELI 2004). Although NISC addresses education and public awareness activities, federal outreach is weak compared to state-level outreach.

	The Aquatic Nuisance Species Task Force (ANSTF, www.anstaskforce.gov) was established under the Nonindigenous Aquatic Nuisance Prevention and Control Act 1990. It is co-chaired by the Director of the Fish and Wildlife Service and the Undersecretary of Commerce for Oceans and Atmosphere and now includes representatives from 10 federal agencies and 12 ex officio organisations (Fisheries and Oceans Canada participates as an invited observer). 6 Regional Panels (comprising representatives of states, tribes, NGOs, commercial interests and neighbouring countries) identify regional aquatic nuisance species priorities, coordinate programme activities in each region, make recommendations to the ANSTF and provide advice to public and private interests for prevention and control. The work of 5 Standing Committees (Prevention, Detection and Monitoring, Control, Research, Communication and Outreach) includes development of species control and management plans (Asian carp, Brown tree snake, Caulerpa, Green crab, mitten crab), The second ANSTF Strategic Plan has been adopted for 2007-2012.
Prevention at external borders	
Australia	Australian Quarantine and Inspection Service (AQIS) is the operational border agency. Biosecurity Australia is responsible for providing science-based quarantine assessments and import risk analyses for plants, plant products and/or animals, animal products, covering all parts of the importation pathway and including consideration of potential environment risks and consequences (see revised Import Risk Analysis Handbook (2007)) and provides risk mitigation advice to AQIS. Both agencies operate out of the Australian Government Department of Agriculture, Fisheries and Forestry. Importers do not specifically pay relative to the risk they create (eg if their imported species causes a weed outbreak). In addition to quarantine legislation, the Environment Protection and Biodiversity Conservation Act 1999 provides that only species that appear on a list of approved species may be imported live into Australia. Amendment of the list is subject to assessment of the potential environmental impacts of the proposed species have been thoroughly assessed. The Permitted Seeds List under the Quarantine Act ensures that the minimum number of invasive plant species is legally imported into Australia: any species <u>not</u> on the list must undergo a weed risk assessment. Currently, Biosecurity Australia and AQIS deal mainly with threats to primary production. AusBIOSEC (see above) is being developed to allow biosecurity arrangements to be coordinated across environmental and primary production areas and to address gaps in policy coverage for pests and diseases with environmental and/or social amenity impacts.
Canada	All foreign trade matters are handled by federal government (Canada Border Services Agency). Substantive prohibitions are mainly focused on agriculture-related items and commodities. Since 2007, border controls have been strengthened to prevent establishment of introduced species, with enhanced inspection of imported plants and plant products and the development of new tools for inspection activities such as the *Import Inspection Manual*. All foods, animals, plants and related products must be declared at customs: failure to declare could lead to confiscation of products, fines of up to $400 per undeclared item and/or prosecution. An Automated Import Reference System has been established as a first step to help commercial importers, and to a lesser extent individuals, determine import requirements. A detailed website for the "Be Aware and Declare" campaign (http://www.beaware.gc.ca/english/) provides accessible information on IAS-related risks (eg including introduction of items made from plants or wood, plant cuttings from family gardens) and notes that IAS are estimated to cost Canadian industries billions of dollars in lost revenues every year. Canada cooperates through the Commission on Environmental Cooperation (Canada-US-Mexico) on development of trilateral risk assessment guidelines to screen risks associated with certain trade pathways, with a particular focus on the aquarium trade in North America. These have been piloted using two groups of freshwater fishes: by Canada, for 5 species of snakeheads found in aquarium and food industries; by Mexico, for suckermouth catfish.
United States	External border control is led by the Department of Homeland Security's U.S. Customs and Border Protection which applies the regulations developed by sectoral federal agencies. The main focus is prohibited agriculture items that may have the potential to become IAS. Outreach efforts with a similar focus are in place (e.g. *Protecting America's Agricultural Resources*). The US Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) includes the Veterinary Services agency and the Plant Protection and Quarantine Services agency. NISC leads the IAS Panel of the North American Plant Protection Organization (NAPPO) which is developing Guidelines for Conducting Pathway Risk Analysis (RSPM

