

Invasive Species in Ireland Review

Discussion and Consultation Paper

August 2008

1. Introduction

The Invasive Species Ireland project which began in May 2006 aims to reduce the impact and threats from invasive species on the island of Ireland and is a joint initiative between the National Parks and Wildlife Service and the Northern Ireland Environment Agency. Preventing the spread and new introductions of invasive species is an issue of shared responsibility and requires the involvement of all relevant government agencies, academia, private and voluntary sectors and the project has sought to do this through the technical working groups and Invasive Species in Ireland Forum.

In Ireland, practical management of introduced species is challenging because of the cross-border implications of controlling introductions and spread. A pro-active stance is fundamental since prevention of introductions is demonstrably more cost-effective than reactive control or eradication measures. The project has put in place practical steps that aim to minimise introductions, evaluated management and control measures, and laid the foundations for a cross-jurisdictional framework to respond to species introductions.

The Invasive Species Ireland project is a three year project and in the first two years it has established itself as a focus for invasive species work in Ireland and facilitated networking and information sharing at a level that had not happened on the island of Ireland to date. This has put in place the foundations needed for any future work. A key part of the project is to undertake a review of progress after two years and to organise a conference to include key stakeholders to share information on the findings of the contract and explore options for a way forward.

The Invasive Species Ireland project team is currently carrying out a review of progress to date with the aims of:

- Benchmarking activity to identify gaps and needs at national and regional/local level
- Assessing the Invasive Species Ireland project against CBD principles and emerging EU Framework
- Benchmarking against other countries to identify actions that are relevant for Ireland
- Developing recommendations and proposals for future options for invasive species management on the island of Ireland

2. Consultation process

This consultation is a key part of the review and is an opportunity for partners and interested individuals to identify and support those actions and priorities that you consider to be important. Responses to this consultation paper can be submitted electronically or at stakeholder meetings which will be held from 10-1pm on the 2/9/08 at the Medical Biology Centre, Queens University Belfast, 97 Lisburn Road and from 11-2pm on 4/9/08 at National Parks and Wildlife Services, 7 Ely Place, Dublin. The outputs from the consultation and the stakeholder meetings will be collated and presented and considered at a conference in November. If you wish to make additional submissions or raise any issues that have not been covered in this consultation paper,

you can do so by email or telephone to Cathy Maguire on +44 (0)28 90278330 or cathy@invasivespeciesireland.com.

The review is quite comprehensive so if you do not want to make a detailed response please answer the questions in Part 1 and let us know what you are doing.

3. International policy context and guiding principles

The UK and Irish Governments are contracting parties to a number of international conventions and agreements which require them to take account of invasive introduced species such as the Convention on Biological Diversity (CBD), the Ramsar Convention and the Bern Convention. Other legislative drivers are European (Birds Directive, Habitats Directive, Water Framework Directive and Plant Health Directive) and national (Wildlife (Amendment) Act 2000 and the Wildlife (Northern Ireland) Order 1995). Both countries are also committed to the EU target of halting the loss of biodiversity by 2010 which contains actions relating to invasive species. These set the policy context and the framework for the current Invasive Species in Ireland project and any future programme. The international context in the form of the CBD guiding principles and emerging EU framework are summarised below.

3.1 Convention on Biological Diversity (www.cbd.int/invasive/)

The Convention on Biological Diversity (CBD) sets out 15 guiding principles for the prevention and mitigation of impacts of invasives alien species (IAS) that threaten ecosystems, habitats or species. These principles provide an international framework for Governments and other organisations to develop effective strategies while recognising that every country faces unique challenges and will need to develop context-specific solutions. The precautionary approach and the emphasis on prevention underpin the guiding principles. Their purpose is to assist Governments in combating invasive species recognising the extent to which they can be implemented depends on available resources. The guiding principles are listed below and defined in more detail in Appendix 1:

1. Application of precautionary approach
2. Application of three-stage hierarchical approach
3. Application of ecosystem approach
4. The role of states
5. Undertake research and monitoring activities
6. Increase education and public awareness
7. Implement border control and quarantine measures
8. Exchange of information on IAS
9. Increase cooperation, including capacity building
10. Guidelines regarding intentional introduction
11. Guidelines regarding unintentional introductions
12. Take appropriate steps to mitigate impacts of IAS
13. Eradication where feasible
14. Containment when eradication not appropriate
15. Implementation of effective control measures

3.2 Global Invasive Species Programme (www.gisp.org)

The Global Invasive Species Programme (GISP) has a global coordinating role providing guidance and building capacity for national approaches towards the prevention and management of invasive species. GISP has identified ten strategic responses to invasive species which can be adopted to reflect national priorities, constraints and vulnerability. Given the complex range of species and circumstances, there is no one size fits all approach rather a set of principles than can be adapted.

