

**Natural Resources Wales evidence to the Environment & Sustainability Committee of the
National Assembly for Wales**

Inquiry into the Impact of Invasive Alien Species in Wales

9th May 2013

1.0 Summary

We welcome the opportunity to submit our views to the Environment and Sustainability Committee Inquiry into the impact of Invasive Alien Species (IAS) in Wales.

- IAS are a substantial environmental and economic threat to Wales already costing millions of pounds to tackle annually. The combination of increased global movement of people and goods and climate change will only increase the threat of IAS over the next few decades
- Prevention, detection and control or eradication are essential activities to tackle IAS and need to be undertaken on a risk-based approach. Critical to this is developing an underpinning information base and supporting management mechanisms.
- The impending European Union (EU) Directive, the GB Programme Board's review of the GB Invasive Non Native Species Strategy and the opportunity to incorporate the Law Commission's IAS related recommendations¹ into Welsh legislation provide significant opportunities to tackle IAS.
- Despite the best efforts of the UK and Welsh governments and organisations and groups working on IAS management, the approach to IAS prevention, detection and control has often been opportunistic or reactionary and finding money to fund these activities is often difficult.
- Consideration should be given to providing dedicated funding for Welsh IAS management to develop a strategy and coordinate efforts to minimise the risk of new arrivals, conduct early detection and response and co-ordinate longer term control/eradication action more efficiently.
- Consideration should be given to placing additional emphasis on developing more strategic preventative and support measures such as assessing the risk of impact, assessing likely pathways for IAS to invade, awareness raising, good practice sharing and bio-security training. This should prove more cost effective than having to undertake specific control/eradication actions.

¹ The Law Commission's review of wildlife legislation:
<http://lawcommission.justice.gov.uk/areas/wildlife.htm>

2.0 Our Role

Natural Resources Wales (NRW) is the statutory body responsible for the management of the environment and the natural resources of Wales. Our IAS related marine, terrestrial and freshwater work is underpinned by a very wide range of associated legal and policy drivers at an international, European and domestic level – see Annex 1 for more details on these.

Through the IAS work we have inherited, we will continue to help with tackling IAS in Wales – much of which we achieve by working in partnership with others including Welsh Government, local authorities, other agencies, the private sector (e.g. landowners, industry and site operators), 3rd sector organisations, local communities and key interest groups.

3.0 General Comments

Invasive Alien Species (IAS) in Wales fall into two categories:

- **Invasive Alien Species (IAS)** include animal and plant species that are not native to Wales and which have a negative impact on Wales' native flora and fauna or upon society.
- **Micro-organisms** such as bacteria or viruses: these may impact upon native flora and fauna or crops and livestock either directly or by causing disease.

We believe that there are three key factors necessary for successful IAS management: prevention, early detection (including horizon scanning) and control/eradication. These need to be supported by well resourced and co-ordinated networks at all levels including the EU, UK, Wales, catchment and local scales to have a truly effective IAS management approach.

Critically, IAS prevention, detection and control/eradication work requires a strategic and co-ordinated long-term approach. There are a wide range of legal and policy drivers associated with IAS management (as outlined in Annex 1) but there are still some significant limitations with the existing legislation. Implementing the IAS related recommendations contained within the Law Commission's recent review of UK wildlife legislation would help and we also look forward to seeing what the potential EU IAS Directive may contain.

Co-ordinated IAS work needs a long-term management approach including having a good understanding of the threat and impact risks posed by species as many of the more damaging species are well established and difficult and expensive to eradicate. Campaigns to eradicate any IAS will almost always take several years of focused measures and will therefore be expensive. In many cases population control, limiting their spread and impact, rather than eradication (e.g. grey squirrels) may be the only realistic option.

Consideration needs to be given to delivering co-ordinated IAS management through dedicated resource. Wales has some good specific examples where this is already happening, for example the catchment based River Dee Invasive Non-Native Species (INNS) project, but the approach would work best if longer term funding were available for this and for it to be mirrored across the whole of Wales at all levels.

A key part of the work of any team set up to tackle IAS in Wales would be to develop generic communications and bio-security training programmes. There are some good examples of this kind of approach, for example the North Wales INNS group's Bio-security training courses, promoting Check Clean Dry to key user groups, NRW field staff bio-security training and advising others on bio-security measures.

The formation of NRW has provided us with an opportunity to bring together and build upon the existing IAS management skills and expertise that we have inherited. We have established a cross-organisation group to help with developing a common understanding of IAS management issues for NRW and how we can best use our resources to help deal with them.

4.0 RESPONSE TO THE INQUIRY'S SPECIFIC CONSIDERATIONS

4.1 Adequacy of data and information currently available on extent and impacts of non-native species in Wales.

The GB Non Native Species Secretariat (GB NNSS) provides invaluable information and guidance including developing individual species risk assessments which form the basis for identifying high risk IAS priorities. The GB NNSS is also an essential mechanism for helping the countries develop consistent cross-border IAS management approaches.

Other data mechanisms provide INNS information, for example the GB Non Native Species Information Portal and the National Biodiversity Network but the extent of available information can be variable especially for supporting specific and local level management action.

