October 2002

SECOND REPORT OF THE EUROPEAN COMMUNITY TO THE CONVENTION ON BIOLOGICAL DIVERSITY

THEMATIC REPORT ON ALIEN INVASIVE SPECIES

(based on the Questionnaire provided by the CBD Secretariat)

THEMATIC REPORTS ON ALIEN SPECIES

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Please provide summary information on the process by which this report has been prepared, including information on the types of stakeholders who have been actively involved in its preparation and on material which was used as a basis for the report

The information on which this report is based was compiled through a mixture of desk-based research (literature and web searches) and interviews and telephone conversations with a range of stakeholders.

European documentary sources included Community legislation and proposals for new legislation, Communications, strategies and action plans, caselaw of the European Court of Justice and questions submitted to the European Parliament.

Stakeholders contacted during preparation of this report include:

- representatives of different directorates-general and services of the Commission (Environment, Health and Consumer Protection, Fisheries, Agriculture, Energy and Transport, Research, Taxation and Customs Union, Development and Trade);
- the European Environment Agency and the European Topic Centre on Nature Protection & Biodiversity;
- nature conservation services, regulatory authorities and/or research institutes in several Member States (Austria, Denmark, France, Germany, Italy, The Netherlands, Portugal, Spain and United Kingdom);
- industry and trade associations concerned with pets, ornamental aquatic species, horticulture and aquaculture;
- non-governmental organisations (e.g. BirdLife International, PlantLife International).

Article 8h Alien species

1. What is the relative priority afforded to implementation of this Article and the associated decisions by your country?					
a) High		b) Medium	X (see below)	c) Low	
2. To what extent are the resources available adequate for meeting the obligations and recommendations made?					
a) Good		b) Adequate		c) Limiting	X
d) Severely limiting					

3. Has your country identified alien species introduced?	
a) no	
b) only major species of concern	X (see below)
c) a comprehensive system tracks introductions	
4. Has your country developed national policies for addressing issues related to alien invasive species?	
a) no	
b) yes – as part of a national biodiversity strategy (please give details below)	X (see below)
c) yes – as a separate strategy (please give details below)	
5. Has your country assessed the risks posed to ecosystems, habitats or species by the introduction of these alien species?	
a) no	
b) only some alien species of concern have been assessed	X
c) most alien species have been assessed	
6. Has your country undertaken measures to prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species?	
a) no measures	
b) some measures in place	X
c) potential measures under review	
d) comprehensive measures in place	

Decision IV/1 Report and recommendations of the third meeting of SBSTTA

7. Is your country collaborating in the development of projects at national, regional, sub-regional and international levels to address the issue of alien species?	
a) little or no action	
b) discussion on potential projects under way	X
c) active development of new projects	

8. Does your national strategy and action plan address the issue of alien species?	
a) no	
b) yes – limited extent	X
c) yes – significant extent	

Case-studies

9. Has your country submitted case-studies on the prevention of introduction, control, and eradication of alien species that threaten ecosystems, habitats or species, in response to the call by the fourth meeting of SBSTTA?	
a) no – please indicate below whether this is due to a lack of available case-studies or for other reasons	X (submitted by Member States)
b) yes – please give below any views you may have on the usefulness of the preparation of case-studies for developing a better biological understanding of the problem and/or better management responses.	
10. How many case-studies are available that could be used to gain a better understanding of the issues surrounding alien species in your country?	
a) none	
b) 1-2 – limited understanding	
c) >2 – significant information available	X

Transboundary issues

11. Are known alien invasive species in your country also a problem in neighbouring or biogeographically-similar countries?	
a) not known	
b) none	
c) a few – but in general alien invasive species problems are specific	
d) more than a few - in general we share common problems with other countries	X

12. Is your country collaborating in the development of policies and programmes at regional, sub-regional or international levels to harmonise measures for prevention and control of alien invasive species?	
a) little or no action	
b) discussion on potential collaboration underway	
c) development of collaborative approaches for a limited number of species	X
d) consistent approach and strategy used for all common problems	

Further comments

The Community has commissioned a comprehensive thematic report on the implementation in the European Union of Article 8(h) and associated decisions of the Conference of the Parties. The following sections outline key measures and developments: detailed information and analysis may be obtained from the full report.

Q.1 What is the relative priority afforded to implementation of this Article and the associated decisions by your country?

Invasive alien species issues have relatively low visibility in the Community, outside specialist circles. In the last five years, however, associated problems and risks have been given much more prominent treatment:

- in 1998, the Community Biodiversity Strategy identified invasive alien species as an emerging issue of environmental importance;

- in March 2002, the European Council (Environment) recognised that the introduction of invasive alien species is one of the main recorded causes of biodiversity loss and the cause of serious damage to economy and health. It supported the use, as appropriate, of national, transboundary and international action. These include, as a matter of priority, measures to prevent such introduction occurring, and measures to control or eradicate those species following an invasion.

Q3. Has your country identified alien species introduced?

Most information on introduced species is compiled and held at the national or sub-regional level (see Thematic Reports submitted to the Secretariat by half of the Member States). There are wide variations between the different Member States' knowledge bases (e.g. taxonomic groups covered) and tracking and monitoring procedures. Accessibility of information is not always satisfactory.

At the Community level, through the European Topic Centre on Nature Protection and Biodiversity, the first project is under way to collate national information (on introduced

fish) to provide a regional statistical overview. The EUNIS database on species, habitats and sites is intended to progressively integrate data on introduced species (consistent with the European Environmental Agency's objective to strengthen capacity for monitoring, data, information, assessment and reporting).

Q4. Has your country developed national policies for addressing issues related to invasive alien species?

The Community Biodiversity Strategy (1998) creates a framework for integrating biodiversity concerns into relevant policy areas. It notes that "the presence or introduction of alien species or subspecies can potentially cause imbalances and changes to ecosystems. It can have potentially irreversible impacts, by hybridisation or competition, on native components of biodiversity."

The Strategy is to be implemented through sectoral Biodiversity Action Plans which are complementary to national strategies and measures. Each of the four Plans adopted to date references invasive alien species issues (Conservation of Natural Resources; Agriculture; Fisheries; Economic and Development Co-operation).

The Community's Sixth Environmental Action Programme (2001-2010) provides for development of a marine protection strategy. This is likely to cover marine invasive species issues, including vectors for introduction associated with shipping.

Q.6 Has your country undertaken measures to prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species?

The Community has comprehensive measures for protection of animal and plant health against harmful organisms and disease: these cover introduction, surveillance, controlling spread and financial support for eradication by Member States. Existing rules are mainly focused on agricultural pests and diseases affecting livestock.

Three instruments specifically address risks that introduced species may present to wild native fauna or flora. Member States are required:

- to regulate or prohibit the deliberate introduction into the wild of any species which is not native to their territory so as not to prejudice natural habitats within their natural range or the wild native fauna and flora (Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora);

- to 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 (Council Directive 79/409/EEC on the Conservation of Wild Birds);

- to prohibit the import, holding and movement of live specimens of species for which

it has been established that their introduction into the natural environment of the Community presents an ecological threat to wild species of fauna and flora indigenous to the Community (Council Regulation 338/97/EC on the Protection of the Species of Wild Flora and Fauna by Regulating Trade Therein). Two species are currently subject to these 'ecological threat' restrictions: the Red-eared slider *Trachemys scripta elegans* and the American Bullfrog *Rana catesbeiana*.

Existing rules related to species, habitats and ecosystems do not address control or eradication of invasive alien species. Where species or habitats of Community interest are adversely affected, Community funding may be available to assist Member States in mitigation and restoration operations.

Q.12 Is your country collaborating in the development of policies and programmes at regional, sub-regional or international levels to harmonise measures for prevention and control of alien invasive species?

The Community collaborates with a variety of bodies with regard to reduction of risks associated with certain pathways as well as prevention and management directed at particular species. It is actively engaged at each of the following levels:

- globally, through e.g. participation in development of legal measures for ballast water management (IMO), and international phytosanitary standards (IPPC/EPPO)

- regionally, through e.g. the Pan-European Biological and Landscape Diversity and engagement in invasive species work carried out by the Convention on the Conservation of European Wildlife and Natural Habitats;

- sub-regionally, through e.g. regional seas instruments for the North-East Atlantic (OSPAR), Baltic Sea and the Mediterranean, each of which mandates prevention and management measures for marine introductions.

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1 Scope and Mandate of the Report

This report responds to Decision V/19.8 of the 5th meeting of the Conference of Parties (COP) to the Convention on Biological Diversity (CBD), which invited Parties to submit to the Executive Secretary of the Convention thematic reports on alien species for consideration at the 6th meeting of the COP.

The Executive Secretary has disseminated Guidelines for Detailed Thematic Reports on Alien Species. These consist of questions based on the elements of Article 8(h) of the Convention, Decision IV/1 of the COP and Recommendations IV/4 and V/4 of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA). The questions relate to identification and assessment of invasive alien species (IAS) on a Party's territory, the substantive and policy measures on IAS adopted by Parties and collaboration at the regional, subregional and international levels to address these issues.

The questionnaire annexed to the Guidelines has been duly completed, accompanied by succinct additional information as requested.

This Report provides a more detailed picture of Community progress to date and is intended as an information resource. It covers the themes raised by the Executive Secretary's Guidelines, with emphasis on the Community's special position as a regional organisation. Section 2 provides background information on invasion pathways and IAS in the Community context. Sections 3 and 4 describe legal, administrative and policy measures adopted by the Community in relevant sectors and outline how the Community contributes to relevant international and European processes.

The Report reflects the cross-cutting and inclusive approach to IAS endorsed by the CBD (Decision IV/1). It was prepared after consultation with sectors engaged in aspects of IAS prevention and mitigation, including nature conservation, wildlife trade, agriculture, fisheries, health and consumer protection, research and trade. It also draws on consultations with a range of stakeholders, including trade associations, non-governmental organisations and research institutes. The particular vulnerability of geographically and evolutionarily isolated ecosystems has received attention.

The Report does not cover re-introductions of native species or introduction of genetically modified organisms as these are treated separately under the Convention.

2 Invasive Alien Species in the European Community: an Emerging Issue

The Community has recognised the proliferation of invasive alien species (IAS) as an emerging issue.[1] In 2002, the European Council (Environment) noted that the introduction of IAS is one of the main recorded causes of biodiversity loss and causes serious damage to economy and health.[2]

2.1 Pathways for introduction

For centuries, alien species have been introduced into and between European countries. Public agencies, industry, conservationists and the public have all played a part in activities leading to intentional and unintentional introductions.

