European strategy on invasive alien species

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European strategy on invasive alien species

Piero Genovesi and Clare Shine

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European Wildlife and Habitats
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Contents

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At their 23rd meeting on 1-4 December 2003, the Standing Committee of the Bern Convention endorsed the European Strategy on Invasive Alien Species and adopted the recommendation appended.

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Preface

Living beings invest an important part of their resources in dispersion of individuals and propagules. The colonisation of new areas forms part of the strategy of most species to proliferate and avoid extinction. Distance and geographical and ecological barriers set limits to such dispersion, permitting the development and evolution of ecosystems in a certain degree of isolation. Biological diversity is in great part the result of the separate evolution of living forms and their adaptation to local conditions. The arrival of new species to an ecosystem is a natural phenomenon and most alien species do not survive or become invasive, although a few may indeed do so. What is not natural is the present rate of dispersal of species through trade, travel or intentional introduction.

A successful invasive alien species proliferates and may "drive out" a native species occupying the same ecological niche, take up space or predate native species to extinction. Invasive Alien Species can upset previous ecological conditions with unpredictable effects on biological diversity.

Invasive Alien Species have been pointed out as the second cause of species extinction at the world level (after habitat deterioration or loss), affecting in particular the biological diversity of islands and of evolutionary-isolated ecosystems. The extraordinary rise in the movement of wild species that goes parallel to the globalisation of the economy has produced an acceleration of the rate of introduction of new alien species everywhere, with its deleterious consequences on native biological diversity.

Since the early 1980s the Council of Europe has been encouraging its member states to prohibit the introduction of non-native species into the natural environment, to take preventive measures against accidental introductions and to take remedial measures where practicable. In 1997 the Standing Committee of the Bern Convention adopted a recommendation "on the introduction of organisms belonging to non-native species into the environment" which included a full survey of measures for controlling introductions of alien species to be taken by governments and other social actors.

The present "European Strategy on Invasive Alien Species" takes forward that approach and set up a very precise "road map" to deal with this crucial ecological problem. The Strategy is in full harmony with the guidelines adopted in 2002 by the 6th Conference of the Parties of the Convention on Biological Diversity and will certainly help develop national programmes, so that a co-ordinated effort of all European states succeeds in diminishing the threats that Invasive Alien Species represent to European biological diversity.

Eladio Fernández-Galiano

Head of Biological Diversity Unit,
Council of Europe

Introduction

Why are invasive alien species a problem?

The introduction of species beyond their natural range is rising sharply, due to increased transport, trade, travel and tourism and the unprecedented accessibility of goods resulting from globalisation. These activities provide vectors and pathways for live plants, animals and biological material to cross biogeographical barriers that would usually block their way.

Most alien species do not become invasive or cause problems in their new locations: many have considerable benefits to society e.g. in agriculture, horticulture, forestry and the pet industry. However, the subset of alien species that are invasive can have significant environmental, economic and public health impacts and present a significant risk of the wholesale homogenisation of ecosystems.

Invasive alien species (IAS) are now considered to be the second cause of global biodiversity loss after direct habitat destruction and have adverse environmental, economic and social impacts from the local level upwards. The European Community has recognised proliferation of IAS as an emerging issue[1], noting that IAS introductions are one of the main recorded causes of biodiversity loss and cause serious damage to economy and health.[2]

IAS status and trends in Europe

Introductions in Europe and the Mediterranean basin started in ancient times. In some cases, the impacts on native ecosystems occurred so long ago that we hardly perceive the effects on the biodiversity of the region. But although the history of species introductions in Europe is very ancient, the phenomenon has grown rapidly and enormously in recent times as a result of increasing globalisation. In addition, climate change affects the abundance and spread of IAS and the vulnerability of ecosystems to invasions. IAS are now a major hallenge for biodiversity conservation in Europe in the new millennium.

1. COM(2001)162 final.
2. European Council (Environment), Conclusions of 4 March 2002: 6592/02 (Presse 47 - G) 24.

Several endangered species in Europe are threatened by IAS (e.g. European mink by the American mink[3]; White-headed duck by the Ruddy duck[4]). The ongoing expansion of the American grey squirrel in north-west Italy is causing the progressive disappearance of the native red squirrel in all overlap areas and is considered a potential threat to forest ecosystems at a continental scale[5]. European forests have been profoundly altered by Dutch elm disease, caused by fungi introduced from Asia, that devastated elm tree populations in much of central Europe and Great Britain[6].

European island biotas, hosting a major portion of the region's biodiversity, are particularly vulnerable to invasions because increased travel and trade break down the natural barriers that have protected and forged these biotas in million years. As a result, the number of invasive alien species on European islands is increasing exponentially and has led to an unprecedented extinction crisis of the islands' endemic species.

As well as damaging biodiversity, IAS have also imposed huge losses on the European economy. Introduced pests and diseases affect agriculture and forestry and alien parasites (such as *Gyrodactylus salaris* and *Anguillicola crassus*) have led to dramatic decreases in fisheries sector incomes in several Nordic state[7]. The muskrat and coypu, both introduced in the last century by the European fur industry, damage river banks through digging and have increased the risk and severity of floods in many central and southern European state. The introduction of the American comb jelly (*Mnemiopsis leidyi*) into the Black and Azov Seas, caused the near extinction of the anchovy and sprat fisheries[8].

International action on invasive alien species

Because IAS are a global problem, unilateral action by a few state can never be enough to prevent unwanted introductions. Co-operation at international, regional, transboundary and

3. Sidorovich V, Kruuk H & Macdonald DW (1999) Body size, and interactions between European and American mink (*Mustela lutreola and M. vison*) in Eastern Europe. Journal of Zoology 248: 521-527.
4. Hughes B, Criado J, Dalany S, Gallo-Orsi U, Green A, Grussu M, Perennou C & Torres JA (1999) The status of the ruddy duck (*Oxyura jamaicensis*) in the western Palearctic: towards an action plan for eradication. Report by the Wildlfowl & Wetlands Trust to the Council of Europe.
5. Bertolino S., P. Genovesi, 2003. Spread and attempted eradication of the grey squirrel (*Sciurus carolinensis*) in Italy, and consequences for the red squirrel (*Sciurus vulgaris*) in Eurasia. Biological Conservation, 19: 351-358.
6. Schrader G., J.G. Unger (2000). Plant pests as alien invasive species: success and failure of European phytosanitary measures – a German view. CBD Technical Series n°1: 81-83.
7. Weidema I (ed) (2000) Introduced Species in the Nordic Countries. Nord 2000:13. Nordic Council of Ministers, Copenhagen.
8. Ivanov V.P., Kamakin A.M., Ushivtzev V.B., Shiganova T. A., Zhukova O., Aladin N., Wilson S.I, Harbison R and Dumont H.J. (2000) Invasion of the Caspian Sea by the Comb Jellyfish *Mnemiopsis leidyi* (Ctenophora). Biological Invasions 2: 255-258.

Amorpha fruticosa

local levels is essential to develop compatible approaches to common problems.

Many international instruments or technical guidelines already deal with IAS issues from various perspectives: plant and animal health, biodiversity conservation, aquatic ecosystems, some sectoral pathways (a summary of key instruments is provided in the Annex to the Strategy). These binding or voluntary instruments provide the baseline from which state and regional economic integration organisations such as the European Community develop policy, legal and management frameworks to address IAS issues.

In recent years, IAS have become a high-profile policy topic for the international community which has emphasised the need for cross-sectoral co-ordination between competent institutions and stakeholders at all levels. New programmes and tools have been developed, notably the Global Invasive Species Programme (GISP)[9] which actively promotes practical regional co-operation. GISP has published a Global Strategy on Invasive Alien Species and a Toolkit of Best Prevention and Management Practices[10].

9. GISP is an international network of volunteers from various backgrounds: scientists, economists, lawyers, policy makers, activists and others from all sectors and constituencies affected by IAS. It has three partners: IUCN-The World Conservation Union; the intergovernmental bioscience organisation CAB International; and the Scientific Committee on Problems of the Environment (SCOPE).

10. McNeely et al (2001) *Global Strategy on Invasive Alien Species*. IUCN; Wittenberg and Cock (2001) *Invasive Alien Species: A Toolkit of Best Prevention and Management Practices*. GISP/CAB International.

Cortaderia selloana

The Convention on Biological Diversity (CBD) has identified IAS as a major cross-cutting theme. This global treaty requires Parties as far as possible and as appropriate, (to) prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species" (Article 8(h)). In 2002, the CBD Conference of the Parties adopted a specific Decision and Guiding Principles[11] to help Parties implement this requirement. The Decision urges Parties, other governments and relevant organizations to prioritise the development of IAS strategies and action plans at national and regional level and to promote and implement the CBD Guiding Principles.

11. Decision VI/23 on Alien Species that threaten ecosystems, habitats and species (COPVI, The Hague, April 2002) to which are annexed the *Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species that threaten Ecosystems, Habitats or Species.*

The CBD Guiding Principles set out a "Three-stage hierarchical approach" as the basis for all action on IAS:

– prevention of IAS introductions between and within state is generally far more cost-effective and environmentally desirable than measures taken after IAS introduction and establishment;
– if an IAS has been introduced, early detection and rapid action are crucial to prevent its establishment: the preferred response is often to eradicate the organisms as soon as possible;
– where eradication is not feasible or resources are not available, containment and long-term control measures should be implemented (CBD Guiding Principle 2).

However, it is important to go further than this basically defensive approach. Conservation policies need to include restoration measures for species, natural habitats and ecosystems that have been affected by biological invasions.

Rationale for a European strategy on invasive alien species

Europe is a major trading bloc with many contiguous state and shared borders and highly-developed free trade arrangements. Huge volumes of species are translocated, intentionally and unintentionally, in the course of routine sectoral activities between and within state. Potentially invasive alien species may easily reach neighbouring state or ecologically different parts of the same state.

The need for a regional approach has long been recognised by European institutions such as the Convention on the Conservation of European Wildlife and Natural Resources 1979 (Bern Convention), the European and Mediterranean Plant Protection Organisation (EPPO) and the European Community, which have all developed legal and technical references for different aspects of IAS (see Annex to the Strategy).

The Bern Convention, to which the European Community and 38 European states are party, requires Parties "to strictly control the introduction of non-native species" (Article 11.2.b). Since 1984, a range of actions have been initiated for more effective implementation of this article. These include the adoption of Standing Committee recommendations on general IAS issues and specific problems, production of technical reports, organisation of workshops and establishment of an IAS Experts' Group.

Despite these and other efforts, Europe now lags behind other regions that have developed strategic frameworks to address IAS in a holistic way. Whilst Europe's complex characteristics can make it harder to develop and implement common trade and movement policies, this should not be used to postpone decisive and balanced action. The common trade and movement policy for the plant health sector developed under EPPO shows that co-ordination and co-operation is feasible.

The impacts of many past invasions could have been reduced if European states had uniformly applied appropriate best practices and taken rapid action to eradicate introduced species following detection. Most biological invasions now threatening Europe might have been prevented by greater awareness of IAS issues and a stronger commitment to address them.

Current inaction in many – though not all – states and sectors may threaten the region's biodiversity, public health and economic interests. In line with international policy, it is now essential to develop efficient co-operation at national and regional level to prevent or minimise adverse impacts of IAS.

The Bern Convention initiative for a European Strategy on Invasive Alien Species, in collaboration with the European Section of the IUCN Invasive Species Specialist Group, began in 2000. It has been welcomed by the Second Intergovernmental Conference on Biodiversity in Europe in Budapest and the CBD.

Challenges and opportunities for the Strategy

Many European states face similar constraints in their IAS efforts. Depending on the country, these may include:

– low public awareness and opposition to government intervention;
– shortage and inaccessibility of scientific information (for species identification, risk analysis, detection and mitigation techniques etc.);
– absence of clear and agreed priorities for action;
– ease of introduction and movement (e.g. through the post), inadequate inspection and quarantine;
– inadequate monitoring capacity;
– lack of effective emergency response measures;
– outdated or inadequate legislation;
– poor co-ordination between government agencies, states and other stakeholders.