1. Build management capacity
2. Build research capacity
3. Promote sharing of information
4. Develop economic policies and tools

5. Strengthen national, regional and international legal and institutional frameworks
6. Institute a system of environmental risk analysis
7. Build public awareness and engagement
8. Prepare national strategies and plans
9. Build invasive alien species issues into global change initiatives
10. Promote international cooperation

3.3 EU Framework on invasive species

(http://ec.europa.eu/environment/nature/invasivealien/index_en.htm)

The EU Action plan on halting biodiversity loss highlights invasive species as a priority objective and the need for the European Community to develop a comprehensive strategy to address this threat. The Commission financed a study 'Scope options for EU action on invasive alien species' in 2006, which identified gaps in the current legislative and policy system, and provided recommendations for action at the EU level. One of the main results of the study was the recognition that most areas for action are issues of shared competence between the EU and member states.

At an EU and indeed at a member state level there are a few limited categories of potential IAS and pathways that are well regulated and covered such as animal disease and plant pests, the new aquaculture regulations covering introductions of new organisms for aquaculture, and the four species which are covered under the Wildlife Trade Regulations (although these can be spread within EU territory). However there is no consistent policy at an EU level and there is continued import and spread of known invasive species.

The European Commission is currently developing an EU strategy to substantially reduce the impact on EU biodiversity of invasive alien species and alien genotypes as well as specific actions including an early warning system. The Commission discussion paper outlines the proposed objectives and some of the actions that may form part of the strategy. A project to provide technical support to the development of an EU strategy is ongoing and it is planned to identify the best options for EU policy by March-June 2009.

Proposed EU Strategy/Framework

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

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

Specific objectives:

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

The strategy will follow the three stage hierarchical approach; prevention; early detection and rapid eradication; and long-term control and containment. Prevention actions identified include lists of IAS based on risk assessments, measures to cover intentional and unintentional introductions and the development of an information exchange and early warning system. Early detection will involve the establishment of a more systematic and co-ordinated surveillance system and development and implementation of eradication plans. Long-term control and containment will involve appropriate management responses at the relevant geographical scale. Measures to restore native biodiversity will also need to be considered. Several cross cutting

issues have also been identified including communication, education and public awareness; improved co-ordination and building partnerships; support of action at member states level; development of knowledge base; financing and the EU as an exporter of IAS.

4. Part 1 – Invasive species activity in Ireland

There are a growing number of organisations and individuals involved in activities relating to invasive species in Ireland. This can take many forms including academic research, practical management, policy development and education and awareness raising activities. Managing invasive species is an increasing part of the role of many environmental managers including local biodiversity and heritage officers. In order to identify key gaps and needs at national or regional/local level, it is necessary to get an overview of what actions different organisations are involved in and feedback on whether the materials or work of the project has been useful in supporting these actions. Please answer the relevant questions below:

- Q1. What is the name of your organisation?
- Q2. What type of activity relating to invasive species are you undertaking?
- Q3. Which species does this include?
- Q4. Which pathways and vectors are addressed?
- Q5. What are the target audiences for education and awareness activities?
- Q6. Do you work in cooperation with other organisations? If so, who?
- Q7. Where does the funding for the activity come from?
- Q8. What is the financial value of the work (if known)?
- Q9. How many staff are engaged in invasive species work?
- Q10. Can you give examples of any successes to date?
- Q11. Have you used any of the Invasive Species Ireland materials in your work?
- Q12. Have you received support from the project? If so, please give details.
- Q13. Have you any further comments you would like to make?

5. Part 2 – Invasive Species in Ireland project

In response to the growing problem of invasive species and the commitments in both Biodiversity Strategies, a review of invasive species in Ireland was undertaken and published in 2004. The review contained 10 key recommendations to both jurisdictions which were considered and then formed the basis of the requirements of the Invasive Species Ireland project which began in May 2006. The full set of recommendations can be found in Appendix 2. The objectives of the Invasive Species Ireland project are:

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

The project has thirteen requirements and all will need to be completed by May 2009. Many are complete and some are ongoing. A brief summary of the actions that have been undertaken to date to fulfil each requirement are given below and views are sought on both the scope of the project and the delivery. Suggestions of where improvements could be made or aspects of the project that stakeholders found useful are particularly welcome as this will help shape any future phases of the Invasive Species Ireland programme.