Increased global trade, transport and tourism provide expanded opportunities for plants, animals and micro-organisms to move beyond their natural range.[3] The great majority of translocated species do not go on to harm species, habitats and ecosystems: many deliver significant benefits for European user groups and economic sectors. However, the species that do become invasive can be costly for industry, competent authorities, site managers and society as a whole. Some impacts on biodiversity and ecological function may be irreversible.

As a major trading bloc, the Community is both a donor and a recipient of translocated organisms. Pathways for introduction are associated with activities in Community policy areas such as trade, transport, agriculture and fisheries. Whilst impacts are often local, introduced species can spread across boundaries to affect other countries.

Pathways for unintentional and intentional introductions include:

- trade and movement of goods (e.g. alien species and micro-organisms translocated in containers, planting media, untreated wood packaging, some food products)
- movement of people, including for tourism, through air, road, rail and sea transport;
- shipping (ballast water, sediment, hull fouling, anchors)
- aviation (in cargo and on and in the aircraft itself)
- postal and courier services (including biological material purchased via the internet)
- mariculture and aquaculture (fish, molluscs and crustaceans introduced for production; disease organisms accompanying introduced species)
- agriculture (crops and livestock) (direct introductions; accompanying diseases)
- shooting and angling (game species and live fish and bait introduced for sport and restocking; may also carry disease organisms)
- aquaria (deliberate discards; discharge of organisms with waste water)
- release of pets or domestic animals
- horticulture and gardening (dispersal of material from tips, ponds etc.)
- habitat restoration and landscaping (e.g. use of non-native genotypes of native plants)
- waste disposal and overflow (discharges of untreated effluent to aquatic systems)
- infrastructure development and interbasin transfers of water
- large-scale movements of vehicles/equipment during development and famine relief programmes and military operations.

[1] COM(2001)162 final.
[2] Council Conclusions of 4 March: 6592/02 (Presse 47 - G) 24.
[3] As an indicator of trade flows into the Community, Customs currently clear a container at the port of Rotterdam every six seconds and 150,000 express parcels at Brussels Airport every night.

Free movement of people and goods are basic principles of the Community. Following the establishment of the Single Market in 1992, internal border controls were abolished and trade control measures put in place at the Community's external borders. The proposed enlargement of the Community will expand the Single Market and facilitate translocation of organisms to new biogeographical regions. New trading partnerships with other States also have pathway implications: these include the evolving EuroMediterranean free trade area which will link the 15 EU Member States and 12 Mediterranean Partners.[4]

2.2 Possible impacts

The European Environment Agency notes negative impacts of IAS on Europe's biodiversity.

> "More and more species, particularly plants, are introduced for economic or recreational purposes, sometimes with dramatic consequences in the case of invasive alien species, particularly in marine and freshwater ecosystems, and also in grasslands. Interactions between species are disturbed, particularly prey/predator relations (herbivores/carnivores, hosts/parasites), leading to food web changes and general disturbance of the ecosystem. Species related to old habitats decline, while species related to young habitats with short rotation periods spread. There are also effects on indigenous gene pools, and increased risks of epidemics".
>
> (*Environment in the European Union at the turn of the century* (EEA 1999)
> (Chapter 3.11: Changes and loss of biodiversity).

IAS can come from any taxonomic group and may have inter-related economic, health and biodiversity impacts. Indicative examples relevant to the Community are given below.

Introduced micro-organisms

These include diseases or pathogens that affect human, animal or plant health. The Community's agricultural sector tackles viruses that may affect wild fauna as well as farmed livestock. For example, Bluetongue disease, which has occurred in the Community for the first time, affects wild ruminants. African swine fever, present only in Sicily, affects wild boar.

Introduced invertebrates

The horse-chestnut leafminer moth, *Cameraria ohridella*, is a moth of unknown origin which can defoliate horse chestnut trees in summer. In some countries (Austria, Czech Republic), it has infested virtually every tree and is spreading at more than 100 km per year across Europe. Rare endemic forests in the Balkans are currently threatened by this insect pest.[5]

[4] Developed under the Barcelona Process, this involves harmonisation of regulatory and customs framework for free movement of goods and is due for completion in 2010.
[5] The Community has funded research for its management: see Appendix 2.

Introduced mammals

Several alien mammals outcompete native wild mammals. Examples include grey squirrel (*Sciurus carolinensis*), which seriously threatens Red squirrel (*Sciurus vulgaris*) in the UK, Ireland and Italy (see 5.4). The American mink *(Mustela vison*), originally introduced for fur production, is invasive in at least seven Member States: it threatens populations of European mink (*Mustela lutreola*) as well as ground-nesting birds, fisheries and game.

IAS with known economic impacts include muntjac deer (*Muntiacus reevesi*) which affects the forestry sector in Ireland, the UK and The Netherlands; the coypu (*Myocastor coypus*) which damages agricultural crops, including rice farms in the Camargue, France; and muskrat (*Ondatra zibethicus*) which damages waterways in Portugal, amongst others.

Introduced birds

Historically, birds have been introduced to ornamental lakes and private waterfowl collections with little perception of the possible dangers of escape or release. The best known case with transboundary impacts concerns the North American ruddy duck (*Oxyura jamaicensis*). This was introduced by conservationists to the UK in the 1950s and later escaped and spread to several western European countries. The duck does not have major impacts in the UK, where it is increasing at about 15% a year. In Spain, however, it forms large wintering flocks and has hybridised with the native White-headed duck (*Oxyura leucocephala*), threatening this globally threatened species with extinction.

Introduced aquatic animals

Introduced freshwater fish that have harmed native fish include the Eastern mudminnow *Umbra pygmaea* and North American catfishes (ictalurids) in the lowland waters of northern Europe; small cyprinids throughout the Danube basin; and pike in some water systems (e.g. impacts on native brown trout stock when used to stock some Irish lakes)[6].

Many native crayfish are affected by disease introduced with alien crayfish species. In Sweden, *Pacifastacus leniusculus* distributes crayfish plague that displaces the native Noble crayfish *Astacus astacus*: the former has spread to northern Latvia and may reach Estonia.

Intentional introductions for aquaculture and mariculture can lead to competition or introduction of disease (*Bonamia* in oyster, *Gaffkemia* in lobster). Although initially judged negligible, the impact of marine aquaculture on biodiversity is considered severe locally as a result of pests and escaping species that lead to genetic change in wild populations (EEA 1999) and of nutrient enrichment. Escape risks are higher for animals farmed in open aquatic systems (sea, lakes, rivers) than for those kept in closed systems.

In the marine environment, some 3000 species are transported in ballast water every day. The Zebra mussel *Dreissena polymorpha*, known for its devastating impact on North American inland water systems (estimated control costs since 1989: $1 billion), now occurs in several European countries. It was recorded in Ireland's Shannon Catchment in the 1990s, reached Northern Ireland (UK) via the shared Erne River catchment and has been detected in the Ebro Delta on Spain's Mediterranean Coast.

[6] European Parliament (Written question E-0474/01: Freshwater fishing in Ireland: ongoing disturbance of the natural balance in the Western Lakes Region).

Modern aquaculture development in the coastal zone is considered to be at high risk of disease transfer from ballast water when the culture facilities and areas of fishing are located near shipping routes. The recent world-wide growth of aquaculture along such infrastructure elements amplifies this risk, "possibly rendering tight disease regulations for this industry useless in many areas". [7]

In the eastern Mediterranean, the number of introduced mollusc species (snails, mussels, oysters, clams) began to increase after the opening of the Suez Canal. This increase has accelerated due to human activity (ballast waters, hull fouling, other import pathways). Some 3–5 % of today's mollusc fauna consists of alien species introduced after 1975.

Aquatic and riparian plants

In the Mediterranean, the marine algae *Caulerpa taxifolia* now affects all littoral Member States (France, Italy, Spain, Greece) and Croatia. It threatens components of marine biodiversity (some species of algae, Posidonia beds which are designated as habitats of Community interest under Annex I, Habitats Directive) and limits the natural habitat for larval fish and invertebrates. Eradication is no longer feasible[8] but the Community supports containment action in Port Cros Marine National Park (France).

The Japanese brown macroalga, *Sargassum muticum* was introduced to Europe through oyster transplantation and can clog coastal waterways. The Japanese seaweed *Undaria*, intentionally introduced to the French coast, was recently found on the United Kingdom's south coast: it has the potential to displace native species and is spreading vigorously.

Introduced freshwater plants damage inland water biodiversity in parts of the Community. Species identified as problematic in four or more Member States include *Azolla filiculoides*, *Eichhornia crassipes*, *Elodea canadensis*, *Fallopia japonica*, *Heracleum mantegazzianum*, *Hydrocotyle ranunculoides*, *Impatiens glandulifera*, *Lagarosiphon major*, *Lemna minuta* and *Ludwigia grandiflora* (see box).

Examples of possible impacts of aquatic and riparian plants:

Hydrocotyle ranunculoides forms dense interwoven mats of floating vegetation that alter the ecology of the water body and kill fish and invertebrates. The Netherlands' Association of Water Boards is seeking to develop a joint control strategy with other European Union Water Management Associations.

The Giant Hogweed *Heracleum mantegazzianum* competes with native riparian species and increases soil erosion along river banks. Its sap causes serious blistering and burns (as does *H.sosnowski*, invasive in at least Estonia). Proliferating populations in urban and suburban areas are considered to represent an increasing public health hazard.

[7] European Concerted Action Study: Testing Monitoring Systems for Risk Assessment of Harmful Introductions by Ships to European Waters (see Appendix 2).

[8] In 1984, it was first recorded covering an area of just one square metre off Monaco: this rose to 3 ha in 1990, 30 ha in 1991, 427 ha in 1992, 1,300 ha in 1993 and more than 3,000 hectares by 1996 (source: IMO).

Terrestrial plants

Invasive plants in parts of the Community include *Rosa rugosa, Robinia pseudoacacia*, *Prunus laurocerasus* and *Rhododendron ponticum*. Rhododendron is highly invasive in the forests and semi-natural woodlands of many Member States, often reducing natural regeneration of native species. In Ireland, it has negative impacts on sphagnum bog, a habitat type of Community interest. In the UK, control costs in just one protected area (Snowdonia National Park, Wales) total £45 million to date.

Some countries are concerned about allergenic plants (e.g. common ragweed *Ambrosia artemisiifolia*) that are not established on their territory but which are known to be invasive elsewhere and could become a problem for public health.