The Strategy addresses these constraints. It aims to facilitate implementation of international commitments and best practice and to support development of realistic policies, measures and targets. Priority actions are proposed that are key in terms of time and feasibility of implementation.

The Strategy recognises that Parties' existing legal obligations may constrain or influence the measures which can be taken, particularly with regard to regulation of trade-related activities.

Who is the Strategy for?

LThe Strategy is primarily targeted at governments of Contracting Parties to the Bern Convention and of other European states.

Trachemys scripta elegans

It is a comprehensive document addressed to nature conservation agencies and all other sectoral agencies with responsibility for activities relevant to IAS prevention or management. It is recognised that many aspects of implementation will be delivered through existing plant, animal and human health agencies which have long-standing expertise in particular areas (e.g. micro-organisms).

The Strategy is also addressed to the Bern Convention Secretariat and strongly supports closer and sustained co-ordination and co-operation with relevant European and international organisations. Although the Strategy is mainly intended to address IAS problems in Europe, it also applies to African states that are Parties to the Convention, as the principles and actions proposed should help to prevent unwanted introductions and mitigate the impacts of IAS in those states.

The Strategy also seeks to engage stakeholders involved in the movement, use and control of potentially invasive alien species (industry and trade, transporters, retailers, resource managers, the public etc.) and to build on the expertise and commitment of competent non-governmental organisations and research institutes. Many of the proposed key actions call for joint or complementary initiatives by private and public stakeholders.

ABBREVIATIONS

Bern Convention	Convention on the Conservation of European Wildlife and Natural Resources
CBD	Convention on Biological Diversity
CBD Guiding Principles	Guiding Principles for the prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species (annexed to Decision VI/23 adopted by the Conference of the Parties to the CBD, The Hague, April 2002)
CMS	Convention on the Conservation of Migratory Species of Wild Animals
EIA	Environmental impact assessment
EPPO	European and Mediterranean Plant Protection Organisation
GISP	Global Invasive Species Programme
IAS	Invasive alien species
IPPC	International Plant Protection Convention 1951, revised 1997
IMO	International Maritime Organisation
ISSG	IUCN Species Survival Commission's Invasive Species Specialist Group IUCN World Conservation Union NGO Non-governmental organisation
Ramsar	Convention on Wetlands of International Importance especially as Waterfowl Habitat
OIE	Office international des epizooties (World Organisation for Animal Health) SEA Strategic environmental assessment
WTO-SPS	World Trade Organisation Agreement on the Application of Sanitary and Phytosanitary Measures (1995)

Strategy

Objectives

The Strategy promotes the development and implementation of co-ordinated measures and co-operative efforts throughout Europe to prevent or minimise adverse impacts of invasive alien species (IAS) on Europe's biodiversity, as well as their consequences for the economy and human health and well-being.

The Strategy provides guidance to help Bern Convention Parties in their efforts to:

- rapidly increase awareness and information on IAS issues and ways to tackle them (§1-2);
- strengthen national and regional capacity and co-operation to deal with IAS issues (§3-4)
- prevent the introduction of new invasive alien species into and within Europe (§5) and support rapid response to detected incursions (§6);
- reduce the adverse impact of existing invasive alien species (§7);
- recover species and restore natural habitats and ecosystems that have been adversely affected by biological invasions, where feasible and desirable (§8); and
- identify and prioritise key actions to be implemented at the national and regional level.

Scope

The Strategy covers:

- terrestrial, freshwater and marine environments under the sovereignty or jurisdiction of Bern Convention Parties. It also provides guidance for activities carried out in areas beyond national jurisdiction (e.g. shipping);
- alien species (as defined by the Conference of the Parties to the Convention on Biological Diversity: see Box 1) in all taxonomic groups, including viruses, prions, bacteria mycorrhiza and feral animals of domestic species (cats, dogs, goats, etc.).

It does not apply to genetically modified organisms[12].

12. The Strategy does not cover genetically modified organisms/ living modified organisms, although some of these have the potential to become IAS, because these are separately regulated under European Community legislation and by several other European states. However, there may be scope for countries to co-ordinate activities relevant to both IAS and genetically modified organisms (e.g. risk analysis, contained use, field trials, control of release, monitoring).

Terminology

The Strategy uses the definitions agreed by the Conference of the Parties to the Convention on Biological Diversity for the purposes of the CBD Guiding Principles (see Box 1).

For plant health and animal health issues, internationally-agreed terminology developed by competent organisations (IPPC, OIE) is relevant.

For the purposes of this Strategy:
– "regional" refers to the whole of Europe;
– "subregional" refers to an area (land, sea or freshwater) shared by two or more neighbouring states.
– "pathway" means, as applicable:
  - the geographic route by which a species moves outside its natural range (past or present);
  - the corridor of introduction (e.g. road, canal, tunnel); and/or
  - the human activity that gives rise to an intentional or unintentional introduction.
– "vector" means the physical means or agent (i.e. aeroplane, ship) in or on which a species moves outside its natural range (past or present).

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Ludwigia spp.

BOX 1

GUIDING PRINCIPLES FOR THE PREVENTION, INTRODUCTION AND MITIGATION OF IMPACTS OF ALIEN SPECIES THAT THREATEN ECOSYSTEMS, HABITATS OR SPECIES (ANNEXES TO CBD DECISION VI/23)

alien species: a species, subspecies or lower taxon, introduced outside its natural past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce.

invasive alien species: an alien species whose introduction and/or spread threaten biological diversity.

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

intentional introduction: the deliberate movement and/or release by humans of an alien species outside its natural range.

unintentional introduction: all other introductions which are not intentional.

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

risk analysis: (1) assessment of the consequences of the introduction and of the likelihood of establishment of an alien species using science-based information (i.e. risk assessment), and (2) identification of measures that can be implemented to reduce or manage these risks (i.e., risk management), taking into account socio-economic and cultural considerations.

1. Building awareness and support

CBD Guiding Principle 6: Education and public awareness

In Europe, both the public and decision-makers often have limited understanding of the range of threats posed by IAS. This can make it hard to mobilise relevant agencies and other stakeholders, particularly for introductions that do not affect human health or major economic interests. Raising awareness and commitment is essential to develop shared responsibility and to encourage private efforts and voluntary compliance.

Aim

Europe's public, decision-makers, scientists and other stakeholders have high awareness of IAS risks and the benefits of IAS prevention and mitigation for native biodiversity, the economy and human health and well-being. Stakeholders are actively engaged in the development of best practices to prevent IAS impacts.

Chasmanthe aethiopica

Key actions

1.1. Set up vigorous information and education programmes for different target audiences (general public, schools, local authorities, government agencies etc.).

1.2. Incorporate IAS into existing education and public awareness programmes where appropriate, (e.g. on native species and habitat conservation, protected areas, wildlife trade).

1.3. Work with key stakeholders to produce and disseminate information and guidance on best practices for those using or affected by IAS (see Box 2 and Boxes 16-17).

1.4. Support the holding of workshops and conferences on IAS.

BOX 2

EXAMPLES OF KEY STAKEHOLDERS

Customs and quarantine services, protected area managers, wildlife trade personnel, other government departments/agencies responsible for agriculture and forestry, water resource management, infrastructure development etc.

Professional associations for tourism/travel, shipping, aquaculture, bird breeding, hunting, fishing, forestry, horticulture, pet trade, botanic gardens, zoological parks and aquaria.

Universities and scientific and research institutes.

Non-governmental organisations.

2. Collecting, managing and sharing information

National and regional capacity to identify, prevent and mitigate IAS threats depends on accurate and updated information that is easily accessible.

Information-sharing between states is critical: answers to a problem may be available elsewhere in Europe or the world. There is currently no pan-European information mechanism on IAS as such, although important resources exist for some taxonomic groups and in some sectors (e.g. the EPPO/EC plant health system). Information gaps (biologic, taxonomic, geographic) can make it harder to determine priorities and take effective prevention and response measures.

2.1. Species inventories

CBD Guiding Principle 8.1: Exchange of information

Aim

A clear understanding of alien species established on national territory is developed to help identify species that are invasive, set priorities for research, prevention, monitoring and mitigation and rapidly detect new arrivals not already present in the country or part of the country.

Key actions

2.1.1. Develop a national inventory of alien species in relevant taxonomic groups recorded in the wild in national territory, giving priority to IAS and using existing data formats, standards and protocols wherever possible (see Box 3). Regularly update the inventory to include newly-detected alien species.

2.1.2. Create and regularly update alien species pages in the national biodiversity Clearing House Mechanism or equivalent and link these to relevant European and global IAS information networks to ensure rapid dissemination of information (see §2.3).

Rhynchophorus ferrugineus

BOX 3

POSSIBLE STEPS TO DEVELOP A NATIONAL INVENTORY AND SET PRIORITIES

Mobilise existing expertise for species inventory and review, based on a partnership approach (universities, research institutes, botanic gardens, NGOs, other stakeholders)

Start with known IAS and species for which information is already available. Link and integrate existing databases.

Based on existing information and experience, make a preliminary assessment to identify priority species and areas for action.

Include potentially invasive alien species, which are not yet introduced but have a high likelihood of introduction or spontaneous spreads from neighbouring countries.

Where available, include information on:
- species taxonomy and biology
- date and place of introduction
- means of arrival and spread
- range and spread dynamics
- risk of expansion to neighbouring countries
- invaded ecosystems
- population size and trends
- impacts recorded and level of threat
- other data relevant for risk analysis and early warning systems
- prevention, mitigation and restoration methods and their efficiency
- references and contact details.

2.2. Research and monitoring

CBD Guiding Principles 5: Research and monitoring
CBD Guiding Principle 9.d: Co-operation including capacity building

Aims

Through systematic monitoring, the ecology, distribution, patterns of spread and response to management of IAS are better understood.

Capacity to predict the consequences of alien species introductions is strengthened.

Critical information is available to support IAS prevention, mitigation and restoration programmes and provide a stronger scientific basis for decision-making and allocation of resources.

Key actions

2.2.1. Support research on priority topics (see Box 4).

2.2.2. Review existing research and monitoring programmes to identify gaps, areas for development and opportunities for more effective collaboration within Europe.

2.2.3. As necessary, establish or expand monitoring systems for pathways, vectors and vulnerable points (see §6).

2.3. Regional exchange of information

CBD Guiding Principle 4.3: The role of states
CBD Guiding Principle 8.1: Exchange of information
CBD Guiding Principle 9.a: Co-operation, including capacity-building

BOX 4

EXAMPLES OF RESEARCH PRIORITIES

Identification and risk analysis of different pathways and vectors for species introductions, or spread including methods to predict potential invasiveness of alien species prior to introduction (e.g. invasiveness in other regions with similar conditions). Risk analysis methods could be based on those used internationally (e.g. within EPPO).

Techniques for rapid detection of newly-arrived alien species

Patterns of spread of alien species with evidence of invasiveness or evidence of high potential for invasiveness.

Basic research on biology, taxonomy, ecology (both in their original range and in the invaded areas) and epidemiology of alien species

Ecosystem vulnerability or resilience.

Assessment of adverse impacts of IAS on native biological diversity including genetic diversity

Evaluation of economic and public health implications of IAS

Development and evaluation of more effective prevention, mitigation and restoration.

Aims

Effective systems are in place to share IAS information with neighbouring countries, trading partners and regions with similar ecosystems to facilitate identification, early warning and coordination of prevention, mitigation and restoration measures.

Information systems can locate, document and provide electronic access to sources of information, provide quality control and ensure controlled vocabularies. Common data protocols or standards are used where possible.

Key actions

2.3.1. Identify and assist lead organisations (e.g. IUCN Invasive Species Specialist Group, European Topic Centre for Nature Protection and Biodiversity) to develop an interlinked European information network on IAS, using existing information resources and capacity as far as possible (see Box 5).