Dedicated surveys and bespoke or innovative projects are helping to improve the information base on IAS distribution, such as CCW's non-native species audit spreadsheet, the England and Wales Mitten Crab recording project and the Plant Tracker phone application. However, invasive species are still likely to be under recorded because of the lack of generic surveillance methodologies or dedicated monitoring programmes.

IAS monitoring and assessment programmes should be based around identified pathways and risks, many of which still need further understanding and research. Without this, it is very difficult for monitoring programmes designed for other drivers, such as the Water Framework Directive, to be able to detect newly arrived IAS in sufficient time to enable a rapid response to eradicate problem species. To help address this problem in the sea, NRW is leading on a transnational (UK and Ireland) project that aims to protect marine biodiversity and industries by managing the pathways by which marine alien species are introduced and spread.

While there is now relatively good peer-reviewed understanding of the impacts of some IAS, the studies needed to develop this understanding can require considerable dedicated research time. Linked to this is the issue of the variability of distribution data and that comprehensive monitoring of IAS species can be relatively resource intensive. Even for species that are known to be relatively widespread such as rhododendron, further detailed data on distribution would help with deciding where to prioritise management effort.

Understanding the impact of IAS is essential in order to prioritise which IAS pose the greatest threat. Case studies and research projects on the impacts of emerging IAS threats are useful. The 2010 CABI report on the 'Economic Cost of Invasive Non Native Species on Great Britain'² is a good assessment of the UK economic impacts and provides some good headline information about the Welsh economic impacts.

For some invasive plant species for example, further investment in remote sensing would provide more accurate information on the spread and level of infestation, hence providing better information for targeting and prioritising management action. The data will also need appropriate interpretation to help steer strategic or local level control and/or eradication measures.

4.2 Action taken to date by WG and relevant authorities to tackle this issue

Through the Wales Biodiversity Partnership's INNS Group, the Welsh Government leads on IAS management in Wales in partnership with other key stakeholders. This group provides a platform for bringing together key organisations with IAS management interests or responsibilities to help develop IAS management approaches in Wales. NRW specialists are helping the Group develop a Welsh non-native species list of IAS priorities and required actions. The Group also conducts a twice yearly Action Audit to monitor and record all IAS work in Wales.

NRW currently focuses activity on IAS to control or reduce the impact of those species that cause the most economic or social impacts or where they affect designated sites. This prioritisation of the available resource means that not all IAS can be addressed.

In terms of legislative progress, the recent ban on several invasive aquatic plant species is very welcome.

Much of our IAS work is generally steered by priorities set within associated habitats or species strategies such as the Woodlands for Wales strategy and the Water Vole Strategy for Wales. We give priority to work targeting designated sites and supporting specific conservation objectives, to broader actions outlined in our Special Sites database and the Water Framework Directive River Basin Management Plans for example, as well as restoring Plantations on Ancient Woodland Sites or tackling *Phytophthora ramorum* infected sites.

NRW is also actively contributing to other strategic initiatives that support IAS management such as the NNSS 'Check, Clean, Dry' campaign where we developed the national video guidance for different water use sectors and developing LIFE+ projects aimed at improving strategic IAS management knowledge. We have also contributed funding to support research for specific species, such as signal crayfish distribution and control measures.

² The Economic Cost of Invasive Non-Native Species on Great Britain (F. Williams, R. Eschen, A. Harris, D. Djedjour, C. Pratt, R.S. Shaw, S. Varia, J. Lamontagne-Godwin, S.E. Thomas, S.T. Murphy)
CAB/001/09 November 2010: <https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=59>

On the Welsh Government Woodland Estate, which is NRW's responsibility to manage, we look to tackle invasive plants like Japanese Knotweed or Rhododendron, prioritising where they impact on habitat quality. NRW staff also work in partnership with others at a project level to help manage invasive species on other landholdings or assets where our resources allow. We look to use a partnership approach to pool resources wherever we can and we provide support through direct management activities, specialist advice and guidance or financial contributions through broader grant or other funding programmes. The River Alyn Himalayan Balsam project is a good example of what can be achieved through co-ordinated action, landowner/ community involvement and post project surveillance.

4.3 How action to tackle INNS in Wales could be improved?

The GB Non Native Species Programme Board is reviewing the GB INNS Strategy this financial year. We look forward to contributing to this review, as this will provide useful information about what should be considered as priorities for Wales. It is essential that strong partnerships across administrations and statutory agencies are encouraged and maintained to ensure a co-ordinated and collaborative approach to INNS management is sustained. We believe that a small number of staff dedicated to IAS work in Wales could make a significant difference. Their role would primarily be to develop and coordinate strategies, develop training programmes and work with EU, UK and local agencies and organisations to tackle IAS.

We support the Welsh Government's use of the Wales Biodiversity Partnership and other fora as mechanisms to harness engagement with the very wide range of organisations and groups who have a role in IAS management. We recognise that other agencies, smaller organisations, communities and individuals all have a role to play in effective INNS management. To facilitate wider engagement and deliver co-ordinated action, developing more effective ways of sharing complex evidence, technical information and good practice with all these interests would be very helpful. Further clarification over roles and responsibilities for IAS management for Government, public sector organisations and others would also help.

Many IAS are persistent and require repeated treatment and monitoring for effective control or eradication. The most successful control or eradication work involves co-ordinated, long-term action in conjunction with the active support of local groups, businesses and the wider public. However currently available funding streams can only provide funds on a 1 to 3 year basis. A longer term more strategically funded approach coupled with a greater emphasis on developing preventative measures could reduce costs and increase effectiveness. However, overall more money is likely to be required if the serious threats posed by IAS are to be successfully tackled.