Some alien species have become weeds of cultivation. The National Botanic Garden of Belgium has documented the spread of some alien bryophytes (e.g. *Lophocolea semiteres*) and invasive grasses (e.g. *Setaria macrocarpa, S. verticilliformis, Panicum dichotomiflorum*) in the weed communities of maize-fields in Flanders.

2.3 Vulnerable ecosystems

The Community has a range of geographically and evolutionarily isolated ecosystems, identified under the CBD as particularly vulnerable to biological invasion.

The Community includes several islands and archipelagos, such as the Aegean and Ionian Islands (Greece), the Azores and Madeira (Portugal), the Canaries and Balearics (Spain) and Guadeloupe, Martinique and La Reunion (France). Two EU accession countries, Malta and Cyprus, are island states. The Overseas Countries and Territories of Member States include many small islands, such as: the British Virgin Islands, Turks and Caicos Islands, South Georgia and the South Sandwich Islands (United Kingdom); Aruba and the Netherlands Antilles (the Netherlands); and New Caledonia and French Polynesia (France). Many of these islands contain habitats and endemic species that have historically suffered from alien species introductions and remain vulnerable to new introductions (see Box).

> The BirdLife International database on Important Bird Areas (IBAs) in Europe lists "consequences of animal/plant introductions" as a threat in many island IBAs (Madeira (3), Canary Islands (29), Azores (14)). The Azores Bullfinch *(Pyrrhula murina)*, a Globally Theatened Species listed in Annex 1 of the Birds Directive, is endemic to San Miguel Island with a total population now estimated to be less than 120 pairs. Main causes of decline are habitat destruction and afforestation with exotic species.

The Community also contains many transboundary ecosystems (terrestrial, freshwater, marine). Introduced species can move freely within shared inland water systems and regional seas, as well as across 'dry' land borders where there are no natural barriers to species movement. The Community and its Member States therefore need to be able to address some types of IAS issues at the transboundary or subregional level (e.g. ecosystem, watershed).

3 EC legal and administrative measures relevant to invasive alien species

Invasive alien species, as a cross-cutting issue, are addressed directly or indirectly by several Directorates-General of the European Commission and through a range of legal instruments. The Community does not currently have a horizontal programme or instrument on alien species.

3.1 Prevention of unwanted imports into the Community

The first line of defence for preventing unwanted introductions from third countries is at the Community's external border. Once a species has entered, it may be freely moved and traded unless special rules apply, and may be translocated to a part of the Community in which it finds conditions suitable for establishment.

Community powers to prohibit or restrict imports apply in relation to:

- organisms harmful to plants or plant products (3.1.1);
- animal and fish diseases (3.1.2);
- species that may threaten wild fauna and flora in the Community (3.1.3).

For the first two categories, the Community has a comprehensive framework of laws and procedures which are harmonised with international phytosanitary, zoosanitary and trade rules. Coverage is mainly focused on agricultural pests and diseases affecting livestock and farmed fish. The framework provides for biosecurity controls in the form of certification, quarantine procedures and post-entry surveillance as necessary, as well as measures to control spread within the Community (3.3).

Member States have primary responsibility for implementing and enforcing relevant legislation. The Commission shares responsibility by overseeing national implementation and providing some technical and financial assistance.

3.1.1. Organisms harmful to plants or plant products

Protective measures against the introduction of harmful organisms are established under Council Directive 2000/29/EC of 8 May 2000 as amended.[9]

"Harmful organisms" are defined as "pests of plants or of plant products, which belong to the animal or plant kingdoms, or which are viruses, mycoplasmas or other pathogens".[10] Pests may be direct or indirect (e.g. weeds of cultivation). "Plants" means living plants and living parts thereof, including seeds. The definition is not restricted to cultivated plants, so the Directive potentially applies to organisms that may harm wild (unmanaged) plants. Consistent with the International Plant Protection Convention terminology, concepts of "alien" or "non-native" are not used.

[9] Council Directive 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community.
[10] Art.1(e).

The Directive contains Annexes listing:

- harmful organisms not known to occur in any part of the Community and relevant for the entire Community;
- organisms known to occur in the Community but not endemic or established throughout the Community and relevant for the entire Community;
- organisms for which protected zones are established;
- plants and plant products which must be banned in all Member States or in certain protected zones; and
- special requirements which must be met by plants and plant products before introduction into and movement within the Community.

Existing Annexes list about 300 organisms. These are mainly direct pests of cultivated plants. No weeds of cultivation are listed.

The Standing Committee on Plant Health deals with quarantine-related matters and meets monthly. Member State representatives submit issues for consideration and give opinions on Commission draft texts for new phytosanitary measures or amendments to the Annexes. New phytosanitary measures are developed in line with internationally agreed standards. Where a standard is not available or does not give the high level of protection required in the Community, measures adopted are consistent with the WTO-SPS Agreement and based on sound risk assessments. Technical capacity for conducting pest risk analysis is located mainly in the Member States.

Where a Member State considers it necessary to take unilateral emergency measures, it must justify these measures: it normally submits a pest risk analysis to the Committee as early as possible. The Commission examines the situation as soon as possible within the above Committee. It may adopt necessary measures, including a decision as to whether measures taken by the Member State should be rescinded or amended.

Border controls, surveillance and certification

The Directive establishes common rules for phytosanitary conditions and procedures for introduction and movement of plants and plant products. The Community Plant Health Inspectorate (now called the Food and Veterinary Office[11]) monitors implementation by Member States and may carry out inspections at the Community's external border through an inspection programme established with the Member State concerned.

- Products originating in third countries are subject to plant-health, documentary and identity checks on introduction into the Community. If satisfactory, they are then authorised for movement throughout the Community, subject to restrictions for movement to protected zones. In some cases they obtain a plant passport.

- For Community products covered by the Directive, controls are carried out at the place of production. Producers must be officially registered. Plant passports are issued after satisfactory inspection: these ensure free movement either throughout the Community or in those parts for which the plant passport is valid.

[11] Established in 1992: based in Ireland.

- Member States may not adopt special plant-health measures for the movement into their territory of plants or plant products originating in other Member States.

- National authorities are required to carry out random checks.

Early warning and information exchange

The main tool is the Alert List maintained by the European and Mediterranean Plant Protection Organisation (EPPO). Member States may separately alert the Standing Committee on Plant Health about organisms of concern.

All interceptions of a consignment or a harmful organism from third countries and presenting an imminent phytosanitary danger must be notified to the Commission, EPPO and the country of origin. The Commission compiles an annual report on all interceptions. Two information systems are used to notify new occurrences of harmful organisms:

- EUROPHYT is an electronic rapid alert system between the Commission and Member States: it is managed by the Food and Veterinary Office;

- CIRCA is a simpler system, used in urgent situations and for information exchange.

The Commission has proposed amendments to Directive 2000/29 to further adjust the Community Plant Health Regime to the conditions of the Internal Market.[12] The proposals are designed to reinforce coordination between national plant protection and custom services and between Member States' plant protection services and to ensure that phytosanitary checks are completed before customs clearance takes place. Amended documentation would give more detail about the import procedures the product has been through.[13] The proposal also establishes procedures for recognising the equivalence of phytosanitary measures adopted by other Parties to the WTO-SPS Agreement.

3.1.2. Animal and fish diseases

Member States must ensure that trade in animals is not prohibited or restricted for animal health reasons other than those arising from relevant Directives or applicable Community legislation. Animal health requirements for imports to the Community, are laid down under species-specific directives[14] or, for species not yet covered by specific rules, under Directive 92/65/EEC as amended.[15] The latter is not limited to species in commercial use. It also applies to intra-Community trade and sets out conditions for approval of establishments holding animals for purposes of education, conservation and research.

Annex A to Directive 92/65 reproduces the list of "notifiable diseases" included in the 'Office International des Epizooties' List A. Annex B lists diseases for which Member States may draw

[12] Proposal for a Council Directive amending Council Directive 2000/29/EC on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community (COM(2001) 183 final, submitted on 5 April 2001).
[13] This is already done in some Member States (e.g. France, Germany, the Benelux countries).
[14] E.g. cattle, swine, sheep and goats, equidae, poultry.
[15] The 'Balai Directive' (Council Directive 92/65/EEC of 13 July 1992 laying down animal health requirements governing trade in and imports into the Community of animals, semen, ova and embryos not subject to animal health requirements laid down in specific Community rules referred to in Annex A (I) to Directive 90/425/EEC).

up national control and monitoring programmes. Outbreaks of these diseases must be notified to the competent national authority (see also 3.3.2).

The Standing Veterinary Committee (SVC) ensures close cooperation between Member States and the Commission. It advises the Commission on necessary actions in the event of disease outbreaks, including in serious case the suspension of imports from third countries and/or the restriction of exports from Member States.

Measures to prevent introduction and spread of fish disease with introduced aquaculture animals are set out in Directive 91/67/EEC.[16] Imports are only authorised from third countries that appear on a list drawn up by the Commission. Criteria for listing include:

- the state of health of the aquaculture animals;
- exotic diseases in the third country which might endanger the health of livestock in the Member States; and
- the regularity and rapidity of the information supplied by the country relating to the existence of infectious or contagious diseases of aquaculture animals in its territory, in particular those diseases mentioned in the Office International des Epizooties' List B.

Imported aquaculture animals and products must be accompanied by prescribed certificates.

Border controls, surveillance and certification

Harmonised rules for veterinary checks and border inspections apply in the Single Market.[17] Imports of live animals and animal products are only permitted at approved Border Inspection Posts (BIPs). National inspectors control certificates (proof of export controls by the country of export) and take samples. The Food and Veterinary Office inspects all BIPS and a record of veterinary inspections is publicly available.[18]

For Member States that border third countries infected with diseases exotic to the Community, the Commission may provide financial and technical support to veterinary activities in such countries to facilitate rapid detection and elimination of disease outbreaks.

Early warning and information exchange mechanisms

The ANIMO system links around 2500 veterinary work stations in the Community and includes details of all veterinary and other certification procedures carried out at border inspection points. It provides a mechanism for rapid exchange of information and for tracing animal movements (e.g. it was used for this purpose within a day of the Foot and Mouth Disease outbreak in the UK in 2001).

[16] Directive 91/67/EEC concerning the animal health conditions governing the placing on the market of aquaculture animals and products.
[17] Council Directive 91/496/EEC laying down the principles governing the organisation of veterinary checks on animals entering the Community from third countries.
[18] http://www.europa.eu.int/comm/food/fs/inspections/vi/reports/index_en.html

3.1.3 'Ecological threat' species

The Wildlife Trade Regulations[19] provide a basis for the Community to implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and to impose stricter controls on trade in certain species. It also establishes powers to restrict the introduction into the Community "*of live specimens of species for which it has been established that their introduction into the natural environment of the Community presents an ecological threat to wild species of fauna and flora indigenous to the Community*".[20] Restrictions may also cover holding and movement (see 3.2.1).