Lupinus polyphyllus

2.3.2. Draw up and link registers of European experts and institutions that can advise on taxonomy and other technical IAS issues.

2.3.3. Promote regular meetings and workshops to update information on taxonomy, biology, ecology, epidemiology, methods of mitigation and restoration (see also §1.3).

BOX 5

POSSIBLE STEPS TOWARDS A EUROPEAN INFORMATION NETWORK

National focal points work with lead organisations to establish regional information objectives and procedures.

National data is integrated into or linked to existing European inventories (e.g. EPPO/EC

plant health system; Nordic-Baltic Network on Invasive Species; European Research Network on Aquatic Invasive Species).

Common data protocols or formats (see also §2.1) are developed to facilitate integration of national data with regional inventories.

As soon as practicable, regional information mechanisms are linked to the global network of IAS databases currently under development.

Where necessary, new information tools are created (e.g. for specific taxonomic groups or subregions).

Regional/subregional fast information systems facilitate communication.

3. Strengthening national policy, legal and institutional frameworks

Invasive alien species – as a cross-cutting issue – concern many social, economic and environmental interests, including trade, health, agriculture, forestry, water resource management, infrastructure development, horticulture, aquaculture, tourism and recreation. In most countries, several departments and agencies have responsibility for some aspect of IAS prevention and management and several different laws may be relevant (e.g. plant and animal health and quarantine; hunting and fishing; nature conservation etc.).

The result can be a complex situation where responsibilities, policies and laws are not very clear or even compatible. This can also hamper efficient communication within the region.

It is therefore crucial that Parties initiate a co-ordinated review process of their institutional and legal frameworks and their strategies, policies and approaches relevant to IAS issues.

In several European states, responsibility for environmental policy and nature conservation issues is decentralised to subnational authorities. The Strategy recommends that IAS issues are addressed (or at least co-ordinated) at the national level, but recognises that each country will need to chose an appropriate structure or network for this purpose.

3.1. Leadership and co-ordination

Aims

Clear leadership or appropriate co-ordination is in place for IAS prevention and mitigation, involving relevant sectors and different levels of government as appropriate.

Efficient use is made of existing structures, procedures and expertise relevant to trade, movement, holding and management of potential IAS (e.g. national plant protection organisations, customs and quarantine services, CITES authorities, veterinary authorities etc.).

Key actions

3.1.1. Establish a national authority, or equivalent network or mechanism, to lead and co-ordinate the efforts of responsible agencies and subnational governments dealing with IAS (see Box 6).

3.1.2 Identify a focal point in relevant departments and agencies to co-ordinate IAS-related matters and liase with the authority/network and other departments.

3.1.3 Work closely with counterpart national focal points for relevant instruments and organisations (CBD, GISP, Ramsar, CMS, UNESCO Man and the Biosphere Programme, IMO, IPPC/EPPO etc.) in the development and implementation of national IAS strategies and management responses.

3.1.4 Make available the contact details of the authority/network and IAS focal points to the public, national sectoral organisations, Bern Convention Secretariat and other Parties.

Hydrangea hortensis

BOX 6

POSSIBLE ROLES OF THE NATIONAL AUTHORITY OR NETWORK

Lead or co-ordinate the policy and legal review process (§3.4-3.8).

Lead or co-ordinate the development and implementation of a national strategy/action plan on invasive alien species (§3.9).

Co-ordinate input from different agencies to national and European policy making and programmes.

Consult with competent scientific authorities to obtain technical advice on decision-making related to IAS.

Engage with stakeholders and relevant sectors to raise awareness to develop and encourage best practices to avoid unwanted introductions and to co-ordinate education and awareness measures (see also §1 and §5.3).

3.2. Policy and legal review and development

Aim

IAS prevention, eradication and control are fully incorporated in national/ subnational legislation and in biodiversity and other relevant policies, strategies and action plans, consistent with international law.

Key actions

3.2.1. Carry out a national review of existing measures and procedures to manage trade, movement, holding, introduction into the environment, establishment, and mitigation of IAS or potential IAS (see Box 7).

3.2.2. Progressively adapt or introduce measures and procedures recommended by the review process.

3.2.3. Promote use of terminology consistent with internationally-agreed definitions (see Terminology). Ensure that the terms "alien" or "native" are defined with reference to biogeographical, not political boundaries.

BOX 7

APPROPRIATE OBJECTIVES FOR A REVIEW PROCESS

A review process could aim to:

- produce practical and proportionate recommendations;
- set priorities;
- identify and involve relevant stakeholders;
- identify areas where management capacity and training need to be improved;
- identify appropriate organisations to take forward any measures.

All proposed policies and measures should be assessed for likely compliance with international trade rules, taking particular account of national obligations under the WTO Agreement on the Application of Sanitary and Phytosanitary Measures. Parties need to avoid taking measures which amount to arbitrary or unjustified, discrimination or a disguised restriction on trade.

3.3. Strategies and action plans

Aim

Parties have specific strategies and action plans in place to address all aspects of IAS prevention and mitigation.

Key actions

3.3.1. Develop an IAS strategy, based on consultation with sectoral stakeholders, scientific organisations, protected area specialists, NGOs and the general public and taking full account of existing sectoral strategies or procedures (see Box 8).

3.3.2. Develop action plans to address specific problems identified e.g. for priority IAS, pathways and vectors, vulnerable sites, ecosystems, etc.

BOX 8

POSSIBLE COMPONENTS OF A NATIONAL STRATEGY ON INVASIVE ALIEN SPECIES

Status and trends of IAS in Europe and the rest of the world

Status and trends of IAS in the country: identification of specific problems

Main pathways, vectors and particular risks

Details of national IAS authority/network

Roles and responsibilities of key agencies and partners

Relevant legislation and non-statutory measures: proposals for improved prevention and management

Outline of criteria for risk analysis, management planning and mitigation, taking into account existing standards and criteria as appropriate

Needs related to monitoring, training, capacity building and funding

Where appropriate, specific measures or policies for isolated and / or ecologically sensitive ecosystems (e.g. islands and archipelagos, protected areas) (see §5.5) Specific measures and policies for wetlands whose ecological character may be threatened by IAS (e.g. through lowering of water tables, alteration of water flow patterns), aimed at preventing or controlling such invasions.

Recovery of species/ecosystems affected by IAS and positive measures to promote use of native species, subspecies and varieties of local provenance (see §8)

Priority list of actions, timelines and lead partners for implementation, with realistic targets to be achieved (see e.g. § 7.2)

Establishment of a mechanism to exchange information and collaborate with neighbouring countries.

3.4. Key approaches and tools

CBD Guiding Principle 1: Precautionary approach
CBD Guiding Principle 2: Three-stage hierarchical approach
CBD Guiding Principle 3: Ecosystem approach

Strategies, legal frameworks and measures need to follow and support the key approaches supported by the CBD Guiding Principles. These approaches and tools are closely interlinked (see Box 9).

Aim

National and regional frameworks support the application of key approaches and tools for IAS prevention and mitigation and

Rattus rattus

the development of improved criteria, techniques and capacity for their effective use.

Key actions

3.4.1. Provide for the application of the precautionary approach to IAS decision-making, consistent with international law, within a risk analysis framework that takes account of possible impacts on native biodiversity and ecosystem function (see also §5.2.2 and §5.3.1).

3.4.2. Incorporate criteria related to IAS risks into environmental impact assessment (EIA) and strategic environmental assessment (SEA) procedures, as appropriate and relevant (see also §5.3.2).

3.4.3. Promote use of the ecosystem approach as an appropriate framework for the assessment of planned actions and policies relevant to IAS.

3.4.4. Contribute to regional co-operation for development or compilation of criteria and indicators to deal with uncertainty on IAS issues, including criteria on using risk assessment techniques, precautionary approach and adaptive management.

3.4.5. Involve relevant stakeholders (e.g. botanic gardens for the horticultural trade) in the development or revision of guidelines for risk analysis and assessment and in relevant assessment processes, including decision-making.

BOX 9

APPLICATION OF KEY APPROACHES AND TOOLS TO INVASIVE ALIEN SPECIES ISSUES

Predicting the potential invasiveness and impacts of an alien species requires an assessment of its likelihood of arrival, ability to survive, time lag before it becomes invasive, speed and extent of invasion, ease and cost of control and possible effects on a wide range of resources and values. Although the epidemiology of biological invasions in some taxonomic groups is now better understood, there are still no general rules applicable across all groups or even within the groups studied in detail. Species frequently change their behaviour when they invade a new habitat, so that studies of their ecology in their home country may not provide fully reliable indications of their behaviour in a new location.

Given the unpredictability of IAS pathways and impacts on biodiversity, CBD Guiding Principle 1 provides that (1) efforts to identify and prevent unintentional introductions, (2) decisions concerning intentional introductions and (3) consideration of mitigation measures should all be based on the precautionary approach, in particular with reference to risk analysis. Where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimise such a threat.

Risk analysis involves making an assessment, using science-based information, of the actual risks related to introductions. Using this assessment, management decisions to reduce or manage these risks can be made in a thorough, consistent, logical and transparent way. Detailed guidance for risk analysis is already available for some sectors, such as plants/plant health, while for other sectors the systems still have to be established and adapted (e.g. pet trade).

Environmental impact assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse. To be effective, EIA should be fully incorporated into existing legal planning processes and not be seen as an 'add-on' process.

Under the CBD, Draft Guidelines annexed to CBD Decision VI/7 (Identification, monitoring, indicators and assessment) suggest that an EIA could be mandatory for activities that indirectly affect legally protected species, e.g. by reducing its habitat, altering its habitat in such a manner that its survival is threatened, introducing predators, competitors or parasites of protected species, alien species or GMOs. The Guidelines state that the need for an EIA should be determined for activities where biodiversity impacts are possible or likely but where EIA is not necessarily triggered by law: e.g. for impacts at the species level, this might include all introductions of non-indigenous species. Priorities and targets defined in the national biodiversity/IAS strategy and action plan process can provide guidance for developing EIA screening criteria that take account of biodiversity impacts.

Potential adverse effects of an introduction to the environment, and the probability of the occurrence of these effects, can be assessed by analysing the intrinsic characteristics of the species, ecological relationships in its current range, the similarities between its existing range and the potential area for introduction, and any past history of the species (or a similar relative) as an IAS.

Strategic environmental assessment (SEA) is the formalised, systematic and comprehensive process of identifying and evaluating the environmental consequences of proposed policies, plans or programmes to ensure that they are fully included and appropriately addressed at the earliest possible stage of decision-making on a par with economic and social considerations (CBD Decision VI/7). It covers a wider range of activities or a wider area, often over a longer time span, than EIA. SEA can help streamline the incorporation of biodiversity concerns into the decision-making process and make project-level EIA more effective.

With regard to biodiversity considerations, the ecosystem approach as described in CBD Decision V/6 is an appropriate framework for the assessment of planned action and policies. The proper temporal and spatial scales of the problems should be determined as well as the functions of biodiversity and their tangible and intangible values for humans that could be affected by the proposed project or policy, the type of adaptive mitigation measures and the need for the participation of stakeholders in decision-making (see §4.3 and §8).

3.5. Ancient introductions

The very ancient history of introductions in Europe makes this region distinctive, both because alien species play an important role in European culture, landscapes and present ecosystems and because Europeans are more used to coexisting with introduced animals and plants than inhabitants of most other regions of the world.

Aim

Species introduced in ancient historic times are conserved only if consistent with the approach proposed in Box 10.

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Zantedeschia aethiopica

Key action

3.5.1. As appropriate, review conservation measures for species introduced in ancient historical times, taking into account their possible impact on native biological diversity and/or their historical and cultural values (see Box 10)

3.5.2. Review ancient introductions in protected species lists with the aim of removing legal protection from invasive or potentially invasive alien species where appropriate (see also §7.1.2)

BOX 10

PROPOSED APPROACH TO SPECIES INTRODUCED IN ANCIENT HISTORIC TIMES

Conservation of species introduced in ancient historic times (e.g. archaeophytes) may be acceptable if:

1) recovery of the original ecosystems is no longer feasible;

2) their conservation does not conflict with the primary aim of conserving the native biological diversity (impact assessment before protection).

