Northern Ireland Marine Shellfish Aquaculture Invasive Alien Species Biosecurity Guidance

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Photo of Slipper limpet *Crepidula fornicata* on mussel shell by Paul Brazier

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Summary

DAERA Marine and Fisheries Division is the statutory body responsible for protecting the marine environment and its associated species. This biosecurity guidance has been developed to provide advice on the requirements for movement of shellfish aquaculture products in Northern Ireland to DAERA staff, other competent authorities, environmental bodies and aquaculture businesses to reduce the risk of introducing and/or spreading invasive alien species (IAS).

Failure to comply with the requirements of the **Alien and Locally Absent Species in Aquaculture (Northern Ireland) Regulations 2012** will result in the Department prohibiting the proposed movement. Regulation 6 (4) provides that a person shall not undertake the movement of an Annex IV species except under, and in accordance with the conditions of, a notice served by the Department under regulation 7(2)(b) or (3)(b).

Furthermore, Article 15 of the **Wildlife (Northern Ireland) Order 1985 (as amended)** relates to an offence being caused should a person release or allows to escape into the wild any animal not ordinarily resident in and is not a regular visitor to Northern Ireland in a wild state or is included in Part 1 of Schedule 9.

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Contents

Glossary **3**

Introduction **5**

Key legislation relating to aquaculture imports for Northern Ireland 7

Responsibly sourcing, traceability and moving aquaculture products **9**

Preventative measures during aquaculture site management activities and translocations . 9

Options to meet the requirements for import or translocation of shellfish products into and within Northern Ireland **11**

Native Oysters (Ostrea edulis) 11

Pacific Oysters (*Magallana gigas*) 11

Blue Mussels (*Mytilus edulis*) 15

Annex A: Environmental Risk Assessment **17**

Annex B: Biosecurity Plan **23**

Annex C: Other legislation and policy related to invasive non-native species **30**

References **32**

Draft

Glossary

Alien species – is a species, subspecies or lower taxon introduced outside its natural past or present distribution; this includes any part, gametes, seeds, eggs or propagules of such species that might survive and subsequently reproduce (Convention on Biological Diversity, 2025).

Closed aquaculture facility –facility where aquaculture is conducted in an aquatic medium, which involves recirculation of water and which is separated from the wild aquatic medium by barriers preventing the escape of reared specimens or biological material that might survive and subsequently reproduce (EC No 708/2007, article 3(3)).

Hybrid – defined as the offspring produced from a cross between parents of different species or subspecies.

Invasive Alien Species (IAS) – an alien species whose introduction and/or spread threatens biological diversity (Convention on Biological Diversity decision VI/23). Also referred to as Invasive Non-Native Species (INNS).

Non-routine movement –any movement of aquatic organisms which does not fulfil the criteria for routine movement (EC No 708/2007, article 3(17)).

Non-target species – any species or subspecies of an aquatic organism likely to be detrimental to the aquatic environment that is moved accidentally together with an aquatic organism that is being introduced or translocated (EC No 708/2007, article 3(8)).

Precautionary Principle – as required under the OSPAR Convention, requires preventive measures to be taken when there are reasonable grounds for concern that human activities may bring about hazards to human health, harm living resources and marine ecosystem, damage amenities or interfere with other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship. A lack of full scientific evidence must not postpone action to protect the marine environment.

Routine movement –movement of aquatic organisms from a source which has a low risk of transferring non-target species and which, on account of the characteristics of the aquatic organisms and/or the method of aquaculture to be used, does not give rise to adverse ecological effects (EC No 708/2007, article 3(16)).

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Risk assessment - process of evaluating the potential risks that may be involved in a proposed activity.

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Introduction

According to the recent Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) report, invasive alien species (IAS) are the fifth main driver of biodiversity loss[1]. IAS can negatively impact native species, alter valuable habitats, and threaten whole ecosystems causing serious problems to the environment and the economy.

The aquaculture sector has been identified as a significant pathway of introduction for marine IAS (e.g., Dewey et al. 2020; Tsiamis et al. 2020). Marine aquaculture species produced in Northern Ireland consists of the Blue mussel *Mytilus edulis*, the Pacific oyster *Magallana gigas*, the Native oyster *Ostrea edulis*, the Manila clam *Ruditapes philippinarum*, Kelp species and the Atlantic salmon *Salmo salar* (DAERA 2025). The present guidance focuses on oysters and mussels, as their culture highly depends on stock translocations, with a propension to carry non-target species (i.e. hitchhikers), mostly as fouling organisms on shells, either as visible entities or as microscopic life stages.

Pacific oyster *M. gigas* aquaculture in Ireland has significantly expanded during the last two decades, overtaking Native oyster *Ostrea edulis* production. Along with Portugal, Ireland has experienced the largest production increase in Europe, with French stakeholders holding 50% of production, mostly targeting the French market (EUMOFA, 2019). For the island of Ireland, spat is supplied mostly by French hatcheries, with two Irish hatcheries and two UK hatcheries covering only a very small percentage (ICES, 2022; BIM 2023).

Mussel aquaculture in Northern Ireland operates as part of an all-Ireland industry, which is based on the Blue Mussel *Mytilus edulis*, but also to a certain extent to the closely related species *Mytilus galloprovincialis*, as well as hybrids of *M. edulis/M. galloprovincialis* (Carliato & Mirimin, 2025). Juvenile mussels are collected from soft-bottom areas and relayed to sheltered sites for further growth (Marine Stewardship Council, n.d.). On the west coast of Ireland (Co. Cork to Co. Donegal), there is also an important production of mussels cultivated on ropes (Dennis et al. 2025). Most of the mussels produced in Northern Ireland are exported to the Netherlands (Cappell, 2021).

