Environmental Code of Practice for Irish Aquaculture Companies and Traders
Ministerial Foreword

By Mr. John Browne, T.D., Minister of State at the Department of Communications, Marine and Natural Resources

As Minister with special responsibility for aquaculture I am delighted to welcome the ECOPACT initiative, from the fish farmers of Ireland, supported by BIM.

It is very encouraging to see the industry in Ireland taking this proactive step and committing themselves to a long term programme of environmental best practice in how they run their farms. The sustainable development of the Irish aquaculture sector is a key priority for my Department and ECOPACT will be a valuable foundation stone in ensuring the success of our strategy.

I am also very pleased to see the association of the ECOPACT initiative with the C.L.A.M.S. process and that both of these valuable schemes will operate in tandem, thus strengthening the overall drive for socially and environmentally sustainable development of the industry.

As a Wexford man it is a source of great satisfaction to me that not only did the first C.L.A.M.S. plan ever launched come from the oyster farmers of Bannow Bay, but also that now the ECOPACT initiative has been unveiled on board the historic and beautiful replica ship, Dunbrody in New Ross. Aquaculture is an excellent way of bringing sustainable wealth and employment to remote rural areas. It can be a significant force for social stability in fragile communities, allowing, as it does, local people to find work in their own home places.

I would like to take this opportunity to commend the ISA and the ISGA for their wholehearted commitment to implementing this initiative for the greater good. Well practised aquaculture is a genuinely sustainable activity with many benefits for Ireland’s economy, however, there is no room for complacency and no room either for poor operators or low standards. I would encourage the fish farmers of Ireland to enthusiastically embrace the ECOPACT initiative and to participate fully in it through their local C.L.A.M.S. groups.

I would also like to acknowledge the work of the Environment and Quality section of BIM for their effort in developing ECOPACT with the industry, which has been assisted by EU funding from the FIFG.
ECOPACT is an exciting new initiative developed by BIM in cooperation with the Irish Shellfish Association (ISA) and the Irish Salmon Growers Association (ISGA), designed to bring about the widespread adoption of Environmental Management Systems (EMS) into the Irish aquaculture industry.

To their credit, a number of leading fish farming companies have already gone down this path using both accredited systems, such as ISO 14001, and non-accredited systems as a starting point. The adoption of a formal system of environmental management by an aquaculture company represents a powerful commitment to environmentally sustainable operations to a standard beyond compliance with the laws governing fish farming in Ireland. Environmental Management Systems are an enlightened approach towards running a business, which benefits the community, the environment and the company concerned.

For a sector like the Irish aquaculture industry, which is made up of many small companies, the existing accredited EMS such as ISO 14001 and the European Union Eco-Management and Audit Scheme (EMAS) are difficult to achieve and maintain because of the complexity and burden of administration associated with them. BIM’s Environment and Quality section recognising this fact, and working with the industry, has brought forward ECOPACT as an initiative to start the process of adopting EMS on a nationwide and systematic basis. As it gains momentum it is intended that specially tailored accredited EMS schemes suited to small fish farming companies will be developed.

This ECOPACT document is designed to provide a solid basis for Irish fish farmers to set up their own highly effective EMS, which will impact positively on their communities and on the environment. The document lays out in detail the approach that should be taken, an overview of the legislation to be complied with and the extra measures and steps that the farmers can take to minimise the environmental impact of their operations in line with international best practice.

In addition to the details of an environmental code of practice ECOPACT also includes a very comprehensive series of annexes. These have been compiled and appended to the document and include: pictures and habitat descriptions for Ireland’s protected animals and plants and a number of subsidiary codes of best practice for specific aspects of aquaculture. This information is intended to act both as a guide for the Irish aquaculture industry and also as a useful reference document for interested members of the public as a whole.

To drive the rapid and committed uptake of the initiative’s objectives on a national and accountable basis, the ECOPACT initiative has been married with the C.L.A.M.S. process. C.L.A.M.S. is a unique Irish aquaculture coastal management system, which has already been very successful and is being widely copied abroad. It is described in more detail in Annex III. Linking ECOPACT with C.L.A.M.S. has the effect of providing a national delivery system for the EMS approach through a widespread locally based network that is strongly supported by the state and its agencies.
Contents

Introduction ...............................................................................................................................................................................3
Culturing Techniques .................................................................................................................................................................4

Environmental Management Systems .................................................................................................................................................7
Environmental Policy: The Framework for your EMS .................................................................................................................9

Environmental Aspects .................................................................................................................................................................11
Cleaning Agents, Fuels and Lubricants ...........................................................................................................................................12
Environmental Monitoring ...............................................................................................................................................................13
Equipment Operation & Maintenance ...........................................................................................................................................14
Management & Organisation ..........................................................................................................................................................15
Nature Conservation .........................................................................................................................................................................16
Navigation & Light ...........................................................................................................................................................................18
Noise ........................................................................................................................................................................................................19
Odour ....................................................................................................................................................................................................20
Oil Spills ................................................................................................................................................................................................21
Site Management ............................................................................................................................................................................22
Stock Health Management ............................................................................................................................................................23
Underwater Archaeology ..............................................................................................................................................................24
Use of Public Access Piers ...........................................................................................................................................................25
Visual Impact ................................................................................................................................................................................26
Waste Management ......................................................................................................................................................................27

Implementation ...............................................................................................................................................................................29

Annex I .........................................................................................................................................................................................32
Important bird species of Irish protected areas ...................................................................................................................................32
Guide to bird species protected under the EU Wild Birds Directive in Ireland ..................................................................................38

Annex II .........................................................................................................................................................................................54
Habitats and Species protected in Ireland under the EU Habitats Directive ..................................................................................54
Guide to species protected under the EU Wild Habitats Directive in Ireland ..................................................................................58

Annex III .......................................................................................................................................................................................68
ISGA Code of Practice for the prevention of stock escapes of Irish farmed salmonids ......................................................................68
FEAP Code of Conduct .................................................................................................................................................................73
C.L.A.M.S. Process Explanatory Introduction ...................................................................................................................................82
Acknowledgements ........................................................................................................................................................................84
References .....................................................................................................................................................................................85
Acronyms ......................................................................................................................................................................................85
Introduction

This manual describes the environmental challenges and responsibilities faced by the Irish aquaculture industry and outlines state of the art management and mitigation measures that the Irish aquaculture industry employs. Each individual issue is given a defined environmental objective, together with environmentally sound management options, that the Irish fish farming industry can adopt to meet each objective.

The aim of this document is to promote the responsible and sustainable development of the Irish aquaculture industry. It will assist the industry in working to the highest standards and enable the sector to produce safe and healthy food in a viable and efficient manner while optimising farm husbandry, maintenance and the interactions of the farm related activities with the surrounding environment.

Demand for seafood products is set to double in the next five to ten years. Globally, this increase in demand cannot be met from capture fisheries alone as they have reached their maximum sustainable yield around the world. Aquaculture is now well established and will increasingly fill this gap in supply of many varieties of seafood.

Aquaculture is the farming of aquatic animals and plants in sea and freshwater environments, including finfish such as salmon, trout, turbot, perch and eels, and shellfish such as oysters, mussels, clams, scallops and abalone, as well as a variety of seaweeds and sea vegetables.

Fish farming is a skilled operation, and often it is an expensive and capital-intensive business. All fish farming relies on a clean and healthy environment. Properly managed aquaculture can exist in harmony with nature and maintain and enhance our natural surroundings. The following section gives a brief description of the main forms of aquaculture in Ireland and how they interact with the environment.
Culturing Techniques

Finfish

Pond, Tank, Raceway Cultivation

These structures are used for land-based cultivation. Ponds and raceways are easy and cheap to build. They are generally built for freshwater farms and used for species such as trout or perch. Tanks are more expensive and can be used for both freshwater and seawater species. In these land-based systems the water can flow through the whole installation once or it can be re-used through special re-circulation technology.

Pen Cultivation

This type of cultivation is used in open waters, such as lakes and the sea, to grow species like salmon and trout. Pens are structures that float in the water. The fish are held in nets, which are suspended from a plastic collar on the surface and hang down through the water column. These operations are serviced by boat and involve feeding the fish with a specially prepared diet, made principally from fish meal and fish oil.
Shellfish

Inter-tidal Culture

The bag and trestle method is used for growing Pacific oysters on the seashore where the farmer can access them during low tide. Trestles are table-like platforms that keep the oysters above the seabed. Juvenile oysters are placed in plastic mesh bags, which are attached firmly to the metal trestles. It takes one and a half to three years for oysters to reach marketable size.

Mussels can be grown on vertical poles, called bouchots, which are exposed during low tide. The mussels attach themselves with their byssus threads to the pole. This technique is primarily used in France.

Clams are cultivated in sandy beaches. They burrow themselves in the sediment, and a mesh to protect them from predators such as birds, is placed over them.

Farms operating in the intertidal zone are usually accessed using tractors at low tide. Shellfish are filter feeders, feeding themselves by browsing off the plankton in the water at high tide.

Sub-tidal Culture

Bottom Culture

Species such as mussels and oysters can also be grown on the seabed without using any structures. Because they are sessile species, i.e. they do not move around once they have left the planktonic stage, they can only be moved by currents or by humans harvesting them. They are usually harvested using fishing techniques such as dredging. Scallops can be grown on the seabed as well. Because they can actively move around by propelling themselves through the water, juvenile scallops are sometimes grown in trays and frames moored to the seabed.

Hanging Culture

This technology is primarily used for growing mussels. They can be grown on vertical ropes or mesh stockings that hang off long-lines. These lines are about 180 metres long and kept afloat by specially designed grey barrels. The lines can also hang down off rafts. It takes one and a half years for mussels to reach marketable size.

Scallops are also cultivated using longline systems involving net bags.

In both bottom culture and hanging culture of shellfish in the subtidal zone the farms are accessed by boats and the stock is harvested at sea.

Tank Culture

This land-based technology is used for the juvenile stages of species such as urchins or abalone. It looks very similar to finfish systems, but the techniques used are very different as these species live on a diet of seaweed.
Environmental Management Systems (EMS)

This section of the ECOPACT document introduces the concept of EMS and how this approach can benefit the fish farmer and his fellow stakeholders in the coastal zone. Water quality, species protection and habitat conservation are challenges currently facing all industries. While the Irish fish farmers are aware of their own local responsibilities and of their reliance on the environment for the success or failure of their business, the aquaculture industry is also under constant scrutiny by the relevant state agencies, conservationists and the general public. If these issues are to be understood properly and addressed, the aquaculture industry should be seen by all the players as part of the solution and not simply as the problem.

The link between aquaculture and species protection, biodiversity, habitats, ecosystems and international conventions is obvious: aquaculture relies on a clean environment to work in and work with. The quality of aquaculture products is defined by the quality of the environment they are grown in.

Aquaculture operators have to consider the potential environmental effects of their activities because species and coastal habitats are protected under international and national laws and could be affected by aquaculture operations.

As well as the “stick” of regulation and potential harm caused to stock by not being environmentally aware, fish farmers can also benefit positively from having transparent environmental management systems in place.

If fish farmers are actively involved in protecting the environment, e.g. by adhering to an agreed Environmental Code of Practice or by implementing an environmental management system, beneficial consequences include:

- Positive press coverage
- Good public image
- Increase in market share
- Smoother expansion and development
- Improved reputation
- Better relations with other stakeholders
- Ability to counter false claims with facts

While discharge consents and other forms of permits are set to protect human health, habitats and species, aquaculture businesses should not just check whether they are within the regulation limits, they should, where possible actively try to minimise impacts.

Environmental Management Systems (EMS) help companies to reduce risk and to maximise opportunities in a co-ordinated way. They are designed to give insight into the most important environmental aspects of a business, help to manage risks and introduce the most efficient and cost effective environmental measures. They also help to manage environmental legal compliance and performance requirements. The two main standards are:

- International Standards Organisation (ISO) 14001 Environmental Management Systems
- European Union Eco-Management and Audit Scheme (EMAS)

Signing up to one of these systems helps managing environmental performance in a structured, efficient and effective way, as well as bringing recognised external
Environmental Code of Practice for Irish Aquaculture Companies and Traders

approval and therefore credibility. This can demonstrate improved performance to others and give competitive advantage in the market place.

Aquaculture businesses have several interest groups whose demands must be satisfied:

- Customers: require high quality produce and increasingly consider environmental and ethical values when choosing a product.
- Local community: amenities and common interests have to be considered and strong local support plays an important part for the success of aquaculture developments.
- Investors: want the best possible return for their money and recognise that companies without sound environmental practices will be increasingly under threat.
- Business partners: want to minimise risk and remain competitive, and a clean environmental image reflects efficient and innovative management.
- Regulatory bodies: certified environmental management can foster positive relationships between companies and authorities and make obtaining licenses or planning permission easier.
The environmental policy must be made relevant to all activities of a company, thus highlighting the importance a company’s management attaches to environmental matters. The policy must be publicly available and should act as a framework for the setting and reviewing of environmental objectives and targets. Therefore it must be reviewed regularly and should be discussed by management on a regular basis. Relevant issues that have to be covered are laid down in the annex of the EMAS regulation including:

- Assessment, control and reduction of the impact of the activity
- Energy management, savings and choice
- Waste avoidance, recycling, reuse, transportation and disposal
- Evaluation, control and reduction of noise within and outside the site
- Staff information and training on environmental issues
- External information on environmental issues

This environmental policy must be based on the principles of good management practices, which are also laid down in the annex of the EMAS regulation stating, for example, that:

- A sense of responsibility for the environment amongst employees at all levels shall be fostered.
- The environmental impact of all new activities, products and processes shall be assessed in advance.
- The impact of current activities on the local environment shall be assessed and monitored, and any significant impact of these activities on the environment in general, shall be examined.

Information necessary to understand the environmental impact of the company’s activities shall be provided to the public, and an open dialogue with the public should be pursued.

The above provides a general overview of the requirements of environmental management systems. The ISO 14001 and EMAS systems are available as “off the shelf” standards, which can be applied to any business. ECOPACT is designed to provide a best working practice platform from which aquaculture companies can introduce environmental management practices on a step by step basis.

It should be understood that fish farmers who develop a recognised EMS for their farms are acting in a very responsible way, which is over and above the requirements of the already strict legislation that regulates aquaculture operations in Ireland.

A full scale accredited EMS may not be immediately practicable or possible for all fish farmers, especially where small scale shellfish operators are concerned, however, they may move towards this goal by following the approach detailed in the next part of this document.
The following section outlines in detail environmental aspects faced by the Irish aquaculture industry, associated key objectives, background and recommended actions to assist operators with the implementation of best environmental practices. Thus, by adopting an EMS for their farm, even if it is not at first formally accredited, Irish fish farmers can capture the benefits of the approach for the good of their own business, the local community and the overall environment.

Within an environmental management system key environmental issues faced by a company have to be identified. For each identified issue an environmental objective has to be set and a programme designed outlining how this objective is to be met over a defined space of time.

This section provides a step by step guide through 13 identified environmental aspects faced by the Irish aquaculture industry, presented in alphabetical order.

For each of the 13 aspects a key objective has been defined, a background description of the aspect itself is provided, and a brief outline of the main regulatory requirements is included. Following the description and the regulatory background, a number of best practice recommended actions have been drawn up to enable the key objective to be met.
Key Objective

To avoid accidental release of cleaning agents, fuels and lubricants into the environment and minimise impact from daily use and handling.

During day-to-day operations, a variety of cleaning agents, fuels and lubricants are in use in production facilities as well as related offices. It is essential that correct use, handling, storage and disposal of these materials be maintained at all times to avoid potential contamination of the environment and ensure staff safety. It is important to establish what kind of materials are being used as well as the potential risk these might pose to the environment and/or staff and if there is a more environmentally friendly substitute available.

Regulatory Requirements

Under the Local Government (Water Pollution) Acts 1977-1990 it is a statutory offence to “cause or permit any pollutant to enter waters”. Chemical containers must be correctly labelled at all times. All ‘dangerous substances’ must comply with the Classification Packaging and Labelling of Dangerous Substances Regulations 2003. Suppliers of chemicals and detergents are legally obliged to provide Material Safety Data Sheets (MSDS) to their customers, which include ecological information.