	No. 31) and Pest Risk Analysis for Plants as Pests - Guidelines for Screening Plants for Planting Proposed for Import into NAPPO Member Countries (RSPM No. 32) (http://www.nappo.org/menu_e.shtml). NISC/ANSTF have formed multi-agency working groups to develop and coordinate new RA methodologies and processes (including screening methods) to identify potential IAS before entry and issued a Training and Implementation Guide for Pathway Definition and Risk Analysis and Risk Prioritization for risk management via unintentional man-made pathways (available at: www.anstaskforce.gov). Through the Generic Nonindigenous Aquatic Organisms Risk Analysis Review Process, ANSTF maintains a priority list of invasive pathways, is establishing a national integrated database of species-specific information based on the outcome of species invasion-risk forecast analyses and supports completion of a permanent barrier on the Chicago Sanitary and Ship Canal and analysis of barrier options on other interconnecting waterways. In June 2008, legislation was proposed (House of Representatives Bill H.R.6311 for a **Non-native Wildlife Invasion Prevention Act**) to establish a risk assessment process to prevent the introduction into, and establishment in, the US of non-native wildlife species that will cause or are likely to cause economic or environmental harm or harm to human or animal species' health (this excludes species defined or regulated as plant pests or as a threat to livestock or poultry under animal health legislation). This would provide for: • criteria and procedures for the conduct of risk assessments; Regulations to be issued through the US Fish and Wildlife Service for all non-native wildlife species proposed for importation except those included in a listed of approved species (species that based on the best scientific and commercial data available, are not harmful to the US economy, environment or human or other animal species' health; or species that may be harmful in some respects but already are so widespread that future import prohibitions or restrictions would have no practical utility); • a List of Unapproved Species prohibited or restricted from entering the US (except under permit for education, research or accredited zoological/aquarium display); • fee collection to recover to the maximum extent practicable the costs of RA under these Regulations; • establishment of the Nonnative Wildlife Invasion Prevention Fund into which fees should be paid and used for the purposes of implementing the act. Part of the rationale behind this draft legislation is the lucrative and largely unregulated trade in imported exotic wildlife thriving in the US, which poses a risk of introducing and disseminating exotic zoonotic pathogens which threaten both human and animal health, and have the potential to become established and maintained in native animal and insect reservoirs (e.g. a monkeypox outbreak in 2003 revealed critical gaps in regulatory authorities and the need for coordination.
Prevention within national borders (intra-provincial trade and posession)	
Australia	Biosecurity regulation for intra-state and inter-state movement of commodities is handled on a jurisdictional basis (ie depending on the state in which the goods are being transported to, from or within.) The Australian constitution prohibits constraints on trade between jurisdictions, but quarantine is an allowable exception. Differences between jurisdictional recognition of regional differences in pest and disease status, and application of different biosecurity procedures can make this system complex. The position regarding regulation of domestic trade, possession and/or movement of problem species differs from state to state (which develop their own biosecurity strategies). Most of the controls to minimise spread of pests are agricultural controls: there is a range of inconsistencies between state legislations (eg on companion animals, ornamental plants) that can encourage the spread of pests from places where they are not problematic in Australia, to where they are (generally on the basis of differing ecology and climate). Some primary industry cross-jurisdictional committees have addressed coordination: AusBIOSEC should provide a broader opportunity to improve harmonisation of intra-state and inter-state quarantine regulations. The Strategies mentioned above all promote more consistent approaches (eg National Environmental Alert List). The Australian Weeds and Pest Animals Strategies (see above) are best seen as frameworks for moving national approaches forward with application done by each state (the national government has no powers of compulsion). This has – after some years – proved successful for priority weeds: all states and territories in Australia have now implemented legislative measures to prevent the sale and trade of the twenty Weeds of National Significance. In some cases, this effectively means one jurisdiction legislating for a benefit to another jurisdiction.