Early in the history of biological invasion studies, oyster and other shellfish movements have been identified as an important vector of marine IAS (Elton, 1958). Since then, the role of

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shellfish transfers as a pathway for IAS introductions has been repeatedly confirmed (Naylor et al., 2001; Mineur et al., 2007), alongside vectors linked to global maritime traffic such as ballast water and hull fouling (Katsanevakis et al., 2013; Williams et al., 2013). A notable example is the large-scale importation of *M. gigas* oysters from the North Pacific (particularly Japan) during the late 20th century, which facilitated the arrival in Europe of a substantial pool of non-native species through hitchhiking (Mineur et al., 2014).

While the Northern Ireland coast is not typically at the forefront of invasions from such remote regions, new IAS are regularly recorded as a result of secondary spread, driven by human-mediated vectors from other European regions. The primary aim of this guidance is therefore to reduce vector pressure and mitigate the risk of further introductions, preventing the arrival and establishment of new IAS in Northern Ireland.

Movement of spat, seeds and half-grown animals pose the risk of introducing and spreading marine IAS indirectly via the hitchhiker pathway. These hitchhiking IAS can sometimes be easily spotted as fouling organisms present on shells, but can also go unseen, for example, as microscopic propagules and larval stages, either in the matrix of the shell or in intervalvular water.

Compared with their terrestrial counterparts, once introduced, marine IAS can be incredibly difficult to manage and impossible to eradicate. Marine IAS can dominate and smother native species, prey on or parasitize them, or outcompete them for resources such as habitat, space and food. Similarly, accidental introduction via the import of aquaculture products can adversely impact the industry itself by reducing the yields. In 2021, the annual cost of invasive species to the aquaculture sector in NI was ~£1 million[3]. Additionally, sites which contain IAS may face restrictions on stock movement.

There is a statutory need to act and put actions in place to prevent IAS introduction and further spread. By complying with the measures set out in this guidance, aquaculture businesses and DAERA can operate within due diligence.

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Key legislation relating to aquaculture imports for Northern Ireland

There are several pieces of legislation that are directly used in the movement of aquaculture products. These are summarised below while other legislation and policy relate to monitoring and management of IAS; these are detailed in Annex C.

1. **The Invasive Alien Species (Enforcement and Permitting) Order (Northern Ireland) 2019**, makes provision for criminal offences relating to breaches of requirements of Regulation (EU) No 1143/2014 on the prevention and management of the introduction and spread of invasive alien species. Under Article 3(2) of this Order, any person who releases or allows to escape into the wild any animal which is not ordinarily resident in and is not a regular visitor to Northern Ireland in a wild state or is a hybrid of any animal of that kind, or is included in Part 1 of the Schedule, commits an offence. it is an offence to release, allow to escape or otherwise cause to grow, any non-native animal or plant Under Article 3(3) it is an offence to plant or otherwise cause to grow in the wild any species of plant or hybrid of any plant included in Part 2 of the Schedule, along with those already listed on the EU list of Union Concern. However, Article 10 states that Article 3 does not apply to anything done under and in accordance with a permit or licence. DAERA is the competent authority responsible for the enforcement of this legislation.

2. **Council Regulation (EC) No 708/2007 concerning use of alien and locally absent species in aquaculture** There are a number of articles of relevance, in particular:
   - Article 4 of 708/2007 states that Member States shall ensure that **all appropriate measures are taken to avoid adverse effects** to biodiversity, and especially to species, habitats and ecosystem functions which **may be expected to arise from the introduction or translocation** of aquatic organisms and **non-target species** in aquaculture and from the spreading of these species into the wild.

   Article 9 of 708/2007 states that for non-routine introductions/translocations, an environmental risk assessment is required; the competent authority decides who conducts it and who pays. Based on that assessment, the advisory committee gives a risk opinion: if risk is low, the permit may be granted; if medium/high, they must seek mitigation to lower it to low. A permit can only be issued when the (possibly mitigated)

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risk is low; refusals must be scientifically reasoned, applying the precautionary principle where information is insufficient.

It should be noted that EC 708/2007 does not apply to movements of native species.

3. Alien and Locally Absent Species in Aquaculture Regulations (Northern Ireland) 2012 concerning the use of alien and locally absent species in aquaculture. Regulation 6 relates to the notifying movement of Annex IV species or translocation of locally absent species while Regulation 7 relates to the process following notification under Regulation 6, and the requirement for an Environmental Risk Assessment carried out in accordance with Article 9(1) of Council Regulation 708/2007 (refer to above).

It is also not acceptable to introduce INNS to a location where they are already present – being present already does not provide a derogation to the legislation.

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Responsibly sourcing, traceability and moving aquaculture products

Obtaining aquaculture stock from locations with a low chance of unintentionally moving IAS will lower the risk of introducing them through your supply chains and will also make it more likely that your import request is approved. Aquaculture businesses will be required to submit evidence that requests to move stock have the appropriate tracing and have been assessed for IAS. The templates in Annex A and B provide tables that can assist in this process.

In addition to this, please provide a full history of movements from other locations your aquaculture stock has been stored or grown before reaching its destination. This improves the traceability of the stock movement and enables a more accurate assessment of potential risk, therefore lowering the chances of IAS introduction.