Recommended Actions

- Minimisation of use of any chemicals on site and use of biodegradable products where available
- Designate person(s) to be responsible for chemical storage and stock control systems
- Thorough annual inspection of chemical storage before placing new order, checking that there is less than one year’s stock of any substance
- Establishment of a stock book and date stamping new stock on receipt
- Clear labelling of all bottles/containers. Replacement of damaged or peeling labels immediately. Any stock that shows signs of deterioration or has lost its label must be disposed of by the recommended methods (check MSDS)
- Avoid accumulation of excessive amount of waste
- Prevention of accidental spillages during normal use, e.g. through bunding, and prompt containment and clean up of spills should they occur
- Establishment of spill response plan ensuring proper procedures and the availability of appropriate equipment
- Wearing of appropriate personal protective equipment when handling hazardous materials
- Disposal of out of date or unused stock in an appropriate manner
Key Objective

To ensure the health of the marine environment and prompt action should pollution occur.

Aquaculture operators are out working in a coastal or rural environment every day of the year. They are aware of the importance of keeping the marine and freshwater environment unpolluted and unspoilt. They are in the frontline when any pollution problem occurs within the water body, being the first to be affected by wrecks, spills or illegal discharges. By working with the environment, aquaculture operators can be the first ones to observe pollution incidents or any other changes in the environment and thus act as an early warning system to the authorities as well as to the local residents.

Regulatory Requirements

Finfish producers are obliged to undertake environmental monitoring as part of their licence conditions and have to be in compliance with the Monitoring Protocols for Offshore Finfish Farms:
- No. 1- Benthic Monitoring
- No. 2- Water Column Monitoring
- No. 3- Sea Lice Monitoring and Control
- No. 4- Audit of Operations
- No. 5- Fallowing.

Recommended Actions

That aquaculture operators adhere to the following practice:

1. Notification of the relevant authorities (Coastguard, DCMNR, County Councils, Fisheries Boards) of any potential threat of pollution they observe and taking samples where necessary.
Key Objective
To minimise environmental impact from vehicles and other marine equipment including the risk of pollution from accidental spills.

As part of the day-to-day operations on aquaculture facilities, vehicles and other marine vessels and equipment are necessary for the proper and safe handling, harvesting and conducting any other operation in relation to fish cultivation. This can cause unnecessary environmental impact if not operated in a proper manner, particularly if operations are situated in sensitive areas. Petroleum products can enter the water from marine engine combustion and during boat clean up and washdown procedures. Tractors and other machinery operated on the shoreline may accidentally leak fuel and lubricants into the surface water and onto the ground. It is in the operator’s own interest to maintain and conduct all machinery in an appropriate manner at all times given the potential risks of pollution and the significant financial investment needed for this machinery.

Regulatory Requirements
Operation of vehicles on the foreshore is subject to licence conditions. All vehicles operated must comply with licensing and operating regulations, and seaworthiness of all vessels must be ensured. All equipment must comply with relevant health and safety requirements.

Recommended Actions
That aquaculture operators adhere to the following practices:

1. Vehicle, vessel and equipment operators must have appropriate training and qualifications for proper and safe use of their equipment
2. Operation of all vehicles, vessels and equipment in safe and professional manner
3. Continuous care and maintenance of vehicles, vessels and equipment to minimise risk of spills or leakages of substances into the marine environment
4. Use of biodegradable products where possible, e.g. hydraulic fluid
5. Preparation of contingency plan in case of vehicle breakdown in intertidal zone
6. Proper disposal of all filters, oils, lubricants and other related materials
Key Objective

To foster an organisational attitude of commitment to protecting and enhancing natural resources.

Aquaculture relies on a clean and healthy environment. All producers are aware of this intrinsic connection between their operations and the surrounding environment. Different culturing techniques and operations interact in a varied manner with the environment so that environmental issues vary with and are specific to each operation and often to each site or farm.

Pressures on the industry are increasing due to public concern and an ever-changing regulatory framework. Responding to these concerns can be challenging and difficult. By implementing an environmental policy, aquaculture operations can explicitly communicate their responsible attitude towards the environment, giving them a powerful tool when communicating with regulators, the local community and other stakeholders in the marine environment. To ensure the integrity of the company, any environmental policy must be supported by policies and procedures proving real commitment through continuous assessment and improvement wherever possible.

Regulatory Requirements

Whilst aquaculture facilities are operated within a tight regulatory framework and specific environmental issues are targeted within this code of practice, currently, there is no regulatory obligation for aquaculturists to establish an accredited environmental management system.

Recommended Actions

That aquaculture operators adhere to the following practice:

1. Development of a company-specific environmental policy
2. Assessment of current practices and their environmental impacts
3. Assignment of responsibilities within the organisation to self-assess against the environmental policy
4. Definition and implementation of performance objectives and monitoring of progress
5. Support to your local environment through projects such as beach clean-ups or similar activities
6. Education of the public by providing information on your operation and by operating appropriate facility tours from time to time
7. Be active members of your local C.L.A.M.S. group
Key Objective

To minimise all impacts on habitats and species within the production area.

Aquaculture operators recognise the rich biodiversity of the Irish coastal environment and the need for its protection. Aquaculture is sustainable and has little impact on the environment when properly practised and managed. The general public, however, has a strong opinion regarding the impact of aquaculture operations on wildlife and biodiversity. All aquaculturists should operate their farms such that they do not give rise to legitimate concerns from the public. There are also potential benefits of aquaculture operations to wildlife, especially from shellfish cultivation, which can provide habitats and forage for other species.

Predation can be a potential problem to fish farmers. Aquaculture operators are encouraged to use preventative measures such as predator nets, proper net weighting and ultrasonic 'seal scarers'. Experience has shown that animals such as herons and seals are highly intelligent and capable of teaching others of their species their methods of hunting. It is more effective to scare these animals away from the farm.

Regulatory Requirements

The most important EU legislation governing nature conservation consists of:


The Wild Birds Directive, adopted in 1976, is the EU’s oldest piece of nature conservation legislation. It creates a comprehensive scheme of protection for the EU’s wild birds species, which contains three separate but related components. The most important for the fish farming sector relates to habitat conservation and includes a requirement to designate Special Protected Areas (SPAs) for migratory and other vulnerable wild bird species. The second consists of a series of bans imposed on activities that directly threaten birds (such as the deliberate destruction of nests and the taking of eggs). The third component establishes rules that limit the number of species that can be hunted and the periods during which they can be hunted.

The Habitats Directive provides a comprehensive protection scheme for a range of animals and plants, as well as for a selection of habitat types. It provided for the creation, by June 1998, of a network of protected sites known as NATURA 2000, which embrace SPAs designated under the Wild Birds Directive and Special Areas of Conservation (SACs) proposed by Member States under the Habitats Directive. Selection of these sites must be based on scientific criteria and scientific information. In all protected sites in the network the stipulated safeguards, including the prior assessment of potentially damaging plans and projects, must be respected. Once fully in place, this network should ensure that the best examples of EU natural habitats, and areas hosting rare and endangered plant and animal species, are properly conserved and protected. The Habitats Directive is the EU’s flagship contribution to safeguarding global biodiversity.

The legislative framework currently governing nature conservation in the Republic of Ireland is contained in the following:

- The Wildlife Act, 1976 and (Amendment), 2000
- European Communities (Natural Habitats) Regulations, 1997
- European Communities (Conservation of Wild Birds) Regulations, 1985

These pieces of legislation protect certain habitats and specific animal and plant species, e.g. all bird species, common and grey seals, dolphins, porpoises, otters, among others, and it is illegal to kill these animals even if they pose a potential threat to farmed animals. They also provide for the establishment of protected areas, namely:

- Natural Heritage Area (NHA)
- Special Protection Area (SPA), specifically for protection of particular bird species
- Special Area of Conservation (SAC), specifically for habitat protection
Natural Heritage Areas (NHAs) form the basic designation for wildlife in Ireland. They are legally protected from the date that they are formally proposed under the Wildlife Amendment Act, 2000. Many of the designations overlap with SACs and SPAs.

Special Protection Areas (SPAs) are areas of importance for bird life. Designations are required for listed and vulnerable species, regularly occurring migratory species and wetlands, particularly those of international importance attracting large numbers of birds each year. (See Annex I)

Special Areas of Conservation (SACs) are considered the prime wildlife conservation areas in Ireland, important on a national as well as EU level. Although most of them were chosen from the proposed NHAs, a number of other sites have also been included. Under the EU Habitats Directive, certain habitats and species must be given protection, and some habitats are given a priority status, having greater requirement for designation and protection. (See Annex II)

Both SPAs and SACs form part of the NATURA 2000 network. This is a network of protected areas across the EU. For these areas conservation management plans have to be devised. The competent authority in Ireland charged with this task is the National Parks and Wildlife Service (NPWS) of the Department of Environment, Heritage and Local Government. Management plans for SPAs containing a marine aspect include specific provisions for aquaculture, so-called Aquaculture Zone Management Plans (AZMPs). These divide the related area into four subzones:

- **ZONE W – Highly Sensitive Zones**: These are the most sensitive areas within SPAs regarding the bird species for which the area was designated. Aquaculture will not be allowed to develop in these areas. In theory existing aquaculture operations in this zone would have to be moved, however, it has become apparent during zoning that little aquaculture is practised in these areas anyway. In the case of an operation having to be moved, a compensation package will be agreed between the licensed operator and NPWS.

- **ZONE X – Transition Zone (Sensitive Zone)**: These are areas where wildlife and aquaculture may co-exist subject to conditions. Expansion of existing operations or new aquaculture applications will be considered on a case-by-case basis. As scientific knowledge increases, these areas may be subject to re-zoning as Zone W or Zone Y.

- **ZONE Y – Less Sensitive Zone**: These areas have low usage by the bird species for which the area has been designated. In such areas the regulation of aquaculture will be in line with the Department of Communications, Marine & Natural Resources’ licensing legislation.

- **ZONE Z – External Influence Zone**: These zones are on the edge of the designated SPAs where aquaculture activities may still have an effect on the designated area through noise levels, access routes etc. Some conditions may apply, which will be considered on a case-by-case basis.

NPWS are also in the process of establishing management plans for marine SACs. This task includes further collection of scientific information including seabed mapping and dive surveys.

Management plans for both SPAs and SACs will go to public consultation before being implemented.

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**Recommended Actions**

That aquaculture operators adhere to the following practice:

1. For new licence application, consult with regional BIM Aquaculture Development Officer who will be able to ascertain if the proposed development is in a designated area and what management plan has been drafted at this stage (June 2003)

2. Plan and observe all access to foreshore via designated routes for intertidal shellfish culture sites

3. Targeting of specific species through predator control measures avoiding additional impacts on other species and habitats, including the secure deployment of predator exclusion devices, e.g. netting, to ensure they do not present an unnecessary risk to wildlife

4. Establish peak bird activity times in your area and schedule work around these when possible to avoid unnecessary disturbance
Key Objective

To minimise the visual impact of markers and brightly coloured buoys to those necessary for safety and navigational purposes.

Maintenance work and harvesting activity may need to be carried out year-round at all times of the day or night, especially in intertidal shellfish farming, and operations can shift into night time to coincide with ‘working tides’.

Lights and buoys have to be used for navigational safety and to allow operating at night time. However, lights could be intrusive for other vessel operators and/or upland owners if poorly directed or reflected from the water.

Regulatory Requirements

Licensed areas and/or structures must be marked according to the terms and conditions laid down in the foreshore license. Lighting shall be limited according to requirements by the Marine Survey Office and Licence and the Commissioner of Irish Lights. Navigational lights and markers must be operational at all times. Spotlights shall not be employed on vessels for navigational purposes.

Recommended Actions

That aquaculture operators adhere to the following practices:

1. Formulate a navigational plan with other operators where aquaculture licences are in close proximity to each other, in conjunction with the Marine Survey Office.
2. Where lighting failures are observed on neighbouring sites, notify relevant licensed operator.
3. Avoid shining bright lights seaward as this could interfere with safe navigation.
4. Minimise the use of lights on site.
5. Position spotlights directly above the work area to maximise specific illumination and minimise reflection.
6. In salmon farming, where in-cage lighting is used, lights should be of the submerged type.
Key Objective

To minimise noise pollution and protect staff, residents and other marine users from noise impact.

Motorised equipment used in aquaculture operations creates incidental noise that can impact on the surrounding environment. Noise travels particularly well across water and during night time. All reasonable effort should be made to reduce this impact and avoid any noise pollution to an area especially when working during the evening or at night time.

Regulatory Requirements

Under the EPA Act 1992 regulations were made, which enable an individual to complain to a District Court seeking an Order to deal with noise nuisance, i.e. noise that is so loud, so continuous, so repeated, of such pitch or occurring at such times that it gives a person reasonable cause for annoyance. For premises requiring planning permission the latter may be granted subject to specific conditions regarding noise.

Recommended Actions

That aquaculture operators adhere to the following practice:

1. Check planning permission for conditions on noise levels and adhere to provisions made
2. Proper maintenance of all machinery, vessels and other marine equipment to ensure minimisation of noise levels
3. Proper lubrication of all rotating parts and where feasible fitting of sound suppression devices, e.g. mufflers, barriers and baffles
4. Restricted use of recreational radios while working on the foreshore
5. Reduction of vessel speed close to the shore where appropriate
6. Keeping all noise to an absolute minimum when working at night
Environmental Code of Practice for Irish Aquaculture Companies and Traders

Key Objective

To avoid odour nuisance outside the operational area.

Day to day aquaculture operations create odour related to stock handling and equipment maintenance, e.g. removing biofouling organisms. When exposed to air for a prolonged period of time, marine organisms produce a strong odour that can be offensive to persons not associated with the production. Odours are very subjective, so a person who is used to working with materials giving off a natural odour may not find this odour offensive, while someone not acclimatised may do so.

ODOUR

Regulatory Requirements

For premises requiring planning permission the latter may be granted subject to specific conditions regarding odour.

Recommended Actions

That aquaculture operators adhere to the following practices:

1. Check planning permission for conditions on odour levels and adhere to the provisions made
2. Proper storage and maintenance of facilities and equipment at all times
3. Designation of storage areas for materials that may create odour
4. Disposal of organic materials before an odour problem can develop
Key Objective

To protect facilities and stock from oil pollution.

Oil spills can contaminate aquaculture facilities and affect stock either by direct contact with facilities or stock they hold, or by oil components entering the organism and causing tainting of flesh or toxic effects. In severe cases of oil contamination, mortalities may occur; however, sublethal effects, such as disturbances of behaviour and physiological processes, are more likely. The presence of oil components may cause flesh to taint, varying with oil type and concentration. Taint is subsequently lost when clean conditions are restored.

Prevention of oiling is the main priority and standard oil spill response measures include:

- Defensive or deflective booming
- Chemical dispersion

The Irish Coastguard, which is the statutory agency for emergency oil spill response measures, uses these techniques.

In addition, management options are available for aquaculturists to help minimise contamination and financial losses. These should be identified in a specific contingency plan and include education and training of staff.

OIL SPILLS

Regulatory Requirements

There are no statutory obligations for aquaculture operators to operate oil spill equipment on site.

Under the Sea Pollution (Amendment) Act, 1999 the Irish Coast Guard is authorised as the Irish national response agency for oil pollution preparedness response. In the event of major pollution incidents it is also responsible for the co-ordination of the on-shore response, as well as for the general removal of oil from the coastline.

Recommended Actions

That aquaculture operators adhere to the following practice:

1. Immediate notification of the Irish Coast Guard in the case of an oil spill
2. Suspension of feeding (fin fish operations)
3. If the stock is at a marketable size, consideration shall be given to the harvesting out of a proportion or all stock.
4. Isolation of stock
5. If feasible, cages should be relocated to an alternative clean site
6. Where facilities are fixed, stock should be moved if possible
Key Objective

To maintain tidy and orderly sites.

To improve and maintain its image the aquaculture industry must prove its awareness regarding environmental protection and conservation as well as being open and transparent in its operations. Fish farmers shall pay attention to the general neatness of operations both from an aesthetic and health and safety viewpoint. To demonstrate commitment, companies could organise periodic beach clean-ups for all waste and general rubbish.

Regulatory Requirements

All operators must comply with the provisions made under the Fisheries Amendment Act 1997, with respect to the maintenance of a licensed site (as there may be variations between the licences, the operator shall check the licence for specific details).

Recommended Actions

That aquaculture operators adhere to the following practices:

1. Keep all shore and on shore facilities tidy at all times
2. Proper maintenance of equipment, vessels and vehicles to ensure orderly appearance
3. Prompt removal and repair of damaged equipment
4. Ensure that operations are within relevant licensed area
STOCK HEALTH MANAGEMENT

Key Objective
To ensure health and welfare of livestock and a healthy environment.