For species posing a threat to native biodiversity, it is recommended that range expansion is allowed or promoted only in contiguous areas after an impact assessment and that translocation to isolated areas outside their present range is avoided.

As far as eradication is concerned, priority needs to be given to tackling new and relatively recent introductions of IAS, rather than concentrating resources on ancient introductions. Eradicating species introduced in ancient historic times may be considered where it is feasible to restore the original ecosystem and where such restoration is a conservation priority (e.g. islands containing important bird populations which are affected by introduced rats).

3.6. Compliance and enforcement

Where IAS cause damage, conventional approaches to liability are usually difficult to apply. This is partly because of difficulties in proving causation and/or fault (time lag, scientific uncertainty, the number of people or businesses using the IAS) and partly because many existing IAS were introduced to the environment in the past by businesses operating under legal standards and permits.

Aims

A mix of voluntary and regulatory measures is developed to underpin and enforce prevention policies, based on consultation with relevant sectors, industry and other stakeholders.

Innovative measures for greater accountability are in place for individuals and entities responsible for the introduction and/or spread of invasive alien species (see Box 11).

Key actions

3.6.1. Review effectiveness of existing voluntary approaches with relevant stakeholders: where necessary, promote the development of new or stronger measures to address specific risks (see §5.3).

3.6.2. Establish criminal/administrative sanctions and appropriate penalties for illegal introductions, movement or holding of IAS, consistent with national policy or legislation.

3.6.3. Consider measures to allocate the costs of control measures and biodiversity restoration to the individual or entity responsible for the introduction of an IAS in breach of national laws or regulations.

BOX 11

POSSIBLE OPTIONS FOR GREATER ACCOUNTABILITY

Explore use of economic instruments to generate sustainable funding for IAS prevention, monitoring and mitigation (e.g. guarantee systems, insurance or levies involving professional breeders or traders, pathway and vector levies for transport bodies etc.).

Explore techniques to promote application of voluntary codes and practices. At the trader/producer level, these might include clearer legal standards (e.g. a 'duty of care' to follow agreed industry codes) and/or labelling schemes linked to observance of relevant codes.

Sus scrofa

4. Regional co-operation and responsibility

4.1. Co-operation between Bern Convention Parties

CBD Guiding Principle 4.1 and 4.2: Role of states
CBD Guiding Principle 8.2: Exchange of information
CDB Guiding Principle 9.a: Co-operation, including capacity-building

Co-operation within Europe – characterised by a shared coastline, transboundary mountain ranges and protected areas and international watercourses – is critical, because species introduced into the territory of one state can easily spread to neighbouring states or subregions. Co-operation with non-European trading partners is also particularly important.

Aim

States recognise the risk that activities within their jurisdiction or control may pose to other states as a potential source of IAS and take appropriate individual and co-operative actions to minimise that risk.

Key actions

4.1.1. Use existing mechanisms for inter-state information exchange, notification and consultation on IAS (e.g. EPPO, OIE, CBD Clearing House Mechanism, Bern Convention) and establish new mechanisms where necessary (also see §2.3.1).

4.1.2. Where not already in place, develop procedures to provide any available information on a species' invasive behaviour (or the invasive potential of a species) to neighbouring states, trading partners and countries with similar ecosystems and histories of invasion (see Box 12).

4.1.3. Provide all relevant information on the state's specific import requirements for alien species, particularly those already identified as invasive, and make this information available to other states.

BOX 12

EXAMPLES OF ACTIVITIES FOR WHICH INFORMATION SHOULD BE PROVIDED

Intentional transfer to another state of potentially invasive alien species, even if it is harmless in the state of origin (e.g.: export of wild boar, hare, etc., to states outside the natural range of these species, for release into the wild).

Intentional introduction of an alien species into national territory if there is a risk of that species subsequently spreading (with or without a human vector) into another state and becoming invasive.

Activities that may lead to unintentional introductions, even where the introduced species is harmless in the state of origin.

4.2. Role of the Bern Convention

The Bern Convention is well-placed to promote national and European co-operation on IAS issues. It provides a regional framework for implementation of the CBD in Europe and brings together the majority of European states and many NGOs specialised in biodiversity conservation. It has given particular attention to biotic invasions over the last twenty years and adopted a wide range of policy and technical recommendations.

Aim

The Bern Convention continues its engagement with IAS issues by facilitating national implementation of this Strategy and strengthening co-operation with relevant regional and global institutions.

Key actions

4.2.1. Continue and support the work of the Convention's Group of Experts on IAS (see Box 13).

4.2.2. Work with key regional and global institutions (e.g. European Commission, EPPO, OIE) to promote the further development of effective IAS measures for Europe and the Mediterranean Region, in particular concerning transboundary movement of potential IAS.

4.2.3. Contribute at the European level to developing a common interpretation of IAS terms and concepts.

4.2.4. Monitor the implementation of this Strategy and report to the Standing Committee on the possible need for further actions in the future.

BOX 13

POSSIBLE ACTIVITIES OF THE BERN CONVENTION GROUP OF EXPERTS ON IAS

Support the Bern Convention Secretariat in reviewing the implementation of this Strategy.

Contribute to the development of technical codes of practice to reduce IAS impacts on European biodiversity, working with relevant sectors and organisations.

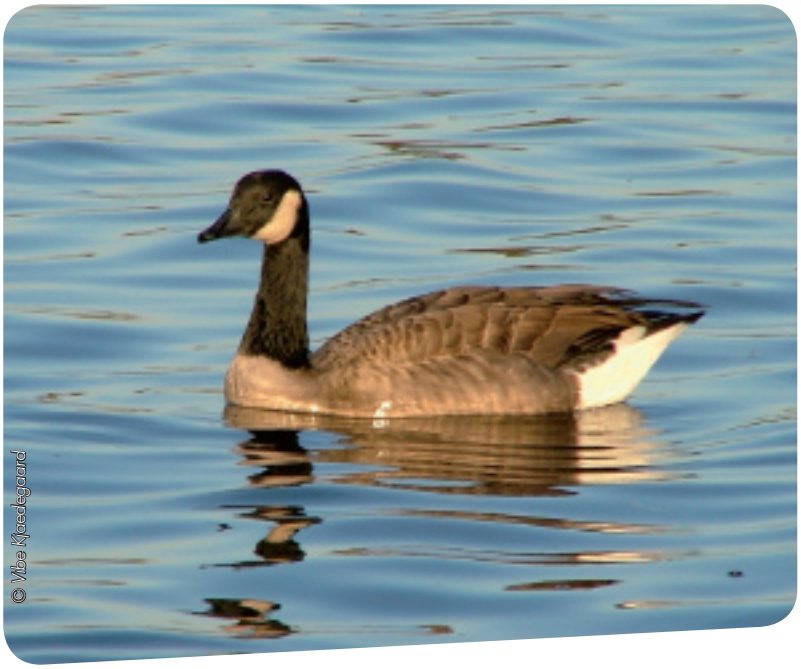
Organise seminars on specific IAS issues, taking account of the need for capacity-building in some Parties and subregions.

Continue technical assistance on methodology for IAS eradication

Facilitate exchange of information between national authorities/networks and focal points, NPPOs, scientific authorities for different taxonomic groups and ecosystems, research institutes and NGOs.

Continue the co-operation with and support the work of the European section of the IUCN Invasive Species Specialist Group.

Organise a major European forum for key organisations involved in IAS issues, sectoral bodies and other stakeholders to raise awareness and strengthen co-operation throughout Europe.



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Branta canadensis

Agave americana

4.3. Subregional co-operation

CBD Guiding principle 3: Ecosystem approach
CBD Guiding principle 9: Co-operation, including capacity-building

Although continental Europe is characterised by territorial continuity, there are marked biogeographical differences in terms of species, subspecies, populations and ecosystems. Many important habitat and ecosystem types (e.g. polar deserts, tundra, temperate forests, steppes, semi-deserts, alpine ecosystems, marine and coastal ecosystems, freshwater ecosystems, wetlands, etc.) would benefit from IAS planning and management consistent with the ecosystem approach as defined by CBD Decision V/6.

Because many of these areas straddle national boundaries, transboundary and subregional co-operation is a priority.

Aims

Use of a biogeographic scale is promoted when defining priorities and implementing measures for IAS prevention, monitoring and mitigation.

States sharing common problems in a subregion, including states not party to the Bern Convention, are encouraged to develop and participate in relevant programmes.

Key actions

4.3.1. Promote dialogue between countries, sectors and key institutions in the same subregion, where not already established, to harmonise strategic direction and develop common approaches to shared IAS pathways and problems.

4.3.2. Develop and implement subregional action plans and initiatives for priority IAS, especially for transboundary areas and shared watercourses (see Box 14).

4.3.3. Make use of existing subregional expertise and networks (International Commission for Scientific Exploration of the Mediterranean Sea; Nordic-Baltic Network on Invasive Species; Regional Biological Invasions Centre hosting the virtual European Research Network on Aquatic Invasive Species; EPPO etc.).

BOX 14

EXAMPLES OF POSSIBLE SUBREGIONAL INITIATIVES

Action plan for the Grey squirrel in the Alpine region

Mediterranean programme to deal with biological invasions on islands

Baltic policy on the treatment of ballast water

Management plan for the American mink in Nordic states

Concerted action for eradication of the ruddy duck (Oxyura jamaicensis) in Europe and the Mediterranean Region

Concerted action for the control of alien crayfish in the Iberian Peninsula

Concerted strategy for the Macaronesian Region.

5. Prevention

CBD Guiding principle 2.1-2: Three-stage hierarchical approach (set out in the Introduction to the Strategy)

Prevention – between and within states – is generally far more cost-effective and environmentally desirable than measures taken following the introduction and establishment of an invasive alien species. It should be given priority as the first line of defence.

Europe particularly needs common approaches to prevention because of the number of contiguous states, the high volume of inter-and intra-continental trade and transport and its extensive free trade arrangements which can facilitate transboundary movements of IAS. Common prevention measures are already in place in some sectors (e.g. plant and animal health) but need to be developed for other activities that can lead to unwanted introductions.

For aquatic ecosystems, the emphasis on prevention is critical. Alien species can be particularly hard to detect in aquatic systems and can disperse rapidly, making eradication or control extremely difficult. For European states with long coastlines and/or with islands, marine IAS issues are of great importance.

Bern Convention Parties have long-established customs, quarantine, plant and animal health systems which play a key role in control of international and domestic trade. However, the expanding volume of goods and passenger traffic entering and moving within Europe by air, sea and land makes it impossible to inspect all risk material. It is therefore important to prioritise available resources, build capacity in key areas and facilitate the application of agreed standards and practices in accordance with national and international law.

5.1. Prevention at source and on arrival: border control and quarantine measures

CBD Guiding Principle 7: Border control and quarantine measurese

Prevention efforts need to begin at the place of origin or export (before a living organism crosses the biogeographical barrier). Prevention at source is particularly important where there are known disease incursions and where interception of

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Myocastor coypus

'hitchhiking' species may be difficult (e.g. where consignments are packed into containers in a source country and transported to dispersed destinations, often remote from traditional inspection sites at entry points).

At the point of import, border controls and quarantine measures need to be used to prevent or minimise the risk of introducing alien species that are or could become invasive. This requires a framework of rules, trained staff, reference lists of species and risk goods, technical procedures and surveillance protocols.

Measures based on risk analysis should be in place to screen intentional introductions in accordance with §5.2 and to minimise unintentional or unauthorised introductions of alien species that are or could become invasive (see §5.3). These national measures need to be consistent with the rules and disciplines adopted within the WTO framework (see Box 7).