Preventative measures during aquaculture site management activities and translocations

Biosecurity procedures implemented throughout aquaculture site management activities can make a significant contribution to reducing the risk of introducing and spreading IAS around aquaculture sites. These will often be site and activity specific. It can also stop newly arrived species from settling on aquaculture sites, becoming established, or possibly spreading further.

Additional effective biosecurity measures to consider are:

- During the process of removing mussels from collector lines and de-clumping, or preparing oysters and oyster bags/straps, as much biofouling should be removed as is feasible to reduce the quantity of biofouling species. Staff involved in this process should be provided with identification materials and report IAS to the appropriate authority (DAERA if in Northern Ireland, BIM if in RoI). Any IAS identified should be disposed of away from the marine environment (e.g. bagged and disposed of to landfill) to reduce risk of spread.

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- Reducing the size of bags in which mussels are transported to increase the surface area available for inspection for IAS before departure from the source location and upon arrival on site.

- Taking representative samples of the stock, and spreading it on white trays, for a more detailed inspection. This can pick up recently arrived IAS before they can establish themselves on site. The guides provided on the DAERA website are useful aids for IAS identification.

Detailed inspections may also be carried out, by Departmental Officials, for external (into Northern Ireland) and internal movements (across Northern Ireland). If consignments do not meet DAERA requirements to prevent the introduction of IAS upon arrival, these may still be rejected at this stage.

Effective preventative practices include those outlined in the Check Clean Dry (CCD) campaign, which is particularly relevant for equipment and comprises three steps:

CHECK: Check equipment, vehicles, boats, trestles and bags for biofouling of aquatic animals and plants and remove them. These should be bagged and binned after removal.

CLEAN: Clean everything, at a non-hydrologically linked location, as thoroughly as possible, using hot water when possible.

DRY: Dry everything for as long as possible before using elsewhere. Some invasive plants and animals can survive for over two weeks in damp conditions.

Further information on CCD procedures can be found at the Invasive Species Northern Ireland website.

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Options to meet the requirements for import or translocation of shellfish products into and within Northern Ireland

Native Oysters (Ostrea edulis)

Native oysters (Ostrea edulis) are not listed as an Annex IV species under ALAS 2012, therefore are not subject to the same regulations with regards to the provision of an Environmental Risk Assessment. However, proposed movements of native oysters must be accompanied by a biosecurity plan in order to assess potential risk of IAS introduction or spread.

Pacific Oysters (*Magallana gigas*)

Under the Alien and Locally Absent Species in Aquaculture (Northern Ireland) Regulations 2012, Pacific Oysters are an Annex IV species and therefore subject to Regulations 6 & 7.

- Regulation 6(2) requires notification to the Department of a movement or translocation.
- If this is the first notification from a particular source site, under Regulation 7(2)(c) the Department will require you to undertake and submit an Environmental Risk Assessment in accordance with Article 9 of EU 708/2007. (Refer to Annex A for further guidance).
- The Department will consider the Environmental Risk Assessment and will either prohibit the movement or permit the movement, and any subsequent movement of the same species, from the same source, undertaken by that person to the same aquaculture facility, subject to any conditions specified in the notice.

Option 1: Import from nurseries

While the harvest of spat naturally recruited in the environment is still widely used (especially in France), hatcheries, also allowing the production of triploids, has taken a more central role over the last decade or so. Usually spawning and crossing of selected broodstock is performed in a closed aquaculture facility (hatchery and micro-nursery) until the veliger larva is attached, and the developing oyster reaches a size of approximately 1~2 mm (Fig. 1).