It is vital for all aquaculture operations to remain as free as possible of pests and disease. Fish farmers work with the Fish Health Unit of the Marine Institute, and in the case of fish farms also with their own veterinary advisors to ensure stocks are healthy before and after introduction to a site. To maintain optimum fish health all stock introductions and transfers must be accompanied by relevant documentation, certified disease free, and records must be maintained to track all imports.

Regulatory Requirements
The introduction and transfer of aquaculture animals is controlled by the Department of Communications, Marine & Natural Resources. For example, before moving stock, ensure that you have the relevant documents, such as transfer licence or movement order.

Recommended Actions
That aquaculture operators adhere to the following practice:
1. Establishment and implementation of an appropriate stock health management plan
2. Notification of disease outbreak (according to Directive 91/67/EEC) within 24 hours to DCMNR and the Marine Institute Fish Health Unit
3. Obtaining relevant movement documents prior to introducing stock to an area, e.g. Fish Transport Licence, Inspection Certificate
4. Documentation relating to stock purchase and movement must be kept on site for three years
5. Implementation of ISGA Code of Practice for the prevention of stock escapes of Irish farmed salmon in fin fish operations (see Annex III) and Infectious Salmon Anaemia Code of Practice (available from the IFA Fish Farming Section)
**Key Objective**

To respect and protect the archaeological heritage of the Irish coastline.

It is generally acknowledged that there is potential scientific value attached to archaeological evidence on, or concealed within, the seabed. Aquaculture operators should endeavour to report unexpected discoveries encountered, so that artefacts and records may be deposited in an appropriate museum as a permanent archive for future study. However, it is true to say that the aquaculture industry in general is extremely benign with regard to any potential for serious disturbance of the benthos and thus represents a very low level of risk with regard to any potential disturbance of archaeological heritage.

**Regulatory Requirements**

The Government has a duty of physically preserving and recording underwater archaeological sites under the National Monuments Acts 1930-1994.

**Recommended Actions**

That aquaculture operators adhere to the following practices:

1. Seek informed archaeological advice at the earliest opportunity to establish whether potential development would be likely to affect a site of underwater archaeological interest. Normally, the operator will consult appropriate archaeological bodies and related organisations (e.g. National Museum, Underwater Archaeology Unit of the Department of Environment, Heritage & Local Government, harbour master, scuba diving associations etc.)

2. Aquaculture operators will present to the licensing authority when required a copy of the advice provided by archaeological bodies consulted, along with their own proposal for accommodating any archaeological constraints that have been identified.
USE OF PUBLIC ACCESS PIERS

Key Objective
To ensure that facilities are kept tidy and no obstructions caused to other users.

When sharing piers, slipways or landing facilities with other marine users it is essential to operate in such a way as to minimise obstruction and keep the area tidy. This will add to better cooperation when using facilities and improve the image of an area.

Regulatory Requirements
Each pier is managed individually, either directly through the Department of Communications, Marine & Natural Resources, the local County Council or a local management committee.

Recommended Actions
That aquaculture operators adhere to the following practice:

1. Establish if there is a management plan in place and comply with its conditions
2. Piers, slipways and landing facilities shall be kept clear of obstruction for other users of the area
3. Prompt removal and disposal of disused equipment, waste and litter without affecting the environment or impinging on the scenic amenity of the area
4. Orderly and neat storage, in cases where landing facilities are used for storage of equipment, and that such storage does not obstruct other pier users
5. In cases where facilities are used as a work platform for repairing equipment and gear, operators shall leave the surrounding area in a tidy manner after completing work
6. Prompt removal of any loose material from the sea or seashore
Key Objective
To minimise visual impact of developments.

In 2001 the Department of Communication, Marine & Natural Resources published the ‘Guidelines for Landscape and Visual Assessment of Marine Aquaculture’. These state that ‘Aquaculture developments should respect the character and diversity of their landscape setting and help sustain the qualities which lend a distinctive sense of place to Ireland’s coastal landscapes’.

Section 5 of the document divides good practice guidelines into:

- Generic: for all types of aquaculture operations
- Specific: for salmon, shellfish longlines, shellfish rafts and oyster operations.

The recommended actions below contain general guidelines for all operations. For full details on the minimisation of visual impact please consult above publication.

Regulatory Requirements
Operators must adhere to their licence conditions, e.g. use of grey barrels.

Recommended Actions
That aquaculture operators adhere to the following practices:

1. Management of existing aquaculture operations according to best practice principle outlined in the DCMNR guidelines
2. Use dark subdued or neutral colours where possible with a matt surface
3. Ensure design and colour continuity between operators in the same area
4. For new developments assess potential visual impact according to the guidelines published by the DCMNR
5. Consult with local C.L.A.M.S. group and take part in any local C.L.A.M.S. initiatives in this regard
WASTE MANAGEMENT

Key Objective

To minimise the amount of waste produced by farming operations and to dispose of all unavoidable waste in an environmentally sound manner.

Most human activities generate waste to some extent. While it is impossible to avoid generation of any waste, it is vital that the waste produced is dealt with in a responsible manner. Existing legislation emphasises the ‘Polluter Pays’ principle, which puts the responsibility on the person who creates the waste to pay for treatment, containment, transport and disposal in a manner that does not cause harm to the environment. This also requires any person who carries out activities of an agricultural, commercial or industrial nature to take all reasonable steps to implement a waste management system to reduce, reuse and recycle waste.

Regulatory Requirements

All issues relating to waste are governed by a suite of both national and international regulations. The Waste Management Act, 1996, is the primary instrument for managing and controlling waste in Ireland. It emphasises waste minimisation and recovery and imposes an overarching obligation on agricultural, commercial and industrial activities to prevent or minimise the production of waste. The Air Pollution Act, 1987 requires the occupier of any premises to use the best practicable means to limit and to prevent an emission, including smoke emission, from such premises.

Recommended Actions

That aquaculture operators adhere to the following practice:

1. Implementation of a waste management plan according to the principles of reduction, reuse, recycling and recovery.
2. Purchase of materials with a long lifespan and/or made from recyclable materials, e.g. recycled paper, rechargeable batteries.
3. Prompt disposal of disused equipment and waste from the site considering relevant legislation, e.g. no disposal of any waste at sea or into any watercourse, no burying of mortalities, burning of plastic and other non-natural materials etc.
5. Establishment of emergency plan to deal with unexpected large volumes of mortalities.
6. Establishment of procedures to ensure that no plastic or other man-made material waste generated during harvesting enters the marine environment.
7. Ensure that a waste container or refuse bag is secured on all vessels and vehicles, for packaging waste, e.g. drinks cans, chocolate wrappers etc.
8. Where possible establish recycling scheme for glass and paper.
Having laid out in detail the component parts that fish farmers should include in their environmental management system, this section of the document will detail the implementation arrangements, which will ensure that the ECOPACT approach is widely applied by the Irish aquaculture industry.

Ideally, every individual fish farming operation in Ireland would be operating under an accredited environmental management system such as EMAS or ISO 14001. In fact, one of Ireland’s leading salmon farming companies has already successfully achieved the ISO standard and is leading the way in primary food production for the entire country. However, it will take some time before this aspiration can become a reality, because the existing accredited systems are not easily transposed into the operations of smaller companies and in particular to the shellfish farming operators.

BIM, through its Environmental Section, will be working to tailor these systems so that they fit more closely with the fragmented profile of the Irish aquaculture industry.

In the medium to short term a more realistic approach is to encourage the full and whole hearted implementation of the ECOPACT approach by all aquaculture operators. Following this approach every Irish fish farming company will have an individually tailored EMS, and while that might not necessarily be independently accredited in the first instance, it will be of great significance given the implementation arrangements outlined below.

It is intended that the C.L.A.M.S. process together with the services of BIM’s Environmental Section in co-operation with the Fish Farming Section of the IFA will form the framework for the implementation of ECOPACT. For a greater understanding of the C.L.A.M.S. process, please see Annex III.
The collective progress of the Irish aquaculture industry towards implementation of ECOPACT can then be measured and reported on in a meaningful and accountable manner.

The groups involved in the C.L.A.M.S. process around the coast have already been extremely active in the area of environmental management on a collective basis, and it is a logical progression of the activity of the C.L.A.M.S. process to extend this approach to the individual companies within each grouping. Examples of the groundbreaking work done in environmental management through the C.L.A.M.S. process include projects such as Killary Harbour visual impact improvement scheme and shoreline improvement works in Bannow Bay and Dungarvan.

These C.L.A.M.S. backed activities have been underpinned by a number of key environmental management schemes and demonstration projects undertaken by BIM’s Environment & Quality Section, e.g. the mussel barrel replacement scheme and recent waste management trials for organic and plastic waste.

In addition to these activities the C.L.A.M.S. groups will undertake to prioritise environmental management in their activities and on an annual basis will provide an implementation audit of the take up of ECOPACT or accredited EMS within the individual companies that form their C.L.A.M.S. grouping. This audit will be published annually by BIM and will also be carried on the BIM website as well as being available through other state agencies involved in the C.L.A.M.S. process (see Annex III).
The implementation and auditing of ECOPACT will be supported by the Environment & Quality Section of the BIM Aquaculture Development Division in co-operation with the Fish Farming Section of the IFA.

For further information in this regard please contact BIMs Environmental Officer at:

Bord Iascaigh Mhara
P.O. Box No. 12, Crofton Road
Dun Laoghaire, Co. Dublin, Ireland
Tel: +353 (0) 1 2144 100
Fax: +353 (0) 1 2144 119
Web: www.bim.ie
Annex I

I. Important bird species of Irish protected areas

The species identified with an asterisk are protected under the Wild Birds Directive and further explained in part II of this chapter. Irish names are included where available.

**Divers and Grebes**

<table>
<thead>
<tr>
<th>Species</th>
<th>Scientific Name</th>
<th>Irish Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Red-throated Diver</em></td>
<td>Gavia stellata</td>
<td>Lóma rua</td>
</tr>
<tr>
<td><em>Black-throated Diver</em></td>
<td>Gavia arctica</td>
<td>Lóma artach</td>
</tr>
<tr>
<td><em>Great Northern Diver</em></td>
<td>Gavia immer</td>
<td>Lómahör</td>
</tr>
<tr>
<td>Little Grebe</td>
<td>Tachybaptus ruficollis</td>
<td>Spágaire tonn</td>
</tr>
<tr>
<td>Great Crested Grebe</td>
<td>Podiceps cristatus</td>
<td>Foitheach mór</td>
</tr>
<tr>
<td><em>Slavonian Grebe</em></td>
<td>Podiceps auritus</td>
<td>Foitheach cluasach</td>
</tr>
<tr>
<td>Black-necked Grebe</td>
<td>Podiceps cassinus</td>
<td>Foitheach pibdhubh</td>
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</table>

**Seabirds**

<table>
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<tr>
<th>Species</th>
<th>Scientific Name</th>
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<tbody>
<tr>
<td>Fulmar</td>
<td>Fulmarus glacialis</td>
<td>Fulmaire</td>
</tr>
<tr>
<td>Manx Shearwater</td>
<td>Puffinus puffinus</td>
<td>Cánóg dhubh</td>
</tr>
<tr>
<td><em>Storm Petrel</em></td>
<td>Hydrobates pelagicus</td>
<td>Guairdeall</td>
</tr>
<tr>
<td><em>Leach's Petrel</em></td>
<td>Oceanodroma leucorhoa</td>
<td>Guairdeall gabhlach</td>
</tr>
<tr>
<td>Gannet</td>
<td>Morus bassanus</td>
<td>Gainéad</td>
</tr>
<tr>
<td>Cormorant</td>
<td>Phalacrocorax carbo carbo</td>
<td>Broigheal</td>
</tr>
<tr>
<td>Shag</td>
<td>Phalacrocorax aristotelis</td>
<td>Seaga</td>
</tr>
<tr>
<td>Razorbill</td>
<td>Alco torda</td>
<td>Crosán</td>
</tr>
<tr>
<td>Guillemot</td>
<td>Uria aalge</td>
<td>Foracha</td>
</tr>
<tr>
<td>Black Guillemot</td>
<td>Cephus grille</td>
<td>Foracha dhubh</td>
</tr>
<tr>
<td>Puffin</td>
<td>Fratercula arctica</td>
<td>Puffin</td>
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**Heron and Egrets**

<table>
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<tr>
<th>Species</th>
<th>Scientific Name</th>
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<tr>
<td><em>Little Egret</em></td>
<td>Egretta garzetta</td>
<td>Blaigh bheag</td>
</tr>
<tr>
<td>Grey Heron</td>
<td>Ardea cinerea</td>
<td>Corr réisc</td>
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## Birds of Prey and Owls

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<th>Species</th>
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<tbody>
<tr>
<td>Buzzard</td>
<td>Buteo buteo</td>
<td>Clamhán</td>
</tr>
<tr>
<td>Hen Harrier</td>
<td>Circus cyaneus</td>
<td>Cróman na gcearc</td>
</tr>
<tr>
<td>Golden Eagle</td>
<td>Aquila chrysaetos</td>
<td>Iolar fiérán</td>
</tr>
<tr>
<td>Osprey</td>
<td>Pandion haliaetus</td>
<td>Coimeach</td>
</tr>
<tr>
<td>Merlin</td>
<td>Falco columbarius</td>
<td>Meirliún</td>
</tr>
<tr>
<td>Peregrine</td>
<td>Falco peregrinus</td>
<td>Fabhcún gorm</td>
</tr>
<tr>
<td>Long-eared Owl</td>
<td>Asio otus</td>
<td>Ceann cait</td>
</tr>
<tr>
<td>Short-eared Owl</td>
<td>Asio flammeus</td>
<td>Ulchabhán réisc</td>
</tr>
<tr>
<td>Barn Owl</td>
<td>Tyto alba</td>
<td>Scréachóg reilige</td>
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## Waterfowl

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<tr>
<td>Bewick's Swan</td>
<td>Cygnus columbianus bewickii</td>
<td>Eala Bhewick</td>
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<td>Whooper Swan</td>
<td>Cygnus cygnus</td>
<td>Eala ghlórich</td>
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<tr>
<td>Mute Swan</td>
<td>Cygnus olor</td>
<td>Eala bhalbh</td>
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<tr>
<td>Pink-footed Goose</td>
<td>Anser brachyrhynchus</td>
<td>Gé ghobghearr</td>
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<td>Greenland White-fronted Goose</td>
<td>Anser albifrons flavirostris</td>
<td>Gé bháinéadanach</td>
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<td>Greylag Goose</td>
<td>Anser anser</td>
<td>Gé ghlás</td>
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<tr>
<td>Barnacle Goose</td>
<td>Branta leucopsis</td>
<td>Gé ghiúrainn</td>
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<tr>
<td>Canada Goose</td>
<td>Branta canadensis</td>
<td>Gé Cheanadach</td>
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<tr>
<td>Light-bellied Brent Goose</td>
<td>Branta bernica hrota</td>
<td>Cadhan</td>
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<tr>
<td>Shelduck</td>
<td>Tadoma tadoma</td>
<td>Seil-lacha</td>
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<tr>
<td>Wigeon</td>
<td>Anas penelope</td>
<td>Lacha rua</td>
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<td>American Wigeon</td>
<td>Anas americana</td>
<td>Rualacha Mheiriceánach</td>
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<td>Gadwall</td>
<td>Anas strepera</td>
<td>Gadual</td>
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<tr>
<td>Teal</td>
<td>Anas crecca</td>
<td>Praslacha</td>
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<td>Mallard</td>
<td>Anas platyrhynchos</td>
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<tr>
<td>Pintail</td>
<td>Anas acuta</td>
<td>Biorearrach</td>
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<tr>
<td>Species</td>
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</tr>
<tr>
<td>Shoveler</td>
<td>Anas clypeata</td>
<td>Spadalach</td>
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<tr>
<td>Pochard</td>
<td>Aythya ferina</td>
<td>Póiseard</td>
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<tr>
<td>* Ferruginous Duck</td>
<td>Aythya nyroca</td>
<td>Póiseard súilbhán</td>
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<tr>
<td>Tufted Duck</td>
<td>Aythya fuligula</td>
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<td>Scaup</td>
<td>Aythya marila</td>
<td>Lacha iascán</td>
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<td>Eider</td>
<td>Somateria mollissima</td>
<td>Éadar</td>
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<tr>
<td>Long-tailed Duck</td>
<td>Clangula hyemalis</td>
<td>Lacha earrfhada</td>
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<td>Common Scoter</td>
<td>Melanitta nigra</td>
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<td>Goldeneye</td>
<td>Bucephala clangula</td>
<td>Orshúileach</td>
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<td>Red-breasted Merganser</td>
<td>Mergus serrator</td>
<td>Síolta rua</td>
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<tr>
<td>Goosander</td>
<td>Mergus merganser</td>
<td>Síolta mhór</td>
</tr>
<tr>
<td>* Smew</td>
<td>Mergus albellus</td>
<td>Síolta gheal</td>
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<tr>
<td>Ruddy Duck</td>
<td>Oxyura jamaicensis</td>
<td>Lacha rua</td>
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**Grouse**