Within a state, appropriate measures may also be needed to control in-country introductions of IAS (see §5.4).

Aim

Parties co-operate to strengthen and prioritise border control and quarantine measures for alien species that are or could

become invasive, making best use of existing resources and information systems.

Key actions

5.1.1. Review existing border controls and quarantine systems to identify and address gaps in coverage and technical or resource constraints.

5.1.2. Implement training and capacity-building programmes for quarantine, customs and other border officials.

5.1.3. Facilitate access by border and quarantine services to IAS databases and expert networks (see §2).

5.2. Intentional introductions

CBD Guiding Principle 1: Precautionary approach
CBD Guiding Principle 9.a and c: Co-operation, including capacity-building
CBD Guiding Principle 10: Intentional introduction

Aim

Proposed introductions are assessed through a comprehensive screening system based on risk analysis. states make all efforts to permit only those species that are unlikely to threaten biodiversity.

Key actions

5.2.1. Take appropriate measures to prohibit first-time intentional introductions of alien species, or subsequent introductions of an alien species already invasive or potentially invasive within a country, without prior authorisation from the competent authority of the recipient state.

5.2.2. Develop an evaluation process, including an appropriate risk analysis which may include an EIA (see §3.4.2 and Box 9), to be carried out before a decision is made on whether to authorise a proposed introduction. Make all efforts to permit only those species that are unlikely to threaten biodiversity: the burden of proof that a proposed introduction is unlikely to threaten biodiversity should be with its proposer or assigned as appropriate by the recipient state.

5.2.3. To facilitate common approaches to decision-making on proposed introductions and avoid unjustifiable trade restrictions, work towards a regional or subregional species listing system where measures are not already established, preferably based on higher biogeographic units, consistent with European and international law (see Box 15).

5.2.4. Regulate or manage the use of alien biocontrol agents, taking into account the IPPC Code of Conduct for the Import and Release of Exotic Biological Control Agents and relevant EPPO standards.

BOX 15

POSSIBLE COMPONENTS OF AN AGREED LISTING SYSTEM FOR ALIEN SPECIES

Black list:

Species whose introduction is strictly regulated, following a risk assessment prior to species listing. No further risk assessments are required for the area for which the assessment was conducted. Priority should go to:

– species already identified as highly invasive in one or more European states, species proven to be invasive in other regions,

– species that are likely to cause problems to several European states, are not yet present there and have a high potential of introduction.

– les espèces susceptibles de poser problème dans plusieurs Etats d'Europe, qui n'y sont pas encore présentes mais ont de fortes chances d'y être introduites.

White list:

Species classified as low risk following a risk assessment or based on long-standing experience. Introduction of specimens of these species may be authorised without restriction or under conditions. However, care should be taken to avoid giving the impression that uncontrolled releases of white-listed species are encouraged. The use of white lists should not prevent preference being given to the use of native species of local provenance where appropriate (see also §8.1).

Grey (holding) list:

Any species not included in the black or white list, or which is date-deficient, should be subject to risk assessment prior to a decision on authorisation. Species related to black-or white-listed species may need to be included in the grey list.

The listing system should be dynamic, making it possible to transfer a species to a different list if scientifically justified (e.g. if a white-listed species is repeatedly introduced over a long period, the risk should be reassessed if there is new evidence of potential invasive behaviour).

Species listing and decision-making need to be based on scientific criteria that are periodically reviewed and are transparent (e.g. New Zealand and Australia publish decision-making protocols on their respective websites and invite public and stakeholder input when they develop new import risk analyses and import standards).

5.3. Unintentional introductions

CBD Guiding Principle 11: Unintentional introductions

Aim

Appropriate measures and operational resources are in place to minimise unintentional introductions resulting from sectoral activities.

Key actions

5.3.1. Provide for risk analysis of pathways and vectors for unintentional introductions to support, in particular, an integrated approach to pathway management at the subregional or regional level.

5.3.2. Assess the risk of unintentional introductions through sectoral activities and programmes by carrying out EIAs and/or SEAs where appropriate (also see §3.4.2 and Box 9).

5.3.3. Promote the implementation and further development of standards, codes of conduct and best practices to minimise identified risks, in co-operation with international standard-setting organisations and relevant sectoral organisations as appropriate (see Boxes 16 and 17).

5.3.4. Carefully assess potential environmental impacts before moving water or translocating species between river basins, to prevent the introduction of species to a water system outside their natural range.

Rana catesbeiana

© Riccardo Scalera

Xenopus laevis

BOX 16

EXAMPLES OF APPROPRIATE ACTIONS FOR TRADE AND TRANSPORT PATHWAYS AND VECTORS

Implement the IPPC Guidelines for Regulating Wood Packaging Material in International Trade and support their application to other categories of risk goods/biological material and packaging.

Implement the IMO's *Technical Guidelines for the control and management of ships' ballast water to minimize the transfer of harmful aquatic organisms and pathogens* (A-868 (20)). Support the rapid adoption and implementation of the IMO International Convention for the Control and Management of Ship's Ballast Water and Sediments and the continuation of the GEF/UNDP/IMO Globallast Programme for technical co-operation.

Support best practices to minimise hull fouling and development of more effective, non-toxic antifouling systems to replace those banned by IMO's International Convention on the Control of Harmful Anti-Fouling Systems. Provide guidance to sailors on risks associated with anchors (can transport propagulae of alien aquatic organisms).

Support the International Civil Aviation Organisation's work to assess IAS risks associated with civil aviation pathways and develop common measures to minimise such risks.

Co-operate with tourist operators and airport/port authorities to develop a code of conduct to minimise movement of potentially invasive species in biological material by tourists and travellers.

Promote codes of conduct to minimise the risk of introducing IAS during engineering and infrastructure development work (e.g. canals, tunnels, highways).

Improve the control and monitoring of import and movement of plants including seed and plant products and other related articles by National Plant Protection Organisations.

BOX 17

APPROPRIATE ACTIVITIES AND PARTNERS FOR PREVENTING UNINTENTIONAL INTRODUCTIONS

SECTOR	EXAMPLES OF BEST PRACTICES
Agriculture, forestry and horticulture	Assist National Plant Protection Organisations to strengthen control and monitoring of the import, trade and movement of plants and plant products to minimise the risk of unintentional introduction of alien organisms (e.g. invertebrates and fungi in the soil of imported pot-plants).
Forestry	With forestry stakeholders, promote implementation of relevant principles of third party independent certification systems and support the development of European forest stewardship standards on selection of species for planting and reduction of threats from alien tree species (also see §8).
Horticulture	Co-operate with horticultural trade bodies, botanic gardens and other stakeholders to raise awareness of IAS amongst gardeners and to foster best practices to avoid unintentional introductions e.g. appropriate disposal of waste containing plants, not using aquatic plants near running watercourses where they can spread etc.
Aquaculture/ mariculture	Promote implementation of the International Council for the Exploration of the Sea (ICES) Code of Practice on the Introductions and Transfers of Marine Organisms (1994) and the FAO Code of Conduct for Responsible Fisheries (1995). Work with key stakeholders (e.g. Federation of European Aquaculture Producers) to address risks to native biodiversity associated with escapes from fish farms and introduction of alien parasites in fish stock. Consider the need for stricter controls on use of highly invasive alien fish species and stronger animal health measures.
Sport fishing	Work with angling associations to minimise risks associated with introduction of alien fish as game. Strictly regulate trade in, transport and use of live bait for fishing, to prevent introduction of species not present in the river basin or lake concerned.
Ornamental fish and aquaria	Apply standards and procedures to public aquaria to reduce risks of escape when tanks are emptied. Work with relevant stakeholders (Ornamental Fish International, Ornamental Aquatic Trade Association) to promote awareness-building and best practice amongst dealers, retailers and the public. Where appropriate, provide guidance for National Plant Protection Organisations which inspect aquarium plants on import.

Pet and animal retailers	Encourage retail associations to develop appropriate information materials as well as a recovery system for animals their owners wish to get rid of. Consider the need to prohibit trade in and possession of alien species assessed to be capable of becoming invasive in the event of release or escape into the wild.
Hunting	Work with the *Fédération des associations de chasseurs de l'UE* (FACE) and national hunting and shooting organisations to assess risks associated with introduction of alien game species for restocking. As appropriate, co-operate in the elaboration, adoption and implementation of a European Code of Conduct on Hunting to regulate and manage such introductions.
Aviculture	Work with bird breeders organisations to minimise risks associated with escapes of alien bird species from captivity. As appropriate, co-operate in the elaboration, adoption and implementation of a code of conduct on aviculture to prevent escapes from captivity, establishment into the wild and hybridisation with native species.
Falconry	Work with the International Association for Falconry and Conservation of Birds of Prey to prevent escapes into the wild of alien birds of prey used for falconry, which could lead to hybridisation with native species. As appropriate, co-operate in the elaboration, adoption and implementation of a European Code of Conduct on Falconry.

American mink farm

Procambarus clarkii

© Riccardo Scalera

5.4. In-country prevention

CBD Guiding Principle 7.2: Border control and quarantine measures
CBD Guiding Principle 10: Intentional introduction
CBD Guiding Principle 11: Unintentional introductions

Species native in one part of a country, may be alien, even invasive, in another part of the same country (e.g. the hedgehog, native to mainland Scotland, was introduced to the Scottish island of Uist where it is invasive). Appropriate measures are therefore needed to control introductions of IAS within states, to new ecological regions, consistent with national legislation and policies where these exist. These may be combined with measures to encourage the use of native species of local provenance (see further §8).

Aim

Measures are in place to minimise the introduction, establishment and spread of IAS or potential IAS within a country.

Key actions

5.4.1. Establish, where appropriate, a control system for intentional domestic movements of potential IAS to ecologi-

cally different parts of the country, making use where appropriate of existing systems such as EC plant passports (see Box 18).

5.4.2. Assess the need to adapt existing licensing rules for containment facilities holding potential IAS (e.g. botanic gardens, greenhouses, arboreta, garden centres, zoos, animal-breeding establishments, fish farms, research institutes). Existing licensing and control systems (e. g. in plant health) should be used where appropriate.

5.4.3. Where necessary, consider a ban on the domestic sale of known highly invasive alien plants.

5.4.4. Consider the development of a certification system for indigenous plant species of local provenance (see §8.2).

BOX 18

EXAMPLES OF APPROPRIATE ACTIONS FOR PREVENTING IN-COUNTRY INTRODUCTIONS

Prohibit or strictly regulate facilities holding potentially invasive alien species in containment/captivity in or near to vulnerable areas.

Develop screening procedures for passenger and commodity traffic between the mainland and islands and between islands.

Promote island information exchange networks connected to the GISP/IUCN Co-operative Islands Initiative.

Develop risk-based measures to prevent the domestic spread of invasive alien plants (e.g. South

Africa has listed three categories of IAS for regulatory and management purposes:

1) plants that must be removed and destroyed immediately;

2) plants that need a permit to be grown;

3) plants that may not be planted, grown or sold, but for which mature specimens do not have to be removed.

5.5. Special measures for isolated ecosystems

CBD Guiding Principle 3: Ecosystem approach

Aim

States with biogeographically or evolutionarily isolated ecosystems (islands, lakes, enclosed and semi-enclosed seas, river basins, mountain ranges, gorges, etc.) and centres of endemism and high biodiversity apply strict measures to prevent or minimise adverse impacts of biological invasions.

Key actions

5.5.1. Develop stricter measures where necessary to prevent or minimise the introduction and spread of potential IAS into these vulnerable areas.

5.5.2. Promote subregional co-operation for more effective protection of shared isolated and vulnerable ecosystems.

5.6. Prediction and prevention of spontaneous spread

It is important to distinguish between the initial entry of a species into a country (or region) and its later spontaneous spread. Spontaneous expansion of an invasive alien species established in a neighbouring country is particularly critical because:

1) it means that the ecological conditions are suitable to establishment; and

2) it may be more difficult to contain the spontaneous spread of a species than to prevent its introduction.