5.1 Risk assessments, policy development and management

Requirement 1: Preparation of risk assessments, exclusion strategies and contingency plans for species that are likely to invade Ireland but are not yet known here

Requirement 2: Preparation of risk assessments and management plans for established invasive species, taking into account the implications arising under new legislation and Directives

A review of risk assessment approaches undertaken by other countries and organisations was undertaken to identify the best approach for Ireland. A risk assessment framework was developed and risk assessment carried out for established and potential invasive species. Species were classified as high, medium or low risk and an 'amber' list was developed which identified those species which were not high risk but if they became established in Ireland would have implications under either the Habitats Directive or the Water Framework Directive. The technical working groups fed into the development of the framework and review of the outputs. A database containing the risk assessments is available for download from the project website (www.invasivespeciesireland.com).

The technical working groups selected the species for which plans should be prepared, making up the 20 plans, with an additional paper on chemical control. During preparation of the management plans for aquatic plant species, the issue of the use of particular herbicides in control was identified as a problem and a policy was agreed and is included in all plans targeting aquatic species. The plans fall into three general categories:

- Exclusion strategies for high risk potential invaders
- Management plans for species with restricted distributions that are amenable to management/control efforts
- Best Practice Management Guidance for established species with widespread distributions for which control efforts may be undertaken at a variety of scales

	Terrestrial	Marine	Freshwater
Exclusion/contingency	1. Non-native deer and wild boar	10. Japanese Kelp	12. Non-native crayfish 13. Water Primrose
Management	2. Predatory mammals on sea bird islands 3. Rhodendron/Cherry Laurel 4. Himalayan Balsam 5. Giant Hogweed 6. Japanese Knotweed 7. Giant Rhubarb 8. Hottentot Fig 9. Grey Squirrel	11. Didemnum	14. Floating pennywort 15. Ruddy Duck 16. New Zealand Pigmyweed 17. Fringed water lily 18. Parrot's feather 19. Chinese Mitten Crab 20. Chub

- Q14. Have you any comments on whether or how the risk assessment could be improved?
Q15. Have you used the outputs of the risk assessment?
Q16. Have you any comments on the exclusion strategies and management plans?
Q17. How can stakeholder involvement in the implementation of the plans be improved? What support would your organisation need?
Q18. The project has focused on species risk assessment and management to date, is a pathway risk assessment needed?
Q19. Have you any additional comments on the risk assessment and policy development?

5.2 Responding to new species invasions

Requirement 3: Provide a rapid response facilitation in the event of a newly reported invasion or new occurrences of invasive species at the request of NIEA or NPWS

A rapid response mechanism was developed although this has not yet been used in the course of the project. Rapid response is a key part of any invasive species management programme however it also depends on reports reaching the relevant agencies. There is a reporting function on the project website and a number of reports of sightings have been received to date.

- Q20. Have you reported any new occurrences of invasive species in Ireland?
Q21. If so, who did you report this to and did you get a satisfactory response?
Q22. Have you any comments on how to develop and implement an effective rapid response mechanism?
Q23. How can we make better use of the Alien Watch section of the website?

5.3 Stakeholder engagement

Requirement 4: Stakeholder engagement

Requirement 5: Development of 'Codes of Good Practise' in conjunction with stakeholders

Requirement 6: Development and delivery of education and awareness programmes

Requirement 7: Engagement with relevant Government Departments

The stakeholder engagement programme has been mainly delivered through three mechanisms, the technical working groups, the annual Invasive Species in Ireland Forum and the Invasive Species Ireland website and mailing list (www.invasivespeciesireland.com). There are four technical working groups, education and awareness, marine, freshwater and terrestrial. Membership is comprised of relevant Government departments, state agencies, academics, NGO's and industry groups. The Invasive Species Ireland Forum is open to all and two Forums have been held to date and a third is planned for March 2009 in Belfast. At this years Forum the need for training was a common theme that arose across all the workshops, highlighting the continued need for further capacity building on invasive species management across sectors. Three potential workshops have been identified that will be run between October and May next year that would provide such training and they are:

- An introduction to invasive species identification and management
- Risk assessment and development of management plans for invasive species
- Monitoring, surveillance and recording for invasive species

A range of education and awareness materials have been developed and made available for download on the project website. The technical working groups recommended the development of four Codes of Practice (COPs) for the horticulture sector, aquaculture, recreational water users and marina operators. These are being developed in partnership with the sectors and the horticulture COP is complete with consultation currently open on the others. Engagement with stakeholders has continued over the course of the project. The project team have responded to queries from stakeholders and provided them with information upon request.