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<tr>
<th>Species</th>
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<tbody>
<tr>
<td>Red Grouse</td>
<td>Lagopus lagopus scoticus</td>
<td>Cearc fhraoigh</td>
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**Crakes and Rails**

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<tr>
<td>Water Rail</td>
<td>Rallus aquaticus</td>
<td>Rálóg uisce</td>
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<td>* Corncrake</td>
<td>Crex crex</td>
<td>Traonach</td>
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<td>Moorhen</td>
<td>Gallinula chloropus</td>
<td>Cearc uisce</td>
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<tr>
<td>Coot</td>
<td>Fulica atra</td>
<td>Cearc cheannann</td>
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**Waders**

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<tr>
<td>Oystercatcher</td>
<td>Haematopus ostralegus</td>
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<tr>
<td>Ringed Plover</td>
<td>Charadrius hiaticula</td>
<td>Feadóg chladaigh</td>
</tr>
<tr>
<td>* Golden Plover</td>
<td>Pluvialis apricaria</td>
<td>Feadóg bhuí</td>
</tr>
<tr>
<td>Grey Plover</td>
<td>Pluvialis squatarola</td>
<td>Feadóg ghlas</td>
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<tr>
<td>Species</td>
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<td>Irish Name</td>
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<tr>
<td>Lapwing</td>
<td>Vanellus vanellus</td>
<td>Plibín</td>
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<tr>
<td>Knot</td>
<td>Calidris canutus</td>
<td>Cnota</td>
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<td>Sanderling</td>
<td>Calidris alba</td>
<td>Luathrán</td>
</tr>
<tr>
<td>Purple Sandpiper</td>
<td>Calidris maritima</td>
<td>Gobadán cosbuí</td>
</tr>
<tr>
<td>Curlew Sandpiper</td>
<td>Calidris ferruginea</td>
<td>Gobadán crotaih</td>
</tr>
<tr>
<td>Dunlin</td>
<td>Calidris alpina</td>
<td>Breacóg</td>
</tr>
<tr>
<td>Little Stint</td>
<td>Calidris minuta</td>
<td>Gobadánín beag</td>
</tr>
<tr>
<td>* Ruff</td>
<td>Philomachus pugnax</td>
<td>Rufachán</td>
</tr>
<tr>
<td>Black-tailed Godwit</td>
<td>Limosa limosa</td>
<td>Guilbneach earrdhubh</td>
</tr>
<tr>
<td>* Bar-tailed Godwit</td>
<td>Limosa lapponica</td>
<td>Guilbneach stríocearrach</td>
</tr>
<tr>
<td>Whimbrel</td>
<td>Numenius phaeopus</td>
<td>Crotach eanaigh</td>
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<td>Curlew</td>
<td>Numenius arquata</td>
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<td>Spotted Redshank</td>
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**Gulls, Terns and Skuas**

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**Passerines**

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II. Guide to bird species protected under the EU Wild Birds Directive in Ireland

Compared to other European countries, Ireland has fewer habitat types and thus fewer breeding bird species. However, some of these species are breeding in Ireland in important numbers while showing serious decline elsewhere.

With its food-rich waters, Ireland provides excellent conditions for outstanding numbers and variety of breeding seabirds, which can be found breeding along the Irish coastline. Six of the most important Irish seabird colonies containing over 10,000 breeding pairs lie on the Atlantic coast: Blasket Islands, Puffin Island and Skellig Islands in Co. Kerry; Illaunmaistir and Inishglora in Co. Mayo; and Horn Head in Co. Donegal. Further to these, three important areas can be found on the east coast, Great Saltee, Co. Wexford, Lambay Island, Co. Dublin; and Rathlin Island, Co. Antrim. Main threats to seabirds in Ireland are water pollution, particularly oil pollution, and netting, in which diving birds may get entangled and drown. Estuaries, which are important feeding areas for wintering and migrating birds, are under threat from land claim, industrial development, disturbance from tourism and recreation. Loss of these habitats could lead to a drop in bird survival during winter and on the migration journeys.

Changes in agricultural practice can also be detrimental to bird life. At the core of the food chain for many bird species are wild flowers, which are outgrown by a few commercially important grasses that are encouraged in growth by nitrate and phosphate enrichment. Plants and insects are also killed directly by pesticides and herbicides, considerably reducing food availability for the lower parts of the food chain, which then in turn cannot support the secondary and tertiary carnivore species. Examples for this are herbivore species such as linnets, partridges and yellow hammer, and barn owls, which are carnivores. As energy becomes more concentrated at the top of the food chain, the top carnivores show a build up of pesticide residues. Species such as owls, kestrels or peregrine falcons can build up high levels of residues, which can lead to sterility, eggshell thinning and possible death.
Divers and Grebes

These fish-eating seabirds usually dive for small fish and invertebrates. Though divers can dive down to 60 metres and stay submerged for a long time, they prefer to forage at the edges of estuaries. Grebes tend to maintain their flocks while feeding and roosting, diving in the presence of danger. Both divers and grebes are vulnerable to effects of pollution and disturbance.

Red-throated Diver (Gavia stellata)

This small diver with its distinct narrow, up-tilted bill is a common winter visitor to all coastal estuaries where it can be found on open waters, bays and harbours. There is only a small breeding population in Ireland based in the Northwest with nesting sites on small islets on loughs or lakes. During the summer adults show a narrow red throat patch and a pale greyish head, while in winter they lack this contrast displaying a whitish throat and breast. Numbers declined over a considerable part of the EU between 1970 and 1990. The major threats, which the species is now facing, are the loss and deterioration of habitats (land drainage, decline of fish stocks, water pollution and mercury levels in fish) and disturbance at breeding sites.

Black-throated Diver (Gavia arctica)

This rare but regular winter visiting bird can usually be found on open coastal waters and bays, as well as occasionally in harbours and on inland freshwater lakes. It has a slender, straight bill and red eyes. In summer, head and nape are greyish in colour with a black chin and throat. In winter, the black crown extends to the eye and the blackish-grey nape extends down onto the sides of the neck.

The major threat to this species seems to lie in disturbance at breeding lakes and high levels of mercury in eggs. It has been suggested that breeding populations are declining recently in several countries, even if the European range remains stable, and studies have shown a low reproductive rate, which might be insufficient to compensate for adult mortality.

Great Northern Diver (Gavia immer)

This large diver arrives into Ireland in autumn from its breeding grounds in Greenland and Iceland. It is a common winter visitor that can be found in all coastal counties on open seas, bays and harbours, as well as on inland lakes and reservoirs. Most birds depart by April. It has a thick, heavy, pale grey bill and a distinctive bump where the long flat crown meets the steep forehead.
Declining food stocks and deterioration of habitat due to water pollution, mainly from oil, are the major threats to this species.

**Slavonian Grebe** (*Podiceps auritus*)

This small, flat-crowned grebe with its stubby dark, pale-tipped bill can be found in bays and harbours, often in small groups, as well as occasionally on inland lakes and reservoirs. Leaving its breeding grounds in Iceland and Scandinavia in winter it is one of the more uncommon visitors to Ireland. An active feeder, the Slavonian Grebe sometimes jumps clear of the water when diving for small fish, insects or other marine invertebrates. In winter, adults are strikingly black and white, with crown nape and upper parts black, contrasting with a white breast, flanks and sharply demarcated white cheeks. In summer, adults show chestnut-red flanks, neck and upper breast with nape and upper part blackish, while the black crown is separated from the black cheeks and chin by golden horns extending from the base of the bill through the eye, forming a crest on the rear of the crown.

Deterioration of habitat and disturbance from fishers, photographers and tourists are the major threats for the species, with fluctuations in water levels and egg-collecting having a negative impact in reproductive success.

**Seabirds**

**Storm Petrel** (*Hydrobates pelagicus*)

Ireland hosts the largest breeding population of Storm Petrels in the world, which can be found on the remote islands off Kerry. This small, dark petrel is common on open sea and ocean, breeding in colonies on small, undisturbed islands mostly on the west coast from where it disperses onto the open sea after breeding. Occasionally, these birds with a square tail, white rump and short, rounded wings can be found inland after storms. The black head, underparts, mantle and upperwing contrast strongly with the square white rump. Its dark feet do not extend beyond the tail and can be seen paddling in the water as it moves back and forth on raised wings when feeding. When flying, fast wing beats are interspersed with glides, making its flight fluttery and bat-like. Petrels feed on a wide variety of marine food items. Besides small fish and plankton they also feed readily on fish waste and thus can be attracted to scraps and offal from trawlers.

Unlike the Irish population, which seems to remain stable, the Mediterranean populations
have declined in recent years. Being highly susceptible to predation, the accidental introduction of mammalian predators to breeding sites is the major threat the species is facing.

**Leach's Petrel** (*Oceanodroma leucorhoa*)

This darker, larger and paler Petrel is not as common as the Storm Petrel in Ireland and only has a very small breeding population based mainly on small, remote islands off the west coast. In autumn it can be observed off the western and northern coasts before dispersing out to sea in winter. The birds have a white rump and a forked tail, showing long, pointed wings. These are held flat or slightly bold when feeding while moving across the water and pattering its feet. It flies with slow wing beats and glides. Like the Storm Petrel, the Leach's Petrel feeds on small fish and plankton, as well as on fish waste and thus can be attracted to scraps and offal from trawlers.

Population trends are poorly known for this species due to the difficulties involved in carrying out surveys and censuses. Major threats to the species include the introduction of predators to breeding sites, e.g. rats or cats, as well as disturbance by tourists, military bombing and sea pollution.

**Heron’s and Egrets**

**Little Egret** (*Egretta garzetta*)

This white, thin-necked heron can be found in marshes, estuaries and lakes feeding in the channels at low tide catching fish, frogs or insects with quick stabs of the bill. Once an uncommon visitor, Ireland now has a breeding population largely based in the southern counties where the birds nest in colonies in trees and bushes. Birds have a long, black, dagger-like bill, black legs and yellow feet.

The major threats to this species are loss and deterioration of habitats due to development and agricultural projects.

**Birds of Prey and Owls**

**Hen Harrier** (*Circus cyaneus*)

During winter, this slim, narrow-winged raptor can be found in most parts of Ireland with some hunting in coastal areas. Breeding numbers in Ireland seem to be declining, but in...
summer small numbers can be found nesting on the ground on moorlands and mountains. Hen Harriers feed on a variety of rodents and small birds, gliding low over an area before suddenly swooping down on prey. Adult females are brown above with pale underparts and brown streaking on neck breast and flanks. They have a large white rump and a brown tail. Adult males show a white rump and underparts, a grey head and upperwing with black tips and dark edge.

The main causes for the population decline include the widespread loss of breeding habitats, the occurrence of localised persecution and destruction of nests.

**Golden Eagle (Aquila chrysaetos)**

This very large raptor used to be a widespread breeding species in Ireland, but now has become a rare visitor mostly in northern and northeastern regions. In an attempt to establish a new breeding population, Golden Eagles have recently been reintroduced in Co. Donegal. This species hunts for a variety of birds and mammals but will also take carrion, making it susceptible to poisoning. It hunts by flying low over ground and swooping down on prey. Adults show brown upper and underparts with a golden-buff crown and nape. It has large broad wings, yellow legs and the large hooked bill shows a yellow cere.

The biggest threats to this species in the past include shooting, poisoning and trapping of adult birds, and human disturbance of nests, including egg collection. Some or all of these activities persist today, even though this species is considered rare throughout the EU.

**Osprey (Pandion haliaetus)**

This spring and autumn visitor can be found on large lakes and rivers mostly along the southeast and southern coast feeding exclusively on large fish caught in spectacular dives. Fish are caught with specially adapted talons before flying off with the catch carried headfirst held in both feet. It can be attracted to fish farms and has also been seen out at sea. The large adults show dark brown upperparts when perched, with a crested white crown and a striking black stripe extending from the eye down the side of the neck. The hooked bill is pale with a dark tip. In recent years larger numbers of birds have been recorded in suitable breeding areas and breeding may occur again in the near future.

Populations of the Osprey have been declining in the EU for over a century, although some recovery has been reported recently. Of the major threats in the past, nest destruction and...
shooting, the latter still occurs today. Habitat destruction and contamination with organochlorines are added threats in present times.

**Merlin** (*Falco columbarius*)

A small resident breeding population of this small scarce falcon can be found in all Irish regions, during summer usually on upland moorlands and bogs, well-vegetated inland lake islands and in conifer plantations. During winter with numbers probably rising due to visiting birds from Iceland and Scotland, birds can be observed along coastal mudflats, estuaries and saltmarshes, as well as on low-lying inland bogs. Its prey consists mainly of birds, however, small mammals and insects are also taken occasionally. When hunting, it usually pursues birds with a darting flight that follows every twist and turn of the prey until it strikes from above. They fly fast and low to the ground occasionally snapping perched or feeding birds. Females show a brown crown, brown upperparts and streaked brown underparts, while males show grey upperparts and a dark grey crown.

The main threats to the Merlin are loss of habitats, contamination of birds with organochlorines from agriculture, human disturbance and nest-robbing by falconers.

**Peregrine Falcon** (*Falco peregrinus*)

This powerful raptor can be found all over coastal and mountainous regions in Ireland. In winter it frequents coastal estuaries and mudflats, leaving the upland breeding areas. Its prey consists of birds and small mammals, including rabbits. It will take birds up to the size of pigeons and can also be seen swooping through flocks of waders and ducks. Adults show a white underpart with delicate barring, white throat and face and a dark crown. The upperparts are bluish-grey, and cere and legs yellow. Females are larger than males. Contamination of the food chain with persistent toxic chemical residues, mainly from agricultural insecticides, caused a widespread decline in population numbers from the 1960s onwards. Since the restrictions and bans of persistent organochlorines over most of Europe, numbers have generally increased. Major threats today include the robbing of eggs for egg collections and to supply a clandestine trade for falconry.

**Short-eared Owl** (*Asio flammeus*)

Summering and breeding birds of this species have occasionally been recorded, but it remains mostly a scarce winter visitor in Ireland. It usually can be found in coastal marshes...
or dunes, perched on posts close to rough vegetation or on the ground, also in moorlands, bogs and stubble fields. This stocky owl hunts for small mammals, such as mice and rats and can also take small birds and occasionally insects. It has yellow eyes, short indistinct ear tufts and a pale face. It shows solid dark wing tips with pale sandy-buff upperparts and white underwing.

Loss of habitat due to agricultural intensification and afforestation as well as disturbances at breeding sites have led to a serious decline in population numbers markedly in parts of eastern Europe, even if its presence is in many respects dependent on food availability.

**Waterfowl**

**Bewick’s Swan** (*Cygnus columbianus bewickii*)

The smallest swan occurring in Ireland arrives in late autumn/early winter from its breeding grounds in Russia and Siberia, leaving again in March/April. Large flocks can commonly be found on lakes and marshes feeding on grass, roots and water plants. They often mix with Whooper and Mute Swans and can sometimes be seen grazing on sloblands and fields. Adults show an all-white plumage with a small yellow patch on a black bill and a shorter neck than the Whooper Swan.

Planned oil and gas extraction in the breeding grounds of the Russian tundra pose a serious threat and much of the Bewick’s Swan’s traditional winter habitat has been lost or degraded leaving the population susceptible to further decline, although its numbers have increased slowly.

**Whooper Swan** (*Cygnus cygnus*)

Like the Bewick’s Swan adults show an all white plumage and a yellow patch on the black bill. This yellow patch is larger than on Bewick’s Swans and triangular with the black confined to the lower edge and tip. They are a common winter visitor arriving in late autumn and leaving in mid-April, with some adults remaining here over the summer. A first breeding pair was recorded in 1992, but main breeding grounds are in Iceland and northern Europe. Whooper Swans can be found alongside other swan species on lakes and marshes feeding on grass, roots and water plants.

Deterioration of habitat, disturbances, illegal hunting and pollution by lead and pesticides are the major threats to this species.
Greenland White-fronted Goose (*Anser albifrons flaviostris*)

Half of the world’s wintering population of the thin-necked, greyish brown Greenland race can be found in Ireland on grass and sloblands, marsh areas and loughs. Small numbers are present in the Midlands, the west and northwest with the main population concentrated in the southeast. Adults show a striking white patch around the base of the orange bill, and orange legs and dark belly markings. These geese feed on grass, fodder, grain, beet and other plant material.