It is essential to take a landscape / catchment scale approach to IAS management wherever possible for effective control. The Ecosystem Approach being developed by Welsh Government should help this by encouraging the careful consideration of IAS interests within the planning of habitat connectivity or other large scale projects. For Wales co-ordinated action at all levels is the key way to successfully reduce the threats and impacts of IAS. The proposed Environment Bill presents an opportunity to draw together the relevant policy drivers and aspects of strategy to provide a clear strategic approach to managing IAS in Wales.

4.4 The European Commission's proposal to bring forward a Directive that would require Member States to take co-ordinated action to tackle this issue

This Directive has the potential to play a significant role in the control of IAS, however the details are not yet clear. We anticipate that the proposal will add a duty for each member state to implement an appropriate IAS strategy. Cross border and transnational cooperation is essential as the geography between Wales and England, for example, will not prevent spread of IAS. A good example of this in action is the Wye Valley where agencies and NGOs on both sides of the border work together to manage deer and wild boar. Similarly the marine environment around Wales is not isolated from the wider Irish Sea and north-east Atlantic and is at risk from a number of vectors including shipping, leisure craft and aquaculture, all of which can spread IAS unless bio-security is improved. Wales needs to work with the other UK administrations to introduce preventative measures to minimise risk of new IAS entering the UK. At the European level, WG can help shape the directive particularly in terms of cooperation between member states. We look forward to working closely with Welsh Government on how best to implement its requirements.

The demands of delivering effective IAS management need to be supported by sufficient resources and capability within the Welsh Government, NRW and partner organisations. Key work areas include establishing an evidence base, engaging stakeholders and delivering existing and new areas of work effectively and efficiently.

There are strong INNS management interdependencies between social well being, economic growth and having a healthy and attractive environment. We clearly recognise the constraints of the current financial climate. However in our view, a truly effective IAS management approach in Wales needs a more strategic and integrated approach at all levels to ensure the effective use of Wales' natural and financial resources, to achieve outcomes for our ecosystems that are sustainable in the future.

ANNEX 1: NRW relevant IAS policy drivers & associated legislation

GB Legislation

The Wildlife and Countryside Act (1981)

Section 14 of The Wildlife and Countryside Act (1981) is the principal legislation dealing with the release of non-native species. This has been amended by the Nature Conservation (Scotland) Act 2004 in Scotland, and the Natural Environment and Rural Communities Act (2006) in England and Wales. Section 14 of the Act makes it illegal to allow any animal which is not ordinarily resident in Great Britain, or is listed on Schedule 9 to the Act, to escape into the wild, or to release it into the wild. It is also illegal to plant or otherwise cause to grow in the wild any plant listed on Schedule 9 of the Act. Offences under section 14 carry a maximum penalty of a £5,000 fine (£40,000 in Scotland) and/or 6 months imprisonment on summary conviction (i.e. at Magistrates' Court) and an unlimited fine (i.e. whatever the court feels to be commensurate with the offence) and/or 2 years imprisonment on indictment (i.e. at Crown Court). Guidance on Section 14 of the Wildlife and Countryside Act 1981 gives further information. Here you can also find a list of species on Schedule 9 of the WCA for England, Wales and Scotland.

The Wildlife and Countryside Act 1981 (Variation of Schedule 9) (England and Wales) Order 2010

This amendment which applies to England and Wales came into force on 6th April 2010 and details the addition and removal of several animal and plant species to Schedule 9. There is also an explanatory note which provides further details.

Natural Environment and Rural Communities Act (2006)

Section 50 of the Natural Environment and Rural Communities (NERC) Act (2006) allows the Secretary of State to ban the sale of invasive non-native species known to cause damage, in England and Wales. Section 51 of the NERC Act allows the Secretary of State to issue codes of practice (e.g. Horticultural Code of Practice), which alone cannot be used to prosecute but can be used in a court of law to demonstrate that the defendant did not take the necessary precautions (or due diligence) to prevent damage caused by release of non-native species.

Import of Live Fish Act (1980)

These Acts give the relevant Minister the power to make Orders to prohibit or licence the import, keeping or release of non-native fish species which might harm the habitat of, compete with or prey on any freshwater fish, shellfish or Salmon. The Prohibition of Keeping or Release of Live Fish (Specified Species) Order 1998, made under the ILFA in England and Wales, prohibits the unlicensed keeping or release of 26 species or genera of non-native fish. The Prohibition of Keeping of Live Fish (Crayfish) Order 1996 aims to prevent the further spread of Signal Crayfish, and prohibits the unlicensed keeping of all other non-native crayfish species in England and Wales. In Scotland, three Orders under the ILFA (Scotland) have been made for three separate species or groups of species (Coho salmon *Oncorhynchus kisutch*, Pike-perch *Stizostedion*

Lucioperca and non-native crayfish). These Acts also allow the courts to order the removal and destruction of illegally stocked specimens of certain fish species.