	At industry level, the Australian Nursery and Garden Industry Association has developed the Nursery Industry Accreditation Scheme (NIASA) and a Biosecure Hazard Analysis and Critical Control Points (HACCP) programme: these operate at individual state level. In South Australia, changes to state plant health legislation (Plant Health Act 2009) provide for recognition by Primary Industries and Resources South Australia of these industry-led programmes. For businesses with NIASA accreditation and BioSecure HACCP certification, benefits include cost savings (i.e. less surveillance audits required by government inspection officers of nursery stock movements into South Australia), technical support and improved market access (i.e. NIASA stock moving into the state does not require quarantine before being sold). NIASA businesses in South Australia will also forgo Accreditation for an Import Verification Compliance Agreement (IVCA) which will be mandatory for all businesses in SA wishing to import nursery stock. Compliance is assessed by qualified Industry Development Officers annually and in some states biannually: in future, these officers may be aligned to the national biosecurity auditing processes driven by state agencies across Australia (Interstate Certification Assurance Arrangement programme).The BioSecure HACCP programme has been reviewed by both state and national biosecurity agencies and feedback provided. The NIASA program has a mechanism in place for the future peer review of the programme but this has yet to be implemented[53].
Canada	The provinces deal with specific interprovincial trade issues and there is currently little capacity or desire to regulate IAS interprovincially, with the exception of invasive agricultural or forestry pests regulated by the Canadian Food Inspection Agency (CFIA) for certain areas or regions in an attempt to control the spread of or eradicate certain pests (http://www.inspection.gc.ca/english/plaveg/pestrava/pestravae.shtml). There are a few species (eg sea lamprey) for which the federal Government is responsible under international treaties. Environment Canada is developing a dedicated website which provides a platform to list alien species with strong invasive tendencies (http://www.ec.gc.ca/eee-ias/Default.asp?lang=En). It recognises the need for a national IAS listing system and a national portal is under development, partly to get the IAS message out to the public and other stakeholders. This will be further addressed in Phase 2 of the National Strategy. However, this faces several constraints: only a few species would be considered nationally invasive (coast to coast, excluding the north); invasiveness (ie harmful impacts) is dependent on region; funding and buy-in would be necessary from provinces and other stakeholders. The emerging Canadian Invasive Plants Framework includes ongoing development of invasive plant policies and regulations, development of risk management documents for plant species for which pest risk assessments have been completed and proposals for a list of prohibited invasive plants. Similar regulatory development is under way for aquatic invasive species (see below).
United States	The inter-state trade framework is broadly similar to that in Canada: once a species is cleared for entry to the US, it can for the most part be moved freely. Controls may be imposed on a state-by-state basis for various categories of IAS e.g. noxious weeds, but there appears to be no compulsory mechanism for coordinating lists and actions between neighbouring states for species of widespread concern. Mexico, Canada and the US cooperate through the Commission of Environmental Cooperation (North American Free Trade Agreement) to strengthen prevention of certain pathways e.g. "Trinational Risk Assessment Guidelines for Invasive Alien Species: Test Cases for the Snakeheads (Channidae) and Armored Catfishes (Loricariidae) in North American Waters" (currently in press).
Early Detection and Rapid Response	
Australia	States and territories have a strong interest in what happens at the national border as they are responsible for actions in the biosecurity continuum immediately post-border (detection and incursion response). Recent significant progress includes the development of a cost-sharing formula for contributions by different jurisdictions to enable major eradication campaigns for newly arrived incursions.

[53] Anthony Kachenko, Nursery and Garden Industry Australia, pers.comm.

	A National Weed Incursion Response Plan is being developed to develop a national framework for managing new incursions into Australia. The framework will include relevant technical and operational guidelines applicable to the detection and early eradication of new weed incursions. The National System for the Prevention and Management of Marine Pest Incursions (established on the basis of an Intergovernmental Agreement in 2005) is being developed and implemented by the National Introduced Marine Pest Coordination Group, which comprises Australian Government departments, state and Northern Territory government agencies, researchers and representatives from fishing and marine industries, port authorities and conservation groups.
Canada	This is primarily a federal responsibility. Under plant protection legislation, emergency measures and funding are available to eradicate certain newly-introduced pests eg forestry pests (through programmes coordinated by the CFIA, including federal ministerial orders for certain pests such as Emerald Ash Borer and Asian Long-Horned Beetle that are consistent with US approaches). A national surveillance network focused on plant health has been established, via a network of survey coordinators across the country, and increased surveillance of high risk entry sites for invasive plants and plant pests is delivered as part of the national IAS survey work plan. Environment Canada and CFIA are both represented on the Invasive Alien Species panel within the North American Plant Protection Organization. Under the Barcode of Life programme, financial support has been provided to the Pacific Forestry Centre to develop DNA barcodes for a wide variety of native and non-native forest pests to make it easier to quickly identify invasive forest pests that are intercepted or detected at international ports. For aquatic IAS, the Department of Fisheries and Oceans has implemented a limited national early detection monitoring programme based on provincial and stakeholder priorities identified through its biological risk assessments. Zonal workshops were also held in 2006 to assist in the identification of high priority pathways and species to be monitored.
United States	In addition to the NISC guidance documents on prioritisation for early detection and rapid response (see above), the Department of the Interior, US Department of Agriculture and Environmental Protection Agency lead the development of a Framework for Early Detection, Rapid Assessment, and Rapid Response to Invasive Species. This aims to provide access to reliable resources on IAS identification, reporting, expert verification, occurrence databases and planning through the National Biological Information Infrastructure which is linked to the Global Invasive Species Information Network (http://edrr.nbii.gov). Rapid response is also supported through the regional panels of the Aquatic Nuisance Species Task Force, which publishes lessons learnt from previous response efforts on its website; supports the development and use of common protocols for surveys and database standards; evaluates rapid response plans prepared for other events (oil spills, hurricanes, foreign animal diseases, etc.) to see how they could apply to reports of invasive species; facilitates contingency planning and encourages federal agencies to address key elements of regional contingency plans (infrastructure, resources and jurisdictional issues) in their programme planning.
Management and control	
Australia	States and territories have the main land management role. Jurisdictions allocate funds from their budgets according to their priorities. There is no major national/Australian Government funding programme for allocations to states or regions specifically for IAS management, although the Government has increased its involvement in biosecurity policy and does make major funds available through the previous government's Natural Heritage Trust and the reworked Caring for Our Country programme. In practice, this has been spread thinly across the broad range of natural resource management on-ground activities. Extended cost-sharing options may be considered through the AusBIOSEC process. National coordination and facilitation of action to address each of the 20 Weeds of National Significance (WoNS) is managed through the WoNS programme. WoNS coordinators work with their management committees to provide national leadership across all jurisdictions to promote a collaborative and cohesive approach to WoNS management. Funding has been provided to develop best practice methodology for management of WoNS. Best practice guides are now available at no cost for 11 of the 20 WoNS, with the remainder in train. National Mapping guidelines have been produced to encourage a standardised approach to collection of data on weed incursions. In parallel, a Uniform National System of Weed Categorisation and Risk Assessment is under development to develop a system of 4-6 generic weed management categories including management objectives for each category and also to develop and apply a rapid weed risk assessment and prioritisation tool to assign a preliminary selection of