The main threat for this subspecies during the winter period include disturbance and unfavourable climatic conditions.

Barnacle Goose (*Branta leucopsis*)

The breeding grounds of this small goose lie in northeast Greenland. In Ireland, small flocks can be found wintering on offshore islands along the east coast, but the main wintering population is on the west coast. Adults have a black crown, neck and breast and a striking whitish face showing a black line from the eye to the bill. It can be seen feeding on grass, rushes and other plant material in quiet, undisturbed grazing areas, sloblands, but especially on uninhabited islands.

The species utilisation of pastures during winter has led to conflicts with agricultural interests, and up to recently licences were granted to kill Barnacle Geese.

Ferruginous Duck (*Aythya nyroca*)

This rare winter visitor can be found on freshwater ponds and lakes, favouring those with rich vegetation. They are also kept in wildfowl collections and some sightings may be of escaped birds. This active diving species feeds on invertebrates, seeds and water plants. Both males and females show a chestnut head, neck and breast and a white undertail, but the females have a dark eye and the males have a strikingly white eye with a black pupil.

The widespread destruction of wetland is the major threat to this species, and illegal hunting at local level in some areas causes serious problems.

Smew (*Mergus albellus*)

This rare winter visitor now occurs annually on lakes, reservoirs and occasionally estuaries in northern counties. This diving duck has a steep forehead and a short crest. It feeds on small
fish and invertebrates. Males show a distinct white and black plumage with a black patch around the eye, while females have a dark brown patch around the eye, a reddish-brown crown and nape, white cheek patch and grey upperparts.

During the last two centuries, the breeding population in the EU has continuously declined. Its breeding habitats have been subject to threats such as deforestation, destruction due to river canalisation and conversion to agriculture. The most serious threat now is predation by the American mink (Mustela vison), and water pollution also has a negative effect.

**Crakes and Rails**

**Corncrake** (*Crex crex*)

This species used to be a very common sight in Ireland, however, today only small numbers can be found along the Shannon Callows and in the west and north-west with numbers still declining and only rarely breeding. It can be found in crop fields, meadows, rough pastures and flooded meadows feeding on invertebrates, plants and seeds. It is very shy and hard to see, running through thick cover and falling back into cover quickly if flushed. The bill and short legs are yellow-brown and the wings are strikingly chestnut in flight. Adults show a brown streaked crown, blue-grey cheeks and a grey breast.

Due to high mortality caused by the intensification and mechanization of hay and silage making and to habitat loss, Corcrake numbers are declining, though the species is still widespread in the EU. Ireland holds the largest concentration of Corncrakes in Europe, making it the most important breeding species in this country, but despite exhaustive work, numbers are declining and this species is threatened with extinctions. Increased destruction of nests, eggs, adults and particularly young chicks, reluctant to leave the nest, is caused by machines for cutting hay and an associated shift to earlier and more rapidly completed harvesting. Additional threats include hunting and collisions with powerlines.

**Waders**

**Golden Plover** (*Pluvialis apricaria*)

Over-wintering migrant birds from Iceland and Europe add dramatically to the small numbers of breeding birds found on mountains and bogs in Ireland’s west and northwest. Feeding on beetles, earthworms, insects and other invertebrates, as well as berries, grasses and seeds,
these birds can be found both inland on arable lands and ploughed fields, as well as along the coast on mudflats and estuaries. Plumage of this large Plover varies in immatures, during breeding and in winter, but generally it shows a short dark bill, dark legs, a gold-spangled upperpart and white underwing and axillaries.

The main threats for the species include disturbances during the breeding period, the deterioration and loss of habitat, e.g. through traditional agriculture abandonment, hydraulic works, sand extraction, afforestation.

**Ruff** (*Philomachus pugnax*)

This visiting bird can regularly be found in small numbers in autumn on muddy verges of coastal, brackish or freshwater habitats. Feeding on insects, molluscs, worms, crustaceans and seeds it can be seen walking with deliberate strides, probing into soft mud with the bill or picking from the surface and occasionally wading into deep water. Adults show a pinkish base on the dark, slightly decurved bill. Colour of plumage and legs are variable and males are larger than females.

The main threat to the Ruff is the loss of habitat due to changes in agricultural and livestock practices and shooting.

**Bar-tailed Godwit** (*Limosa lapponica*)

This large wader commonly arrives from its breeding grounds in northern Europe in late summer, with peak arrival in September. Though small numbers spend the summer in Ireland, most depart in late spring. It can be found in all coastal counties on sandy estuaries and mudflats, though during high tide flocks can also be seen feeding on fields. It feeds on molluscs, flatworms and lugworms, but may also take insects. In summer, adults show brick-red underparts and head, while in winter head and underparts are grey/white with brownish streaks on the breast. The legs are dark as well as the bill, which is slightly up-curved with a pink base.

The main threat to this species is the poor or lack of any protection of many European passage and wintering sites. Outside the breeding season the concentration of the population to a few suitable coastal wetlands increase its vulnerability.
Wood Sandpiper (Tringa glareola)

This slim wader passes through Ireland in autumn and spring with most sightings mainly of immature birds in August and September and very few birds overwintering. It can be found in most counties, but main concentrations are along the eastern and southeastern coast. Feeding on a variety of small crustaceans, worms, molluscs, larvae, insects and occasional small fish it probes the soft mud or picks its prey off the surface of shallow pools. Though it can be found along the open shoreline, it feeds mainly at the muddy edges of coastal pools, lakes and marshes. It has greenish-yellow legs and a dark-tipped bill and brown upperparts with pale spotting.

Caused by drainage of wetlands, the breeding population has been in decline for the past century. An additional threat is posed by exploitation of peatlands, of which vast areas have been destroyed by forestry in the north of its breeding range.

Red-necked Phalarope (Phalaropus lobatus)

This species used to breed in Ireland until the late 1990s but now has become a rare passage migrant, though occasionally breeding pairs can still be found at a site in Co. Mayo, making Ireland the most southern breeding grounds for this species. It can be found on freshwater marshes with dense vegetation and open pools. While wading or swimming buoyantly it feeds on a variety of larvae and insects by picking them from the surface of the water or from stones and vegetation. It has a black bill, grey legs and winter adults show a thin black ear patch, pale grey upperparts and white below.

Major threats to the species include human disturbance, habitat simplification, drainage of wetlands, floodings, and predation by Long-tailed Skua (Stercorarius parasiticus).

Gulls, Terns and Skuas

Ireland holds good breeding tern colonies, including the Arctic, Sandwich, Common and Little Terns, but most importantly the rare Roseate Tern. The latter has shown a serious population decrease throughout all of Europe and North America, but through proper management and wardening, along with the provision of special nest boxes, which the species readily uses, numbers in several Irish locations seem to be increasing again.
Mediterranean Gull (Larus melanocephalus)

With sightings confined mainly to the winter period this species has become a widespread annual visitor with a small breeding population established in the southeast. Main numbers are reported from the east and south coasts, where it can be found on coastal estuaries and mudflats. Mixing with other gull species, it feeds on a variety of small fish, molluscs, worms and insects, but can also occasionally be found on rubbish tips feeding on waste and scraps. It is a stooky gull, slightly larger than the common gull with a broad, parallel yellow bill, yellow legs, yellow eye and dark pupil. Adults show a black ring on the bill, pale grey upperparts, white head and white underparts.

The major threats to this species are loss of habitat, disturbance and tourism development on coastal areas. During migration and in winter, the species is threatened by changes in fishing practices, illegal hunting and oil pollution.

Black Tern (Chlidonias niger)

This regular autumn visitor can usually be found feeding on a variety of insects on freshwater lakes, reservoirs and marshes. It can occasionally be seen out at sea but is usually in coastal counties. This small species has short wings, a shallow forked tail and flies with stiff, shallow wing beats while picking feed from the surface. Unlike other tern species, this species does not dive.

Increasing disturbance from recreational activities such as water-sports and tourism and the reduction of food resources due to habitat loss and deterioration through river canalisation, wetland drainage, water pollution including eutrophication, have led to a decline in numbers over most of the European range.

Sandwich Tern (Sterna sandvicensis)

This species is one of the earliest summer visitors to Ireland, breeding in noisy colonies on undisturbed islands or shingle beaches in most coastal counties. From early March until September it can be found feeding on a variety of fish caught by diving in open coastal waters, bays and harbours, before departing for wintering off the west coast of Africa. This large, long-winged tern shows a white rump and white short, forked tail, black legs and a slender, yellow-tipped bill. Upper parts are grey on summer adults with a black cap and a shaggy crest.
The main threats to this species are deterioration and loss of habitat, fluctuation in fish stocks, disturbance and predation by foxes at breeding sites, though numbers are generally increasing in the EU.

**Common Tern** (*Sterna hirundo*)

This species also winters off the west coast of Africa and visits Ireland during the summer, breeding in colonies on small coastal or lake islands in most coastal and some inland counties. It dives from a height following mid-air hovering to catch a variety of fish. Adults show red legs and a long, black-tipped red bill, black crown and nape, a pale grey mantle and wings, and white cheeks and underparts. Wings have a distinctive dark wedge on the tips.

Major threats to the species include deterioration of habitat, disturbances at the breeding sites, predation and the use of pesticides, but population trends seem to be positive within the EU.

**Roseate Tern** (*Sterna dougallii*)

Wintering off the coast of West Africa this species is beginning to breed successfully in Ireland again, in colonies on small islands and beaches mainly in eastern, south-eastern and northern counties. Like other terns it feeds on a variety of fish, diving from mid-air hovers. Its blackish bill has a dull red base, adults show orange-red legs, long tail streamers extending beyond the wings, black crown and nape, white under and grey upperparts, and white cheeks.

This species is listed as ‘endangered’ and has suffered a dramatic population decline throughout Europe. A particular threat is posed by hunting in winter quarters, and human disturbance, egg-collection and avian or ground predators such as Peregrine (*Falco peregrinus*), gulls and foxes.

**Little Tern** (*Sterna albifrons*)

Apart from the northern and northeastern regions, this tiny, long-winged tern can be found during summer in most coastal counties breeding in small colonies on sandy and shingle beaches. Diving from mid-air hovers, it feeds on a variety of small fish and crustaceans. Adults show orange-yellow legs, a black-tipped yellow bill and a white forehead contrasting with its black crown and nape. Underparts, neck and throat are white, upperparts bluish-grey.

Numbers of this species are decreasing probably due to habitat loss, e.g. tourist development of beaches, human disturbance and predation by gulls and rats.
**Arctic Tern** (*Sterna paradisaea*)

After wintering on the Antarctic pack ice, this summer visitor can be found breeding in most coastal areas and on large inland lakes. Like the other tern species it feeds on a range of small fish and invertebrates, which are caught by dives following mid-air hovers. Adults show a shortish, dark red bill and red legs, long white tail streamers, whitish underparts, pale grey upperparts, white cheeks and a rounded black crown and nape.

Depletion of fish stocks due to overfishing and water pollution, disturbances and predation at nesting sites seem to be the major threats today.

**Passerines**

**Nightjar** (*Caprimulgus europaeus*)

This rare breeding species and summer visitor can be found mainly in the southwestern, western and midland counties in conifer plantations with open moorland and felled woodlands. It feeds on a variety of insects that are caught on the wing. This small camouflaged bird flies with buoyant wing beats interspersed with glides. During daylight hours they sit still on low branches or among ground vegetation. Adult males have a greyish-brown plumage with a complicated black, buff, brown and cream barring, spotting, streaking and mottling pattern.

The decline of this species has mainly been caused through habitat degradation due to changes in forestry practices, afforestation, road mortality and pesticide use, which seriously reduces or eliminates populations of insects.

**Kingfisher** (*Alcedo atthis*)

During summer this common resident bird can be found along streams, rivers, canals and on lakes and marshes, while in winter it may also occasionally feed on channels on tidal marshes. Feeding on a wide variety of aquatic insects and small fish, it dives into the water from open perch or an overhanging branch, opening its wings on impact. This brightly-coloured, small, short-winged bird shows a dark bill with orange base, bright blue-green crown, darker blue-green nape and turquoise mantle and rump. Throat and neck patch are white with the underparts bright chestnut-orange.

The main threats to the Kingfisher population are the effects of hard winters, which can...
outweigh all other threats to the species’ survival. Though its range has expanded over the past century, numbers have recently decreased in several countries. Other threats that prove highly detrimental to the species include human persecution, canalisation of streams, clearance of vegetation and chemical and biological pollution of rivers.

**Chough (Pyrrhocorax pyrrhocorax)**

This black crow is an uncommon bird found on rugged headlands and islands along the northern, western, and southern coast. It feeds on larvae, worms, slugs and insects by probing in fields or sand dunes or on short-cropped grass. It’s easily identifiable by its red legs and bright red, long, thin, curved bill.

While Choughs are relatively rare in Britain, Ireland holds one of the largest populations in Europe. The main threat to this species is loss of habitat due to changes and reduction in traditional livestock farming, through abandonment or conversion to forestry, intensive and specialist farming and tourist related developments. This has led to a decrease in numbers in about 90% of the population and the distribution contracting in many areas.
I. Habitats and Species protected in Ireland under the EU Habitats Directive

Habitats listed in Annex I of the Habitats Directive for which sites have been selected in Ireland. All habitats are identified with a specific code in the NATURA 2000 network.

### Priority Habitats

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1150</td>
<td>Coastal Lagoons</td>
</tr>
<tr>
<td>2130</td>
<td>Fixed Coastal Dunes with Herbaceous Vegetation (Grey Dunes)</td>
</tr>
<tr>
<td>2140</td>
<td>Decalcified Fixed Dunes with Empetrum nigrum</td>
</tr>
<tr>
<td>2150</td>
<td>Atlantic Decalcified Fixed Dunes</td>
</tr>
<tr>
<td>21ao</td>
<td>Machair</td>
</tr>
<tr>
<td>3180</td>
<td>Turloughs</td>
</tr>
<tr>
<td>6210</td>
<td>Semi-Natural Dry Grassland and Sub-land Facies on Calcerous Substrates</td>
</tr>
<tr>
<td>6230</td>
<td>Species-Rich Nardus Grassland, on Siliceous Substrates in Mountain Areas</td>
</tr>
<tr>
<td>7110</td>
<td>Active Raised Bogs</td>
</tr>
<tr>
<td>7130</td>
<td>Blanket Bog (Active)</td>
</tr>
<tr>
<td>7210</td>
<td>Calcareous Ferns with Cladium mariscus</td>
</tr>
<tr>
<td>7220</td>
<td>Petrifying Springs with Tufa Formation</td>
</tr>
<tr>
<td>8240</td>
<td>Limestone Pavements</td>
</tr>
<tr>
<td>91d0</td>
<td>Bog Woodland</td>
</tr>
<tr>
<td>91e0</td>
<td>Alluvial Forest</td>
</tr>
<tr>
<td>9580</td>
<td>Taxus baccata Woods of the British Isles</td>
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### Non-Priority Habitats