Plant Health Act (1967); Plant Health (England) Order (2005); Plant Health (Wales) Order (2006); Plant Health (Scotland) Order (2005); Plant Health (Forestry) Order (2005)

These pieces of legislation provide protective measures against the introduction of organisms harmful to plants and plant products. The Orders implement EC Directive 77/93/EEC, now consolidated into Directive 2000/29/EC (see above), and is implemented by Defra in England, WAG in Wales and SEERAD in Scotland. The Plant Health (Forestry) Order 2005 is implemented by the Forestry Commission.

Countryside and Rights of Way Act (2000)

The CROW Act updates and amends parts of the Wildlife & Countryside Act relating to non-native species in England and Wales only. Changes that impinge upon the release of non-natives include

- The maximum penalties for a Section 14 offence have been increased
- New Section 19ZA of the Wildlife & Countryside Act stipulates that wildlife inspectors may enter any premises (except dwellings) to ascertain whether an offence has been committed.
- Section 19ZB gives police officers and wildlife inspectors the power to obtain a blood or tissue sample from a specimen to be used for analysis (including DNA analysis) to determine the identity or ancestry of the specimen.
- Article 74 stipulates that it is the duty of all Ministers and government departments, in carrying out their functions, to consider conserving biological diversity in accordance with the CBD. This therefore implies that the implementation of Article 8(h) of the CBD concerning non-native species should be considered by all Ministers and government departments.

Environmental Protection Act (1990)

This Act has very limited provisions for non-native species, but is included here due to the potential classification of soil and other waste containing viable propagules of invasive non-native plant species as controlled waste. This has been applied to Japanese Knotweed *Fallopia japonica*, with the result that waste containing this species must be disposed of in accordance with official Environment Agency guidance designed to prevent the further spread of the plant.

Salmon and Freshwater Fisheries Act (1975) as amended by the Environment Act (1995)

Section 30 of this Act makes it an offence to introduce any fish into inland waters without the permission of the Environment Agency in England and Wales. As well as covering non-native species, this Act also prohibits the introduction of native species outside their natural ranges.

Salmon Act (1986)

In Scotland, Section 24 of the Salmon Act (1986) prohibits the introduction of Salmon *Salmo salar* or Salmon eggs into inland waters to a salmon fishery district without the permission of the District Salmon Fishery Board, but there are no controls on other species native to Britain.

Scottish legislation that might be useful:

The Wildlife and Natural Environment Bill (Scotland)

In June 2009 the Scottish Government (2009a) published a consultation document on proposals for a Wildlife and Natural Environment Bill. The consultation ran until 4 September 2009, and 456 responses were received. The responses and an analysis of the responses have been published online (Scottish Government and Scottish Government 2010a). The Government has also published a report on the consultation, which sets out how the proposals are being taken forward in the Bill (Scottish Government 2010b). The Government's intention to introduce a Wildlife and Environment Bill was confirmed in the First Minister's legislative statement to Parliament on the 3 September 2009 (Scottish Parliament 2009a). The Bill was published on the 10 June 2010, along with a Policy Memorandum, Explanatory Notes and other accompanying documents. A Delegated Powers Memorandum has also been published. The Bill contains 35 sections in six parts and a schedule.

The Nature Conservation (Scotland) Act 2004

The Nature Conservation (Scotland) Act 2004 introduced a number of new measures to tackle non-native species. Controls on species listed on Schedule 9 of the WCA and of animal species released into the wild were increased to include hybrids of those species. Section 13 provides a new power to Ministers to list species on an order which makes it an offence to sell, offer or expose for sale, or have in one's possession or transport for the purposes of sale the specified species. A new power was also provided to allow Ministers to designate guidance so that, although non-compliance itself will not be an offence, it can be used as evidence in a court of law as a common reference point, and in determining whether the accused acted responsibly or exercised due diligence. The Act increased penalties for offences, in Scotland, to those levels shown above.

Europe

Bonn Convention on the Conservation of Migratory Species of Wild Animals

The objective of the Bonn Convention is the conservation of migratory species worldwide. In order to avoid any migratory species becoming endangered, contracting parties must endeavour to provide immediate protection for migratory species included in Appendix I. To protect endangered migratory species, contracting parties to the Convention will also endeavour: to conserve or restore the habitats of endangered species; to prevent, remove, compensate for or minimise the adverse effects of activities or obstacles that impede the migration of the species; and to the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to further endanger the species.

The Convention on the Conservation of European Wildlife and Natural Habitats

States that under Article 11(2)(b) that each Contracting Party to the Convention undertakes to "strictly control the introduction of non-native species".

Directive on the conservation of natural habitats and of wild fauna and flora

(EC Habitats Directive) Article 22 of this Directive (92/43/EC) requires Member States to "ensure that the deliberate introduction into the wild of any species which is not native to their territory is regulated so as not to prejudice natural habitats within their natural range or the wild native fauna and flora and, if they consider it necessary, prohibit such introduction."

Directive on the conservation of wild birds

(EC Birds Directive) Article 11 of this Directive (79/409/EC) states that "Member States shall see that any introduction of species of bird which do not occur naturally in the wild state in the European territory of the member states does not prejudice the local flora and fauna."