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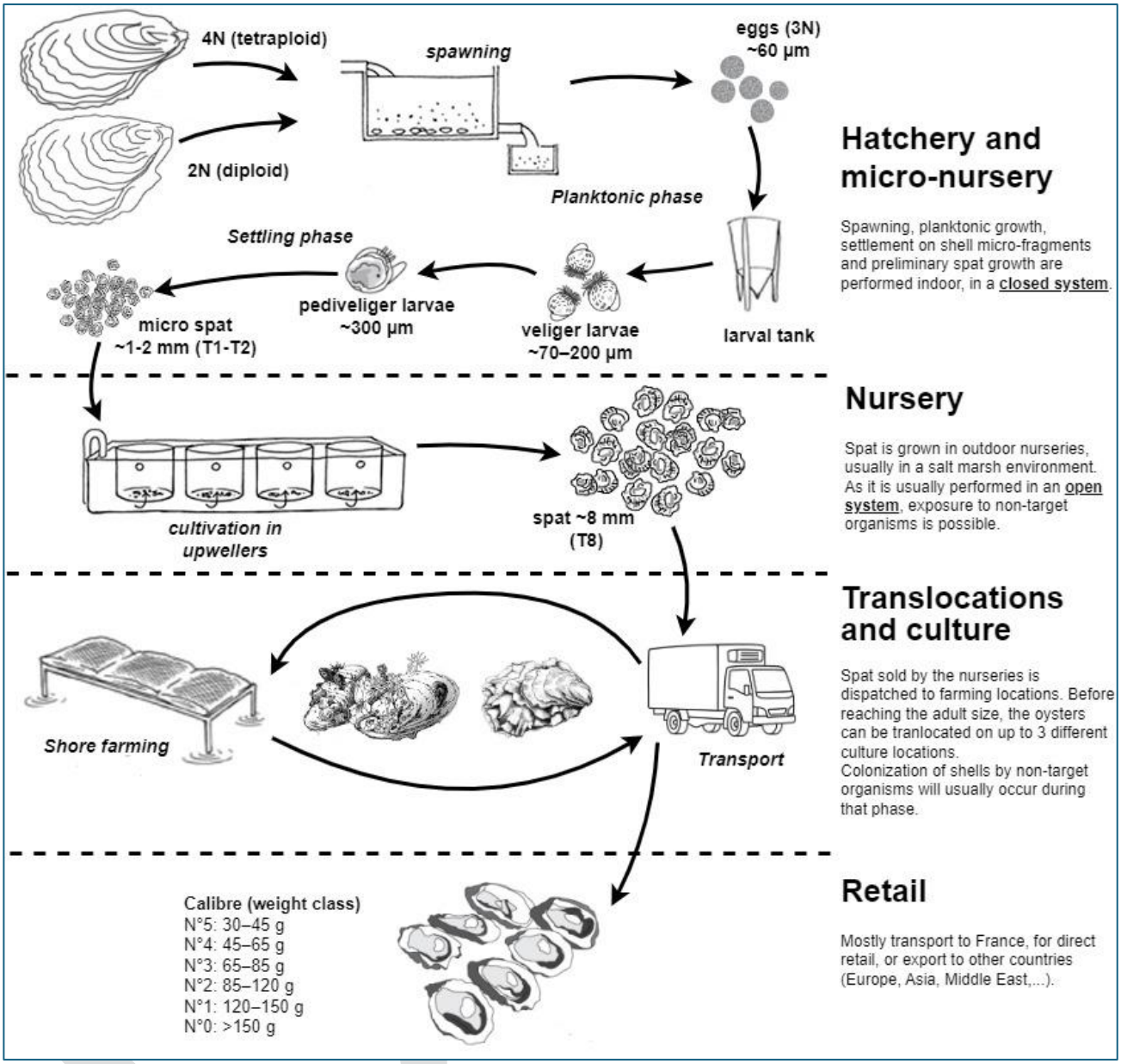


Figure 1: Details of the commercial production cycle of *Magallana gigas* as applied to triploids, only sourced from hatcheries (DAERA).

To get a spat to a minimum retail size (usually 8 mm), growth is performed in nurseries. Nurseries for Pacific oysters are outdoor ponds with direct intake and outtake of water from the sea, using natural phytoplankton production supplemented by cultures (Fig.1, Fig.2). The system can be surrounded by buffer basins to allow decantation, and the intake/outtake can be closed over several tidal cycles. However, the nursery is not a closed aquaculture facility (as defined in Glossary).

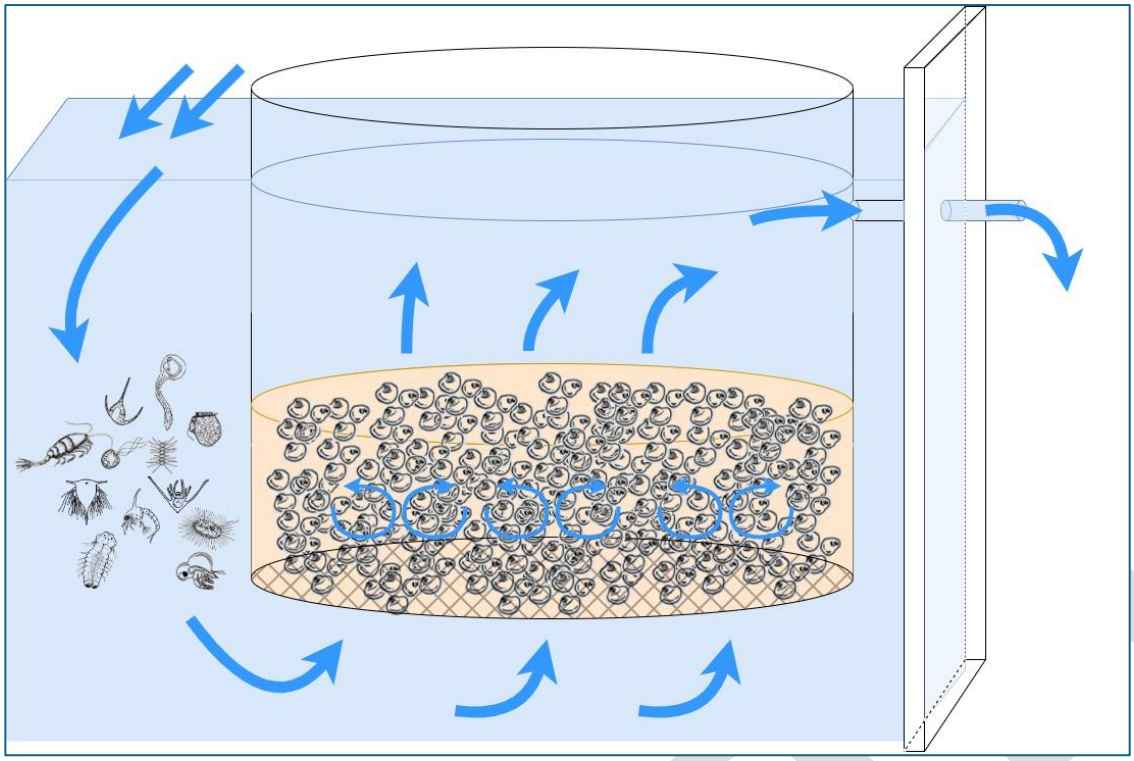


Figure 2: Details of outdoor *C. gigas* nursery culture, using cylinders with mesh base (upwellers). In those open systems, exposure to non-target organisms cannot be excluded (DAERA).