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1110</td>
<td>Sand Banks which are slightly covered by seawater at all times</td>
</tr>
<tr>
<td>1130</td>
<td>Estuaries</td>
</tr>
<tr>
<td></td>
<td>Inbhir</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Mudflats and Sandflats not covered by seawater at low tide</td>
<td>1140</td>
</tr>
<tr>
<td>Large Shallow Inlets and Bays</td>
<td>1160</td>
</tr>
<tr>
<td>Reefs</td>
<td>1170</td>
</tr>
<tr>
<td>Annual Vegetation of Drift Lines</td>
<td>1210</td>
</tr>
<tr>
<td>Perennial Vegetation of Stony Banks</td>
<td>1220</td>
</tr>
<tr>
<td>Vegetated Sea Cliffs of the Atlantic and Baltic Coasts</td>
<td>1230</td>
</tr>
<tr>
<td>Salicornia and other Annuals Colonising and Sand</td>
<td>1310</td>
</tr>
<tr>
<td>Atlantic Salt Meadows</td>
<td>1330</td>
</tr>
<tr>
<td>Mediterranean Salt Meadows</td>
<td>1410</td>
</tr>
<tr>
<td>Mediterranean and Thermo-Atlantic Halophilous Scrubs</td>
<td>1420</td>
</tr>
<tr>
<td>Embryonic Shifting Dunes</td>
<td>2110</td>
</tr>
<tr>
<td>Shifting Dunes along the Shoreline with Ammophila arenaria (White Dunes)</td>
<td>2120</td>
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<tr>
<td>Dunes with Salix repens ssp. argenta</td>
<td>2170</td>
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<tr>
<td>Humid Dune Slacks</td>
<td>2190</td>
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<tr>
<td>Oligotrophic Waters containing very few minerals of Sandy Plains</td>
<td>3110</td>
</tr>
<tr>
<td>Spartina Swads</td>
<td>1320</td>
</tr>
<tr>
<td>Oligotrophic to Mesotrophic Standing Waters</td>
<td>3130</td>
</tr>
<tr>
<td>Hard Oligo-Mesotrophic Waters with Benthic Vegetation of Chara spp.</td>
<td>3140</td>
</tr>
<tr>
<td>Natural Eutrophic Lakes</td>
<td>3150</td>
</tr>
<tr>
<td>Natural Dystrophic Lakes and Ponds</td>
<td>3160</td>
</tr>
<tr>
<td>Water Courses of Plain to Montane Levels with Aquatic Vegetation</td>
<td>3260</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>3270</td>
<td>Rivers with Muddy Banks with Cheno-podion Rubri p.p. and Bidetion p.p. vegetation</td>
</tr>
<tr>
<td>4010</td>
<td>Northern Atlantic Wet Heaths with Erica tetralix</td>
</tr>
<tr>
<td>4030</td>
<td>European Dry Heaths</td>
</tr>
<tr>
<td>4060</td>
<td>Alpine and Boreal Heaths</td>
</tr>
<tr>
<td>5130</td>
<td>Juniperus communis Formations on Heaths and Calcerous Grasslands</td>
</tr>
<tr>
<td>6130</td>
<td>Calaminarian Grasslands</td>
</tr>
<tr>
<td>6410</td>
<td>Molinia Meadows on Calcerous, Peaty or Clayey-Silt-Laden Soils</td>
</tr>
<tr>
<td>6430</td>
<td>Hydrophilous Tall Herb Fringe Communities</td>
</tr>
<tr>
<td>6510</td>
<td>Lowland Hay Meadows (Alopecurus pratensis, Sanguisorba officinalis)</td>
</tr>
<tr>
<td>7120</td>
<td>Degraded Raised Bogs Still Capable Natural Regeneration</td>
</tr>
<tr>
<td>7140</td>
<td>Transition Mires and Quaking Bogs</td>
</tr>
<tr>
<td>7230</td>
<td>Alkaline Fens</td>
</tr>
<tr>
<td>7310</td>
<td>Siliceous Screes</td>
</tr>
<tr>
<td>8110</td>
<td>Calcerous and Calc Schist Screes</td>
</tr>
<tr>
<td>8120</td>
<td>Siliceous Rocky Slopes with Chasmophytic Vegetation</td>
</tr>
<tr>
<td>8210</td>
<td>Calcerous Rocky Slopes with Chasmophytic Vegetation</td>
</tr>
<tr>
<td>8220</td>
<td>Siliceous Rocky Slopes with Chasmophytic Vegetation</td>
</tr>
<tr>
<td>8310</td>
<td>Caves Not Open to the Public</td>
</tr>
<tr>
<td>8330</td>
<td>Submerged or Partly Submerged Sea Caves</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4010</td>
<td>Fraochtána Fiuchan an Atlantaigh Thuidh le Erica tetralix</td>
</tr>
<tr>
<td>4030</td>
<td>Fraochtána Tirme na hÉorpa</td>
</tr>
<tr>
<td>4060</td>
<td>Fraochtána Alpacha agus Bóireacha</td>
</tr>
<tr>
<td>5130</td>
<td>Foirmíochtaí Juniperus communis ar Fhrachmaíonna nó Féarthailte Calcreacha</td>
</tr>
<tr>
<td>6130</td>
<td>Féarthailte Calaimleanáracha</td>
</tr>
<tr>
<td>6410</td>
<td>Móinír Molinia ar Ithreacha Calcreacha, Móinteacha nó Créula Sioltachá</td>
</tr>
<tr>
<td>6430</td>
<td>Pobail Imeallacha Luibheanna Arda Hidrifileacha</td>
</tr>
<tr>
<td>6510</td>
<td>Móinér Féar Talaimh Isl (Alopecurus pratensis, Sanguisorba officinalis)</td>
</tr>
<tr>
<td>7120</td>
<td>Portaigh Ardalaithe Dhíghrádaithe a bheadh fós in ann of Athghiniúint go Nádurtha</td>
</tr>
<tr>
<td>7140</td>
<td>Puitigh Idirthréimhseacha agus Portaigh Chreatha</td>
</tr>
<tr>
<td>7230</td>
<td>Eanaigh Alcalieacha</td>
</tr>
<tr>
<td>7310</td>
<td>Sceathain Shilicíula</td>
</tr>
<tr>
<td>8110</td>
<td>Sceathain Chailcreacha agus Chalic-Shiosta</td>
</tr>
<tr>
<td>8210</td>
<td>Fánaí Carraigchea Calcreach le Fársa Casmaifteach</td>
</tr>
<tr>
<td>8220</td>
<td>Fánaí Carraigchea Silicíula le Fársa Casmaifteach</td>
</tr>
<tr>
<td>8310</td>
<td>Pluaiseanna nach bhfuil oscailte don phobal</td>
</tr>
<tr>
<td>8330</td>
<td>Pluaiseanna Mara Báite nó Báite i bPáirt</td>
</tr>
<tr>
<td>91a0</td>
<td>Collite Sean-Darach Neamhghasain le llex agus Blechnum ar Oileán na Breataine is na hÉirann</td>
</tr>
</tbody>
</table>
Species listed in Annex II of the Habitats Directive for which sites have been selected in Ireland.

<table>
<thead>
<tr>
<th>Species listed in Annex II</th>
<th>Scientific Name</th>
<th>Irish Name</th>
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<tbody>
<tr>
<td>Lesser Horseshoe Bat</td>
<td>Rhinolophus hipposideros</td>
<td>Cruáiltóg bheag</td>
</tr>
<tr>
<td>Otter</td>
<td>Lutra lutra</td>
<td>Marda uisce</td>
</tr>
<tr>
<td>Grey Seal</td>
<td>Halichoerus grypus</td>
<td>Rón glas</td>
</tr>
<tr>
<td>Common Seal</td>
<td>Phoca vitulina</td>
<td>Rón beag</td>
</tr>
<tr>
<td>Bottle-nosed Dolphin</td>
<td>Tursiops truncatus</td>
<td>Delfh bholgshróanach</td>
</tr>
<tr>
<td>Porpoise</td>
<td>Phocaena phocaena</td>
<td>Muc mhara</td>
</tr>
<tr>
<td>Brook Lamprey</td>
<td>Lampetra planeri</td>
<td>Loimpre shrutháin</td>
</tr>
<tr>
<td>River Lamprey</td>
<td>Lampetra fluviatilis</td>
<td>Loimpre abhann</td>
</tr>
<tr>
<td>Sea Lamprey</td>
<td>Petromyzon marinus</td>
<td>Loimpre mhara</td>
</tr>
<tr>
<td>Salmon (fresh water only)</td>
<td>Salmo salar</td>
<td>Bradán</td>
</tr>
<tr>
<td>Twaite Shad incl. Killamey Shad (A.f. killamensis)</td>
<td>Alosa fallax</td>
<td>Sead fhallacsach lena n-áirítear</td>
</tr>
<tr>
<td>White-clawed Crayfish</td>
<td>Austropotamobius pallipes</td>
<td>Gliomach fionnuisce</td>
</tr>
<tr>
<td>Marsh Fritillary Butterfly</td>
<td>Euphydryas aurinia</td>
<td>Fritileán réisc</td>
</tr>
<tr>
<td>Kerry Slug</td>
<td>Geomalacus maculosus</td>
<td>Drúchtín ballach</td>
</tr>
<tr>
<td>Fresh Water Pearl Mussel</td>
<td>Margaritifera margaritifera</td>
<td>Diúilicín na bPéarlaí</td>
</tr>
<tr>
<td>Freshwater Pearl Mussel</td>
<td>Margaritifera durrovensis</td>
<td>Diúilicín na bPéarlaí</td>
</tr>
<tr>
<td>Whoir Snail</td>
<td>Vertigo angustior</td>
<td>Seilide rinseach</td>
</tr>
<tr>
<td>Whoir Snail</td>
<td>Vertigo geyeri</td>
<td>Seilide rinseach</td>
</tr>
<tr>
<td>Whoir Snail</td>
<td>Vertigo moulinsiana</td>
<td>Seilide rinseach</td>
</tr>
<tr>
<td>Killamey Fern</td>
<td>Trichomanes speciosum</td>
<td>Raithneach Chill Aírme</td>
</tr>
<tr>
<td>Slender Naiad</td>
<td>Najas flexilis</td>
<td>Náiad chaol</td>
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<tr>
<td>Marsh Saxifrage</td>
<td>Saxifraga hirculus</td>
<td>Mórán réisc</td>
</tr>
<tr>
<td>Shining Sickle Moss</td>
<td>Drepanocladus vernicosus</td>
<td>Corráinchaonach geal</td>
</tr>
<tr>
<td>Petalwort</td>
<td>Petalophyllum ralfsi</td>
<td>Lus na bPeiteal</td>
</tr>
</tbody>
</table>
II. Guide to Protected Species under the Wild Habitats Directive in Ireland

**Lesser Horseshoe Bat** (*Rhinolophus hipposideros*)

This rare species is widespread throughout Europe and can be found in sheltered valleys with deciduous woods of dense scrubs, usually close to the roosting sites, such as barns and old buildings. These roost sites used during the summer by maternity colonies ideally offer a range of temperature conditions in different parts of a single site. If conditions are not favourable, females are likely to change sites over the summer. During winter, these bats hibernate in mines, caves or cave-like places. Winter and summer roosts are usually situated close together and less than 10km apart. If the foraging areas are away from the roost site, the bats need landscape features such as hedgerows to provide movement corridors. Populations have declined considerably, mainly due to disturbance in roosting and hibernating sites. This includes the loss or renovation of old buildings as well as closure of mines and caves or their increased use for leisure. Additionally, the loss, damage and fragmentation of habitat, such as woodland for foraging, hedgerows and tree lines, poses a serious problem.

**Otter** (*Lutra lutra*)

This semi-aquatic mammal can be found in a wide range of ecological conditions, from inland freshwater habitats to coastal areas. In coastal areas populations feed in shallow, inshore marine areas, utilising freshwater areas for bathing and terrestrial areas for resting and breeding hols. Coastal otters can be found in sheltered wooded inlets as well as more open, low-lying coasts. Running and standing freshwaters utilised by inland otter populations need to have an abundant food supply, which often is associated with high water quality. Suitable habitats include vegetated river banks, reedbeds and woodland, islands that can be used for foraging, breeding and resting.

Once widespread in Europe, populations of the otter showed a sharp decline during the 1960s and 70s due to pollution, which was worsened by hunting and habitat loss. Current threats include loss of habitat, e.g. impoverished river banksides needed for breeding and resting, water pollution, especially with PCBs, and insufficient prey, which is linked to poor water quality. Mortalities due to road deaths and drowning in eel traps are also a problem.

Today the species’ distribution is rather discontinuous with strong populations in Spain, Portugal, Greece and much of eastern Europe. Over most of continental western Europe the species is scarce to extinct, but reintroduction or restocking projects are in progress in several countries.
Grey Seal (*Halichoerus grypus*)

Among the rarest seals in the world, Grey Seals spend most of their time at sea, coming ashore in autumn for breeding. They form colonies on rocky shores, beaches, small uninhabited islands, occasionally sandbanks and in caves. They may range widely in search of prey. Almost 50% of the world’s population of this species can be found breeding around the British Isles, but population numbers specifically for Ireland have gone mostly unchecked. Three reproductively-isolated stocks of Grey Seal are recognised world-wide, the West Atlantic (northern North American) stock; the Baltic stock; and the East Atlantic stock, which extends from Iceland and northern Norway southwards to northern France.

Common Seal (*Phoca vitulina*)

Common Seals are typically found in estuaries and on sandflats, which they use as haul-out sites. Like Grey Seals they may range widely in search of prey. Pups can swim almost immediately after birth allowing Common Seals to breed in sheltered tidal areas on banks with access to deep water. This seal species has a near-circumpolar distribution. Four subspecies are recognised, from the Eastern and Western Atlantic, and the Eastern and Western Pacific. In Europe only the Eastern Atlantic subspecies can be found, occurring from Iceland and northern Norway down to northern France, including the Kattegat/Skagerrak area and South-western Baltic. The European population was sharply reduced due to a viral epidemic in the late 1980s, but has shown a remarkable recovery since.

Bottle-nosed Dolphin (*Tursiops truncatus*)

This dolphin species can be found mainly in inshore waters world wide in temperate, subtropical and tropical waters. It can exist offshore as well, and there is evidence of a possible offshore ecotype. Distinct populations have been identified in the Atlantic, North Pacific and Indo Pacific/Red Sea. Animals range in length from 2.3 to 3.9 metres and weigh between 150 and 275kg. Adults have a dark grey back and lighter grey flanks with a whitish underside, while calves often appear blue in colour. Because the line of the mouth is curved up at the back these animals seem to be smiling. They have a short rounded beak, fairly long and pointed fins and a sickle shaped dorsal fin. Using a variety of feeding methods, bottlenose dolphins are opportunistic feeders and will feed mainly in shallow waters on fish, crustaceans and squid though they are also capable of diving several hundred meetings in search of prey.
Though most populations have remained stable, declines have been recorded in northern Europe, the Black Sea and the Mediterranean, with a drastic decline in the Moray Firth in Scotland, suggesting that this specific population is heading towards local extinction.

Ireland has a resident population of around 130 animals in the Shannon Estuary, which is one of only seven known resident populations in Europe. For this reason, the Shannon Estuary has been declared a Special Area of Conservation. Animals may be sighted along the whole coastline in inshore areas. Ireland also hosts two ‘friendly’ bottlenose dolphins, which are interacting with humans, one in Dingle, Co. Kerry, and one in Doolin, Co. Clare. Threats to the species include pollution, entanglement in fishing equipment and disturbance from tourists.

**Porpoise (Phocoena phocoena)**

Porpoises are small animals ranging in length from 1.4 to 1.9 metres and weighing between 40-65kg. They have a dark grey upper body and a lighter underside with the transition area often speckled in appearance. Their small rounded flippers are dark and their blunt head shows no distinctive beak. One to three grey stripes lead from the flipper to the lower jaw. Feeding on small fish as well as shrimp and squid, porpoises occur in coastal waters in the north Atlantic and Pacific, Mediterranean and Black Sea. They are known to swim some distance up rivers.

Threats to the species include pollution, especially from substances such as PCBs and organochlorines, and hunting in some areas of the world, such as Japan. Animals may also get entangled in fishing nets.

Though they may be absent in areas of high bottlenose dolphin activity, such as the Shannon Estuary, porpoises can be found in nearly all coastal waters around Ireland.

**Brook Lamprey (Lampetra planeri)**

The smallest of lampreys found in Ireland, this primitive, jawless fish resembling an eel can be found in streams and occasionally lakes in northwest Europe. It is a non-migratory freshwater species that requires clean gravel beds for spawning in parts of the rivers with low current. Spawning occurs from April to May and the larvae lie buried in the substrate. The species has declined in some parts of its European range.
River Lamprey (Lampetra fluviatilis)

This species of lamprey is anadromous, i.e. it spawns in freshwater and completes part of its life cycle at sea, and can be found in coastal waters, estuaries and rivers, though there are also a few land-locked populations. Threats to the species include pollution and artificial obstacles such as weirs or dams, which impede their migration. This species is only found in western Europe with a range from southern Norway to the western Mediterranean. Irish species are considered important for the conservation of the species at EU level.

Sea Lamprey (Petromyzon marinus)

This is the largest of lamprey species found in Ireland. It is also anadromous and can be found in estuaries and accessible rivers. Like the other lamprey species it needs clean gravel beds for spawning and marginal silt of sand for the burrowing juveniles, though sea lampreys prefer warm waters for spawning. Since they seem to be relatively poor in ascending obstacles, features such as weirs and dams impede their migration to the spawning grounds, restricting the species to the lower levels of rivers.

The range of sea lampreys covers much of the Atlantic coastal area of western and northern Europe and eastern North America, though populations have declined in some parts of the European range.