Q24. Have you participated in a technical group or attended any of the meetings or Forum? If so, how useful did you find it?

Q25. Should the Forum continue to be held annually? If so, have you any suggestions for improvement?

Q26. If you have contacted the project team with an inquiry, did you get a satisfactory response?

Q27. Have you used the website? If so, how useful did you find it?

Q28. Have you any suggestions to improve the website or any of the education and awareness materials?

Q29. Do you think that there is a need for training on invasive species? If such training is made available do you intend to participate?

Q30. Have you any particular training needs?

Q31. If relevant, do you intend to adopt the COPs? If not, why not?

Q32. How do you think the stakeholder engagement could have been improved?

Q33. What should be the priorities in the coming years?

5.4 Monitoring, surveillance and recording

Requirement 8: Recommend monitoring, surveillance and recording programmes

Proposals for a monitoring, surveillance and recording programme are currently under development. The project has collaborated with the National Biodiversity Data Centre and CeDar on the development of a National Invasive Species Database and the practical implications of setting up monitoring, surveillance and recording programmes. Data quality protocols and guidelines are being developed and any monitoring, surveillance and recording programme will be linked to this database and the Biological Records Centres.

The excel template for records for the National Invasive Species Database has been integrated into the Invasive Species Ireland website. The website acts as a portal to submit records with validation being undertaken by the either NBDC or CeDar. The website also acts as the mechanism for the public to submit invasive species records and the homepage encourages the submission of records. Maps of species distribution will be available through a web based interface later this year.

Q34. Will you or your organisation participate in an invasive species monitoring, surveillance and recording programme?

Q35. Have you any comments on such a programme?

Q36. What mechanisms do you or your organisation have in place to ensure records are submitted to the Biological Records Centres?

5.5 Legislation

Requirement 12: Review legislative provisions and make recommendations for improvements

The Invasive Species in Ireland report highlighted the requirements and provisions for dealing with invasive species at a variety of legislative levels. However, the report stopped short of formulating new policy or addressing requirements for legislative reform. A review of legislation and governance was undertaken by a specialist environmental lawyer and recommendations for improvement have been made. These will feed into this review and identification of future options.

Q37. Have you any comments on current legislation or governance in Northern Ireland or Ireland and how this can be improved?

5.6 Funding

Requirement 13: A short report on opportunities for partnership working and to link into European and other funding to carry out invasive species work, both locally and at an all-Ireland level.

Instead of a report it has been agreed that a funding section on the website will be developed containing details on potential funding sources and links to the relevant information.

Q38. Have you any comments on current funding options for invasive species work?

6. Part 3 – Benchmarking

As part of this review, the Invasive Species Ireland project will be benchmarked against a number of countries and the emerging EU framework. This will include an analysis of their national programmes and governance structures to identify actions that would improve invasive species management in Ireland. Two countries that are viewed as leaders in invasive species management are Australia and New Zealand and their national programmes share some characteristics namely:

1. A single agency approach
2. A clear vision and strategy
3. Framework that covers intentional and unintentional introductions
4. Strong border control
5. Good public awareness of invasive species issues
6. Extra protection for fragile habitats and species – offshore islands
7. Rapid response, control and eradication capacity – no contingency funds but funding is made available at short notice for initial response activities

The quantitative indicators by which programmes will be prepared include:

1. Number of plans produced and adopted
2. Number of Codes of Practice produced and adopted
3. Number and scale of practical actions undertaken (this will include education)
4. Website hits and most downloaded document
5. Financial resources - money spent/allocated to invasive species categorised by management, research, education/awareness and infrastructure
6. Human resources – dedicated staff and staff time

Q39. Are there any aspects of other national programmes that you think have particular relevance to Ireland?

7. Part 4 – Invasive species management on the island of Ireland

Addressing the problem of invasive species involves many challenges including:

- Halting impacts on biodiversity and the economy from invasive species
- Preventing new introductions
- Early detection of new species
- Controlling and containing existing species
- Mitigating impacts
- Building capacity and support
- Developing the evidence base for policy and decision making

This will involve putting in place a national programme to set the framework for actions that meet the challenges outlined above. The focus to date has been at a national level rather than a regional or local level where there may be different priorities and needs.

Q40. What are the biggest challenges to invasive species management in Ireland at a national and local level?

Q41. What issues are currently not being addressed?

Q42. What are the priority actions that Government should take?