	250 species to their appropriate categories. Several programmes focus on industry and public engagement in invasive plant control (eg Defeating the Weed Menace programme). Work is underway to support the nursery and garden industry to deliver industry training accreditation to growers, wholesalers and retailers on invasive plant issues (see above). Mandatory labelling for invasive plants (indicating the country of origin of the plant, the areas where it is indigenous and whether it has proven invasive elsewhere) was considered in 2004. The proposal found that such a system could be favourable to the nursery industry because it would: allow a graduated transition when replacing invasive species by non-invasive species, thus permitting the industry to maintain profits; incur lower costs than a banning/policing approach; help minimise potential future civil liability; increase consumer reliance on industry expertise; and as an industry-led strategy, would probably incur lower costs to governments than a regulatory one. A mandatory programme was expected to be more effective than a voluntary one because wide industry participation would be needed and it would be unfair for all the costs of such a programme to be borne by voluntary participants only. Overall, such a scheme was expected to be a cost-effective complement to regulations on impact and sale of invasive species provided that: prior to or during implementation, an information programme was developed to encourage consumers to modify their behaviour; regulatory and administrative systems were able to underpin the strategy; and industry and governments committed sufficient resources and efforts to overcome the difficulties met while implementing such a strategy (Martin et al. 2005, reported in EPPO 2007b). However, this proposal was opposed by the Nursery & Garden Industry Australia (NGIA) as well as individual states and territories. The NGIA has its own National Plant Labelling Guidelines which provide guidance on how to deal with 'potentially harmful plants'. It has also developed a Grow Me Instead programme which engages local nursery owners in identifying weedy species in their regions and then promoting low risk alternative species to consumers at the point of sale. The Australian Government provides funding under the Natural Heritage Trust and Invasive Animals Cooperative Research Centre to develop and promote improved pest animal control tools. IAS in inland water systems are dealt with at the state jurisdictional level and requirements differ from state to state. The spread of alien species by anglers is a major problem in some cases (eg Tilapia in Queensland). Catchment groups do some abatement work. Awareness initiatives to promote best practices for anglers exist in some states eg Queensland. National Control Plans are being developed for six marine pest species of concern to reduce impacts and minimise the spread of these pests.
Canada	The provinces are responsible for management of terrestrial natural resources, including most management of established IAS, except on federal lands (military lands, parks). No federal funding is provided to provinces specifically for IAS control. Provinces may choose to invest in IAS as they see fit. Management activities tend to be the most costly and consequently, there is a diversity of investment across the country (some provinces choose to invest very little while others opt to invest considerably more). The federal Government cannot control how provinces invest. Currently, aquatic invasive species (e.g. live bait, alien fish angling) are separately regulated by provincial jurisdictions. Proposed revisions to the existing Fisheries Act (subject to Parliamentary approval) would introduce a number of regulatory controls to manage aquatic invasive species (AIS) in all Canadian waters: (1) AIS will be defined by regulation; (2) certain species, such as lamprey in the Great Lakes or elsewhere, will be designated as such in order to apply control measures to them; (3) protocols to manage and control the spread of AIS; (4) rules governing the import, export, transport and release of aquatic invasive species; (5) the methods used for destroying aquatic invasive species by Minister or persons authorised by the Minister to destroy AIS; (6) the obligation to provide information about AIS (possibility of using reinforced information-gathering provisions in support of AIS-management programme); and (7) inspectors, in addition to fishery officers, would be able to enforce these particular provisions.
United States	Inter-jurisdictional cooperation and coordination is delivered through NISC, ANSTF, the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (www.fws.gov/ficmnew) and the Committee on Invasive Terrestrial Animals and Pathogens. In addition, many state governments have established similar coordination groups and much of the control and management activity is generated at state level (in 2006 the State of Florida spent almost $100 million on IAS control and the State of California $39 million on control of aquatic invasives alone).