Atlantic Salmon (freshwater only) (Salmo salar)

Salmon are anadromous, i.e. they are born in freshwater, descend into the sea to grow to maturity and then return to spawn in freshwater rivers and streams. Salmon enter freshwater rivers from spring to autumn. Spawning occurs during winter and in some rivers may not be completed until January. The spawning populations of Atlantic salmon are more or less reproductively isolated and genetically distinct, and genetic differentiation generally increases with increasing geographical distance.

Spawning sediment needs to be clean, silt-free and adequately aerated. Once the hatched fish are ready for feeding they emerge to the surface of the gravel and disperse. In spring the juveniles migrate downstream to the sea, and several simultaneous and consecutive changes in physiology, morphology and behaviour occur preparing the fish life at sea. Salmon can spent up to seven years in freshwater before migrating to the sea. However,
the majority of fish spent two years in freshwater. Little is known about salmon life in the sea, but it is likely that they leave coastal waters rapidly. Main feeding grounds are off the West coast of Greenland and around the Faroe Islands.

After spending between one and two winters at sea most salmon return to their spawning area. After spawning some fish may return to sea. However, spawning involves a long fast from the point the sea fish re-enter freshwater. This exhausting fasting period of several months and the energy demand of spawning mean that the majority of salmon will not survive to spawn again.

Populations of the Atlantic salmon, Salmo salar, can be found in rivers throughout the North Atlantic area, along the western and northern coasts of Europe, on the East coast of North America, in Iceland, Southwest Greenland and in arctic Russia.

Main threats to the species include pollution, the introduction of non-native salmon stocks, physical barriers to migration, exploitation from netting and angling, physical degradation of spawning and nursery habitat, and increased marine mortality.

**Twaite Shad** *(Alosa fallax)* **including the Killarney Shad** *(Alosa fallax killamensis)*

A member of the herring family, the twaite shad closely resembles its relative the allis shad, but is usually smaller than the latter measuring up to 40cm in length. The only definitive way of distinguishing between the two species is to examine the gills. On the first gill arch twaite shad show 40-60 gill-rakers, which are comb-like structures for filtering zooplankton, while allis shad have 90-130. Their bodies are covered with distinct circular scales forming a toothed edge on the lower margin and an adipose membrane that partially covers each eye.

Little is known about ecology and habitat of the twaite shad, which returns from the sea in spring to spawn in coastal areas usually at night and in shallow areas near deeper pools where the fish can congregate. Although the majority of adults die after spawning, repeat spawning also occur.

Twaite Shad can be found along the western coastline of Europe with a range from southern Norway to Morocco and along the eastern Mediterranean, though populations have shown a substantial decline due to pollution, habitat destruction, overfishing and obstruction of migratory routes. In Ireland, the unique landlocked Killarney Shad can be found only in Lough Leane, Co. Kerry.
**White-clawed Crayfish** (*Austropotamobius pallipes*)

This aquatic species favours hard-water streams and rivers but can be found in a diverse range of unpolluted habitats. Threats to this species include pollution, especially pesticides and sewage, habitat modification but mainly the introduction of non-native crayfish species especially through farming, bringing with it disease problems such as crayfish plague, a virulent disease caused by the fungus Aphaniomyces astaci. This disease spreads not only via the animal itself, but also by water, fish or equipment that has been in contact with diseased crayfish.

Introduced species such as signal and other non-native crayfish are also larger and usually more aggressive than the native species and are able to produce more young, increasing the threat to the native species through competition and predation.

A significant part of the EU resource is found in the UK and the Republic of Ireland, where it is widespread. Crayfish plague occurs in the Republic of Ireland but is unknown in Northern Ireland, while in Britain, three non-native crayfish species are now breeding in the wild. Only in areas free of disease white-clawed crayfish are likely to survive in future.

This species is listed in Appendix III of the Bern Convention and Annexes II and V of the EC Habitats Directive and is classed as Globally Threatened by IUCN/WCMC.

**Marsh Fritillary Butterfly** (*Euphydryas aurinia*)

This butterfly species can be found in a range of habitats where devil’s-bit scabious *Succisa pratensis*, its larval food plant, occurs, including grassland, wet heath, bog margins and woodland clearings. It may also occur in fens and on sand dunes. A major threat to the species is posed by sheep, which selectively graze devil’s-bit scabious, except in very low stocking densities. Other threats include burning and mowing, as well as drainage of wetland habitats. The sedentary adults form temporary sub-populations by remaining in a series of linked metapopulations, leading to the establishment of local races, of which 34 have been described in Europe alone. Habitat fragmentation prevents this colony formation and populations do not seem able to persist, making it essential to preserve a cluster of suitable sites in close proximity.

Population numbers vary greatly from year to year, which has been related to cycles of attack from parasitic wasps in the past. Overall the marsh fritillary butterfly is one of the most rapidly declining species in Europe and is regarded as vulnerable or endangered over most of its European range, where Spain and the UK constitute strongholds for this species.
Kerry Slug (Geomalacus maculosus)

The Kerry Slug, or Spotted Irish Slug, can be found in old sandstone areas and in woodlands feeding on a range of lichens, liverworts and mosses, as well as fungi and algae. There are two principal colour varieties, one with a ginger-bronze to olive body colour and yellow-gold spots, the other with a blue-grey to black body colour and white spots. Individual animals can live up to seven years. It seems to be the only slug that habitually curls into a ball when disturbed.

This species can only be found in three protected sites in Ireland, the Killarney National Park, Glengarriff Forest and Uragh Wood Nature Reserve, as well as in confined areas in northern Spain and Portugal.

It seems that forestry activities and habitat destruction are the main threats to the survival of this rare species, however, there is not enough information available on the biology of the species and how to protect it.

Freshwater Pearl Mussel (Margaritifera margaritifera and M. m. durovensis)

This species of mussel can be found in fast flowing rivers and streams, burrowing into sandy substrates, often between boulders and pebbles. It grows up to 140mm in length and requires unpolluted, cool, well-oxygenated soft water free of turbidity. The mussel spends its larval stage attached to the gills of salmonid fish, e.g. Atlantic salmon or trout. The larvae attach themselves during mid to late summer and drop off the following spring to settle in the riverbed gravel where they grow to adulthood. Reproductive maturity is reached only after at least 12 years and individuals may live for over 120 years.

Threats to the species, which have caused population numbers to decline, include pollution and organic enrichment, acidification and siltation, pearl-fishing, river engineering, and declining salmonid stocks. Though still widely distributed in Europe and north-eastern America, the species has suffered serious decline. It is now highly vulnerable or threatened with extinction throughout its range and listed as ‘vulnerable’ by IUCN. Outside Ireland and Britain, only a few viable populations survive in mainland Europe.

Of international importance is the endemic Irish freshwater pearl mussel Margaritifera margaritifera durovensis. A subspecies to Margaritifera margaritifera it is only found in the river Nore catchment.
Whorl Snail (Vertigo angustior)

This tiny whorl snail, also called narrow-mouthed whorl snail, can be found mainly on marshy ground of high, even humidity, with flowing groundwater. Living amongst short vegetation, such as grasses, herbs or mosses that are quickly warmed by the sun, it requires unshaded conditions. Populations of this species flourished in post-glacial conditions, but changes in the climate have led to a dramatic contraction of its range. Main threats to the species include physical disturbance, reduced grazing pressure, drainage or afforestation of the sites where it survives. The species is considered threatened in most countries, though it still is widely but locally distributed in central Europe northwards to southern Norway and Sweden.

Whorl Snail (Vertigo geyeri)

This small whorl snail, also called Geyer’s whorl snail, can be found widely scattered across Europe in local populations. Its preferred habitats are relatively exposed, humid calcareous flush-fens fed by tufa-depositing springs. Animals require dense covering vegetation of low-growing grasses and sedges. Like the narrow-mouthed whorl snail, populations of Geyer’s whorl snail flourished in post-glacial climates, and changes in these conditions have led to a contraction of its range, which includes localities between Northern Scandinavia, the Swiss and Austrian Alps, and Ireland.

The main threats to the species include habitat changes, e.g. drainage or changes in grazing patterns, trampling by animals and humans.

Whorl Snail (Vertigo moulsinsiana)

This is the largest of the three whorl snail species, also called Desmoulin’s whorl snail, and can be found in calcareous wetlands close to rivers or lakes, or in fens. It feeds on the microflora of reed grasses and sedges, e.g. greater and lesser pond-sedge, and may ascend taller reeds and scrubs in autumn. Just like the other whorl snail species its range in Europe has contracted due to changes in climatic conditions.

The species can still be found widespread north to Denmark and the extreme South of Sweden, with Ireland and England supporting reasonable populations. The species is considered rare across its whole range.

Main threats to the species include habitat degradation, especially changes to the hydrology.
Killarney Fern *(Trichomanes speciosum)*

This medium-sized, long-lived fern has delicate, translucent fronds arising from a creeping rhizome. The small fern used to be quite common during the 1800s but was picked almost to extinction for botanical collections. It prefers damp habitats, e.g. the splash zone of waterfalls, shaded and permanently humid rock faces, located in deep recesses, in wooded ravines and on cliffs. In Ireland it occupies quite a wide range of habitats, and in Brittany it has colonised numerous old wells. The species range is confined to Europe and Macaronesia, including Ireland and the UK, north-west Italy, western France, Portugal and Spain, Madeira, the Canary Islands and the Azores.

The main threats to the species are human activities, including those that cause changes to the ambient humidity, such as tree-felling, stream water abstraction, drainage and afforestation, and those associated with botanical collection, such as trampling and removal of vegetation for photography. Pollution from sewage, fertilisers, mining and quarrying can also cause damage to populations, as well as natural processes changing the hydrology of the habitats.

Slender Naiad *(Najas flexilis)*

This species occurs in lakes, rivers and heathland pools, as well as in canals. Major threats to the survival of the species include pollution such as nutrient enrichment, e.g. from sewage effluent, and restrictions on light penetration of the water body due to heavy weed growth. The species is threatened and rare throughout its European distribution, which covers most of northern Europe and extends south to Switzerland.

Marsh Saxifrage *(Saxifraga hirculus)*

This attractive, yellow-flowered perennial requires base-rich and wet conditions. Because its favoured lowland habitats have been lost, it is now considered an upland species. Populations have suffered from overgrazing and drainage with many sites for the species heavily grazed, although moderate levels of grazing seem to be beneficial to this plant. The marsh saxifrage can be found all throughout Europe, though populations are declining or threatened in most countries, due to loss and degradation of habitat through afforestation, drainage and over-grazing.
Shining Sickle Moss (*Drepanocladus vernicosus*)

This medium-sized straggling moss is found on base-rich flushes and springs in the uplands and occasionally on lowland sedge fens. It does not reach high altitudes, although it can be found frequently in the uplands. Potential threats to this species include habitat destruction, lowering of the local water table at lowland sites, and heavy grazing of flushes by sheep and deer at upland sites.

Though this species is rare, it is widely distributed throughout Europe, with many populations declining due to widespread destruction and habitat loss. The species is listed as Data deficient in Europe.

**Petalwort** (*Petalophyllum ralfsii*)

This pale green thalloid liverwort has erect lamellae on its upper surface and grows in damp, open calcareous dune slacks, predominantly on low hummocks rather than on very wet ground, and on compacted sandy/muddy bryophyte-rich turf. Occasionally it has been recorded in other coastal grassland where conditions are similar.

Main threats to the species include loss of habitat due to natural succession, dune stabilisation and development, construction of golf courses, drainage, recreation and botanical collection.

Petalwort can mainly be found in the Mediterranean, although it occurs throughout western Europe. Being confined to dune slacks of a specific kind that are threatened in many areas, the species is now infrequent and declining throughout its range, and has been classed as Vulnerable. Ireland and the UK may now be its strongholds.
ISGA Code of practice for the prevention of stock escapes of Irish farmed salmonids

Introduction

• The Irish Salmon Growers' Association is committed to best environmental and husbandry practice in accordance with the principles of sound, sustainable development.

• ISGA is committed to ensuring that transparent codes relating to these principles are applied evenly throughout the industry; ongoing communication and co-operation between producers and the state is vital to ensure the long-term success of such codes.

• ISGA along with our colleagues in other North Atlantic salmon producing nations have concluded a groundbreaking agreement with NASCO on a Code of Containment for Farmed Salmon. This has directly lead to the development of this current document.

• It is the aim of the ISGA, through the promotion of the following procedures, to assist the Irish Salmon Industry in reducing to the absolute minimum any opportunity for salmon to escape from farms through failure of management, equipment or procedure. It is recognised that there is a potential for unavoidable natural catastrophes or uncontrollable outside forces to damage farms and potentially cause escapes. It is the aim of this document to ensure all events within the control of the farmer are managed to the highest standards in order to ensure full stock containment.

• The Irish salmon industry works in a unique physical and legislative environment within Europe. It is in the best interests of all farmers to ensure the highest farming standards are adhered to from both an economic and environmental viewpoint.

• It is therefore agreed that all ISGA members shall follow this Code of Practice for the containment of stock and the reporting of any escape that may occur. These procedures may be included in farm licence applications, including Environmental Impact Statements, in-house procedure manuals at the farm, appropriate Quality Assurance Schemes and also in Co-ordinated Local Aquaculture Management Plans.
1 Site Selection and Location

1.1 All fish farm boats, barges, nets and sea pens shall be adequately marked so as not to be a navigational hazard or obstruct the movement of sea traffic. All navigational marking shall comply with regulations as stated by the Department of Marine and Natural Resources.

1.2 Site location shall give due consideration to prevailing weather conditions in the area.

1.3 On choosing a site, in consultation with the equipment suppliers and the farm’s insurance company, the farmer shall determine the most appropriate equipment, mooring systems, pens, nets, etc to be used and their suitability for the specific location and purpose intended.

1.4 In the case of a new site, where a full Environmental Impact Statement is required, it shall, as a matter of course, assess wave climate, hydrography, prevailing weather conditions and any other factors, which may cause stress to pens and nets.

2 Pen Structures, Tank Systems

2.1 The selected structure shall be designed and constructed so as to be capable of withstanding any environmental and extreme weather conditions that may be experienced at the site. Moorings in particular must be designed with adequate strength to withstand the worst conditions to be expected.

2.2 All pens shall be installed in a professional manner and comply with the manufacturer’s instructions and specifications; the farm should, where possible, engage the manufacturer to oversee the first completed mooring installation.

2.3 All pens shall comply with agreed any DoMNR engineering requirements regarding anchorage, stability, strength and buoyancy.

2.4 All pens shall be easily identifiable and appropriate records maintained for each unit with regard to stock in the unit, as well as maintenance, repair and testing records.

2.5 Pen moorings shall be compatible with the pen unit installed. Installation shall be carried out to ensure that all loads or stresses imposed on the unit are distributed in accordance with its design, and that the unit has adequate movement and flexibility. Moorings shall be installed in consultation with the pen manufacturer and mooring manufacturer and
tested regularly; the underwater fitting and chains should be inspected at least once every two years.

2.6 Tank systems should be designed to effectively contain fish and minimize the possibility of escape, where the outflow from tanks passes into a settling pond the outflow from the settling pond should incorporate a screen of suitable size and construction to avoid escape.

3 Pen Nets

3.1 The design of the net should account for extreme weather conditions likely to be encountered at the site and due consideration given to the net's ability to withstand such conditions. Net design shall ensure that under pressure stresses are directed into reinforced areas of the net specifically designed to deal with this and not into the main body of the net. The pen collar or waterline area of the net is more exposed to UV light and abrasion than the rest of the net therefore it should be suitably reinforced.

3.2 Pen nets shall be compatible with the pens being used and installed to manufacturer's specifications.

3.3 Pen nets shall be manufactured from a material of suitable quality that is fit for the purpose intended. All nets shall be treated with a UV-inhibitor in order to prevent deterioration from exposure to ultraviolet light.

3.4 Nets shall be tested on a regular basis during their life-span, including breaking strength, in compliance with manufacturers and insurance company instructions and always visually inspected from above water and by divers in the immediate aftermath of extreme weather conditions.

3.5 In order to reduce the risk of drag and tear minimum recommended clearances (as defined by net manufacturer) between the base of the pen and the sea floor shall be adhered to at all times. Appropriate clearances are required from neighbouring cages and sub surface weights used to maintain net shape.

3.7 Appropriate and effective predator deterrence devices should be employed. These should be upgraded as more effective and cost efficient methods become available.

3.8 Each net should be marked and identifiable, all nets should have clear records showing
a detailed history of its use, i.e. age, frequency and results of stress testing, last area of use etc.