However, considering factors such as rapid shell growth during early development and continuous movement and friction, the likelihood of spat from nurseries carrying hitchhikers is currently understood to be low.

Import from closed hatcheries should be accompanied by the hatchery's biosecurity document outlining mitigation measures implemented to prevent INNS introduction and spread. It should be noted that, at present, this would not require site surveys or additional treatment as described below.

Option 2: Translocations between farming sites

Once they have been cultivated in the open marine environment, oysters of any size (seed or half-grown) pose a significant risk as IAS can attach onto shells or bags or even grow within the bags. These will require the application of treatment techniques to destroy any IAS present, thereby reducing the risk of introduction or spread.

Currently, treatment options include:

- **Flash boiling**, where oysters in bags are submerged for **3 seconds** in a water bath at 85°C (Robert et al. 2003; State of Queensland 2025). This temperature is usually recommended by the manufacturers of oyster farming equipment.
- **Brine dipping**, where oysters in bags are submerged for at least **10 minutes** in saturated brine (360-400kg salt/m^3) and then left to dry for a period of **24 hours** to enable salt crystals to form, effectively drying out any INNS that are attached to the shells or bags (Franklin 1974; Catherine et al. 1990; Robert et al. 2003; Ruellet 2004; Asgari & Jahangard 2012). This must be carried out in a sheltered location as rain may dilute the treatment efficacy.

Flash boiling is an effective treatment for eliminating the majority of non-target organisms (including IAS), but it is limited by the size of oysters that can survive the process. The use of brine dipping can eradicate soft-bodied organisms, and has also been shown to be efficient against the slipper limpet *Crepidula fornicata* (Franklin 1974)

Flash boiling is commonly utilised in the French oyster industry, but it requires additional machinery (Le Roux & Boncoeur, 2006). Such equipment can be sourced from different manufacturers for inclusion into the workflow.

Alternatively, brine treatment requires less equipment but can be less convenient because the process takes longer. This measure is generally more appropriate as a temporary solution, when smaller quantities have to be processed.

For oysters that do not directly originate from a nursery environment (i.e. having not been laid down in the open sea), only following application of one or the other of the treatment options will the import be accepted by the Department.

Exemption

An exemption can be granted for movements that occur within the same body of water, only if they fulfil all of the following conditions:

- The export site and the receiving site are both licensed and inside Northern Ireland's jurisdiction.

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- Both licensed sites are within the same bay. Relevant bays in Northern Ireland include Carlingford Lough, Dundrum Bay, Killough Bay, Strangford Lough, Belfast Lough and Lough Foyle.
- The distance between the geographical centres of the two licensed sites do not exceed 5 kilometres.
- All oyster batches in the movement are traceable back to the original hatchery/nursery, and all re-laying steps in intermediate locations are documented. This also implies that the first entry of the batch into the country and into the bay must fulfil the conditions set above (Option 1 and Option 2).

Blue Mussels (*Mytilus edulis*)

Blue mussels are not listed as an Annex IV species under ALAS 2012, therefore are not subject to the same regulations with regards to the provision of an Environmental Risk Assessment. However, proposed movements of blue mussel seed must be accompanied by a site survey and biosecurity plan in order to assess potential risk of IAS introduction or spread.

There are two sources for Blue mussel. The first is through the harvest of wild seed from a subtidal bed for relaying at an on-growing site. The second is the removal of rope grown mussels, again for relaying. Both methods are subject to permits in terms of harvest and relaying.

The hot water treatment applied to Pacific oysters is not appropriate for Blue mussel seed as the latter's thin shell increases the risk of mortality during treatment. However, lower temperatures (45 to 51°C) have been successfully trialled under real mussel operation conditions (Asgari & Jahangard 2012). Current understanding suggests the experimental system has not yet been adopted by the industry for application at a mass scale, nor made commercially available.

Brine treatment has also been trialled for mussels but yielded quite high mortalities under real conditions (around 20-25%) (Asgari & Jahangard 2012). One potential reason is the

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presence of an open slit between the two valves at the byssal notch in *Mytilus* species, allowing brine to enter the mantle cavity, whereas oysters are able to achieve a more secure seal (MacKenzie 1961).

Unlike oysters, mussel shells have a smooth surface, reducing the number of niches for microscopic IAS propagules. The periostracum tends to be thicker and does not erode. Therefore, **thorough cleaning** must be implemented to reduce the amount of associated non-target organisms (depending on the strength of the bond). Many mussel cleaning devices are commercially available, and that process could be undertaken (offshore or onshore) before re-laying.

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Annex A: Environmental Risk Assessment

The following tables have been adapted from Annex II of Council Regulation (EC) No 708/2007 to outline the Ecological and genetic risk assessment process.

Part 1 – Ecological and Genetic Risk Assessment Process

Step 1 Likelihood of establishment and spreading beyond the intended area of introduction

Event	Likelihood (H, M, L) ([1])	Certainty (VC, RC, RU, VU) ([2])	Comments in support of assessment ([3])
The introduced or translocated species, escaped or dispersed, successfully colonises and maintains a population in the intended area of introduction beyond the control of the aquaculture facility.			
The introduced species or translocated, escaped or dispersed, spreads beyond the intended area of introduction.			
Final rating ([4])			

([1]) H = High, M = Medium, L = Low

([2]) VC = Very certain, RC = Reasonably certain, RU = Reasonably uncertain, VU = Very uncertain

([3]) The assessor is referred for guidance to Appendix A and Appendix B of the ICES Code of Practice.