8. Part 5 – Identification and recommendation of future options

The development of a national or in this case, a bi-lateral invasive species management programme is generally a step-wise process. Few countries have the ability, resources or political will to implement a full-fledged prevention and management system straight off the shelf. At eight regional workshops held by GISP from 1999-2004, each region identified six major gaps in common:

- Insufficient technical capacity (scientific, policy, enforcement)
- Institutional coordination
- Political will
- Public awareness
- Policy and legal frameworks
- Financial resources

These gaps also reflect the current situation in Ireland and will be considered in this review. GISP identifies three general phases in national implementation of CBD obligations and other international guidance to prevent the introduction and spread of invasive species. The preliminary phase which involves laying the groundwork for planning, co-ordination, training and basic first steps towards generating invasive species identification, planning and management activities. The second phase is the intermediate phase which integrates legal guidance, border management and regional engagement. The third phase allows for fine-tuning activities around specific priorities as resources are available. In the context of this framework, to date the Invasive Species Ireland project has put in place the majority of actions identified in the preliminary phase and progressed some of the actions identified in other phases (see Appendix for details of phases).

8.1 Proposed structure to evaluate future Invasive Species in Ireland programme options

The actions identified in the GISP phases provide a useful list of measures that could be put in place over time to build an effective invasive species prevention and management programme. Although the speed at which this could occur will be resource dependent. A national strategy would usually set the context in which to identify the objectives and actions of a programme. In the absence of such a strategy and to enable the options to be developed in a structured way, a framework has been proposed below. This can incorporate the actions identified in the GISP analysis, is compatible with CBD and the emerging EU framework.

1. Vision, Aims and Objectives
2. Legislative framework
3. Prevention
4. Early detection, monitoring, surveillance and rapid response
5. Eradication, management and mitigation
6. Education and awareness
7. Capacity building
8. Governance

Q43. Do you agree with using this structure to identify and assess future options?

Q44. At the current time it is not proposed to develop an invasive species strategy for Ireland, rather strategic aims are incorporated into the Biodiversity Strategies. Is a dedicated invasive species strategy needed? If so, please state reasons.

In the next sections we are seeking suggestions of key actions and priorities that should form part of any future programme. These will be collated and developed into options. In each section respondents should identify their priority actions and how their organisation could contribute to achieving the actions through partnership working.

8.2 Vision, Aims and Objectives

In the absence of a dedicated invasive species strategy there isn't a vision statement on invasive species in Ireland. A vision statement, aims and objectives will set the strategic context for any future programme and actions. The EU vision could be adopted for Ireland or one could be developed. The aims and objectives of the current project will also need to be amended for any future programme. The partnership working principle that has underpinned the project to date will also form the foundation of any future work.

Q45. Do you have any comments on what the vision, aims and objectives of any future programme should be?

8.3 Legislative framework

The legislation review has identified a wide range of issues that need consideration such as:

- Fragmentation of legislative provisions leading to a high degree of legal complexity and uncertainty in reviewing, administering and enforcing legislation and policy relating to IAS
- The absence of an overall guiding policy in IAS operating in either jurisdiction or for the island as a whole
- No lead agency tasked with co-ordinating policy development, risk assessment, data management or regulatory action on IAS in either jurisdiction or for the island as a whole
- Inconsistent approaches to preventing the introductions of IAS
- Problematic legal definitions
- Lack of transparency and consistency concerning risk assessment processes undertaken by the various agencies
- Inconsistent implementation of the polluter pays principle
- Development of economic instruments as methods of control
- Inconsistencies concerning the availability of legal defences
- Lack of clarity concerning the control of hybrids, lichens, fungi and micro-organisms
- Weak mitigation controls and information management systems

There are several options for law reform that could be pursued such as the development of dedicated primary legislation, enact a core piece of legislation designed to clarify essential common elements of the system of environmental control of IAS, or review legislation with a view to more complete compliance with the CBD with publication of detailed guidance for officials and others affected by the legislation.

Q46. Do you have any comments on how legislative reform might be undertaken in a future programme?

8.4 Prevention

Any future programme in line with CBD principles will have prevention as a priority. With limited resources this may lead to the perception that less is being done to manage already established species and overcoming this perception would be an important action.

Q47. Do you support increased emphasis on a more preventative approach, in other words, an approach that involves investment now to reduce future risks and costs?

Q48. Do you foresee any significant pitfalls or opportunities in making this happen?

Q49. What do you see as the key prevention actions that should form part of a future programme?

Q50. How can you or your organisation help through your specific functions, role or responsibilities?