	Efforts are generally funded through the budgets of each partner agency/organisation. Several federal agencies may provide funds to non-federal partners as cost-share payments. In some cases, funds may be designated for specific IAS projects by the federal appropriations process. State, local, tribal, or private sector partners often provide their proportion of a cost-share to a foundation grant in the form of in-kind contributions (i.e., wages and benefits, travel costs and computer time). In 2001, principles to combat invasive plants were adopted in the St. Louis Declaration together with the St Louis Voluntary Codes of Conduct for botanical gardens, the nursery industry, landscape architects, gardeners, and government agencies. Many professional associations have now endorsed the codes. Their primary purpose is as an outreach and education tool (levels of awareness of IAS risks even within the industries concerned were initially very low). A 2007 survey showed that respondents with higher awareness and/or with greater involvement in trade associations reported significantly greater participation in prevention measures (Burt et al. 2007. Reported in EPPO 2007/161 (Preventing introductions of invasive plants for horticultural purposes through voluntary initiatives in the USA). Two effective outreach and control programmes are '**Stop Aquatic Hitchhikers'** (clean your boat campaign aimed at recreational boaters to prevent further spread of zebra and quagga mussels to western US: www.protectyourwaters.net; and '**Habitattitude'** (don't dump your pet campaign, developed and run jointly with part of the pet industry to educate the industries and their customers about the impacts of releasing pets and invasive plants into the wild: www.habitattitude.net). Some federal agencies have policies that require use of certified IAS-free products for specific markets e.g. the National Park Service may require that only certified weed-free hay be used for livestock within a national park. Other examples are the requirement that crop seed must meet weed contamination standards before sale; regulations requiring that only artificial/nonliving fishing baits be used; and requirements that firewood be debarked to remove invasive insects or other bark-inhabiting organisms prior to shipment within the United States. Other measures, such as bounties and unrestricted hunting seasons and bag limits, are sometimes implemented to reduce populations of certain invasive alien animal species. An on-line training program by the U.S. Fish and Wildlife Service trains volunteers from the public to assist in managing invasive plants on National Wildlife Refuge System lands (www.fws.gov/invasives/).
Management of ballast water and other pathways	
Aus	Under the National System for the Prevention and Management of Marine Pest Incursions, the Australian Government is developing legislation for managing bio-fouling and ballast water. Bills currently being drafted will implement the BWM Convention and provide a basis for consistent national regulation of ballast water movements between Australian Ports (replacing current ballast water management requirements under quarantine legislation): jurisdictions are working to have the legislation in place by 1 July 2009. An Australian Ballast Water Unit will provide a single point of contact for the shipping industry and will coordinate inspections. A regulation impact statement was commissioned to examine the impact of implementing consistent national ballast water management requirements and concluded that ballast water exchange outside 12 nautical miles moving to on-board treatment after 2009 was the most cost effective management option in most cases. National Best Practice Management Bio-fouling Guidelines are being developed for a number of sectors including commercial, fishing and recreational vessels and ports and harbours The Australian Government is moving towards applying risk-based Biofouling Management Requirements to all international vessels arriving in Australia. The website http://www.daff.gov.au/aqis/avm/vessels/less-25m/biofouling-protocols will be updated when implementation of these requirements can be confirmed. These requirements are backed by a National Communication and Awareness Strategy including specific communication plans for each marine sector eg AQIS has produced a Biofouling Fact Sheet which provides information for yacht operators about how the protocol will impact them and what they should do prior to arrival in Australia. For military activities, the Department of Defence has signed a memorandum of understanding with AQIS concerning quarantine procedures, fees and requirements for defence force personnel and equipment returning to Australia. For international development assistance, IAS are taken into account through AusAID's environmental

	assessment and management processes. If invasive species are identified as an issue, an activity environmental management plan will be prepared. A country level SEA can provide information for partner countries and regional organisations to raise the issue of invasive species in aid programme consultations.
Canada	The federal Government, through Transport Canada, developed guidelines in 1989 for ships entering the Great Lakes and expanded them nationally in 2000. On 28 June 2006, the Ballast Water Control and Management Regulations were adopted under the Canada Shipping Act. These Regulations, administered by Transport Canada, require all ships entering Canada (other than from nearby American ports) to exchange their ballast water at sea or treat it before discharging it in Canada. Ships on voyages within Canada are excluded from the Regulations but are subject to non-enforceable guidelines. Joint Canadian and American inspections cover about 80% ocean going foreign ships before they enter the Great Lakes. For the 2006 shipping season, 94% of the ships inspected were in compliance with the Regulations. The remaining 6% of ships had to take corrective action, effectively providing 100% compliance of inspected ships. For 2007, non-compliance dropped to 3.5% for ships entering the Great Lakes. While the Great Lakes inspections cover all ships, for 2007 Transport Canada also selectively targeted higher risk ships destined for Quebec ports and found a higher rate of non-compliance.
United States	A long-standing national ballast water management programme is supported through the Non-indigenous Aquatic Species Prevention and Control Act/National Invasive Species Act and delivered through ANSTF actions. The US works bilaterally with Canada on this issue (see above). Guidance for risk analysis and prioritisation of other major pathways is available and being further developed (see above).