([4]) The final rating for the likelihood of establishment and spreading is assigned the value of the element with the lowest rating (for example, high and low ratings for the above elements would result in a final low rating). Again, both events — probability of the organism successfully colonising and maintaining a population in the intended area of introduction (be it a confined environment such as a facility, or a natural habitat) and the probability of spreading beyond the intended area of introduction (estimated as explained above) — need to occur in order to have establishment beyond the intended area of introduction.
The final rating for the level of Certainty is assigned the value of the element with the lowest level of certainty (e.g. very certain and reasonably certain ratings would result

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in a final reasonably certain rating). The harmfulness of an establishment and spreading should be taken into account, together with risk/benefit ration, in arriving at the final rating.

Step 2 Consequences of establishment and spreading

Event	**Likelihood (H, M, L)**	**Certainty (VC, RC, RU, VU)**	**Comments in support of assessment ([1])**
Genetic mixing with local populations leads to a loss of genetic diversity.			
Competition (food, space) with or predation on native populations leads to their extirpation.			
Other undesirable events of ecological nature			
Some of the abovementioned events persist even after removal of the introduced species.			
Final rating ([2])			

([1]) The assessor is referred for guidance to Appendix A and Appendix B of the ICES Code of Practice.

([2]) The final rating for the consequences of establishment and spreading is assigned the value of the element (individual probability) with the highest rating and the final rating for the level of certainty is assigned the value of the element with the lowest level of certainty.

Step 3 Risk potential associated to the alien and locally absent species

A single value is given based on the assessments done in Steps 1 and 2:

Component	**Risk potential (H, M, L)**	**Certainty (VC, RC, RU, VU)**	**Comments in support of assessment ([1])**
Establishment and spreading (step 1)			

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Ecological consequences (step 2)			
Final rating of overall risk potential ([2])			

([1]) The assessor is referred for guidance to Appendix A and Appendix B of the ICES Code of Practice.

([2]) The final categorisation of risk potential takes the value of the highest of the two probabilities when there is no probability increment between the two estimates (i.e. if the Risk of establishment and spreading is high and the risk of ecological consequences is medium, the final rating takes the value of the highest of the two probabilities which is high. When there is a probability increment between the two estimates (i.e. a mixture of high and low) the final value is medium.

The result of this assessment will be expressed in terms of the following risk levels:

A high-risk movement:

(a) has a high risk of damaging biodiversity from spreading and other ecological consequences;

(b) operates under farming conditions which would increase the risk of such damage;

(c) involves an aquaculture facility which sells live aquatic animals for further farming or restocking;

(d) as a consequence, the movement is of major concern (major mitigation measures are required). It is advised that the proposal be rejected unless mitigation procedures can be developed to reduce the risk to low.

A medium-risk movement:

(a) has a medium risk of damaging biodiversity from spreading and other ecological consequences;

(b) operates under farming conditions which would not necessarily increase the risk of such damage, taking account of the species and the containment conditions;

(c) involves an aquaculture facility which sells its products mainly for human consumption;

(d) as a consequence the movement is of moderate concern. It is advised that the proposal be rejected unless mitigation procedures can be developed to reduce the risk to low.

A low-risk movement:

(a) has a low risk of damaging biodiversity from spreading and other ecological consequences.

(b) operates under farming conditions which would not increase the risk of such damage;

(c) involves an aquaculture facility which sells its products for human consumption only;

(d) as a consequence the movement is of negligible concern. It is advised that the proposal be approved. Mitigation is not needed.

The proposal can only be approved as presented (no mitigating measures required) if the overall estimated risk potential is low and if the overall certainty for which the overall risk has been estimated is very certain or reasonably certain.

If, as a result of a first analysis, a high or medium category is attributed to the overall risk, then containment or mitigation proposals are to be incorporated in the application, which will be subject to subsequent risk analysis until the final rating for the overall risk becomes low with a very certain or reasonably certain assessment. Descriptions of these additional steps, together with detailed specifications of the containment or mitigation measures, will become an integral part of the risk assessment.

Part 2 Non-Target Species Assessment Process

Step 1 Likelihood of establishment and spreading of non-target species beyond the intended area of introduction

Event	Likelihood (H, M, L)	Certainty (VC, RC, RU, VU)	Comments in support of assessment ([1])
A non-target species is introduced as a consequence of the introduction or translocation of the aquatic organisms.			
The introduced non-target species encounters susceptible habitats or host organisms.			
Final rating ([2])			

(1) The assessor is referred for guidance to Appendix A and Appendix B of the ICES Code of Practice. (2) The final rating under likelihood is assigned the value of the element with the lowest risk rating and the final rating for the level of certainty is also assigned the value of the element with the lowest level of certainty.

Step 2 Consequences of non-target species establishment and spreading

Event	Likelihood (H, M, L)	Certainty (VC, RC, RU, VU)	Comments in support of assessment (1)
The non-target species compete with or predate on native populations, leading to their extirpation.			
Genetic mixing of the non-target species with local populations leads to a loss of genetic diversity.			
Other undesirable events of ecological or pathological nature			
Some of the abovementioned events persist even after removal of the non-target species.			
Final rating (2)			
(1) The assessor is referred for guidance to Appendix A and Appendix B of the ICES Code of Practice. (2) The final rating for the consequences is assigned the value of the highest risk rating and final rating for the level of certainty is also assigned the value of the element with the lowest level of certainty.			