EC Wildlife Trade Regulations

CITES is implemented in the EU through the Wildlife Trade Regulations. Currently these are Council Regulation 338/97/EC on the protection of species of wild fauna and flora by regulating trade therein (the Basic Regulation) and Commission Regulation 865/2006/EC laying down detailed rules concerning the implementation of Council Regulation 338/97/EC (the Implementing Regulation). Suspension regulations including 997/2010/EC (5 November 2010) and Regulation 359/2009/EC (30 April 2009) suspend the introduction into the Community of certain species from certain countries. Four animals species have been banned from import into the EU but there is no restriction on movement between Member States or holding:

1. Red-eared Terrapin or Slider (*Trachemys scripta elegans*)
2. American Bullfrog (*Lithobates catesbeianus*)
3. Painted Turtle (*Chrysemys picta*)
4. American Ruddy Duck (*Oxyura jamaicensis*)

Water Framework Directive and guidance

This establishes a framework for national measures to achieve or maintain a good ecological status for European inland, transitional and coastal waters by 2015 and prevent their further deterioration.

Marine Strategy Framework Directive 2008/56/EC (17 June 2008)

Requires each Member State to develop a maritime strategy based on the ecosystem approach with the aim of achieving or maintaining 'good environmental status' in the marine environment by 2021.

Plant Health Directive 2000/29/EC (8 May 2000)

Establishes protective measures against the introduction into the EU and intra-EU spread of organisms harmful to plants or plant products.

Aquaculture Regulation 708/2007/EC (11 June 2007)

Establishes a dedicated framework to assess and minimise the possible impact of alien and locally absent species used in aquaculture on the aquatic environment.

Worldwide

The UK is also a contracting party to international conventions:

Convention on Biological Diversity (CBD)

States under Article 8(h) that each Contracting Party shall "prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species". Contracting parties to the CBD also agreed to "achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level" (2010 Biodiversity Target).

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)

The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

United Nations Convention on the Law of the Sea

Article 196 of this Convention requires Member States to take all measures necessary to prevent, reduce and control the intentional or accidental introduction of species (non-native or new) to a particular part of the marine environment, which may cause significant and harmful changes.

International Plant Protection Convention (IPPC)

The IPPC has been in force since 1952, and has 111 governments as Contracting Parties. It was extensively revised in 1997 to, amongst other things, reflect the provisions of the WTO SPS Agreement (see below) such as the requirement for Pest Risk Analysis (PRA).

Useful info:

Review of Non-native Species Legislation and Guidance, Fasham and Trumper (2001). This report reviews domestic legislation and guidance.

Scope Options for EU Action on Invasive Alien Species (2006). This report assesses the EU's current legal and policy framework related to invasive alien species.

Relevant policy aims and objectives

Table 1 - International instruments.

Area of influence	Detail of instrument	Relevance to this project
International regulation	<ul style="list-style-type: none"> • The Convention on Biological Diversity (CBD) • United Nations Convention on Law of the Sea (UNCLOS) • United Nations Convention on Law of the Non-Navigational U of International Watercourses • International Convention for the Control and Management of Ship Ballast Water and Sediments • Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species 	All call for the prevention of harmful invasive alien species.
European regulations	<ul style="list-style-type: none"> • Developing European Strategy (now possibly a Directive) on Invasive Alien Species • Habitats Directive 92/43/EEC • Water Framework Directive • Marine Strategy Framework Directive • EU Regulation 708/2007 concerning the use of alien and locally absent species in aquaculture • Environmental Liability Directive (ELD) 2004/35/EC • Fish Health Directives (91/67/EEC, 93/53/EC and 95/70/EC) • Plant Health Directives (2000/29/EC) 	<p>Europe is developing its strategy to combat Alien Invasive Species. This will put prevention and early detection / rapid response at the heart of the European approach to non-native species.</p> <p>In addition, existing directives have requirements this project will support including:</p> <ul style="list-style-type: none"> • protecting biodiversity • protecting habitats • improving water quality • reducing adverse impacts resulting from alien species in aquaculture • reducing environmental pollution
Voluntary Codes	<ul style="list-style-type: none"> • ICES Code of Practice on the Introductions and Transfers of Marine Organisms 2005 	The ICES code aims to reduce the ecological, environmental, economic and genetic impacts associated with the transfer of species utilised in aquaculture activities.

Table 2. High level policy aims:

Policy Area	Aim	Benefits
INTERNATIONAL		
Marine Protected Areas IUCN and CBD	Delivering an ecologically coherent well-managed network of MPAs by 2012 ... Protect marine life while allowing sustainable and legitimate use of our seas ... Meet our commitments under the Convention on Biological Diversity and contribute to ... Good Environmental Status ... under the Marine Strategy Framework Directive	Helping to protect the diversity and ecology of MPAs by reducing the number and impact of harmful non-native species. Following Commitments under the CBD through emphasising prevention and rapid response to native species.
EUROPEAN		
Marine Strategy Framework Directive 2008/56/EC	To achieve GES by 2020. To have measures in place by 2016. Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem	Directly delivers against targets set for managing pathways and achieving GES for descriptor 2 of the directive. Measures to reduce unintentional introductions through good biosecurity practice. Improved early warning monitoring through awareness raising, improved communication and development of surveillance / alert systems. Measures to address the most damaging INNS by building capacity to rapidly respond and eradicate new INNS in the marine environment
Water Framework Directive 2000/60/EC	To bring all water bodies to Good Ecological Status.	Helping to achieve Good Ecological Status by reducing the number and therefore impact of INNS . The UK considers that non-native species are one of the significant pressures that could result in a water body failing to meet environmental objectives.
Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011)	This strategy is aimed at reversing biodiversity loss and speeding up EU's transition towards a resource efficient and green economy. It is an integral part of the Europe 2020 Strategy ⁴ , and in particular the resource efficient Europe flagship initiative ⁵ .	Helping to achieve Target 5: By 2020, Invasive Alien Species and their pathways are identified and prioritised, priority species are controlled or eradicated, pathways are managed to prevent their introduction and establishment of new IAS.
Comm (2009) 162 Building a sustainable future for aquaculture	The EU aquaculture industry of the future should be at the forefront of sustainable development. Advancing	Working with industry to help develop good practice that benefits the industry and environment; allowing their