Import restrictions are adopted in consultation with the countries of origin concerned, taking account of the views of the Scientific Review Group (SRG).[21] Proposals for listing may be raised by the chairman or any SRG member.

Two species are currently subject to an import ban under this Regulation.[22] These are the Red-eared slider *Trachemys scripta elegans* and the American Bullfrog *Rana catesbeiana*. The Commission is funding research on the effectiveness of these measures.[23]

Additional species proposed by some Member States for 'ecological threat' listing include two long-established invasives (North American ruddy duck, grey squirrel). The SRG also discussed certain aquatic and riparian plants at its meeting in November 2001.[24]

Implementation to date raises certain issues:

- the Regulation can be a key component of prevention, but would benefit from a more integrated approach that also covers monitoring, site/species management and control.
- it applies to known invasives and does not cater for situations of uncertainty.
- selection of species for listing is complex (some 'alien' species are native in overseas territories and/or already widely distributed in parts of the Community e.g. by nurseries or through natural reproduction).[25]
- listing of subspecies may require additional taxonomic guidance to facilitate identification by Customs officers.[26]

[19] Collective term given to Council Regulation 338/97/EC on the Protection of the Species of Wild Flora and Fauna by Regulating Trade Therein and Commission Regulation 1808/2001/EC laying down detailed rules concerning the implementation of Council Regulation (EC) No 338/97.
[20] Art.4(6)(d) of Regulation 338/97.
[21] The SRG is established under Art.17, Regulation 338/9: it consists of representatives of each Member State's Scientific Authorities and is chaired by a representative of the Commission.
[22] The ban was first imposed in 1997. The most recent Suspensions Regulation is Commission Regulation (EC) No 2087/2001 of 24 October 2001 suspending the introduction into the Community of specimens of certain species of wild fauna and flora.
[23] *Study of application of EU Wildlife Trade Regulations in relation to species which form an ecological threat to EU fauna and flora* (Amphi Consult, Denmark: Interim Report delivered March 2002).
[24] *List of alien invasive aquatic and riparian species in the EU* (Information document supplied by the European Union of Water Management Associations).
[25] The Community's Biodiversity Action Plan for Conservation of Natural Resources (§104) provides for updating the list of known 'ecological threat species' and including this list in the EC Clearing House Mechanism (see 4.1.1 and 3.5.3).
[26] e.g. the *Trachemys scripta* group of turtles is subject to different taxonomic views and is split into 3-19 subspecies: it may be necessary to clarify the basis for listing under Reg.339/97 (Interim Report, supra n.24).

- significantly extending the list would have major implications for Customs capacity.

- listing a species (i.e. withdrawing it from trade or preventing its entry onto the Community market) is likely to be most effective if decision-making takes account of market forces and demand. There are indications that an import ban might have perverse consequences: e.g. increased captive breeding (within the Community) to meet demand and/or market adjustment through the import of alien subspecies as substitutes, potentially with similar impacts on biodiversity.[27]

- the species listing process needs to be scientifically based, proportionate, non-discriminatory, transparent and involve consultation with relevant industry and trade stakeholders.

3.2 Prevention of unwanted introductions within the Community

Plant, animal and fish health rules outlined in 3.1 also apply to products originating within the Community, in accordance with relevant Directives. These are not separately described here.

Three instruments specifically address introduction or movement of alien species within the Community (3.2.1-3). The European Court of Justice has considered this issue (3.2.4). Escapes from zoos are covered by a separate instrument (3.2.5).

3.2.1. Holding or movement of 'ecological threat' species

Article 9(6) of the Wildlife Trade Regulation establishes powers to prohibit or restrict the holding or movement of live specimens of species that are subject to import restrictions under Art.4(6). The rationale for such rules would be to end the supply and keeping of named IAS in order to prevent or reduce opportunities for release to the wild. The Regulation does not provide for restrictions on domestic sale.

No species are currently listed under Article 9(6). This means that whilst import of two species is banned (see 3.1.4), captive breeding, sale and possession are not. Efforts to reduce supply and holding of known IAS therefore have to be based on education and voluntary compliance: e.g. NGOs in the Netherlands and the UK have campaigned to persuade pet shops and garden centres to ban sale of Bullfrogs, but with limited success.[28]

The Community's CITES Management Committee is examining whether the Commission should be asked to develop new regulations to impose stricter holding and movement restrictions. Certain aspects will need particular consideration:

[27] In Belgium, large numbers of *Rana (levantina) bedrigae* are now imported for the garden pond trade. "While it is not yet clear whether this species is able to survive in Belgium in the long-term, the combination of free trade within the EU and its close relation to native *Rana* species are reasons for concern" (Interim Report, supra n.24).
[28] *ibid*.

- due to climatic variations, a species is unlikely to be an ecological threat throughout the Community: e.g. a fish that might cause problems in southern Italy would almost certainly die on release in Finland;

- there is no legal basis to apply movement restrictions at the subregional level, although Art. 30 of the EC Treaty potentially provides such a basis (see 3.2.4 on recent ECJ case law);

- the Commission has no power to adjust possession and movement controls in accordance with the level of assessed ecological threat for a given species. Such powers may be necessary to ensure that measures adopted are proportionate;

- the Regulation does not provide a basis for licensing the possession and movement of ecological threat species. A permit and registration system, aligned with the existing CITES licensing system, could facilitate tracking of sales, possession and transfers. It would also provide for more effective oversight and detection of escapes or releases;

- a more flexible approach could also address situations where candidates for 'ecological threat' listing are already widely held in captivity (e.g. *Oxyura jamaicensis*).

3.2.2. Introduction of alien birds

The Birds Directive[29] requires Member States to establish a general system of protection for all species of naturally occurring birds in the wild state in the European territory of the Member States to which the Treaty applies, except as specifically provided for by the Directive. In addition, Member States must "*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 this connection they shall consult the Commission*" (Art.11).

"Introduction" is not defined but is interpreted by the Commission to mean intentional release to the wild (c.f. import). "Natural" occurrence is also not defined but is interpreted to include accidental species and to exclude deliberately introduced species.

Little data is available at the Community level on implementation of this provision. National reports submitted under the Directive have not covered this aspect.

3.2.3. Introductions damaging to habitats and wild species

The Habitats Directive[30] requires Member States to "*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*".[31] The results of the assessment undertaken must be forwarded for information to the Committee set up under Article 20.

The first National Reports on implementation of the Directive have only recently been submitted, so there is not yet a Community overview of national implementation of Art.22(b).

[29]Council Directive 79/409/EEC on the Conservation of Wild Birds.
[30]Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora
[31] Art.22(b).

More generally, the Directive mandates assessment of plans and projects likely to have a significant effect on a Special Area of Conservation (SAC) established under the Directive, whether individually or in combination with other plans or projects.[32] This requirement should be applied to activities that involve the release, translocation or contained use of introduced species in the vicinity of SACs.

The following points can be made about the Birds and Habitats Directives:

- they are exclusively concerned with intentional introductions;
- their provisions are not limited to impacts on protected sites or species;
- Member States are free to decide how to implement the relevant provisions (as regards species coverage, assessment and permit systems, monitoring etc.);
- "territory" is not defined by either Directive, but is used in a political (jurisdictional) sense. The Habitats Directive defines native by reference to national boundaries, whereas the Birds Directive uses a bigger scale as it references the "European territory of the Member States".[33] Neither of these definitions correspond to the ecological approach used under the CBD. They also do not cater for situations where species native to one area may be invasive elsewhere in the same country if translocated beyond their natural range (e.g. between a country's mainland and its islands or between a country's islands);[34]
- difficulties might arise if a species protected under a Directive is native in one part of the Community but harmful or potentially problematic elsewhere. This was not envisaged when the Directive was adopted in 1992, but could be an issue following enlargement.

3.2.4. European case law on restricting movement of alien species

The European Court of Justice has considered the application of Art.8(h) in the context of free movement of goods within the Community (see Box). The case creates a precedent – at least in specific circumstances – for limiting the operation of the Single Market for reasons related to protection of wild species and genetic diversity.

> Case C-67/97 concerned the keeping of a non-indigenous species of bee on the island of Læsø (Denmark) and the protection of the brown bee subspecies *Apis mellifera mellifera* which is native to the island. No specific Community rules applied to this situation, which means that national law remain applicable if consistent with EC Treaty provisions.
>
> The European Court of Justice ruled on 3 December 1998 that a legislative measure prohibiting the keeping on an island such as Læsø of any species of bee other than the native subspecies *Apis mellifera mellifera* must be regarded as justified, under Article 30 of the EC Treaty (ex Article 36), with a view to protecting the health and life of animals. It considered that measures to preserve an indigenous animal population with distinct characteristics contribute to the maintenance of biodiversity by ensuring the survival of the population concerned and are thus aimed at protection of animal life. From the point of view of such conservation of biodiversity, it is immaterial whether the object of protection is a separate subspecies, a distinct strain within any given species or merely a local colony, so long as the populations in question have characteristics distinguishing them from others and are therefore judged worthy of protection.

The Commission considers that this case law might, under certain conditions, also apply to territories larger than small islands such as Læsø. It is examining whether the principles established by the ECJ for small islands could be applied to a Member State such as Austria, to enable it to reserve all or most of its territory for bee-keeping based on native subspecies.[35] The issue of intra-Community controls to protect native bees has also been raised in the European Parliament on behalf of British bee breeders, concerned that hybridisation and/or infection from the varroa and Kashmir viruses present in non-native bee species might lead to the extinction of native *Apis Mellifera Mellifera* populations.[36]

There may be scope to apply this case law to other alien species or subspecies that, once introduced to a given territory, are extremely difficult to contain and may have irreversible effects at the species or genetic level. Activities that might present such risks include the introduction of alien crayfish, the use of live baitfish in wild or semi-wild fisheries without prior screening for suitability, and large-scale landscaping and replanting with non-native genotypes of plants.

3.2.5. Escapes from zoos

Council Directive 1999/22/EC of 29 March 1999 relating to the keeping of wild animals in zoos requires Member States to take measures to ensure that all zoos implement specified conservation measures (Art.3). These include measures for "preventing the escape of animals in order to avoid possible ecological threats to indigenous species and preventing intrusion of outside pests and vermin." Non-compliance is subject to severe financial penalties and possibly the closure of the establishment.