Annex 5 REVIEW OF SELF-FINANCING MECHANISMS

Summary of unpublished report prepared for GloBallast in 2004 (Gollasch, S. 2004 (unpubl.). Review of Self-Financing Mechanisms for Ballast Water Management. Prepared for the Global Ballast Water Management Programme (Globallast) in 2004. Project No: GLO/99/G31/A/1G/19, Contract No: 2004-30. 37 pp.)

1. Overview of potential self-financing mechanisms

Self-financing mechanisms applicable at the national level

- **Mandatory insurance**

Many forms of mandatory insurance already exist to cover harmful impacts resulting from known risk actions e.g. driving cars. In 2000, the draft Biodiversity Strategy elaborated by Argentinean authorities proposes that mandatory insurance should be considered to cover the risks of escape, damage to third parties and the costs of eradication measures in the event of an alien species becoming established and causing harm (Shine et al 2000).

To generate funds for ballast water management, one option could be to require mandatory insurance for all relevant commercial resource users of the aquatic environment, with an insurance premium being independent from the company's revenue.

- **Deposit/performance Bonds**

Performance bonds are consistent with the "user pays" and "polluter pays principles". They are comparatively easy to implement where the payment is a necessary step for issuing a business licence. This mechanism shifts the cost burden from the regulator/state to the resource user. In construction law, for example, a routine requirement provides for contractors to deposit a bond to ensure that up-front funds are available to pay the costs of completing and cleaning up the project if the contractor fails to do so. In the ballast water context, one option would be for shipping companies to place a bond to commit themselves to respect best practices of ballast water management. This bond could be refundable if it is recognised that the shipping company is efficiently respecting its engagements and complies with quality discharge standards laid down by the IMO Ballast Water Management Convention (Bonjean 2003).

A system of this type, where the user has to prove compliance to recover the bond, provides the user with a much greater incentive to comply with the requirements: in the absence of a bond-type system, it is uncertain whether non-compliance will be detected or sanctioned.

- **Ballast Water Levies or Taxes**

General taxation is the most common financial revenue source used to fund Government services. To fund ballast water management initiatives, a tax could be imposed related to the volume of ballast water onboard or on each individual ship when calling at a port. The tax could be regressive such as the VAT on products.

This tax could represent a fixed percentage for each measured volume (e.g. cubic meter) of ballast water carried on board ships. The tax could either address the total volume of ballast

water onboard or the total volume of ballast water being (intended to be) discharged in a certain region. However, it is important to note that the amount of money generated by the tax should be competitive with the price of other means of ballast water management, i.e. the better one manages its ballast water, the less one pays (assuming here that the best way of managing ballast water is treatment onboard or discharge to land-based reception facilities).

Another source of income would be the revenue recovered from the fines imposed on ships or shipping companies if they failed or persistently refused to comply with internationally-agreed ballast water discharge requirements. Companies that wish to participate and do not pay the non-compliance fee could be required to lodge an assurance bond.

Another option would be not to focus exclusively on ballast water when implementing a tax system. Alternatives could be to charge any commercial vessel, whether or not it carries ballast water, with a fee either according to the vessel size or cargo capacity and/or to charge a tax on importers of cargo according to the volume or weight of the goods being imported.

Another means to create funding could be applicable for passenger vessels, such as cruise liners. Passengers could be charged a levy when purchasing a ticket similar to the security fee applicable to purchasers of air-line tickets.

However, it should be noted that this kind of fees or taxes eventually will be paid by the consumers as industries likely will not pay from their own pocket, but will pass these costs on. The ultimate objective should be to impose a fee or levy that is not a disincentive for the trade and travel industry and at the same time produces sufficient funding to support e.g. inspection, monitoring, prevention, and rapid response efforts (Jenkins 2002). As an intermediate solution, shipping companies may seek exemption from a tax or levy under the condition when they exchange ballast water at sea.

- **Penalty System (“Polluter Pays Principle”)**

The Polluter Pays Principle involves direct charges on industries involved in global trade and travel to fund governmental responses, rather than relying on existing general funding and other sources detracted from other programmes. It has been shown to be an efficient basis for fund-raising tools for cleanup of oil spill pollution and could also work for “biological pollution” (i.e. IAS). However, the reactive approach is not helpful for biological invasions as a time lag usually occurs before a new species is detected and possibly demonstrated as harmful, which means that the specific “polluter” (e.g. the individual ship which introduced this new species) can almost certainly never be identified. This is why a more proactive approach is needed to use generally applicable tools, especially fees and taxation instruments (Jenkins 2002).