	research and technology must also help the aquaculture industry to be environmentally sustainable. Applying high standards will improve the image of the aquaculture industry and facilitate its access to the markets	businesses to be more sustainable achieve environmental / social responsibility and ensuring the survival of their businesses into the future.
NATIONAL		
Invasive Non-native Species Framework Strategy for Great Britain	To minimise the risk posed, and reduce the negative impacts caused by invasive non-native species in Britain.	Support all levels of the Strategy, particularly prevention and rapid response . Follows Strategy approach working in partnership and improving awareness and communication . The GB Programme Board responsible for the Strategy has indicated their support for this project.
Ireland Non-native Species Strategy	Halting impacts on biodiversity and economy from invasive species Preventing new introductions Early detection of new species Controlling and containing existing species Mitigating impacts Building capacity and support amongst stakeholders Developing the evidence base for policy and decision making	Support the implementation of the strategy at all levels of the strategy as it relates to the marine environment. Help to develop and share good practice. Ensure industry engagement and buy it.
Our seas – a shared resource UK Policy – High Level Marine Objectives	Clean, healthy, safe, productive and biologically diverse oceans and seas	Helping to protect the diversity of our oceans and seas by reducing the number and impact of harmful non-native species. Helping to make marine businesses more sustainable by protecting them from problems caused by non-native species (e.g. biofouling, disease, competition with farmed / fish stock) and achieve environmental social responsibility .

Marine Strategy Framework Directive

The Marine Strategy Framework Directive (MSFD) requires that ‘non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem’.

Good Environmental Status for non-indigenous species in UK waters will be achieved when:

- Measures to address intentional and unintentional introductions of IAS are in place.
- The amount (abundance / distribution) of IAS in UK waters can be effectively assessed.
- Measures to address the most damaging established IAS are in place (eradication, containment, control).
- Trends in the number/distribution of the most damaging IAS in the marine environment are reducing over time.
- Early warning and information system is in place supported by functioning surveillance and monitoring system.
- Impacts of IAS on habitats, native communities and ecosystem functioning can be assessed and are reducing over time.
- The number of new introductions of IAS is significantly reduced by 2020.

GB Non-native Species Strategy

The Invasive Non-Native Species Framework Strategy for Great Britain provides a high level framework which details key actions required to address the problems caused by INNS. This strategy covers terrestrial, freshwater and the marine environment, and follows the three stage hierarchical approach adopted by the CBD; prevention, detection/surveillance and control/eradication.

The overarching aim of this Strategy is to minimise the risk posed, and reduce the negative impacts caused, by invasive non-native species in Great Britain. Key aims include:

- to achieve increased awareness of non-native species issues and promote appropriate changes in behaviour or attitudes throughout all relevant sectors;
- to reduce and where possible, prevent the intentional and unintentional introduction of invasive non-native species;
- to ensure that effective contingency response capabilities are in place and resourced to prevent the establishment of new invasions where possible;
- to improve co-ordination of actions to tackle invasive non-native species in partnership with key interest groups outside government; and
- to make optimum use of available capacity and resources to improve detection and monitoring capabilities.

Water Framework Directive

The WFD is the overarching Directive for Water Quality. It requires a holistic, approach with default objectives of preventing deterioration of water bodies and aiming to bring all water bodies to Good Ecological Status (GES) by December 2015. Invasive non-native species are recognised as a significant threat to achieving GES.

Biodiversity and Marine Protected Areas

The UK is committed to delivering an ecologically coherent and well-managed network of MPAs by 2012. MPAs will protect marine life while allowing sustainable and legitimate use of our seas to continue. The network of MPAs will ensure we meet our commitments under the Convention on Biological Diversity and contribute to measures aimed at achieving Good Environmental Status across Europe's seas by 2020 under the EU Marine Strategy Framework Directive.

Welsh Government

The Wales Environment Strategy states that:

'By 2010, 95 percent of international sites in favourable condition; by 2015, 95 per cent of Welsh SSSIs in favourable condition and by 2026, all sites to be in favourable condition'

The Wales Environment Strategy Action Plan states that:

- We will meet our international obligations and the urgent need to halt the loss of biodiversity and aid its recovery on sites of international, Welsh and local importance, and in the wider environment. We will do this through all our activities.