3.3 Control and eradication within the Community

Measures are in place to control the spread of harmful organisms and animal and fish diseases (3.3.1-2). The rationale for Community rules to restrict free movement of goods in this context is that pests/diseases have implications for human and plant/animal health or may cause serious losses in the agriculture and fisheries sector.

3.3.1. Organisms harmful to plants or plant products

When harmful organisms are detected, Member States must immediately notify the Commission and take immediate measures to eradicate or, if impossible, inhibit the spread of the harmful organism concerned (under Directive 2000/29/EC as amended). In situations of imminent danger, a Member State may take action where the Community has not acted and where it considers action essential. Measures are referred to the Standing Committee on Plant Health which may propose necessary amendments to the Annexes.

> Example: The Western Corn Rootworm (*Diabrotica virgifera virgifera*) was unintentionally introduced to the Balkans during the 1990s as a result of military and humanitarian assistance. It is rapidly spreading west and has been detected in Italy. The Committee has requested Italy to carry out specific surveillance work and is considering to recommend the transfer of the organism to a different Annex.

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led measures for the conservation of indigenous bee subspecies.

[36] WRITTEN QUESTION E-3770/98 (see *Official Journal C 325 , 12/11/1999 p. 0024).*

Directive 2000/29 provides for a Community "plant-health control" financial contribution to cover expenditure relating directly to the measures taken by a Member State or to planned measures for the eradication or, if impossible, containment of harmful organisms. The system combines elements of solidarity and responsibility. The Community reimburses money spent by Member States to control harmful organisms in areas not previously infested, but the Commission also investigates the cause of the infestation. If evidence is found of negligence or inadequate implementation, the Member State may be required to reimburse Commission expenditure and/or as appropriate, to compensate other Member States affected by the infestation.

3.3.2. Animal and fish diseases

Member States must notify the Commission and other Member States of any outbreak of a listed animal disease. Where this poses a serious threat to human or animal health in the EU, the Commission may ban movements from the affected Member State to other Member States. The Food and Veterinary Office carries out an inspection on the ground and advises on the necessary measures. A risk-based approach is used to target controls.

Member States may draw up voluntary or compulsory control or monitoring programmes for Annex B diseases. These must specify the geographical area in which the programme is to be implemented and the non-discriminatory nature of trade in the territory of the Member State concerned with respect to intra-Community trade. Where a Member State considers that (part of) its territory is free from an Annex B disease, it must present appropriate supporting documentation to the Commission, which is assessed by the Standing Veterinary Committee. Where the Commission approves a programme approved by a Member State, it may define any additional general or specific guarantees that may be required in trade. Pending a decision, the Member State may maintain in its trade dealings the relevant requirements needed in order to maintain its disease-free status.[37]

The Commission adopts an annual list of disease eradication programmes that qualify for a financial contribution from the EU. Member State experts are involved in technical evaluation of the programmes submitted for approval by the Commission.

Community-level measures are also in place to control outbreaks of fish disease.[38] Territory is divided into zones and movement from infected to clean zones is prohibited (see Box). The list of zones is regularly updated.

> Infectious salmon anaemia (ISA) has occurred in Norway since 1988. It was considered exotic to the Community until an outbreak in Scotland in 1998 when it was detected in both farmed and wild populations. Community measures were adopted to prevent the spread of the disease, eradicate the agent from infected farms and ensure surveillance. Affected Member States submitted schemes to the Standing Veterinary Committee for the withdrawal of all fish in farms situated in their territory and infected with ISA. No further outbreaks have been reported in Scotland recently and experts consider it possible to eradicate the disease from Scottish fish farms.

[37] Arts.14-15 and 26, Directive 92/65/EEC.
[38] e.g. Council Directive 93/53/EEC of 24 June 1993, introducing minimum Community measures for the control of certain fish diseases.

3.3.3. Species that threaten habitats and species of Community interest

There are no control or eradication requirements in the Wildlife Trade Regulation or the Birds and Habitats Directives.

For species and habitats of Community interest, a control requirement is implicit in the Habitats Directive. Member States must take appropriate conservation, planning and management measures in Special Areas of Conservation that correspond to their ecological requirements (Art.6). This means that where introduced species have significant negative effects on those habitats or species, appropriate avoidance action should be taken.

The Community provides financial support, through the LIFE co-funding mechanism, for two categories of control and eradication projects proposed by Member States:

- control/eradication as a generic component of site management (e.g. many woodland conservation projects provide for control of invasives such as rhododrendrons);

- control/eradication as a primary project objective (see Box).

Examples of LIFE co-financing for control and eradication projects

- **Italy: forest restoration, Conero Regional Nature Park**

Impacts of Aleppo pine introduced into the Park include fire risks and associated parasites. Restoration measures for the native holm oak forest include progressive elimination of the pines and planting of indigenous species to restore the original characteristic composition of these riparian forests and prevent soil erosion (LIFE98 NAT/IT/005089: 1998-2003)

- **Sweden: restoration of alvar-habitats at Stora Karlsö**

Alien plants and encroaching scrub will be cleared from 200 ha (85%) of the island's grassland and alvar habitats. After restoration, a long-term management plan provides for the reestablishment of sheep grazing and appropriate use of Community agri-environment measures (LIFE00 NAT/S/007118: 2000-2005).

- **Mediterranean: research and containment for *Caulerpa taxifolia***

Two LIFE projects funded mapping of infested areas, experimental control techniques and design of a possible containment strategy. They involved French, Spanish and Italian partners and aimed to raise awareness of government agencies, private stakeholders and the public. The projects also engaged southern Mediterranean countries likely to be affected by the algae's spread. The Community has co-funded expert symposia and supported relevant work under the Barcelona Convention which covers the whole Mediterranean Basin. Site-specific projects to protect and restore priority habitat types have also been funded (e.g. for Posidonia beds, Balearic Islands (LIFE00 NAT/E/007303)).

- **Island projects (Autonomous Regions, Portugal)**

LIFE funding has supported control/eradication on Selvagem Grande Island (*Edychium gardnerianium*, *Nicotiana glauca*), Deserta Grande Island (rabbit, goat) and Madeira (*Acer pseudoplatanus*, rats, cats). The NGO, BirdLife International, is a partner in the programme to eradicate rats and cats from Madeira.

3.4 Prevention beyond Community borders

The Community recognises that it may be a source of species that may harm components of biodiversity when translocated outside the Community.

In the area of plant and animal health, exporting Member States must comply with the import regulations of the country of import. Bilateral sanitary and phytosanitary agreements are also in place with certain countries. The Directorate-General for Development and the EuropeAid Co-operation Office provide trade-related technical and financial assistance to developing countries to build capacity for improved plant, animal and food health quarantine systems, monitoring and control measures.

The Wildlife Trade Regulations cover exports and re-exports, but not with regard to the potential invasiveness of a particular species. Exports are outside the scope of the Birds and Habitats Directives.

Community funding to developing countries may cover capacity-building for IAS prevention and management. Under thematic budget line B7-6200 for Environment and Tropical Forests in Developing Countries, funds are available to facilitate implementation of multilateral environmental agreements. Projects are selected on the basis of guidelines and priorities established by DG Development. The budget orientations for 2002-3 are expected to include support for the development of national biodiversity action plans and strategies and for the CBD's expanded Work Programme on Forest Biological Diversity (adopted in 2002). This Programme identifies IAS prevention and mitigation in forest ecosystems as a priority area.

3.5 Horizontal measures and tools

3.5.1. Precautionary principle

This is a fundamental principle of Community policy on the environment laid out in Article 174 of the EC Treaty. The Commission recognises that the precautionary principle is evolving in different policy areas and has sought to provide clarity and consistency in its application.[39] It calls for the principle to be placed within a structured approach to risk analysis, which consists of three inter-related principles: the scientific assessment of risk, the management of risk and the communication of risk. The Commission promotes general international acceptance of risk analysis, including in discussions with WTO-SPS and international standard-setting bodies.

The Commission's Communication establishes guidelines to avoid inappropriate use of the principle and to prevent it being used as a disguised form of trade protectionism. For the principle to be relevant, two pre-conditions must be in place:

- potentially dangerous effects deriving from a phenomenon, product or process have been identified; and
- scientific evaluation does not allow the risk to be determined with sufficient certainty.

[39] See Communication from the Commission on the Precautionary Principle (COM(2000)1 dated 2.2.2000; address by the Commissioner for Health and Consumer Protection, 9 November 2000.

Whilst risk managers decide whether to invoke the principle, judging what is an acceptable level of risk is a political responsibility. The Commission recognises that zero risk is rarely if ever found: in virtually all cases, the task is to manage and control risk.

3.5.2. Research

The Community does not have a specific research programme on alien species, although different programmes fund projects on various IAS issues (see Appendix 1). These projects involve a mix of partners from different Member States and sectors. Little work has been done on economic evaluation of IAS impacts.

Research to date has not had a strong pathway focus. Two known pathways have been addressed: ballast water movements in shipping, and aquaculture. For the latter, the Community has funded joint research with industry to develop accessible management tools and best practice guidelines (see Appendix 1).

In December 2000, the European Platform for Biodiversity Research Strategy discussed orientation and priorities for a European strategy in the biology of invasions. It emphasised the need for inter-disciplinary research and international collaboration and drew up an indicative list of topics of strategic importance (for details see http://bim2000.cefe.cnrs-mop.fr/default.htm) The three priority issues identified for European research are:

- development of techniques to predict invasiveness;
- improvement of monitoring, detection, prevention and control techniques; and
- multi-disciplinary scientific support for appropriate policy on prevention, management for control and legislation, public awareness and information

There has been little formal follow-up to these recommendations (but see 4.1.1).

The Community's multi-annual Framework Programme for Research (FPR) helps to organise and financially support cooperation between universities, research centres and industries. The Sixth FPR, for which work programmes are currently being developed, lists *Global change: biodiversity and ecosystems* as a priority thematic area of research (FP6 1.6.3). In June 2002, scientists from research institutions throughout Europe proposed the development of a Network of Excellence on Invasive Alien Species as a possible research action under this thematic area.

3.5.3. Information gathering and dissemination

The European Environment Agency is responsible for environmental information exchange and dissemination and plays a key role in awareness-raising. It hosts the European Community Biodiversity Clearing-House Mechanism (EC-CHM), a regional CHM established in support of the CBD. This aims to make biodiversity-related information of Community institutions more easily accessible not only to these institutions but also to Member States and the public.