Step 3 Risk potential associated with non-target species

A single value is given based on the assessments performed in Steps 1 and 2:

Component	Risk potential (H, M, L)	Certainty (VC, RC, RU, VU)	Comments in support of assessment (1)
Establishment and spreading (step 1)			
Ecological consequences (step 2)			
Final rating (2)			
(1) The assessor is referred for guidance to Appendix A and Appendix B of the ICES Code of Practice.			

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(2) The final rating under risk potential is assigned the value of the element with the lowest risk rating and the final rating for the level of certainty is also assigned the value of the element with the lowest level of certainty.

The conditions applicable to the assessment of risk potential associated to the alien species (part 1) are to also apply, *mutatis mutandis*, to this risk potential associated with non-target species (part 2), including the obligation to introduce containment and mitigation measures

PART 3 Overall Environmental Risk Assessment – Summary Report

— History, background and rationale for the request:

  — risk assessment summary information

  — summary of the ecological and genetic risk assessment

  — summary of the non-target species risk assessment

— Comments:

— Mitigation measures:

— Concluding statement on total organism potential risk:

— Advice to competent authority:

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Annex B: Biosecurity Plan

To complete a successful risk assessment and develop an effective **b**iosecurity plan requires management support and full engagement from relevant staff. All staff should be made aware of the outcomes and what is expected of them. It is a good idea to appoint a staff member to have responsibility for carrying out the assessment, producing plan actions and driving implementation. They will be responsible for record keeping, providing information to staff and should also notify other producers in the area as appropriate so as to encourage neighbouring operators to carry out their own risk assessments and biosecurity planning. Key elements of the plan such as the notification procedures and observation record sheets should be made readily available on staff notice boards or in your environmental manual. **The template below is adapted from a range of Irish and UK sources including the Invasive Species Ireland (ISI) project, Scottish Natural Heritage, Defra and NRW. Examples of types of information are indicated in red.**

The Risk Assessment and Biosecurity Plan can be developed in six steps:

1 UNDERSTANDING YOUR SITE	**RISK ASSESSMENT**
2 UNDERSTANDING HOW INNS CAN BE INTRODUCED TO YOUR SITE	
3 IDENTIFICATION OF SIGNIFICANT RISKS	
4 DEVELOPING BIOSECURITY MEASURES	**BIOSECURITY PLAN**
5 BIOSECURITY OBSERVATION, MONITORING & REPORTING	
6 CONTINGENCY PLANNING	

STEP1: UNDERSTANDING YOUR SITE

This step will enable you to make a basic assessment of the risks associated with your site and its location.

Site Description

Include Maps and Licence numbers for all your sites

Natural Environment

INCLUDE DESCRIPTION e.g.

Large freshwater input resulting in low salinity sites. Likely to be intolerant for salt water invasive species. Need to remain alert to brackish water species.

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No known invasive alien species in the bay.

Human Environment

INCLUDE DESCRIPTION e.g.

Located in close proximity to other oyster aquaculture businesses. Good working relationship between the local companies. Small marina located upstream in XX Town. Major fisheries harbour located at XX

REPEAT FOR EACH BAY WHERE YOU HOLD LICENCES

STEP 2: UNDERSTANDING HOW IAS CAN BE INTRODUCED TO YOUR SITE

This step will enable you to identify if any of your business activities have the potential to facilitate introduction and spread of IAS. List the main steps in your production process and other activities carried out by your business and identify associated IAS linkages. Some activities will carry no risk but should still be identified.

Movement of stocks, vessels and equipment all present a risk. Consider where stocks have come from and if transported from another bay seek to find out if IAS are present there. Do you operate on multiple sites and are these in different bays? How do you move stock within your site? Do you remove equipment from the site when not in use?

Operational Procedures

DESCRIPTION	ASSOCIATED IAS LINKAGE?
Purchase and intake of Oyster Seed	
Grading & re-packing	
Movement of oysters between licensed sites in different bays	
On-growing	
Harvesting	
Depuration & packing for dispatch	

While most of the production stages do not carry a risk of moving alien species they do provide an opportunity to observe different species and this should be considered for monitoring.

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STEP 3: IDENTIFICATION OF SIGNIFICANT RISKS

This step examines in greater detail the operational procedures and activities for which a potential IAS linkage has been identified. List the activities in the table below:

Significant risks for aquaculture operations are most commonly associated with stock movements, equipment movements and biofouling.

Do vessels and equipment move between bays? Is biofouling present? How is biofouling prevented and removed? Is anti-foulant used or is there a procedure in place for cleaning either in situ or on land? How is biofouling disposed and washwater discharged? Is all site equipment necessary?

ACTIVITY	RISKS	SIGNIFICANCE	ACTION
Describe in detail the activity / operational procedure which carries a risk	What IAS species are associated with the activity? Species name or type e.g. fouling (benthic) free swimming, sedentary. Also consider life cycle stage.	Level of Risk High/ Low (based on site location, existing distribution of IAS and current procedures)	Can existing procedures be improved to reduce risk? Y / N
Purchase and intake of Oyster Seed			
Movement of oysters between licensed sites in different bays			

STEP 4: BIOSECURITY PLAN

This step helps you to plan by developing biosecurity measures to minimise risk**.**

Bear in mind how much control you actually have over the risk. Actions should be practical, achievable, easy to understand and flexible.