Even before the IMO Ballast Water Management Convention enters into force, countries may consider requiring ships calling at their ports to provide ballast water reporting forms and ask crews to enter all ballast water operations into a ballast water record book. A penalty system may apply to non-complying vessels, i.e. required ship reporting forms or keeping the ballast water record book are not correct or not complied with in a satisfactory manner.

- **Tradable Ballast Water Shares**

The system of tradable shares has been successfully applied in the USA for reducing air pollution. When applying this mechanism to ballast water discharges, the key mechanism would be to give all users shares for ballast water discharges and make those shares tradable, i.e. shipping companies with ballast water management systems onboard their ships can make profit from selling their shares.

However, applying this to ballast water discharges has a major downside as certain shareholders are permitted to release unmanaged ballast water and by doing so the risk of species invasions persists.

Self-financing Mechanisms applicable on subnational or port-level

In contrast to a nationwide approach, the European Bank for Reconstruction and Development has suggested that environmental financing may be less and less the task and responsibility of central governments. Instead, municipalities (e.g. ports) and industries may have to generate their own ways and means to finance measures to prevent or reduce negative impacts and improve the quality of the environment. This is especially valid in countries with an economy in transition as funding is especially critical here. An environmentally sustainable development should be financed increasingly from the profits of industry, from the locally generated revenues of concerned municipalities and industrial stakeholders (European Bank for Reconstruction and Development 1996).

However, it should be noted that much of the costs (i.e. all those apart from undertaking the management action) are aimed at supporting the regulation, which ultimately is a Government responsibility. It is the responsibility of government to oversee the behaviour of all industries and it cannot fully devolve the ultimate responsibility to check that industry is behaving as the community expects. As a result, local or port-level approaches may be seen as complementary measures to the instruments that government implements to protect the environment. They may be especially applicable in (marine) protected areas.

- **Environmental fees for tourism**

It should be considered to widen the scope and not to base self-financing options on shipping and related industries only. Where applicable, tourism may function as one additional source of revenue in a comparable way as e.g. in ski resorts where tourists are charged with an environment protection fee already.

Pristine aquatic environments, attracting tourists, may be seen as common goods to which everybody should be granted, at best, free and unconditional access. However, it is routine practice to ask visitors to pay fees when entering e.g. coastal marine parks or other protected areas. In many places around the world divers are already asked to pay a fee for using prime diving grounds. To date, these fees have mainly been used to cover maintenance and running costs but the revenue generated could also be used to avoid disturbance of such areas by introduced species. Revenues could also be spent on ballast water management programmes that, in turn, will reduce habitat or ecosystem changes caused by biological invaders.

The pioneer country in terms of a tourism-tax is Ecuador, which has implemented a tax to support financing the conservation of the Galapagos Islands. As a fund-raising tool for general environmental protection, the Government of Mauritius has already implemented an environmental protection fee in the tourism industry as a levy on hotel revenue (Macdonald et

al. 2002). Another good example is the Bonaire National Marine Park (BNMP) in the Netherlands Antilles, considered as a scuba diving paradise. Since 1992 the cost of basic park operations have been generated by a fee charged to divers (US $10) which also covers expenses such as salaries, boats and vehicles, mooring maintenance, outreach materials, and law enforcement (fee revenue covers up to 80%-90% of BNMP's total budget: MPA News 2001).

Slightly increasing existing diver fees and broadening the scope to require other tourists to pay a fee may create some additional funding. Given that port regions are often located in close proximity to marine protected areas, this instrument of ecotourism support becomes of interest[54].

- **Fee for Aquaculture Activities and Fishing**

Mariculture farms are dependent on an unspoiled environment enabling maximum growth and recruitment of the target species. Similarly, fishermen depend on healthy environments for maximum catch. Biological invaders, such as food competitors or phytoplankton species causing harmful algal blooms, have already caused a loss of income in the aquaculture industry. It should be in the interest of these industries to avoid unintentional future species introductions. Therefore, it may be considered to pose a user fee on these stakeholders in order to help support the ballast water management that aims to protect them.

- **Fee for Marina Operators**

In the same way as other users, taxes or fees could be applied to operators of marinas.

2. Suggested tools for national governments and port managers for self-financing mechanisms for ballast water management programmes

Voluntary or mandatory instruments?

Industries may follow voluntary codes of practices to improve their image and reputation. Voluntary codes are incentives for all members to raise standards and eventually increase profits. These instruments are particularly useful for countries where the industry seeks to create a green image to attract their target customers. However, voluntary codes rely on motivation. Experience shows that, in general, shipping is reluctant to comply with voluntary guidelines. In the absence of a legal obligation for compliance with voluntary codes, some kind of pressure needs to be created on an industry not to be the non-compliant 'black sheep'. To solve this, one may consider combining voluntary ballast water management guidelines with a fee imposed on all incoming non-complying commercial vessels proportional to the volume of ballast water they carry or intend to discharge.