The EC-CHM has links to national CHMs, European organisations and networks relevant to biodiversity issues and the Global Biodiversity Information Facility. It is also linked to databases on nature, hunting, tourism, forestry, agriculture, land cover, fisheries and climate change. There are currently 19 linked nature conservation databases, including the EU Wildlife Trade Reference Database, LIFE databases and the World Conservation Monitoring Centre's protected area database.

The EEA collaborates with the European Topic Centre on Nature Protection and Biodiversity which maintains and develops EUNIS.[40] The EUNIS species module was initially focused on data on protected and rare species in Europe[41], but is being progressively enriched. Recently interlinked databases include:

- *FISHBASE* (includes information on distribution, ecology, ecosystems for 2251 taxa, of which 751 are freshwater species (regarding synonymy, those 2251 taxa are concerned by more than 14100 different names);

- The Atlas Florae Europaeae Database (provides information on taxonomy and distribution on more than 40700 species names and more than 16000 geographical distribution of flora);

- the ongoing project *Euromed+Plantbase* will produce additional and complementary information on European Flora.

EUNIS currently has little coverage of introduced species in Europe. The one project under way covers introduced fish species: it takes the form of statistical presentation of species by country, data and purpose of introduction.

The EEA Annual Work Programme 2001 provides for continued implementation and integration of databases. The Topic Centre intends to link EUNIS to the CBD/GISP system of interoperable databases and also to subregional or specialised databases and research networks in Europe (see Appendix 2).

The EEA is defining a core set of indicators to monitor and guide policies. The Topic Centre is responsible for the core set of biodiversity indicators, which will cover monitoring of species. These indicators should preferably facilitate monitoring and data compilation on introduced species.

The EEA is also strengthening contacts with relevant Commission services and other users to ensure its outputs are policy-relevant.

3.5.4. Assessment tools

Community legislation on environmental impact assessment (EIA) covers several activities known to present or which could present IAS-related risks. For example, Member States have to decide whether an intensive fish farm should undergo an EIA by reason of its size or nature.[42] Community funding for intensive aquaculture projects is subject to a satisfactory EIA.

The Strategic Environment Assessment Directive[43] does not mention IAS but it cross-references the CBD (Art.6.2) and applies to many sectors that can provide pathways. It mandates assessment for plans and programmes prepared for agriculture, forestry, fisheries, transport and tourism and for those which require an assessment under the Habitats Directive in view of their

[40] EEA Information System on Nature in Europe. It consists of data modules on sites, habitats and species.
[41] One of the Topic Centre's partner organisations is the Bern Convention.
[42] Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment as amended by Council Directive 97/11/EC of 3 March 1997.
[43] Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment.

likely effect on sites. Information to be provided in a SEA includes likely effects of the proposed plan or programme on biodiversity, fauna, flora, soil, water and landscape, amongst others, and the interrelationship between the above factors. The Directive sets out a procedure for cross-border consultation concerning possible transboundary impacts (Art.7).

The Commission is developing a Sustainability Impact Assessment (SIA) system to ensure that development of major policies takes account of the three dimensions of sustainable development (economic, environmental, social)[44]. The Directorate-General for Trade has begun to undertake SIAs for trade policy negotiations. Issues related to biosecurity and IAS need to be given full consideration within this framework.

Existing risk assessment capacity is concentrated mainly at the national level. However, the new European Food Safety Authority[45] has a mandate to provide scientific risk assessment on all matters relating directly or indirectly to food safety, including animal and plant health. It will also have strong risk communication responsibilities.

3.5.5. Liability

At present, there are no Community rules on liability for damage to biodiversity, including damage generated by an invasive alien species.

In 2002, the Commission proposed a regime for environmental liability with regard to the prevention and remedying of environmental damage.[46] The proposed Directive would cover damage to biodiversity that is legally protected at the Community and/or national level and to waters covered by the Water Framework Directive. In line with the 'polluter pays' principle, the operator who has caused actual or threatened damage would be required to bear the cost associated with such measures, including for restoration measures. Provision is made for cost allocation where several operators are shown to be responsible (Art.10).

"Biodiversity damage" does not include the adverse effects of activities authorised by relevant authorities pursuant to Art.6(3) and (4) of the Habitats Directive or under national habitat and species conservation legislation, provided that national provisions offer equivalent guarantees, including in terms of compensatory measures required.

Liability would either be 'strict' (for defined hazardous activities) or based on fault/negligence (other activities).

As currently drafted, the proposed Directive does not include IAS pathway activities in the list of hazardous activities set out in Annex I which are subject to strict liability rules. The Annex is mainly concerned with installations covered by Community pollution control legislation; waste management operations; and manufacture, use, transport and storage of a range of defined dangerous substances or products. However, it specifically applies to the contained use, transport and release of genetically modified organisms.[47]

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[44] See COM(2002) 276 of 5 June 2002

[45] Established under Regulation 178/2002 of 28 January 2002.

[46] COM(2002)17 final, published 23 January 2002.

[47] Respectively regulated by Council Directive 90/219/EEC of 23 April 1990 on the contained use of genetically modified micro-organisms and by Directive 2001/18/EC of 12 April 2001 on the deliberate release into the environment of genetically modified organisms.

The proposed Directive is potentially applicable to IAS-related damage resulting from an operator's fault or negligence. However, several conditions need to be satisfied:

- it does not cover damage caused by an emission or event allowed in applicable laws or regulations, or in the permit or authorisation issued to the operator (Art.9(1)(c));
- it does not cover activities which were not considered harmful according to the state of scientific and technical knowledge at the time when the activity took place (Art.9(1)(d));
- neither of these exceptions apply where an operator has been negligent (Art.9(2));
- it must be proved that the operator is at fault or has been negligent before s/he can be required to bear the cost of preventive or restorative measures (Art.8);
- it does not apply to damage or to an imminent threat of such damage caused by pollution of a widespread diffuse character where it is impossible to establish a causal link between the damage and the activities of certain individual operators (Art.3(6)).
- it applies only to professional activities (i.e. it would not cover introductions for personal purposes by tourists and other individuals).

4. Evolution of EC policy on invasive alien species

4.1 Policy instruments within the Community

Policies developed over the last four years give increasing prominence to IAS issues.

The Community Biodiversity Strategy (COM(98)42) notes that

"the presence or introduction of alien species or subspecies can potentially cause imbalances and changes to ecosystems. It can have potentially irreversible impacts, by hybridisation or competition, on native components of biodiversity."

It recommends that consistent with the precautionary principle, the Community should take measures to prevent alien species harming ecosystems, priority species or the habitat they depend on and establish measures to control, manage and, wherever possible, remove the risks that they pose.

The Strategy is partly implemented through sectoral Biodiversity Action Plans that are complementary to national strategies and measures. The four Plans adopted to date each reference IAS in specific sectoral contexts.

4.1.1. Biodiversity Action Plan on Conservation of Natural Resources

The Plan[48] recognises that IAS may affect the wider environment, not just designated habitats and species, and may negatively impact on genetic resources. It supports development of solutions at international level (§105) and provides for two specific actions (§104):

- updating the list of alien species known to pose an ecological threat to native flora and fauna, habitats and ecosystems within the EU under the Wildlife Trade Regulation. This list should be included in the EC Clearing House Mechanism under the CBD;

- facilitating the exchange of information, through the Clearing House Mechanism, regarding existing legislation, guidelines and experience, including on measures taken to prevent the introduction of, to control or to eradicate those alien invasive species.

Development of a European list is being taken forward by BioPlatform, a thematic network acting in support of the European Platform for Biodiversity Research Strategy. This will build on existing national lists but as these are often incomplete or still under development, progress has been slow.

4.1.2. Biodiversity Action Plan for Agriculture

The Plan[49] identifies the "uncontrolled spread of alien and wild species" as a possible result of agricultural practices that impact on biodiversity (§24) and prioritises implementation of measures to prevent the abundance and spreading of non-native species introduced and favoured by agriculture (§33).

It does not set out specific IAS-related measures.[50] However, the proposed actions to prevent displacement of genetic diversity, to maintain or restore stability and diversity in managed ecosystems and to increase resistance to pests and diseases are important components of a comprehensive approach to IAS prevention and mitigation.

The Plan specifies agricultural practices that may qualify for Community support.[51] Member States may develop measures to cover a range of actions conducive to prevention and improved control of IAS. These could include a preference for native species and local varieties in new planting, measures to protect and improve the ecological stability of forests, maintenance or restoration of natural corridors and linear elements to reduce landscape fragmentation and management practices to promote the conservation or re-establishment of native species of insects, birds and small mammals.

[48] COM(2001)162 Final, Volume II (Brussels, 27 March 2001).
[49] COM(2001)162 Final, Volume III (Brussels, 27 March 2001).
[50] NB. When the Plan was drafted, animal/plant health was handled by the Directorate-General for Agriculture: it has since been transferred to a new Directorate for Health and Consumer Protection (SANCO: see Appendix I).
[51] E.g. under Council Regulation (EC) No. 1257/99 on Support for Rural Development: this requires Member States to prepare Rural Development Plans which are subject to the Commission's approval.

4.1.3. Biodiversity Action Plan for Fisheries

The Action Plan[52] calls for the application of precautionary measures in the use, containment and transport of farmed organisms, the integration of aquaculture into catchment and coastal area management, and EIA procedures governing location of farming operations. Action IX identifies three main measures to limit introduction of new species and secure animal health:

- thorough evaluation of the potential impact of new non-indigenous species to aquatic aquaculture: promotion of the application of the ICES[53] and EIFAC[54] Codes of practice;
- development of guidelines on containment of farmed fish in aquaculture;
- review of existing Community aquatic animal health legislation with a view to ensuring its updating to assist the maintenance of biodiversity in the aquatic environment.

The Action Plan notes the possible need to update the ICES list of diseases for monitoring, to ensure that it is broad enough to recognise the geographic variation within Europe and to minimise transfer of disease and pests with aquaculture species which can otherwise be freely moved within the Community. This aspect may assume greater importance with the enlargement of the Community, as several accession countries have important inland fisheries.

The Directorate-General for Fisheries maintains close links with the Federation of European Aquaculture Producers (FEAP) which represents Member States and some accession countries. FEAP is the focal point for industry representation to the Commission, and sits on the Working Group on Aquaculture created under the Commission's Advisory Committee on Fisheries and Aquaculture. The FEAP Code of Conduct for European Aquaculture, adopted in July 2000, addresses IAS issues.