3.9 Farms should have enough spare nets in good condition available at all times to replace damaged nets on all pens.

4 Farming practices and Staff

4.1 Daily on-farm procedures shall be executed in a professional and careful manner to ensure that the highest standard of farming practice is achieved.

4.2 Due consideration and careful planning shall be given to any procedure that may increase the possibility of escape such as grading or fish transfer. Towing of stocked pens requires supervision on both the boat and the pen being towed. Diving personnel should be on stand-by where tows have to navigate past or over potential hazards.

4.3 The use of boats on site shall be conducted so as to minimize any possible damage that may occur to nets or pens. Where possible, boat propellers should be fitted into wells or fitted with guards to minimize the risk of contact with nets or rope.

4.4 Farm employees shall be suitably experienced or trained for the work required and be familiar with the farm's Comprehensive Emergency Plan.

5 Preventative Measures

5.1 Each licensed site shall have a maintenance and inspection program designed specifically for conditions at that site, including good housekeeping and the removal of surplus or unused equipment on site. Net cleaning or changing shall be regular to prevent undue stresses on nets consequent to fouling. Apart from the nets, all associated waterborne structures shall be subject to maintenance, inspection and repair procedures on a regular basis to minimize the risk of escape. The farm shall ensure the regular removal of fouling in situ of the pen collar, floats and related structures within the photic zone.

5.2 Each site shall devise a storm procedure detailing actions to be taken to ensure the site is prepared in the event of adverse weather; this shall include follow-up procedures for the inspection and testing of all nets and equipment after the storm. Measures to move pens to alternative sheltered sites in the event of forecasted very extreme weather should be agreed with the Department of Marine & Natural Resources.
5.3 All nets, screens and pen structures must be cleaned and inspected before new stock is added.

5.4 Precautions should be taken to protect stock and structures against malicious damage, i.e. by installing security systems where necessary.

5.5 When not in use nets should be stored in a dry area that is vermin free and away from direct sunlight.

5.6 Nets should only be put in long-term storage after cleaning as decomposition of organic material on the net during storage can lead to deterioration of quality.

6 Record Keeping

6.1 Maintenance records should be kept for each pen unit detailing repairs and tests, net changes, grading, transfers, treatments and any predator problems.

6.2 In order to assist in quantifying the number of escaped fish should an incident occur, adequate stock records should be maintained detailing numbers, types, origin and year classes of fish per pen unit.

7 Notification of Escapes

7.1 In the event of an escape the licensee shall notify the Department of the Marine and Natural Resources, Coastal Zone Administration Division, Leeson Lane, Dublin 2, the appropriate Regional Fishery Boards and the Irish Salmon Growers' Association within twenty-four hours of the escape. The licensee shall make available records of fish escaped, including numbers, types, origin, and year classes.

8 Measures for Recapture of Escaped Fish

8.1 The licensee should liaise with the local Fisheries Board on methods best suited to the recapture of escaped fish.

ISGA April 2002
A Code of Conduct for European Aquaculture

The primary goal of this Code of Conduct, prepared by the Federation of European Aquaculture Producers, is to promote the responsible development and management of a viable European aquaculture sector in order to assure a high standard of quality food production while respecting environmental considerations and consumers’ demands.

As a Code of Conduct, this document serves to establish and recommend guiding principles for those in Europe who are producing live fish species through aquaculture.

The Code does not seek to distinguish between the species nor the types or scale of farms that are encountered within the European aquaculture sector.

Its purpose is to establish a common base, through effective self-regulation, for sectoral responsibility within society and demonstrate the considerations of the production sector towards the fish it rears, the environment and the consumer.

Responsible and Sustainable Aquaculture

Aquaculture has become an important production activity throughout the world and, as such, has to assume the responsibilities of its status.

Aquaculture provides nutritious food to the consumer and its operators should plan, manage and maintain their activities to the standards expected.

The FEAP has developed this Code of Conduct with specific reference to:

- The provisions for responsible aquaculture development contained in the FAO Code of Conduct for Responsible Fisheries, which was adopted by the 28th Session of the Conference of the Food and Agriculture Organisation of the United Nations (1995).
- The Holmenkollen Guidelines for Sustainable Industrial Fish Farming (Oslo – 1994).
- The ICES Code of Practice on the Introductions and Transfers of Marine Organisms (Copenhagen 1994).
The Code of Practice for Irish Aquaculture Companies and Traders

Federation of European Aquaculture Producers


The Code is not definitive but addresses those areas that the Federation of European Aquaculture Producers considers to be important and of prime concern. Additionally, the role of the Code is to motivate and assist the development of the principles of best practices.

It is assumed that European and national legislation provide a minimum standard for aquaculture. It is hoped that this Code can serve as the basis for the development of individual national Codes of Practice or Codes of Conduct in order to interpret and apply existing standards and to develop, refine or improve standards, as required.

Guiding Principles

The Code of Conduct for European Aquaculture addresses the responsibility of the fish farmer to the fish, the environment and the consumer.

Individuals, co-operatives and companies that engage in aquaculture, singularly and collectively:

1. Shall consult and collaborate with European, national and regional authorities for the development and implementation of policies, practices and regulations. These policies should assist the achievement of environmental, economic and social sustainability of the aquaculture production sector.

2. Shall consult and co-operate with other aquaculture producers and sectoral suppliers for the development and agreement of common standards and objectives.

3. Shall plan and operate aquaculture sites in a manner that minimises unacceptable negative interaction with the environment.

4. Shall use only such sites whose characteristics are compatible with long-term sustainable operation and with acceptable ecological effects.

5. Shall plan and operate aquaculture sites in a manner that conserves water resources.

6. Shall respect the considerations for welfare that apply to the species being raised.

7. Shall take such measures as are appropriate to avoid disease outbreaks and implement
8. Shall use therapeutic agents in accordance with the appropriate legislation and the principles of best practice.

9. Shall dispose of waste and chemicals in a manner that does not constitute a hazard to human health and the environment and in accordance with the appropriate legislation.

10. Shall co-operate with those involved in research, technological development and training activities that seek to improve the social and environmental compatibility of aquaculture.

11. Shall implement improvements in technology and in management where such advances are economically possible and can assist the sustainability of the activity and improve the social and environmental compatibility of aquaculture.

12. Shall make the best efforts to produce products of the highest quality at all stages of the aquaculture process.

**Husbandry and Welfare**

Any person who owns farmed fish, or has farmed fish under his or her control, and every person engaged in the overseeing of farmed fish shall, according to their responsibilities, ensure that every step is taken to safeguard the health and welfare of such fish.

- **Water**
  
  The water supply should be of sufficient quality and quantity to ensure the well-being of the species being farmed.

- **Fish stocks**
  
  The intake of live fish stocks into an aquaculture system must be of good health and known origin.
  
  a) Genetically modified organisms

  The FEAP does not endorse the use of genetically modified fish in aquaculture since it is concerned about the maintenance of the natural characteristics of the products, in addition to the environmental qualities of biodiversity. However, the results of genetic research may play an important part in the future development of global food production.
The FEAP may review its position on this topic if such developments are acceptable to the consumer and do not pose any safety or environmental problems.

- **Fish health**

  The responsibilities concerning the optimisation of fish health include:

  1. Avoidance of unnecessary stress of the fish - all measures should be taken to ensure that the media and conditions in which the population is held are optimised for the reduction of stress.

  2. Regular inspections - the fish should be inspected frequently enough to ensure that significant behavioural and physical changes would be discovered and acted upon immediately.

  3. Avoidance of the introduction of diseases - fish brought into an aquaculture system must be of good health and certified origin. Adequate precautionary measures should be taken to avoid inter-farm contamination through direct physical contact.

  4. Seeking proper diagnosis if disease presence is suspected.

  5. The use and application of therapeutic agents should observe the prescribed dosage and where appropriate, withdrawal times, in order to avoid the accumulation of residues in the flesh.

  6. When required, only licensed or approved therapeutic agents should be used.

  7. Avoidance of spreading of diseases - farmers have the responsibility to minimise the risk of the spread of diseases beyond their farms into the ecosystem where wild fish and other farms may be affected.

  8. Regardless of the reason for mortalities, any dead or dying fish require prompt removal from the growing area, in a way that does not affect the welfare and health of the remaining stock.

  9. The disposal of dead fish should be done carefully and effectively, in a way that does not affect the environment negatively.
• **Food and Feeding**
  Correct feeding practices reduce wastage, assuring better water quality, good health and farm performance.

  1. All fish should receive adequate quantities of feed, using the correct nutritional formulation for the species farmed.
  2. Such feeds should be properly composed and manufactured and, where possible, labelled and providing the correct granular or pellet sizes for the size of the fish.
  3. Daily rations should be appropriate for the species and the growing conditions available in the site facilities.
  4. Feed distribution methods should ensure that all individuals have sufficient access to the feeds supplied.
  5. Excessive feeding should be avoided since this can result in feed wastage that may cause water quality deterioration.

• **Handling and Transportation**

  1. For the avoidance of unnecessary stress and injury to live fish, the handling of live fish should be kept to a minimum and should be done using the least stressful method.
  2. The movement and transport of live fish should be done as quickly as possible and with an adequate oxygen supply.
  3. The strictest control procedures should be applied to fish that are transferred between farms and freshwater catchment areas in order to reduce the potential transfer of disease to a minimum.

• **Predators**

  Many predators affecting aquaculture are species that are protected by legislation.

  Whenever possible, predators should be excluded from the areas where live fish are held.

  Where this is not possible, lethal methods of predator control shall only be used when this action is legally permissible for the predator species in question.
Stocking density

The stocking density for fish should be adjusted to the specific requirements of the species and include respect for:

1. The average live weight of the fish,
2. The population's health and behavioural needs,
3. The population's demands on the growing environment, in particular their behavioural needs, the availability of an adequate oxygen supply and the removal of wastes to avoid the excessive accumulation of substances that may cause stress or toxic effects (e.g. CO2 and ammonia).

Slaughter

1. All fish should be fasted sufficiently before slaughter so as to induce a completely empty digestive system.
2. Fish should be killed quickly and humanely, referring to national regulations for guidance.

Monitoring and Record keeping

1. Fish farms should aim to be self-regulating. To achieve this, proper systems of monitoring and recording are required so that problems can be averted before they arise.
2. Written records are essential for the farmers to ensure good husbandry and welfare of the fish.
3. The use of computer-assisted monitoring of stocks and record-keeping is to be encouraged given the benefits of:
   a. Optimal feed distribution,
   b. Use of therapeutic agents and their traceability
   c. HACCP (Hazard Analysis and Critical Control Point) systems.
4. Effective self-regulation can be achieved through the routine monitoring of:
   a. Water quality (on and off-farm),
   b. The quality of other inputs and resources used in the production process,
   c. Off-farm environmental parameters that are of immediate and direct relevance to the production process,
d. Environmental standards and objectives that, ideally, are agreed with local authorities,
e. Product quality and safety standards.

The Environment

Aquaculturists should work together with other water users to assure equitable use of the resource and mutual understanding.

• Water use and quality
  a) Abstraction and discharge.
    The practise of aquaculture requires water and therefore the profession has to accept that the activity has an impact and be committed to limit it.
    Unnecessary water use must be avoided.

• Site selection
  All fish farms should be designed, developed and managed with a view to the equitable and efficient use of resources.
  Aquaculturists shall use only those sites that are compatible with
  1. Long-term sustainable operations,
  2. Acceptable ecological effects.
  Best efforts should be made for aquaculture to integrate harmoniously with the surroundings of the site.

• Site Management
  Aquaculturists should apply the best available technology and procedures in order to optimise both the farm husbandry and the interactions of the farm with the environment.
  Best efforts should be made so that the general appearance of the site is attractive, neat and tidy.
  a) Escapes
    Farmers will seek to minimise the potential risks that are presented by farmed fish escapes to wild fisheries.
Farmers will, in the event of escapes, co-operate and inform the respective authorities to assure that appropriate actions will be taken.

b) Therapeutic actions

Farmers will ensure that the potential for contamination of the environment will be minimised when using disinfecting agents and other therapeutic agents.

Recommended withdrawal periods for therapeutic agents must be carefully observed and implemented prior to harvesting.

Social and Economic Relationships

Aquaculture has an important role to play in bridging the gap between the supply and demand of affordable, nutritious food of high quality.

- Aquaculture operators must be aware of the social contribution required of their professional activities and assure their integration in local community development and planning.

- Aquaculture operations must be based on technology and equipment that ensure the safety of the employees. This includes establishing routines for handling materials and chemicals to avoid health hazards to workers.

- The aquaculture sector acknowledges its responsibility towards local society by providing a safe and stable workplace.

- Training appropriate to the responsibilities of those engaged in aquaculture should be integral to all operations.

Aquaculture sectors throughout Europe provide significant economic benefits in the regions where they are located, many of which are remote and relatively disadvantaged. Each sector will endeavour to ensure the short and long-term balance between supply and demand, so as to deliver economic stability to European aquaculture.
The Consumer

The prime goal of the aquaculture producers of Europe is to produce nutritious products of the highest quality for the consumer.

Aquaculture is a controlled process that allows the farmer to grow and harvest fish, which is of consistently good quality, having the following characteristics:

- A healthy fish that has been reared in the best possible conditions
- A protein source of high dietetic quality
- A nutritious source of food
- Available continuously throughout the year
- A product that is consistently fresh
- Good taste and flavour

Fish farmers shall contribute actively towards the balanced and sustainable development of aquaculture. They shall make their best efforts to assure the transparent development of the activity to the benefit of the consumer.
The unique Co-ordinated Local Aquaculture Management Systems (C.L.A.M.S.) process is a nationwide initiative to manage the development of aquaculture in bays and inshore waters throughout Ireland at a local level. In each case, the plan fully integrates aquaculture interests with relevant national policies, as well as:

1. Single Bay Management (S.B.M.) practices, which were initially introduced by salmon farmers to co-operatively tackle a range of issues, and have now been extended to all aquaculture species,
2. The interests of other groups using the bays and inshore waters,
3. Integrated Coastal Zone Management (I.C.Z.M.) plans, and
4. County Development plans.

The process has been widely adopted in bays and inshore waters where fish farming is practiced around the Irish coast, as a further proactive step by fish and shellfish farmers, to encourage public consultation on their current operations and their future plans.

Because C.L.A.M.S. is designed to treat each bay/region as a separate entity, the process involves an individual plan being drawn up for each area. This management plan lays out clearly what fish and shellfish farmers are currently doing in the bay, how they operate and what their future plans are. The plan involves a long consultative process with many interested parties in the relevant area and includes:

1. A detailed description of the bay/area in terms of physical characteristics, history, aquaculture operations, future potential, problems etc.
2. The integration of a series of codes of practice for current aquaculture operations and translation of those national codes to the specific circumstances of each bay or coastal region.
3. The expansion of the concept of S.B.M. to species other than salmon.
4. The formation of a development plan for aquaculture in the bay.
5. The compilation of information on other activities in the bay.
6. The establishment of a local and national communication network with ‘bottom up’ and ‘top down’ dialogue capacity.

Once completed the C.L.A.M.S. plan is usually available to view in the local Chambers of Commerce and the public library.

C.L.A.M.S. is not a licensing or regulatory process. This function is vested on a statutory basis with the Coastal Zone Administration section of the Department of Communications, Marine and Natural Resources. It provides a policy backdrop, which helps in the formation of a detailed evaluation of individual license conditions. C.L.A.M.S. can inform those tasked with compliance monitoring with regard to general issues such as bay carrying capacity, but cannot be used on an individual basis.
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IFCA Fish Farming Section

International Tanker Owners Pollution Federation Ltd. (ITOPF)

Irish Whale and Dolphin Group

National Parks and Wildlife section (NPWs), Department of Environment, Heritage & Local Government

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Joint Nature Conservation Committee JNCC: www.jncc.gov.uk/


The Irish Whale and Dolphin Group: http://iwdg.ie/

UK Biodiversity: www.ukbap.org.uk/

Acronyms

C.L.A.M.S. Co-ordinated Local Aquaculture Management Plan

DoE NI  Department of Environment Northern Ireland

EHS  Environment & Heritage Service DoE NI

EMAS  European Union Eco-Management and Audit Scheme

FIFG  Financial Instrument for Fisheries Guidance

ISA  Irish Shellfish Association

ISGA  Irish Salmon Growers Association

ISO  International Standards Organisation

ITOPF  International Tanker Owners Pollution Federation Ltd.

NPWs  National Parks & Wildlife section, DoEHLG

IUCN  The World Conservation Union

WCMC  World Conservation Monitoring Centre

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