<http://new.wales.gov.uk/desh/publications/enviroprotect/environmentstrategy/environmentactionplan/esap0811e.pdf?lang=en>

It also states that:

- We need to maintain and enhance the quality of our marine environment, and work actively with stakeholders to manage the marine environment in Wales over the longer term. Specifically, we will develop a framework for management of seas and coasts around Wales in a collaborative way:

The Woodlands for Wales Strategy states that:

- There are several invasive native and non-native woodland species that seriously affect the ability of woodland owners to deliver many of the outcomes set for this strategy, including that of improved woodland diversity. None of the impacts of species such as grey squirrel, deer and rhododendron, can be considered in isolation from other policies or the wider interests of society. For this reason we intend to deal with these issues in a strategic and targeted manner. We shall encourage other parts of government, as well as our delivery partners and stakeholders, to work closely together to develop countrywide approaches, and make best use of limited resources to achieve agreed priorities.

NERC Act Duty:

- In 2001 the Countryside and Rights of Way Act imparted a biodiversity duty on the Welsh Assembly Government and Section 74 committed WAG to publishing a list of species and habitats of principle importance for Wales. In 2006 this was superseded by the the Natural

Environment and Rural Communities Act. Section 40 imparted a 'biodiversity duty' on all public authorities in Wales (and England) and Section 42 of this Act required the publication of a new list of priority species and habitats in Wales. Under Section 42, there is a requirement for WAG to 'further the conservation' of species and habitats on this list and promote the taking of action by others to do the same.

ANNEX 2 CASE STUDIES OF IAS PROJECTS IN WALES

Case Study 1: Efforts to Eradicate the Carpet Sea Squirt in Holyhead marina

The carpet sea squirt (*Didemnum vexillum*) is an invasive sea squirt that is not native to UK shores. It was first detected in Europe in 1991 and has since spread to several countries (including France, Ireland and the UK). The species was discovered in the marina in Holyhead Harbour in the summer of 2008 and there were concerns that *D. vexillum* would have negative impacts on biodiversity and shellfish interests.

D. vexillum forms sheet-like colonies on natural and artificial hard substrata as well as benthic organisms including other ascidians and algae and even on *Zostera marina* beds (Carman and Grunden 2010). The serious ecological and economic damage experienced in New Zealand and other temperate regions has led to a large investment in on-going research into the biological tolerances and spread of *D. vexillum* (Biosecurity New Zealand, 2009; USGS, 2009; Gittenberger, 2007, Bullard and Whitlatch, 2009) as well as rapid response, monitoring and management following introductions (Coutts and Sinner, 2004; Pannell and Coutts, 2007; Locke and Hanson, 2009). It has been identified that pleasure craft movement provides the greatest risk for the spread of *D. vexillum*, so the predicted spread of *D. vexillum* around the Welsh coast was modelled using the species biological limits and current known populations. Cruising routes and marinas used by recreational vessels was also fed into the model.

The model showed that large areas of the Welsh coast could become affected fairly rapidly including European Marine Sites and the main shellfish beds in Wales. This would have a large economic and environmental impact on the Welsh industry and environment.

In 2009 funding was received from the Welsh Government to undertake a three year eradication programme in Holyhead marina to try to eradicate the *D. vexillum* before it spread to other areas. The cost of the eradication around £700k is small compared to the cost of eradicating it from marinas and amenity beaches had it spread from Holyhead marina. The cost to the shellfish industry in the Menai Straits alone could have run into several million pounds.

A rapid response mechanism to eradication/control of Invasive Non-Native Species needs to be established with suitable funding for the task, especially if prevention methods are not in place to reduce the risk for the transfer and settlement of INNS.

A separate project looking at the development of an isolation berth to treat suspect vessels is under development at present by Holyhead marina and Bangor University.

Case Study 2: Data gathering to reduce the risk of Chinese Mitten crab

Chinese mitten crabs are officially listed as one of the World's 100 worst invasive species. They can cause damage to fishing gear and river banks, block intake screens, modify natural habitats and compete with native species. It is this economic and ecological damage that makes this crab such an unwelcome arrival. The full extent of these exotic pests in English and Welsh waters is currently unclear.

A number of mitten crab sightings have been reported from the Dee estuary over the past four or five years and one mitten crab has been found in the Conwy estuary. Further to these finds and also due to requests from Mussel fishery operators to gather seed in estuaries where mitten crab have been reported, it was decided to gather information to clarify the distribution of this species around the UK. An identification leaflet was produced by CCW, National History museum, Marine Biological Association and Newcastle University and also a reporting website was set up for records to be sent (www.mittencrabs.org.uk)

There is very limited information on the habitat requirements of the mitten crabs and so a project was set up to look at four rivers in North Wales:

1. River Dee – where there are known Mitten crab
2. River Conwy – where one crab had been found
3. River Clwyd – a river in between the Dee and Conwy
4. River Mawddach – a west facing river emptying into Cardigan bay

Data loggers were placed in the four rivers to collect environmental data and the effect of water hardness on juveniles was also checked. The reasons for this were to try and identify if mitten crab required a river to have certain environmental conditions for them to establish themselves in. This would help to identify the rivers at risk from mitten crab and so a risk management strategy could be put into place.

The project had support from NRW (former CCW, EAW), universities, NGOs, fishing associations and the general public. The data collection and river bank surveys are being carried by North Wales Wildlife Trust volunteers.

There is also a DNA project under way to identify the original source of the mitten crab to understand the spread of the mitten crab to their current rivers.

All this work is currently being carried out with a very small amount of funding and if successful could save a lot of environmental and economical cost in the future.