The Community is a member of the FAO European Inland Fisheries Advisory Commission and works closely with the International Council for the Exploration of the Sea. It is party to the North Atlantic Salmon Conservation Organisation (NASCO) and contributed to an action plan for the application of a precautionary approach to salmon management. In February 2000, a NASCO liaison group was established as a forum for discussion between governments and industry on both sides of the Atlantic. It set up a working group, currently chaired by a representative of the Commission, to develop guidelines on containment of farmed salmon. Two meetings have been held to date.

4.1.4. Biodiversity Action Plan for Economic and Development Cooperation

This Plan[55] affirms that alien species introductions are a direct cause of biodiversity loss (§2). Several proposed Actions, though not focused on IAS, provide a basis for integrating consideration of IAS issues into development cooperation programmes. These include :

- support for national biodiversity strategy development;
- integration of biodiversity issues into sectoral development programmes; and

[52] COM(2001)162 Final, Volume IV (Brussels, 27 March 2001).
[53] Internatonal Council for the Exploration of the Sea. *Code of practice on the introduction and transfer of marine organisms* (1994 and any future revisions).
[54] FAO European Inland Fisheries Advisory Commission. *Codes of practice and manual of procedures for consideration of introductions and transfers of marine and freshwater organisms* (1989).
[55] COM(2001)162 Final, Volume V (Brussels, 27 March 2001).

- institutional capacity-building to ensure that biodiversity issues are included in EIA and SEA procedures.

However, the Plan notes that the Commission has limited technical capacity to deal with biodiversity issues in development and economic cooperation.

4.1.5. Sixth Environmental Action Programme (2001-2010)

The Programme[56] acknowledges concern about the potential risks to biodiversity from undesired and unforeseen consequences of the introduction of certain non-native species which are not well-suited to the local conditions. It notes that introduction of non-native (alloctone) species in new marine environments can also give rise to environmental stress.

The Programme proposes cross-cutting initiatives that provide an opportunity to integrate IAS measures more systematically into Community policy. These initiatives include:

- integration of landscape protection and restoration into agriculture and regional policy;
- development of good forest management under rural development plans;
- development of a marine protection strategy; and
- implementation of Integrated Coastal Zone Management.

4.1.6. Strategy for Sustainable Development

The Community's Strategy aims to halt biodiversity decline by 2010. In March 2002, the European Council reviewed its implementation and gave priority status to developing the necessary additional measures, such as the prevention, control and eradication of invasive alien species which can cause serious damage to biological diversity.

[56] Decision 1600/2002/EC of the EP and the Council of 22 July 2002.

4.2 Cooperation with International and European fora

4.2.1. Convention on Biological Diversity

In March 2002, the European Council (Environment) adopted conclusions on Invasive Alien Species in preparation for COP6.[57] It endorsed the ongoing work within the CBD framework, for enhanced implementation of Art.8(h) and supported:

- the adoption of strong and effective Guiding Principles;
- agreement on standardised definitions and terminology, including a definition of IAS that covered subspecies and lower taxonomic categories including described genotypes, with distinct biological features;
- further work to identify specific gaps in the relevant international regulatory framework;
- adequate assessment of real and potential threats to biodiversity and application of the precautionary principle, including adequate risk assessment procedures for intentional introductions and appropriate measures for unintentional introductions to prevent or mitigate their adverse effects on biodiversity;
- for intentional introductions, placing the burden of proof for the safety of ecosystems, habitats or species with the person/institution responsible for the introduction;
- for unintentional introductions, establishment of appropriate mechanisms for known pathway activities and of practical and effective preventive/control systems for possible pathways;
- clearer definition of responsibilities with regard to non-natural biological invasions:
  - countries at the origin of an invasion should be aware of their responsibilities and cooperate to ensure the success of later eradication measures;
  - Parties and countries where an invasion first occurs have the key responsibility to prevent the spread both within and beyond national jurisdiction;
  - relevant information should be provided using available mechanisms such as the Biodiversity Clearing-House Mechanism, communication structures and/or “early warning systems”;
- the undertaking of feasibility studies and trial projects for mitigation, eradication, containment or control measures and sharing this experience with other countries where the same IAS have expanded;
- capacity building in relation to IAS, especially from the legal, administrative and scientific perspective, and incorporation of IAS issues in development cooperation programmes.

The Council urged further cooperation between ongoing processes on IAS and the strong involvement of specified conventions, processes and organisations.

[57] Council Conclusions of 4 March: 6592/02 (Presse 47 - G) 24.

At COP VI, the Community participated actively in the negotiation and adoption of Decision VI/23. It was a member of the Contact Group established to facilitate the finalisation of the Guiding Principles for the Implementation of Article 8(h), Invasive Alien Species (Guiding Principles) and supported the adoption of strong principles, particularly with regard to precaution, the role of states, border control and quarantine measures and intentional introductions.

At its meeting on 25 June 2002, the European Council (Environment) stressed in its Conclusions the importance of moving forward the Decisions adopted in The Hague and, in particular, its commitment to the effective implementation of the Guiding Principles. It emphasised its support for the content of the Guiding Principles, including the provisions on the application of the precautionary principle. The Commission and Member States were urged to incorporate relevant aspects of the Guiding Principles into their polices, programmes, strategies and action plans.

4.2.2. Other global fora

Consistent with Decision VI/23, the Community works with a range of international bodies concerned with IAS-related issues. These include:

- the secretariats of biodiversity-related organisations such as CITES[58] and the Ramsar Convention on Wetlands;[59]

- the Global Invasive Species Programme (GISP). During GISP Phase I, the Community funded the development of technical guidance to support capacity-building.[60] The Commission was represented (Directorate-General for Research) at the GISP-led regional workshop on *Management of Invasive Alien Species: Forging Cooperation in the Baltic/Nordic Region* (Copenhagen, Denmark, May 2001);

- in the area of plant protection and risk assessment standards, the International Plant Protection Convention (IPPC)[61] and the European and Mediterranean Plant Protection Organisation (EPPO). A joint EU-EPPO coordination meeting is held before each meeting of the IPPC Interim Commission on Phytosanitary Measures, hosted by the FAO;

- for animal health, the Organisation International des Epizooties;

- the World Trade Organisation, which administers the 1995 Agreement on the Application of Sanitary and Phytosanitary Measures (SPS). SPS meetings are attended by representatives

[58] Decision 11.64 on trade in alien species calls for recognition that non-indigenous species can pose significant threats to biodiversity, and that fauna and flora species in commercial trade are likely to be introduced to new habitat as a result of international trade. It urges Parties to consider the problems of invasive species when developing national legislation and regulations that deal with the trade in live animals or plants.

[59] Resolution VII/14 on *Invasive Species and Wetlands* (1999) urges Parties, where necessary, to adopt legislation or programmes to prevent introduction of "new and environmentally dangerous alien species" into their jurisdiction and to develop capacity for identifying such alien species, including those tested for agricultural and horticultural use.

[60] Shine, C, N. Williams and L. Gundling. *Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species* (IUCN Environmental Policy and Law Paper. No.40. 2000).

[61] The Community is not a party to the IPPC 1951 as this does not provide for accession by Regional Economic Integration Organisations. The revised IPPC (1997) provides for accession by REIIOs but has not yet entered into force. All Member States are party to the IPPC

of the Directorates-General for Trade and for Health and Consumer Protection, and preceded by coordination meetings with Member States;

- for aviation pathways, the International Civil Aviation Organisation.[62] All Member States are party to ICAO. The Community is currently going through accession procedures;

- for shipping vectors, the International Maritime Organisation (see Box).

The Community concluded an agreement of cooperation with the International Maritime Organization (IMO) in 1974. It participates in the ongoing work of the IMO Maritime Environmental Protection Committee (MEPC) to develop internationally standardised procedures for addressing environmental risks associated with modern shipping. Two instruments are under development:

- draft International Convention for the Control and Management of Ships' Ballast Water and Sediments. The MEPC recently approved a technical Circular on design measures for ballast water and sediment options in new ships (MEPC 47th session, London 4-8 March 2002);

- draft International Convention on the Control of Harmful Anti-Fouling Systems.

The Community does not have legislation to regulate the discharge of ballast water, though it has funded research on technical aspects (see Appendix 1). At least one Member State (Portugal) has legislation requiring compliance with the existing IMO voluntary guidelines on ballast water management.

The draft Marine Strategy (see 4.1.5) may contain specific measures to address marine pathways, both generally and for ballast water management.

The Community is party to the Convention on the Conservation of European Wildlife and Natural Habitats. The Bern Convention's Standing Committee has adopted detailed recommendations with regard to:

- introduction of organisms belonging to non-native species into the environment;[63]

- non-native terrestrial vertebrates (assessment of potential threats to biodiversity in and beyond national territory; regulation or even prohibition of deliberate introduction and trade in national territory; monitoring of introduced populations; eradication) [64]; and

- eradication/control of named IAS (*Caulerpa taxifolia*, *Oxyura jamaicensis*).[65]

[62]The ICAO General Assembly (Resolution A33-18, adopted at the 33rd Session, Montreal 2001) acknowledges that civil air transportation represents a potential pathway for IAS introduction. Contracting States are urged to take mutually supportive efforts to reduce the risk of introducing potentially invasive alien species via this pathway to areas outside their natural range. The ICAO Council will continue to work with appropriate concerned organisations to identify possible steps to reduce introduction risks. As there is a shortage of system-wide data for this pathway, the ICAO launched a survey of Contracting States in 2002.

[63] Recommendation No. 57 (1997).

[64]Recommendation on the Eradication of Non-Native Terrestrial Vertebrates (No.77, 1999).

[65]Recommendation on controlling proliferation of *Caulerpa taxifolia* in the Mediterranean (No. 45, 1995); Recommendation on the conservation of the White-headed Duck (*Oxyura leucocephala*) (No. 61, 1997).

In 1992, the Committee established a Group of Experts on the Legal Aspects on Introduction and Re-introduction of Wildlife Species. Since 2001, this Group has been developing elements for a European Strategy on IAS.[66] The Bern Convention is also organising a Workshop on Invasive Alien Species on European Islands and Evolutionary Ecosystems in which the Commission will participate.[67]

Within the framework of the Pan-European Biological and Landscape Diversity Strategy, the Community participated in the Intergovernmental Conference "Biodiversity for Europe" (Budapest, February 2002). This developed recommendations for IAS prevention and management at the pan-European level, including the need to launch awareness-raising initiatives and to strengthen preventive measures.