Co-operation at the management level between neighbouring states can help to predict and prevent this kind of spread. One country's mitigation could well be a neighbouring country's prevention.

Aim

Patterns of spread of established IAS are better predicted to allow timely responses by neighbouring states.

Key actions

5.6.1. Produce, update and circulate maps of distribution for the most problematic/priority IAS.

5.6.2. Develop predictions of temporal and spatial patterns of spread.

5.6.3. Ensure that information is rapidly and effectively circulated to neighbouring states (see §6.1).

5.6.4. Give priority to the eradication and containment of established IAS that could potentially spread outside the state's territory (see §7.3).

6. Early detection and rapid response

The counterpart to prevention at source (before a species crosses a biogeographical barrier) is prompt detection and intervention post-barrier. Early detection of IAS is essential because of the need for rapid action before significant populations are established.

6.1. Surveillance

CBD Guiding principle 2.2: Three-stage hierarchical approach

Surveillance (activities aimed at identifying alien species new to the country) is a critical element of prevention: without effective surveillance, early detection will mostly cover larger species and remain anecdotal (see §2.1).

Aim

Parties have comprehensive and cost-effective surveillance procedures in place.

Key actions

6.1.1. Making best use of existing capacity (see Box 19), establish procedures to collect, analyse and circulate information on IAS, including identification keys for different taxonomic groups (see further §2).

6.1.2. Set up an Early Warning System and organise regular surveillance of high-risk areas such as:
- main entry points for commercial/tourist arrivals (airports, ports, harbours, open moorings, train stations) and areas frequently visited by tourists;
- entry points for spontaneous spread (coasts, border crossings of water systems shared with neighbouring countries, etc.);
- areas adjacent to containment facilities for potential IAS;
- highly disturbed areas (land clearance, construction, storm damage) and areas where disturbance is regularly occurring (roads, railways etc.); and
- isolated ecosystems and ecologically sensitive areas.

Podarcis sicula introduced in its natural range

BOX 19

WAYS TO MAKE BEST USE OF EXISTING CAPACITY FOR EARLY DETECTION

Use established early warning systems (e.g. in plant and animal health sectors).

Include invasive alien species in existing wildlife monitoring arrangements.

Train field officers and protected area staff to conduct site-and species-specific surveys.

For transboundary sites and ecosystems, promote joint surveys by neighbouring management bodies.

Encourage specialist NGOs to participate in reporting networks.

Develop information materials to assist farmers, gardeners, birdwatchers, foresters, fishermen, hunters, divers, hikers and photographers to detect and report new arrivals.

Introduce reporting requirements for landowners and occupiers, based on a list of priority IAS.

6.2. Rapid response and contingency planning

CBD Guiding principle 2.2: Three-stage hierarchical approach
CBD Guiding Principle 12: Mitigation of impacts
CBD Guiding principle 13: Eradication

There is only a limited period of time in which eradication is a practicable option, before the invasive species reaches a certain level of population and/or range expansion. Particularly for the mainland, which has a much lower proportion of successful eradications than islands, it is difficult to predict with any certainty the length of the critical period during which eradication is feasible. This makes rapid implementation of an eradication programme particularly important for mainland incursions.

Aim

The time between documenting an introduction and implementing a response is reduced through the clear allocation of roles and powers and the development of contingency plans for eradicating newly detected alien species, except those recognised as low risk.

Key actions

6.2.1. Ensure that all competent authorities (including local authorities and protected area authorities) have sufficient powers to remove IAS or alien species with a high potential to become invasive, in accordance with national law and policy (see Box 20).

6.2.2. Prepare contingency plans for eradicating groups of species with similar characteristics (e.g. plants, invertebrates, marine organisms, fresh-water organisms, fresh-water fishes, reptiles, amphibians, birds, small mammals, large mammals).

6.2.3. Provide adequate funds and equipment for rapid response to new invasions and train relevant staff to use the control methods selected.

BOX 20

EXAMPLES OF ACTIONS TO SUPPORT RAPID RESPONSE OBJECTIVES

Where necessary, streamline the authorisation process for rapid response.

Consider the use of emergency orders where urgent eradication action is needed.

Contribute to regional co-operation on research and development of emergency response materials.

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Carpobrotus edulis

7. Mitigation of impacts

Prevention can reduce the rate of occurrence of new introductions, but not halt them. When the establishment of an invasive alien species has been detected, appropriate management responses (eradication, containment, control) are needed in the earliest possible stages of invasion to mitigate adverse effects.

Consistent with the three-stage hierarchical approach set out in CBD Guiding

Principle 2:

– eradication programmes should be considered first. Eradication is the most coherent solution in terms of biodiversity conservation and can be more effective, cost effective and ethical than other management alternatives (control, containment, do-nothing) (see §7.2);

– where a science-based assessment shows that eradication is no longer feasible, or resources are not available for eradication, containment or control (see §7.3 and §7.4) should be implemented. This is a high priority for IAS that could spread to neighbouring countries and to ecologically sensitive areas;

– long-term control measures (see §7.4) should be considered on the basis of a cost/benefit analysis for established species where such measures can substantially reduce adverse impacts.

7.1. Policy and legal aspects

CBD Guiding Principle 1: Precautionary approach
CBD Guiding Principle 2.2: Three-stage hierarchical approach
CBD Guiding Principle 6: Education and public awareness
CBD Guiding principle 12: Mitigation of impacts

At the regional level, common legal procedures are well-established for control of pests and diseases that affect plant, animal and human health, but not explicitly for IAS that threaten native biodiversity and ecosystem function. One constraint that competent authorities may need to address is opposition by certain sectors of society to programmes to control alien species (especially birds and mammals).

Aim

Parties have a clear legal basis for mitigation measures and procedures to consult and involve affected communities and stakeholders.

Key actions

7.1.1. Equip competent authorities with powers to take appropriate mitigation measures, based on the precautionary approach and an examination of the long-term benefits and costs (environmental, economic and social) (see Box 21).

7.1.2. Where necessary, review species lists and conservation strategies with the aim of removing legal protection from IAS and potential IAS (e.g. under measures applicable to higher taxa) and ensure that their legal status is compatible with mitigation measures.

7.1.3. With affected states, promote co-ordinated mitigation measures for species identified as a transboundary, subregional or regional problem (e.g. Action Plan for Eradication of the Ruddy Duck in the Western Palaearctic), using existing structures where possible (e.g. the European Plant Health System).

BOX 21

POSSIBLE MEASURES TO SUPPORT MITIGATION POLICIES AND ACTIVITIES

More effective use of existing legal measures (e.g. for game management, weed control).

Active involvement of species user groups (e.g. hunting, shooting, falconry, angling) in monitoring and mitigation.

Education and awareness programmes to engage local communities in support of necessary mitigation and, where appropriate, encourage their participation (see also §1).

Establishing responsibility, within reasonable limits, for landowners, occupiers and relevant stakeholders to prevent or control further spread of listed invasive alien species (see §3.11).

Incentives for landowners and occupiers to carry out mitigation measures on their land.

Powers of compulsory access to sites where voluntary approaches fail.

Psittacula krameri

7.2. Eradication

CBD Guiding Principle 13: Eradication

Eradication is an essential management tool and should be encouraged and promoted where appropriate and feasible (see Box 22). However, it can only be carried out for a limited proportion of the IAS established in a country: for many long-established IAS present in the wild, eradication will simply not be feasible.

BOX 22

CONDITIONS FOR STARTING AND ERADICATION

There is adequate public support. Sufficient funds are available.

There is adequate political commitment.

The eradication is ecologically feasible. Feasibility should be assessed on the basis of relevant biological characteristics of the target species, its ecological relationship with the invaded area and socio-economic considerations.

Aim

Realistic priorities for eradication are agreed and implemented and results are disseminated.

Key actions

7.2.1. Establish priority lists of IAS to eradicate (see Box 23).

BOX 23

PRIORITY SPECIES FOR ERADICATION

Newly-arrived alien species, especially where non-reversible effects are predicted. Species representing a major threat to native biodiversity.

Species already established in the wild, whose effects on native ecosystems are reversible.

Species for which eradication is most feasible.

Removal of feral animals of domestic species and commensal non-native species that damage the natural environment should be considered as a management option, particularly on islands.

7.2.2. Prepare and implement national containment/eradication plans for two IAS (one aquatic and one terrestrial) to demonstrate what can be achieved (see Box 24).

7.2.3. Contribute to the implementation of Target 10 (Objective 2) of the Global Strategy for Plant Conservation adopted by the CBD Conference of the Parties in 2002 (*"Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems"*).

7.2.4. Prioritise vulnerable and relatively undisturbed ecosystems and islands for eradication of IAS, based on a classification of natural value, degree of disturbance and feasibility of success.

7.2.5. Prepare and implement a comprehensive IAS containment/eradication strategy for two regions (one predominantly containing dry and one with wet biotopes).

7.2.6. Implement and fund eradication programmes, subject to prior risk analysis and public consultation.

7.2.7. Notify and consult with neighbouring states and the Bern Convention Secretariat about proposed eradication of transboundary populations: seek to develop joint programmes with other states affected, including for follow-up monitoring.

7.2.8. For continental states, prepare a joint co-ordinated eradication plan for selected species.

BOX 24

DESIGN OF ERADICATION PROGRAMMES

Consider impacts, reversibility of effects and risk of re-invasion of the management area (immigration rate of the alien species being eradicated should be zero).

A trial eradication can be a useful tool to collect information for the assessment (e.g. bait preference and acceptance to target species, risk of destruction of non-target species, ways to minimise this risk, etc.), which should determine the chances of success and address worst case scenarios.

Select eradication methods primarily on the basis of their efficiency (all individuals of the population should be vulnerable to the removal methods or the methods should reduce population size below the threshold of viability).

Methods should be as selective, ethical and humane as possible and comply with applicable regulations (e.g. animal welfare).

Combine different methods to ensure that individual organisms surviving the primary campaign are destroyed.

Monitor effort, costs and results to allow for corrections and identify means to prevent future re-invasions.

Monitor recovery of native plant and animal populations and provide, where necessary, for conservation measures.

Botanical garden with some invasive plants

7.3. Containment

CBD Guiding Principle 14: Containment

Containment programmes may have one or more specific aims:
– to contain the species within defined geographical boundaries;
– to prevent its spread to neighbouring countries;
– to prevent its expansion to isolated and/or ecologically important areas ; and/or
– to postpone the species' population growth in order to develop more effective eradication techniques.

Containment methods should be selected with regard to their efficiency, selectivity and the undesired effects they may cause. Regular monitoring is essential and needs to be linked with quick action to eradicate any new outbreaks.

Aim

Realistic priorities for containment are agreed and implemented; results are disseminated.

Nasua nasua

Key actions

7.3.1. Establish priority lists of IAS for containment, where appropriate in collaboration with neighbouring states for which the same species are problematic.

7.3.2. Prioritise areas for containment, based on classification of natural value, degree of disturbance, importance as invasion corridors and feasibility of success.

7.3.3. Implement and fund containment programmes for priority IAS, subject to prior risk analysis and public consultation.

7.3.4. Identify and develop co-ordinated programmes on containment of IAS which affect neighbouring states or sub-regions.

7.4. Control

CBD Guiding Principle 15: Control

The aim of control is to reduce the density and abundance of an IAS to keep its impact to an acceptable level in the long term.

Before starting a control programme a cost/benefit analysis should be realised, desired outcomes should be clearly defined and appropriate monitoring of the results should be planned. Control methods should be selected with regard to their efficiency, and selectivity, with due consideration of the undesirable effects they may cause. In some cases the use of integrated management techniques is the best option.

Aim

Control programmes, based on a cost/benefit analysis and realistic priorities, are agreed and implemented and their results are disseminated.