8.5 Early detection, monitoring, surveillance and rapid response

This could involve measures such as information exchange, a rapid response mechanism, and implementation of surveillance, monitoring and recording systems and further development of contingency plans.

Q51. What do you see as the key actions in this area that should form part of a future programme?

Q52. How can you or your organisation help through your specific functions, role or responsibilities?

8.6 Eradication, management and mitigation

This could involve measures such as the development of eradication strategies, management plans and Codes of Practice. Equally the emphasis could be on implementation of existing plans or facilitation of management actions at a local level.

Q53. What do you see as the key actions in this area that should form part of a future programme?

Q54. Given that resources always have limits, do you have suggestions or ideas for maximising the benefits?

Q55. How can you or your organisation help through your specific functions, role or responsibilities?

8.7 Education and awareness

Education and awareness actions could include international engagement, public awareness campaigns and education. The focus of this would be to build cross-sectoral participation, gain political support and engagement and to ensure public support for action on IAS.

Q56. What do you see as the key actions in this area that should form part of a future programme?

Q57. How can you or your organisation help through your specific functions, role or responsibilities?

8.8 Capacity building

Given the limited resources available for IAS it is vital to build capacity of a wide range of individuals and organisations to lead, contribute to and support any national programme. Research and training programmes are key elements of increasing capacity.

Q58. What do you see as the key actions in this area that should form part of a future programme?

Q59. How can you or your organisation help through your specific functions, role or responsibilities?

8.9 Governance

Regulatory and operational roles with relevance to IAS are split across a number of Government departments and public bodies. Previous reviews have recommended the creation of a cross-border IAS agency. Currently the relevant departments and agencies are part of the steering group or technical working groups, there is no formal mechanism to ensure that the relevant bodies either participate in the programme or implement actions.

Q60. Have you any comments on the current Governance arrangements or how they could be changed in the future?

8.10 General

Q61. Are there any other significant issues or work areas not covered that should be covered, or that would not clearly fall under any of the existing work areas in the programme?

Appendix 1 CBD Guiding Principles

1. Application of precautionary approach

Given the unpredictability of the pathways and impacts on biodiversity of invasive species, efforts to identify and prevent unintentional introductions as well as decisions concerning intentional introductions should be based on the precautionary approach. The precautionary approach should be applied when considering management methods for established species and the lack of scientific certainty about the impacts of an invasion should be used as a reason for postponing or failing to take appropriate eradication, control or containment measures.

2. Application of three-stage hierarchical approach

Priority should be given to preventing the introduction of invasive species between and within states. Preventing an introduction is generally more cost-effective and environmentally desirable than measures taken following the introduction and establishment of a species. If a species has been introduced, early detection and rapid action are crucial to prevent its establishment. The preferred response is to eradicate as soon as possible but if it is not feasible or cost effective then long term control measures should be implemented.

3. Application of ecosystem approach

Measures to deal with invasive species should be based on the ecosystem approach.

4. The role of states

States should recognise the risk that activities within their jurisdiction or control may pose to other states as a potential source of IAS and take appropriate actions to minimise that risk, including the provision of any available information on invasive behaviour or invasive potential of a species.

5. Undertake research and monitoring activities

In order to develop an adequate knowledge base to address the problem, states should undertake research and monitoring of invasive species as appropriate. These efforts should attempt to include a baseline taxonomic study of biodiversity. Monitoring should include targeted and general surveys and involve stakeholders; research should document the invasion dynamics, ecological impact and how this changes over time.

6. Increasing education and public awareness

States should promote education and public awareness of the causes of invasion and the risks associated with the introduction of invasive species. Programmes should engage local communities and sectors in support of mitigation measures.

7. Implementing border control and quarantine measures

States should implement border control and quarantine measures to ensure intentional introductions are subject to proper authorisation and that unintentional introductions are minimised. Measures should be based on risk assessment of threats and pathways. Capacity and training should be provided to underpin implementation of measures. Early detection systems and regional and international coordination are essential to prevention.

8. Exchanging of information on IAS

States should assist in the development of databases and information systems and disseminate information for use in the context of any prevention, introduction, and monitoring and mitigation activities. This information should include incident lists, potential threats to neighbouring countries, information on taxonomy, ecology and genetics of invasive species, as well as national regional and international guidelines, procedures and recommendations.

9. Increasing cooperation, including capacity building

This may be internal or a cooperative effort between two countries and efforts may include information sharing, trade agreements focused on particularly damaging species, capacity building including technology transfer and training, cooperative research efforts and funding.