[54] The World Conservation Union (IUCN) has published a guidebook to assist managers of protected areas in identifying and securing appropriate and sustainable financing. The guide book "Financing Protected Areas: Guidelines for Protected Area Managers" provides a process for creating business and financial plans, and discusses mechanisms for generating revenues. The book is available at the associated IUCN website of http://biodiversityeconomics.org/finance/topics-38-00.htm

Another downside is that creating a demand for the industry to follow voluntary codes may take a long time. As biological invasions are an urgent and growing issue, it seems more appropriate to implement a mandatory instrument to increase compliance in a timely manner.

Incentives or penalty systems?

- **Incentives**

One incentive could be that ships that carry out proper ballast water management may be subject to lower port fees. As a result supportive stakeholders will save costs on port fees. However, a major problem persists: non-supportive stakeholders may continue without proper ballast water management by agreeing to pay higher port fees. One possible solution could be to set the port fees at a significant level with the hope of encouraging stakeholders to implement ballast water management measures to reduce the financial burden.

- **Penalty Systems**

In contrast, a penalty system may be established for non-compliance with ballast water management requirements. Penalty systems are easier to implement as compliance control is transparent and, compared to incentives, a time lag will usually be limited if the penalty fee is substantial.

- **Motivation**

Especially if applied on a voluntary basis, instruments to motivate the industry to comply need to be created. One key issue here will certainly be costs. Industries will be more likely to comply if the costs for non-compliance are high enough to be a real deterrent. A fee or tax system will likely result in compliance.

- **Creation of a label**

As in other codes of conduct (i.e. dolphin-friendly tuna fishing) a label may be created for importers using ships that apply ballast water management. If the importers are permitted to label their products accordingly, this might result in a well-designed scheme in a competitive advantage when marketing their products. This instrument may be particularly attractive for importers when a positive environmental image is an important sales factor.

- **Launching awards**

Annual awards could be created recognising businesses with high environmental standards, such as vessels being equipped with ballast water treatment systems, and by doing so providing them with a competitive marketing instrument.

3. Creating a Ballast Water Management Fund

Noting the experience gained in Australia, US and New Zealand, it is recommended that countries consider implementing a ballast water fee or tax applicable to all ships calling at their ports – regardless if they carry ballast water or intend to discharge ballast water in waters

of their jurisdiction. This approach seems to be the easiest in terms of compliance control – and is also capable of generating a considerable amount of funding.

It is recommended that the generated income should be paid into a Ballast Water Management Fund similar to many existing port fees levied for oil pollution response, ships' waste collection, provision of navigation aids, dredging etc. To prevent diversion of funds, the money generated should be deposited in a designated account.

When setting up a ballast water management fund, three financial phases may occur. Firstly, government funding is needed in the initial phase to allow proper planning of the initiative. Secondly, in an intermediate phase, government funding together with revenues from self-financing mechanisms may be used as co-financing resources for a ballast water management programme. The efforts and costs involved to gather funding may be under-estimated and co-financing is essential in these cases to guarantee the programme's success, continuation and financial sustainability. Thirdly, when the system is up and running, all costs should be covered by sums generated and at the same time the system should be profitable enough to allow funding for ballast water management programmes and related activities.

It is recommended to use the budget generated by self-financing mechanisms in a transparent way, enabling the donor stakeholder(s) to follow up how the money was spent. One way to achieve this could be to establish a fund control and supervision board, which includes representation from all relevant Governmental authorities and those who pay the fee. It may also be considered to release annual revenue reports.

4. Final observations

As funding is one of the key issues today in environmental protection initiatives, self-financing mechanisms are of vital importance. However, all additional costs placed on the burden of the shipping industry will likely result in increased costs for moving cargo with ships.

An awareness campaign may be useful to explain to the public that with little extra payment the rate of biological invasions can be reduced and by doing so safeguarding the (local) environment. Biological invasions are already understood as a major problem and this is why the author assumes the public is willing to accept little extra costs to avoid being exposed to the negative consequences caused by biological invaders. When informing the public, it should be considered to take a similar approach as when phasing out leaded fuel in the petro-chemical industry.

As outlined above, there are different options that could be considered, however it is likely that they would be more effective in combination.

Countries may also consider implementing self-financing mechanisms to solve the lack of funding in other environmental protection initiatives. It should however be noted that external funding, no matter how it is generated, is not a solution for all fiscal difficulties.

It is hoped that the financial resources generated will facilitate ballast water management and research and eventually result in a reduction of unwanted ecological and economical impacts from unintentionally introduced species.