Key actions

7.4.1. Assess costs, benefits and outcomes of IAS control programmes already in place; disseminate results.

7.4.2. Establish priority lists of IAS and of areas for control.

7.4.3. Implement and fund control programmes in sectors where not yet established.

8. Restoration of native biodiversity

CBD Guiding principle 3: Ecosystem approach

As part of a holistic approach, IAS policies and measures need to go further than the defensive three-stage hierarchical approach (CBD Guiding Principle 2) and support restoration measures for species, natural habitats and ecosystems that have been affected by biological invasions. Increased resilience of native biodiversity can in turn provide greater protection against re-invasion or new incursions.

Aim

IAS strategies and eradication and control programmes promote restoration measures for native biodiversity and, wherever possible, the use of native species of local provenance in preference to alien species.

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Reynoutria spp.

Key actions

8.1. Identify and co-operate with appropriate partners on restoration programmes and relevant research and information exchange (see §2.3-2.3).

8.2. Promote the use of native plant species of known local provenance in landscaping, revegetation, roadside planting, erosion control, watercourse management, management of ecologically sensitive areas and development assistance programmes, unless these are unavailable, unsuited to the programme purpose and/or risk analysis indicates that alien species are unlikely to have adverse impacts (see Box 25).

8.3. Explore opportunities to reintroduce native species following eradication programmes, subject to consultation with neighbouring states and the Bern Convention Secretariat (see Box 26).

BOX 25

EXAMPLES OF APPROPRIATE ACTIONS TO SUPPORT BIODIVERSITY RESTORATIONE

Take steps to increase the supply of native species of known local provenance to meet landscaping and environmental management needs (e.g. through certification systems, see 5.4.4).

Design agri-environment measures to support restoration of native biodiversity damaged by invasions.

Support the use of native species in the establishment of forest plantations and the restoration of degraded ecosystems, in accordance with the Principles of third party independent certification systems.

Promote natural restoration of degraded areas after removal of IAS and facilitate natural ecosystem restoration.

BOX 26

RE-INTRODUCTION OF NATIVE SPECIES FOLLOWING ERADICATION PROGRAMMES

This can be a suitable management option but should only be carried out in accordance with best practice guidelines (e.g. IUCN/SSC Guidelines for Re-introductions).

Particular care should be taken to avoid introducing a different subspecies or non-local population of the native species concerned (e.g. a non-native plant genotype), due to the risk of genetic contamination.

Selected international and European instruments and institutions with provisions, programmes or activities relevant to invasive alien species[13]

Instrument or institution	Date of entry into force	Relevant Provisions	COP decision(s) or equivalent	Related activities and programmes
Biodiversity-related instruments: global				
Convention on Biological Diversity (Rio de Janeiro,1992) http://www.biodiv.org	29.12.1993	Article 8 *In-situ* Conservation Each Contracting Party shall, as far as possible and as appropriate: (h) Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species.	Decision IV/1 C, IV/5, V/8 Decision VI/23 on Alien species that threaten ecosystems, habitats or species and annexed Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species (adopted by the CBD COP, The Hague, April 2002)	IAS designated as a cross-cutting theme under the CBD. The 3rd Joint CBD-Ramsar Work Plan (2002-2006) provides for collaborative actions with GISP, IUCN and the World Conservation Monitoring Centre to increase the availability of information and guidance on aquatic IAS.
Convention on wetlands of international importance especially as waterfowl habitat (Ramsar, 1971) http://www.ramsar.org	21.12.1975		Resolution VII.14 on Invasive Species and Wetlands Resolution VIII.18 on Invasive Species and Wetlands (November 2002)	Joint work programme with CBD (see above)
Convention on the conservation of migratory species of wild animals (Bonn, 1979) http://www.wcmc.org.uk/cms/	01.11.1983	Article III (4) (c): Range State Parties of a migratory species listed in Appendix 1 shall endeavour: to the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to further endanger the species, including strictly controlling the introduction of, or controlling or eliminating, already introduced exotic species. Article V (5) (e) Where appropriate and feasible, each agreement (for Annex II) should provide for, but not be limited to protection of such habitats from disturbances, including strict control of the introduction of, or control of already introduced, exotic species detrimental to the migratory species.		IAS covered by CMS-CBD Joint Work Plan

13. Adapted from Shine, C., N.Williams and L.Gundling (2000). *A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species* (IUCN EPLaw Paper No.40).

Instrument or institution	Date of entry into force	Relevant Provisions	COP decision(s) or equivalent	Related activities and programmes
Biodiversity-related instruments: regional and subregional				
Convention on the conservation of European wildlife and natural habitats (Bern, 1979) http://www.nature.coe. int/english/ cadres/bern.htm	01.06.1982	Article 11(2)(b) Each Contracting Party undertakes to strictly control the introduction of non-native species.	Standing Committee Recommendations include: - Recommendation no 18 (1989) on the protection of indigenous crayfish in Europe; - Recommendation No. 45 (1995) on controlling proliferation of *Caulerpa taxifolia* in the Mediterranean; - Recommendation No. 61 (1997) on the conservation of the White-headed Duck *(Oxyura leucocephala)*; - Recommendation No. 78 (1999) on the conservation of the Red squirrel (*Sciurus vulgaris*) in Italy - Recommendation No. 57 (1997) on the Introduction of Organisms belonging to Non-Native Species into the Environment - Recommendation No. 77 (1999) on the eradication of non-native terrestrial vertebrates	Reports published: Legal Aspects of the Introduction and Reintroduction of Wildlife Species in Europe. Isabelle Trinquelle T-PVS (92) 7. Introduction of non-native organisms into the Natural Environment. (1996). Cyrille de Klemm, Nature and Environment Series, No. 73 Introduction of non-native plant species into the Natural environment (1997). J.Lambinon, Nature and Environment series No 87 Methods to control and eradicate non native terrestrial vertebrates (1998). J.F.Orueta The status of the Ruddy Duck (*Oxyura jamaicensis*) in the western Palearctic and an Action Plan for eradication, 1999-2002 (1999) Identification of non-native freshwater fish established in Europe, assessing their potential threat to native biodiversity (B.Elvira, 2000) Workshops and meetings include: Control and Eradication of Non Native Terrestrial Vertebrate (Malta, 1999); Control of Ruddy Ducks (UK, 2000); IAS on European Islands and Evolutionary Ecosystem (Horta, Azores, 2002).
Benelux Convention on nature conservation and landscape protection (Brussels, 1982)	01.10.1983	Article 1 The present Convention aims at regulate the concentration and the co-operation between the three Governments in the field of the conservation, the management and the restoration of natureandlandscapes.	Benelux Council of Ministers Decision 17.10.83. Parties to the 1982 Benelux Convention are required to prohibit the introduction of non-native animal species into the wild without authorisation from the competent national authority; preintroduction assessment required; communications between parties about planned introductions.	

Instrument or institution	Date of entry into force	Relevant Provisions	COP decision(s) or equivalent	Related activities and programmes
Protocol for the implementation of the alpine Convention in the field of nature protection and landscape conservation (Chambéry, 1994)	Date of adoption: 20/12/1994	Article 17 The Contracting Parties guarantee that species of wild fauna and flora not native to the region in the recorded past are not introduced. Exceptions are possible when the introduction is needed for specific use and may not have adverse effects for nature and for the landscape.		
Protocol concerning specially protected areas and biological diversity in the Mediterranean (Barcelona, 1995)	Entered into force in December 1999	Article 6 The Parties, in conformity with international law and taking into account the characteristics of each specially protected area, shall take the protection measures required, in particular: the regulation of the introduction of any species not indigenous to the specially protected area in question, or of genetically modified species, as well as the introduction or reintroduction of species which are or have been present in the specially protected area. Article 13 The Parties shall take all appropriate measures to regulate the intentional or accidental introduction of nonindigenous or genetically modified species to the wild and prohibit those that may have harmful impacts on the ecosystems, habitats or species in the area to which this Protocol applies. The Parties shall endeavour to implement all possible measures to eradicate species that have already been introduced when, after scientific assessment, it appears that such species cause or are likely to cause damage to ecosystems, habitats or species in the area to which this Protocol applies.		Action Plan on the Introduction of Species and on Invasive Species in the Mediterranean Sea (approved by the Sixth Meeting of National Focal Points in June 2003; scheduled for adoption by Parties in November 2003).

Instrument or institution	Date of entry into force	Relevant Provisions	COP decision(s) or equivalent	Related activities and programmes
Agreement on the conservation of AfricanEurasian migratory waterbirds (The Hague, 1995) http://www.wcmc.org.uk/aewa	01.11.1999	Article III(2)(g) Parties shall prohibit the deliberate introduction of non-native waterbird species into the environment and take all appropriate measures to prevent the unintentional release of such species if this introduction or release would prejudice the conservation status of wild fauna and flora; when nonnative waterbird species have already been introduced, the Parties shall take all appropriate measures to prevent these species from becoming a potential threat to indigenous species. Annex 3 Action Plan 2.5 Parties shall, if they consider it necessary, prohibit the introduction of non-native species of animals and plants which may be detrimental to the populations listed in Table1. Parties shall, if they consider it necessary, require the taking of appropriate precautions to avoid the accidental escape of captive birds belonging to non-native species. Parties shall take measures to the extent feasible and appropriate, including taking, to ensure that when non-native species or hybrids thereof have already been introduced into their territory, those species or their hybrids do not pose a potential hazard to the populations listed in Table1.		African-Eurasian Waterbird Agreement Secretariat: proposed tripartite Joint Work Plan between AEWA, CMS and Ramsar. Draft Conservation Guideline on Avoidance of Introductions of Non-Native Migratory Waterbird Species (Resolution 2.3, adopted September 2002). The AEWA Technical Committee will revise these Guidelines by December 2003 to ensure consistency with policy decisions and terminology developed under CBD and Ramsar. Ongoing AEWA study on rehabilitation of important sites for migratory waterbirds that have been degraded by invasive aquatic weeds (2003-4, contracted to the IUCN Environmental Law Centre)
EC Council Directive 79/409/EEC on the conservation of wild birds (as amended)	02.04.79	Article 11 Member states shall see that any introduction of species of bird which do not occur naturally in the wild state in the Euro pean territory of the member states does not prejudice the local fauna and flora.		

Instrument or institution	Date of entry into force	Relevant Provisions	COP decision(s) or equivalent	Related activities and programmes
EC Council Directive 92/43/ EEC onthe-conservation of natural habitats and of wild fauna and flora	21.5.92	Article 22 In implementing the provisions of this Directive, member states shall: ensure that the deliberate introduction into the wild of any species which is not native to their territory is regulated so as not to prejudice natural habitats within their natural range or the wild native fauna and flora and, if they consider it necessary, prohibit such introduction.		The EU's four sectoral Biodiversity Action Plans all reference IAS (conservation of natural resources; agriculture; fisheries; economic and development co-operation) . These were adopted under the Community Biodiversity Strategy (COM(98)42). These policy instruments are complementary to national strategies and measures.
Council Regulation 338/97/EC on the protection of the species of wild flora and fauna by regulating trade therein		Art.4(6)(d) 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. Article 9(6) 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).		Four IAS are now subject to an import ban under Commission Regulation (EC) No 1497/2003 of 18 August 2003 amending Council Regulation (EC) No 338/97 on the protection of species of wild fauna and flora by regulating trade therein: Red-eared slider *Trachemys scripta elegans*; *Chrysemys picta*; American Bullfrog Rana catesbeiana; Ruddy duck *Oxyura jamaicensis*
Marine and freshwater systems				
United Nations Convention on the law of the sea (Montego Bay, 1982) http://www.un.org/De pts/los/losconv1.htm http://www.imo.org (http://globallast.imo.org)	16.11.1994	Article 196 States shall take all measures necessary to prevent, reduce and control pollution of the marine environment resulting from the use of technologies under their jurisdiction or control, or the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes.		IMO Resolution A.868 (20)1997 Guidelines for the control and management of ships´ ballast water to minimize the transfer of harmful aquatic organisms and pathogens. IMO Marine Environment Protection Committee's Technical circular on design measures for ballast water and sediment options in new ships (MEPC 47th session, London 4-8 March 2002). IMO is currently negotiating the draft International Convention on the control and management