10. Guidelines regarding intentional introduction

No first time intentional introduction or subsequent introductions of an invasive or potentially invasive species should take place without prior authorisation from a competent authority. A risk analysis which may include an environmental impact assessment should be carried out before authorising a proposed introduction to the country or new ecological regions within a country. States should make all efforts to permit only those species that are unlikely to threaten biological diversity. The burden of proof that a proposed introduction is unlikely to threaten biodiversity should be with the proposer of the introduction or be assigned as appropriate by the recipient

state. Authorisation of an introduction may where appropriate be accompanied by conditions such as preparation of a mitigation plan, monitoring, payment for assessment and management, or containment requirements. Decisions concerning introductions should be based on the precautionary approach and within a risk assessment framework.

11. Guidelines regarding unintentional introductions

All states should have in place provisions to address unintentional introductions (or intentional introductions that have become established and invasive). These could include statutory and regulatory measures and establishment or strengthening of institutions and agencies with appropriate responsibilities. Common pathways of unintentional introductions need to be identified and appropriate provisions to minimise introductions should be in place. Sectoral activities are often pathways for unintentional introductions. EIA of such activities should address the risk of unintentional introductions and risk assessment should be undertaken for these pathways.

12. Taking appropriate steps to mitigate impacts of IAS

Once the establishment of an invasive species has been detected, states should individually and cooperatively take appropriate steps such as eradication, containment and control to mitigate adverse effects. Management techniques should be safe to humans, the environment, and agriculture and ethically acceptable to stakeholders in the affected areas. Mitigation measures should take place in the earliest possible stage of invasion on the basis of the precautionary approach. Consistent with national policy or legislation the individual or entity responsible for the introduction should bear the costs of control measures and biodiversity restoration where it is established that they failed to comply with national laws and regulations. Hence early detection of new invasions is important, combined with capacity to take rapid follow up action.

13. Eradication where feasible

Where feasible, eradication is often the best course of action and the best opportunity comes in the early stages of invasion where populations are small and localised. Early detection systems focused on high-risk entry points can be critically useful while post eradication monitoring may be necessary. Stakeholder engagement and support is essential to support eradication work and consideration should be given to secondary effects on biological diversity.

14. Containment when eradication not appropriate

When eradication is not feasible, containment is often an appropriate strategy in the cases where the distribution of the species is small enough to make efforts feasible. Regular monitoring linked with rapid action to eradicate any new outbreaks is essential for containment.

15. Implementing effective control measures

Control measures should focus on reducing the abundance and impacts of invasive species. Effective control will often rely on a range of integrated management techniques including mechanical, chemical and biological control and habitat management implemented according to existing national regulations and international codes.

Appendix 2 Invasive Species in Ireland Review Recommendations

Ten key actions were recommended that will reduce the risks of invasions, help control and manage new and established invasive species, monitor impacts, raise public awareness, improve legislation and address international obligations:

Key Action 1: Detailed risk assessments and contingency plans should be urgently prepared for species that are likely to invade Ireland in advance of their arrival.

Action 1.1: In consultation with interested stakeholders a list of problem species, designated by risk level, should be developed immediately for priority action.

Action 1.2: A catalogue of scientific research relating to invasive species issues should be established and made available.

Action 1.3: Lists of species which have become invasive in other parts of the world should be maintained.

Action 1.4: The full consequences of potential invasions by non-native species should be established by extending investigations of ecological impacts into a cost-based environmental impact assessment.

Key Action 2: Barriers to a rapid and decisive response to new invasions should be minimized by high level cross-jurisdictional and inter-departmental support for and funding of contingency plans.

Action 2.1: Engagement with specific industrial and trade and commerce sectors should be initiated at the outset in the creation of control schemes to clarify feasible management objectives.

Action 2.2: A budget should be made available to support the development of control techniques for putative invasive non-native species.

Action 2.3: Programmes should be developed that allow the restoration of native habitats and species following the removal of invasive species.

Key Action 3: The ecological and economic impact of long-standing alien species and technology for their control should be investigated in detail in order to plan and execute cost-effective strategies for control and eradication.

Key Action 4: Legislative provisions should be analysed and new legal frameworks developed specifically for dealing with invasive species, while facilitating beneficial introductions.

Action 4.1: An analytical review of legislation pertaining to non-native species should be undertaken by environmental law specialists.

Action 4.2: Governments should work with industries and trade organisations to encourage the development of legal underpinning for codes of conduct that define and allocate duty of care.

Action 4.3: Consultation processes regarding codes of practice and legislative development should be initiated with stakeholders.