The Community is party to three regional seas instruments that require measures to regulate or manage intentional and unintentional introductions of alien species and genetically modified organisms:

- the Convention for the Protection of the Marine Environment of the North-East Atlantic 1992. The OSPAR Strategy on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area provides for assessment of the introduction of alien or genetically modified species, whether deliberately or unintentionally, as a human activity likely to have an actual or potential adverse effect on certain species and habitats or on ecological processes;

- the Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention). This is administered by HELCOM, which provides support to the Baltic Sea Alien Species Database (see Appendix 2); and

- the Barcelona Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean. Parties are developing a Strategic Action Plan for Biodiversity in the Mediterranean Region which will address IAS issues.

The Community is also a signatory to the Mediterranean Wetland Strategy and Action Plan (Venice 1996) which recommends a prohibition on introductions to wetlands and promotes control measures for already introduced alien species.

[66] T-PVS(2001)12: *Contribution to a European Strategy on Invasive Alien Species*, prepared with the European Section of the IUCN Invasive Species Specialist Group: the Strategy will be further developed during 2002-3. This initiative has been welcomed by the CBD COP (Decision VI/23, §21).
[67] Horta (Açores, Portugal) , 10-12 October 2002.

APPENDICES

Appendix 1 Community-funded research projects and partnerships relevant to invasive alien species

The CORDIS database records five research projects with components relevant to IAS, funded under a range of Community programmes.

1. **Biodiversity assessment tools (2001-3)** (EESD[68]: project reference EVK2-1999-00041)

Development of indicators, or 'biodiversity assessment tools', to provide early warning of changes in biodiversity of terrestrial ecosystems in Europe, particularly in relation to possible threats to biodiversity (such as pollution and alien species), and to measure such changes. Test the proposed indicators across land-use gradients in several Member States, from forests to intensively managed agricultural areas, and measure the impact of land-use change on selected major components of biodiversity, including earthworms, ground-beetles, butterflies, plants, lichens and birds.

2. **Giant Hogweed (*Heracleum mantegazzianum*) a pernicious invasive weed: developing a sustainable strategy for alien invasive plant management in Europe** (begun 2001) (EESD: project reference EVK2-2001-00128)

Use of knowledge of the taxonomy, genetics, biology and ecology of *H. mantegazzianum* to:

- develop simple, practical and environmentally safe management methods to reduce the abundance and prevent further spread of this species, and disseminate this knowledge to practitioners across Europe;
- search for effective natural enemies with a view to establishing a sustainable method to control this species; and
- develop concepts for managing other similar alien invasive plant species.

3. **EPIDEMIE (Exotic Plant Invasion Deleterious Effects on Mediterranean Islands**) (begun 2000) (EESD: project reference EVK2-CT 2000-00074)

Simulation models will integrate regional surveys and local ecological studies to produce clear insights into the ecosystem vulnerability. The project will provide guidelines for the sustainable management of Mediterranean ecosystems in order to prevent the deleterious impact of exotic plant invasions.

3. **Freshwater crayfish and the crayfish plague fungus: disease diagnosis and effects of fungal infection on immunity and reproduction** (1997-2000) (FAIR[69]: project reference FAIR973660)

Project objectives are to:

- design molecular tools to detect the crayfish plague fungus;

[68] Programme for research, technological development and demonstration on Energy, Environment and Sustainable Development, 1998-2002.
[69] Fisheries Agriculture and AgroIndustrial Research.

- design tools to identify, follow and trace origin of infection of crayfish parasites primarily crayfish plague;

- distinguish between resistant and non-resistant populations and individuals with the aim of breeding resistant native European crayfish;

- design tools which can be used to determine health status (immune status) of farmed and wild crayfish so that stress conditions can be avoided;

- provide knowledge to possibly enhance the efficiency of the immune system;

- determine the association between the immune system and reproduction to aid in the development of a better broadstock.

4. **Impact of invasive grass species on the structure, function and sustainable use of coastal & inland sand dune ecosystems in Southern Africa** (1997-2000) (INCO[70]: Project reference: IC18970145)

Main project objectives were to:

- investigate the current, and likely future, impact of *A. arenaria* on South African dune systems by studying the natural behaviour of the introduced sand stabilising dune grass;

- compare the effect of soil-borne pathogens and arbuscular mycorrhizal fungi on vegetation succession in temperate European sand dunes with coastal and inland sand dunes in Southern Africa and examine the genetic structure of the invasive plant species;

- provide management prescriptions for the wise use and, if appropriate, control of A. arenaria to maximise its beneficial properties for coast protection without a concomitant threat to ecosystem function, biodiversity and wildlife;

- provide management procedures for the wise use and, if appropriate, control of the naturally invading tropical weed grass *Cenchrus biflorus* to maximise its beneficial properties for re-establishment of vegetation in over-exploited areas of Kalahari sand dune savannah.

5. **Testing Monitoring Systems for Risk Assessment of harmful Introductions by Ships to European Waters** (1997-1999) (jointly funded by INCO (project reference IC20970015) and MAST 3[71] (project reference MAS3970111).

The first project, an EU Concerted Action Study, aimed to assess, compare and harmonise various sampling methods of ballast water. It involved European scientists working on ballast water problems in a joint effort to develop reliable and intercalibrated methodologies for monitoring (intercontinentally and regionally) the continuous and changing rate of transmission of harmful alien species via ships' traffic, thereby providing a tool for risk assessment and

[70] Specific research, technological development and demonstration programme in the field of cooperation with third countries and international organizations 1994-1998.
[71] Specific programme of research and technological development in the field of marine science and technology, 1994-1998.

environmental management. Case histories of selected introduced species and their major pathways (inventories of various types of transmissions) were compiled to assist in understanding the requirements for the development of adequate mitigation (treatment) techniques. Study partners included five Member States (Finland, Germany, Ireland, Sweden, United Kingdom), one accession country (Lithuania), IMO, ICES WGITMO and ICES/IOC/IMO SGBWS, and external experts.

The Concerted Action identified research gaps and recommended that a targeted research programme be formulated. There has not yet been funding for a follow-up study.

The Community is also funding a project for **Sustainable control of the horse chestnut leaf-miner** (*Cameraria ohridella)* under the 5th Framework Programme for Research. The CONTROCAM project involves Germany, Italy, Switzerland, Austria, Czech Republic, France, Greece and Bulgaria. Its aims are to:

- assess the present and potential future impact of the moth on horse-chestnut trees, both in urban areas and in natural forests;
- investigate the potential of different environmentally safe and sustainable control methods including pheromone-based monitoring and control, biological control and cultural methods;
- study. the epidemiology of the moth;
- develop and disseminate the basic structures of an integrated pest management system for *C. ohridella* that will also be applicable across all affected areas of Europe;
- use the project as a generic model for developing sound approaches to the study and control of exotic invasive pests in Europe.

The Community supports aquaculture research through:

- **Aquaflow,** a network of leading aquaculture institutions in Europe (initiated in 1998 (project reference FAIR-CT97-3837) and now Concerted Action (Q5CA-2000-30105)). Aquaflow is co-ordinated by the European Aquaculture Society and its management partner is the Federation of European Aquaculture Producers (FEAP).The network aims to improve communication and exchange of expertise between scientists and producers and disseminates technical leaflets across 19 European countries to an estimated 150,000 aquaculture SME end-users. Examples include *Guidelines for Best Environmental Practice (*TL2001-007), *Impacts of introduced and escaped fish on local populations* (TL2000-083) and Biosecurity and Ecopathology (TL2001-030).

- **MARAQUA (Monitoring and Regulation of Marine Aquaculture)** (1999-2001) (project reference FAIR PL98-4300). This Concerted Action did not involve new research, but concentrated instead on a review of existing information and the development of Scientific Guidelines for Best Environmental Practice in relation to the regulation, control and monitoring of marine aquaculture in Europe. The project aims to facilitate the establishment of a European Network to bring together scientists, producers, regulators and voluntary organisations, in an effort to co-ordinate and provide means for the efficient exchange and review of information.

The Commission is currently funding a study of the application of the Wildlife Trade Regulations in relation to species which form an ecological threat to EU fauna and flora (project reference B4-3040/2001/326066/MAR/E.3) (see 3.1.4).

LIFE funding has supported projects that generate data on certain invasives e.g. *Caulerpa taxifolia* has been the focus of two European research programmes (The spread of the tropical green alga *Caulerpa taxifolia* in the Mediterranean, 1992–1994; Control of the expansion of *C. taxifolia* in the Mediterranean, 1996–1999).

LIFE has also provided funding for assessment of projects that could present risks of unintentional transfer e.g. the *Study contract to assess a planned water transfer between the Douro and Tejo River Basins*, Portugal, in the context of the Habitats Directive (reference ENV.B.2/ETU/2001/0118r) assessed the likelihood that fish translocated to basins in which they are not currently present might hybridise with other species.

Appendix 2 Subregional networks and databases on invasive alien species

Some non-exhaustive examples of subregional information tools are given below.

Baltic Sea cooperation involves four EU Member States (Germany, Denmark, Sweden and Finland). The *Baltic Sea Alien Species Database* has been established by the Baltic Marine Biologists Working Group on Non-indigenous Estuarine and Marine Organisms **(**NEMOs**)** http://www.ku.lt/nemo/mainnemo.htm. It is intended to operate as a regional node in the future Global Information System for Invasive Species.

The Nordic Council of Ministers (Norway, Sweden, Denmark, Finland and Iceland) established a working group which produced a joint report, *Introduced Species in the Nordic Countries* (2001: available through the CBD Clearing House Mechanism). This includes 17 case studies on IAS problems in shared marine, terrestrial and limnic environments. The Nordic Network on Introduced Species (NNIS) has now been established: it brings together scientists and administrators and provides accessible information on introduced species in the Nordic countries and links to other sites (http://www.skovognaturstyrelsen.dk/natur/nnis).

The creation of a Baltic/Nordic Alien Species Task Force as a forum within existing structures for regional cooperation was recommended by the regional workshop on Management of Invasive Alien Species: Forging Cooperation in the Baltic/Nordic Region (Copenhagen, May 2001).

In 2001, work began on the European Research Network on Aquatic Invasive Species (ERNAIS) (http://www.zin.ru/projects/invasions/gaas/ernaismn.htm). Programme goals are to

- develop an international network of European databases on Aquatic Invasive/Alien Species, linking existing databases in Europe and worldwide;

- create a network to exchange information on port and ballast water studies, including a first directory of European experts from 21 countries in the area of aquatic invasions;

- assess ecosystem impacts of aquatic invasive species, study potential effects of introduced parasites and disease agents and research on genetically modified organisms.

- For the Mediterranean, the International Commission for the Scientific Exploration of the Mediterranean Sea has established an expert group to prepare an updated digital atlas for exotic species of fish and shellfish (crustaceans and molluscs) (**www.ciesm.org/atlas).**