Instrument or institution	Date of entry into force	Relevant Provisions	COP decision(s) or equivalent	Related activities and programmes
				of ships ballast water and sediments, due for adoption in early 2004 Global ballast water management programme (Glo-Ballast) launched in 2000, in co-ordination with United Nations development programme and global environment facility, providing technical assistance to developing the IMO ballast water guidelines (A-868(20)) and prepare for the new ballast water Convention) International Convention on the control of harmful antifouling systems (2001) bans the use of toxic substances such as trienyl-tin in anti-fouling paints but may cause an increase in marine bioinvasions due to hull fouling.
Convention on the Law of the nonnavigational uses of International watercourses (New York, 1997) http://www.un.org	Date of adoption 21.05.1997 Not in force	Article 22 Watercourse states shall take all measures necessary to prevent the introduction of species, alien or new, into an inter-national water-course, which may have effects detrimental to the ecosystem of the watercourse resulting in significant harm to other watercourse states.		
Convention concerning fishing in the waters of the Danube (Bucharest 1958)	20.12.1958	Annex Part V Article 10 The acclimatisation and breeding of new species of fish and other animals and of aquatic plants in the waters of the Danube to which this Convention applies may not be carried out save with the consent of the Commission.		
International Council for the Exploration of the Sea (ICES) and the European Inland Fisheries Advisory Commission (EIFAC)		Code of Practice on the introductions and transfers of marine organisms (1994) Recommends practices and procedures to diminish risks of detrimental effects from marine organism introduction and transfer.		Working Group on introductions and transfers of marine organisms

Instrument or institution	Date of entry into force	Relevant Provisions	COP decision(s) or equivalent	Related activities and programmes
FAO Code of conduct for responsible fisheries (1995) http://www.fao.org		Article 9.3.2 States should cooperate in the elaboration, adoption and implementation of international codes of practice and procedures for introductions/transfers of aquatic organisms.		Technical guidance has been developed under the Code of Conduct and is available from the FAO website: e.g. *Precautionary approach to capture fisheries and species introductions and Aquaculture Development*
		Article 9.3.3 States should, in order to minimise risks of disease transfer and other adverse effects on wild and cultured stocks, encourage adoption of appropriate practices in the genetic improvement of broodstocks, the introduction of non-native species, and in the production, sale and transport of eggs, larvae or fry, broodstock or other live materials. States should facilitate the preparation and implementation of appropriate national codes of practice and procedures to this effect.		(respectively FAO Technical Guidelines for responsible fisheries 2/1996 and 5/1997); FAO European inland fisheries advisory commission. The FAO database on aquatic introductions now covers freshwater fish, molluscs, crustaceans and marine fish.
Civil aviation International				
Civil Aviation Organisation http://www.icao.int/			ICAO Assembly Resolution A-32-9: Preventing the introduction of invasive alien species (1998). ICAO General Assembly Resolution A33-18, adopted at the 33rd Session, Montreal 2001: urges Contracting States to take mutually supportive efforts to reduce the risk of introducing potential IAS via this pathway to areas outside their natural range.	The ICAO Council is working with appropriate organisations to identify possible steps to reduce introduction risks. It conducted a survey of Contracting States in 2002-3 to compile system-wide data on this pathway and is currently analysing the results. The possible need for an ICAO prevention strategy will be considered by the ICAO Assembly in 2004.
Plant and animal health measures and the multilateral trading system				
International plant protection Convention (Rome, 1951) Revised version adopted in 1997, but not yet entered into force www.ippc.int	03.04.1952	Provides a framework for international cooperation to prevent the introduction of pests of plants and plant products, and to promote appropriate measures for their control. It deals with the spread of pests between countries and	International Standards for Phytosanitary Measures include: Guidelines for pest risk analysis (ISPM #2) Code of Conduct for the Import and Release of Exotic Biological Control Agents (ISPM #3) Glossary of phyto	The CBD and IPPC Secretariats have established a programme of collaboration to better integrate biodiversityrelated and phytosanitary expertise. In February 2003, the two Secretariats agreed a Memorandum of Understanding that

Instrument or institution	Date of entry into force	Relevant Provisions	COP decision(s) or equivalent	Related activities and programmes
		phytosanitary measures within a country. Parties are required to establish national plant protection organisations with authority in relation to quarantine control, risk analysis and other measures required to prevent the establishment and spread of pests that, directly or indirectly, are pests of plants and plant products.	sanitary terms (ISPM#5) and its Supplement No. 2 on Guidelines on the understanding of 'Potential economic importance' and related terms including reference to environmental considerations. Guidelines for surveillance (ISPM #6). Determination of pest status in an area (ISPM #8). Guidelines for pest eradication programmes (ISPM #9). Guidelines for the notifycation of non-compliance and emergency action (ISPM #13) Pest reporting (ISPM #17). Pest risk analysis for quarantine pests (ISPM #11). and its Supplement on Analysis of Environmental Risks.	recognises the overlapping objectives of the IPPC and CBD, calls for strengthened cooperation between secretariats and identifies areas for collaboration.
Convention for the establishment of the European and Mediterranean plant protection organisation (Paris, 1951) http://www.eppo.org/	01.11.53	Recognised regional plant protection organisation within the framework of the IPPC. Advises member Governments on the technical, administrative and legislative measures necessary to prevent the introduction and spread of pests and diseases of plants and plant products. Adopts standards (several hundreds), including Standards on Pest Risk Assessment, Pest Rist Management and on Environmental Risks of Biocontrol Agents.	Regional standards including standards on pest risk analyses, and standards on environmental risk analyses for biological control agents.	Development of regional standards for the European and Mediterranean region. A work programme has been initiated in 2002 on invasive alien plants.
EC Council Directive 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plantproducts and against their spread within the Community Revised 28 November 2002 http://europa.eu.int/co mm/food/fs/ph_ps/harm/index_en.htm	First Council Directive 77/93/CEE adopted in 1977	Binding measures against the introduction of alien plant pests into the EU and against their spread within the whole territory of the EU member states. Provides for border and internal inspection (Plant Health Certificates and Plant Passports)	Member states of the European Union implement plant health measures and standards consistent with EC plant health directives and regulations. The EU Council Group of Heads of Plant Health Services adopted a statement on the relevance of phytosanitary measures against invasive alien species affecting plants in December 2002. Revised Directive 2000/29 aims to improve the transparency of import procedures	

Instrument or institution	Date of entry into force	Relevant Provisions	COP decision(s) or equivalent	Related activities and programmes
			for plants and plant products and further adjusts the EU Plant Health regime to the conditions of the internal market, responding to risks resulting from increased trade.	
Office International desEpizooties http://www.oie.int/		Develops standards and guidance on pests and diseases of animals (but not on animals themselves as pests). Codes set out standards on import risk analysis and import/export procedures and minimum health guarantees required of trading partners to avoid the risk of spreading animal diseases. NB Member states of the European Union implement animal health measures and standards consistent with EC animal health directives and regulations: http://europa.eu.in t/comm/food/fs/ah_pcad/ah_pcad_index_en.html.	International Animal Health Code for Mammals, Birds and Bees (10th Edition) International Aquatic Animal Health Code (5th Edition 2002) Codes include Guidelines for Import Risk Analysis as well as risk management measures applicable to specific diseases, updated annually.	OIE has an Ad Hoc working group on risk analysis for aquatic animal diseases and a Working Group on Wildlife which addresses wildlife management and reintroduction issues that have an animal disease dimension, but not (to date) related habitat and ecosystem issues. OIE, FAO and World Health Organisation hold annual meetings to reinforce information exchange and improve co-ordination of activities. In February 2003, they approved the joint implementation of a global early warning system (working on a list of diseases of common interest and a future plan of action) and the development of a joint strategy to strengthen regional activities for animal disease control.
WTO Agreement on the application of sanitary and phytosanitary measures (Marrakech, 1995)	01.01.1995	Provides a uniform framework for measures governing phytosanitary measures for human, plant and animal life or health. Sanitary and phytosanitary measures are defined as any measure applied a) to protect human, animal or plant life or health (within the Member's Territory) from the entry, establishment or spread of pests, diseases, disease carrying organisms; b) to prevent or limit other damage (within the Member's Territory) from the entry, establishment or spread of pests. Currently recognises international standards developed within the IPPC framework (plant health), by OIE (animal health) and by Codex Alimentarius Commission (food safety).		

Other references

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APPENDIX

Convention on the Conservation of
European Wildlife and Natural Habitats

Standing Committee

Recommendation No. 99 (2003) of the Standing Committee, adopted on 4 December 2003, on the European Strategy on Invasive Alien Species

The Standing Committee of the Convention on the Conservation of European Wildlife and Natural Habitats, in accordance with Article 14 of the Convention,

Having regard to the aim of the Convention which is notably to ensure the conservation of wild flora and fauna, by giving particular attention to species, including migratory species, which are threatened with extinction and vulnerable;

Recalling that under Article 11, paragraph 2.*b* of the Convention, each Contracting Party undertakes to strictly control the introduction of non-native species;

Bearing in mind Recommendation No. R (84) 14 of the Committee of Ministers of the Council of Europe to member states on the introduction of non-native species, adopted on 21 June 1984;

Recalling Recommendation No. 57 (1997) on the Introduction of Organisms belonging to Non-Native Species into the Environment, and the use it makes of terms such as "native species" and "introduction", as well as to the species, subspecies or varieties to which Recommendation 57 refers to;

Recalling Recommendation No. 77 (1999) on the eradication of non-native terrestrial vertebrates;

Recalling that under Article 8.*h* of the Convention on Biological Diversity, each Party undertakes to prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species;

Recalling Decision VI/23 of the 6th Conference of the Parties of the Convention on Biological Diversity, on Alien species that threaten ecosystems, habitats or species, and the definitions used in that text, as well as the conservation guidelines of the Africa-Eurasian Migratory Waterfowl Agreement;

Wishing to contribute to improve the control of the introduction of alien species, and the mitigation of the effects of invasive alien species on the native flora, fauna and natural habitats;

Noting substantial progress on regulation, management and eradication of invasive alien species has been achieved in Europe in the last years;

Referring to the measures proposed in the "European Strategy on Invasive Alien Species", [document T-PVS(2003) 7];

Recommends that Contracting Parties:

1. draw and implement national strategies on invasive alien species taking into account the European Strategy on Invasive Alien Species mentioned above;
2. co-operate, as appropriate, with other Contracting Parties and Observer states in the prevention of introduction of invasive alien species, the mitigation of their impacts on native flora and fauna and natural habitats, and their eradication or containment where feasible and practical, *inter alia* by exchanging information, collaborating in European projects and paying particular attention to invasive alien species in trade and transboundary areas;
3. keep the Standing Committee informed of the measures taken to implement this recommendation.

Invites Observer states to take note of this recommendation and implement it as appropriate.

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Contacts:

Eladio Fernández-Galiano, Head of the Biological Diversity Unit
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Fax: +34 93 211 49 91
E-mail: david@diazdesantos.es
http://www.diazdesantos.es

Díaz de Santos Madrid
C/Albasanz, 2
ES-28037 MADRID
Tel.: +34 91 743 48 90
Fax: +34 91 743 40 23
E-mail: jpinilla@diazdesantos.es
http://www.diazdesantos.es

SWITZERLAND/SUISSE
Planetis Sàrl
16 chemin des Pins
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Tel.: +41 22 366 51 77
Fax: +41 22 366 51 78
E-mail: info@planetis.ch

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Invasive alien species can upset ecosystems and are one of the main causes of species extinction. The European Strategy on Invasive Alien Species developed in the framework of the Bern Convention, encourages the implementation of co-ordinated measures in all European states so as to prevent or minimise their adverse impacts on native biological diversity.

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