Action 4.4: The scope for implementing “polluter pays” principle for preventing invasions should be investigated.

Action 4.5: Licensing arrangements should remain in place whereby desirable non-native species can be introduced, for commercial reasons and/or for biological control.

Key Action 5: A framework, including support for specialist identification skills, should be established for the collation and cross-border exchange of information on non-native species.

Action 5.1: A centralized biological recording unit should be developed in the Republic of Ireland.

Action 5.2: Recording schemes should be developed for species which possess invasive qualities, involving separate monitoring criteria for land of differing protection categories and vulnerability to species invasions.

Action 5.3: Authority should be granted to a monitoring agency to require landowners to comply with monitoring of invasive species on private land.

Action 5.4: Taxonomic experts should be engaged to train personnel for monitoring tasks and for deployment at key points of entry.

Key Action 6: Measures for the prevention and eradication of invasive species should be incorporated into agri-environment schemes.

Key Action 7: The dissemination of information to the public and the engagement of stakeholders, particularly in the commercial sector, should be prioritised by developing online, educational and scientific resources, and by targeted public awareness campaigns.

Action 7.1: Establishment of websites, e-mail discussion groups, workshops and conferences, to disseminate information on invasive species, their prevention and control, both nationally and internationally should be developed.

Action 7.2: Awareness campaigns should be initiated to raise public consciousness of non-native invasive species problems.

Action 7.3: Targeted information should be broadcast to specific groups such as specialist societies and professions.

Action 7.4: Education on invasive species and their implications should be retained and improved within school curricula and higher education centres.

Key Action 8: The use of native species in amenity planting and stocking and related community actions to reduce the introduction and spread of non-native species should be encouraged.

Action 8.1: Native species of local provenance should be encouraged for use in conservation or amenity planting schemes and to stock freshwaters in situations where a choice exists.

Action 8.2: Promote public acceptance of moves towards increased consumption of local produce.

Key Action 9: The two jurisdictions should continue to work through international mechanisms to improve the regulatory and policy framework for dealing with invasive non-native species.

Action 9.1: The two jurisdictions should continue to work through international mechanisms to improve the regulatory and policy framework for dealing with invasive non-native species issues.

Action 9.2: Northern Ireland and the Republic of Ireland should support the development of international trade agreements relating to invasive non-native species, in order to retain their reputation as a responsible trading partner.

Key Action 10: A cross-border specialist group should establish a dedicated agency to lead on invasive species issues, beyond the immediate actions prioritised above.

Action 10.1: Establishment of a cross-border forum or NDPB to guide the establishment of a centralized invasive species agency.

Action 10.2: Establishment of a cross-border, inter-departmental agency under the guidance of the cross-border forum.

Appendix 3 GISP national implementation phases

Preliminary Phase:

Coordination: inter-agency coordinating group or committee, national strategy, defined agency roles and responsibilities, links to regional organizations/expertise.

Planning: national strategy and action/implementation plan, identification of initial management priorities and main threats (species and pathways), initiation of regulatory/legal gap analysis.

Baselines: preliminary national surveys (by ecosystem, of available literature/experts), official reference lists, initiation of national invasive species database.

Training: basic training in invasive species issues, skills/tools for protected area managers, government staff, extension agents in agriculture, forestry, fisheries and the environment.

Projects: national demonstration projects for control, management and prevention.

Outreach and awareness: engagement of stakeholders and decision-makers in planning efforts, public awareness regarding threats to livelihoods, economies and biodiversity.

Intermediate phase:

Legal systems: national legislative models, integration of existing international standards and pathway guidance, risk assessment regulations.

Infrastructure: inspection and quarantine, monitoring and information systems, training, information systems.

Early detection and rapid response: capacity to mobilize for small-scale eradications, monitoring and warning systems to inform key agencies and stakeholders.

Regional engagement: strategies and frameworks for coordination, learning networks, intergovernmental organizations, trading partners.

Management plans: development of control and management plans for high priority invasive species and pathways.

Outreach and awareness: focus on measures to mitigate threats and public/private sector responsibilities for action, access to and use of key regional and international sources of information and expertise.

Advanced Phase:

Tools: economic impact assessment methodologies, risk assessment methodologies (species and pathways), research/diagnostic capacity, larger scale eradication and management activities, protocols for clean exports.

Customized prevention: import screening and listing approaches, country/region specific prevention measures, involvement and promotion of regional and international standards.

Financial resources: user fees, payment mechanisms, private sector engagement

Outreach and awareness: social marketing campaigns.