Mitten crabs migrate from freshwater to estuaries during the spring and back again during the autumn. Therefore plans are being developed to try to tackle mitten crabs by trapping around Chester weir. Depending on the success of this work, similar approaches could be developed at “pinch-points” in rivers/estuaries elsewhere to try to control the spread of this species.

Case Study 3: Freshwater INNS Strategic Action in North Wales

Local IAS forums have become established in Pembrokeshire and in North Wales. The North Wales forum has undertaken a risk assessment exercise to inform action prioritization. As a direct outcome of this work, it has become recognised that strategic co-ordinated action is essential if highlighted IAS are to be subject to effective control.

Freshwater IAS include a number of high risk species, both plant (e.g. himalyan balsam, Japanese knotweed, giant hogweed) and animal (e.g. mitten crab, American crayfish). Consequently, the Welsh

Dee Trust and the respective IAS forums covering North Wales & River Dee recognised that co-ordinated strategic action on a catchment/sub-catchment basis represents the best long term approach to successfully controlling or eradicating invasive species. A project officer has been appointed for the Dee and has prepared an overarching spatial action plan to target future surveillance and management action.

Action in the upper Alyn catchment demonstrates what can be achieved by integrated and co-ordinated spatial action. In this case, Flintshire and Denbighshire County Councils have lead a protect that co-ordinates management and surveillance action. Stakeholders and partners in this project include land owners and voluntary organizations including community and conservation groups.

Surveillance results indicate a significant decline in abundance of Himalyan Balsam within the project area. It is hoped to extends the project further down stream towards Wrexham. Annual issues are the availability of resources required to facilitate action.

One of the identified issues concerning INNS is public awareness. Consequently, Snowdonia National Park, four Welsh county councils (Gwynedd, Flintshire, Denbighshire and Wrexham), together with a range of other key stakeholders, are initiating a cross boundary partnership event on 29-30 June 2013 entitled 'Big Dee Day – The Invasion'. The principle aims of this event are to raise awareness of INNS, to encourage recording, and to stimulate and undertake management action

Case Study 4: Severn Rivers Trust (SRT) – Invasive Non Native species Survey

Funded by the Welsh Government Ecosystem Resilience and Diversity Fund 2012/13

Location: Strategic survey within the Severn Rivers Catchment

Target IAS:

- Himalayan Balsam
- Japanese Knotweed
- Giant Hogweed

This strategic survey took place between August and October 2012 along 98 separate water bodies. Surveyors also took note of where fencing of river bank may reduce erosion and improve the river and riparian habitat for native fish and other species.

The survey provided a strategic overview of the location, density and species present in the catchment, providing a baseline to enable a systematic approach to the problem caused by these species³. The Severn Rivers Trust then worked with 3 volunteer community river groups to undertake some targeted clearance of Giant hogweed and Himalayan balsam along the river and will support these groups in the future to do more.

This survey was an excellent starting point for a strategic approach tackling invasive species throughout the Severn catchment. The SRT through their report recommend that *“a practical and*

³ Morris M. (Dec 2012) 'Severn Uplands Invasive non native species survey' Severn Rivers Trust

strategic operation commences with all possible stakeholders to tackle the issue of non-native plant species in the area. This will only work through partnership working with a number of stakeholders” (Morris M 2012). The report then goes on to list the steps required to make this happen. As part of the project the SRT also produced identification sheets for the 3 target species. For more information/maps go to the Biodiversity Action reporting System <http://ukbars.defra.gov.uk/project/show/27278>

Case Study 5 – Responding to the Invasive (Killer) Shrimp Outbreak in Wales

Discovered in Cardiff Bay & Eglwys Nunydd in November 2010 after being found in Grafham Water, England. This shrimp was a completely unknown entity in terms of UK impact and what to do about it. However European evidence suggested it is highly damaging to freshwater ecosystems.

EAW, CCW and Welsh Government helped form an England and Wales National Task Group to work collaboratively on managing the response including developing national policy and technical research projects about how to deal with it. We set up an all-Wales bespoke monitoring programme for high priority sites and helped develop new sampling techniques for this species. We worked with the site's owners/managers – Cardiff Harbour Authority and Tata Steel and other operators - to develop risk assessments for their activities and establish appropriate biosecurity measures. We have proactively engaged key user groups (especially anglers and boaters) and the wider public through a variety of mechanisms including press articles, radio and television features and local demonstration days. We have developed innovative communication methods to reach the widest number of key users about the practical actions they can take and these have been adopted as national good practice: <https://secure.fera.defra.gov.uk/nonnativespecies/checkcleandry/index.cfm>

Key priority sites across Wales have CHECK, CLEAN, DRY signage and this message is also promoted through other information routes including user good practice guides, national angling byelaw guidance, awareness raising presentations and the SPLASH water recreation programme for example.

We have also been enhancing the bio-security capability of our field staff through additional equipment purchases (e.g. duplicate sampling equipment and drying rooms), awareness raising and training. We are helping to develop an easy to use e-learning bio-security module that we also plan to roll out externally for others to use.

We continue to support the site operators who are maintaining their bio-security measures on a voluntary basis and we continue to work collaboratively with National Task Group colleagues and others on new work areas and to share information and good practice.

To date there have been no subsequent invasive shrimp detections in Wales.