ACTIVITY	Seed procurement
WHO is responsible	

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WHAT action will be taken to reduce the risk	• Ensure that all hatchery seed has a current valid health certificate. • Speak to or write a letter to hatcheries asking if they have any biosecurity measures in place for alien species. • Rapid visual inspection of seed upon receipt when packing for deployment to the shore. • If unknown species detected seed should be held onshore until further investigation allowing identification can take place.
WHERE *will the control take place*	At seed reception point. DETAILS
WHEN *will the control take place*	Prior to and at seed intake stage.

ACTIVITY	Movement of oysters between licensed sites in different bays
WHO is responsible	
WHAT action will be taken to reduce the risk	High risk movement has been identified as movements out of Bay B to other licensed sites. • Prior to removal of oysters from bay carry out rapid visual inspection insitu for presence of Didemnum Vexillum (other known species present) and other alien species. If present consider not moving stocks at this time and implementing on site control measures such as: • Further inspection of bags once removed from the inter tidal. • Bags should be dipped in freshwater for 10 minutes to kill any alien species present.

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	• All oysters should be packed into clean bags for redeployment to the foreshore in the new bay. • Oyster bags should be cleaned and dried before re-use. • Ongoing monitoring of oysters to ensure Didemnum vexillum (other species) does not colonise new bay. • The same visual inspection measures should be applied to all movements between bays as a good practice measure.
WHERE *will the control take place*	At Bay A and Bay B bay prior to redeployment of oysters to the foreshore
WHEN *will the control take place*	Prior to and during movement.

STEP 5: OBSERVATION, MONITORING & REPORTING

This step will help you to set up procedures for staff awareness, monitoring and reporting. Early detection increases the likelihood of successful containment, control and eradication of IAS. Staff awareness and a procedure for reporting unusual observations of new or unknown species together with targeted monitoring help maximise the potential for early detection.

STAFF AWARENESS	
OBSERVATION	Shore manager for each bay
MONITORING in addition to that included within the risk control actions. Frequency, Responsibility and Record keeping	Ongoing visual inspection during all shore work. In the event of unusual siting a more structured inspection detailing location, type and amount of species to be carried out and recorded

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REPORTING	Initial reporting to shore manager In the event of unusual siting, a Manager / Nominated person should be immediately notified.

STEP 6: CONTINGENCY PLANNING

This step helps you determine what to do in the event that a new or unknown species is detected**:**

Even with careful planning and the establishment of biosecurity measures, it is still possible that IAS may arrive at an aquaculture site. The ongoing observation and monitoring should ensure that any new arrivals are quickly spotted and if a new or unknown species is detected in or adjacent to your sites it is important to take immediate action

ACTION	**RESPONSIBILITY**
STAGE 1 – SUSPECTED ARRIVAL OF IAS	
No movement of stocks from the area Immediate notification DAERA. To assist with confirmation the following details should be recorded: • Date • Location. Include grid reference or GPS co-ordinates if possible • Details on the density and extent of the species (single specimen or chain/s) and on the environment in which it was found (e.g. over growing equipment, among other mussels etc). • How it was found (e.g. spotted in situ, collected in a sample etc) • If possible take photographs and record other observations such as size, shape, form and colour. • Retain samples - place in plastic bag/container and preserve.	

Work with authorities to develop further response.	
STAGE 2 – PRESENCE OF HIGH IMPACT SPECIES CONFIRMED	
Depending on species initiate immediate containment measures. Seek to gather as much information as possible about the species to inform action.	
Carry out wider survey of equipment, vessels, etc, to determine the status and extent of the invasion	
STAGE 3 – ERADICATION / LONG-TERM CONTROL MEASURES IN PLACE	
Depending on the scale of the invasion and the status of the IAS, measures may be established in partnership with relevant authorities and experts.	

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Annex C: Other legislation and policy related to invasive non-native species

1. Under **Article 15 of the Wildlife (Northern Ireland) Order 1985** it is an offence to:
    - release or allow to escape into the wild any animal (or hybrid) which is not ordinarily resident or a regular visitor to Northern Ireland, or is included in Part I of Schedule 9, and
    - plant or otherwise cause to grow in the wild any plant (or hybrid) which is included in Part II of Schedule 9.

    A defense to a charge of committing an offence is to prove that the accused took all reasonable steps and exercised all due diligence to avoid committing the offence. The Wildlife Order is enforced by the PSNI in conjunction with DAERA.

2. **Marine Strategy Regulations 2010** delivers on various international obligations, including those outlined the UN Convention on the Law of the Sea (UNCLOS), the UN Sustainable Development Goal 14 (to conserve and sustainably use the ocean, seas and marine resources for sustainable development), the OSPAR North-East Atlantic Environment Strategy and the Convention on Biological Diversity. It requires action to be taken to achieve or maintain Good Environmental Status (GES) in our seas. The Regulations set out 11 descriptors of GES, including descriptor 2 which covers invasive alien species: *''Non-indigenous species (NIS) introduced by human activities are at levels that do not adversely alter the ecosystems."*

3. **The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995** is the corresponding domestic legislation to The EU Habitats Directive (92/43/EEC). These regulations focus on protecting biodiversity through the conservation of habitats and species. Under this regulation, activities or projects that could affect the integrity of the National Site Network sites must undergo appropriate assessments that consider effects on the integrity of the site and its conservation objectives. With invasive alien species posing significant risks to native species and habitats, activities that can introduce and spread these are a consideration in such assessments.

4. **Northern Ireland Invasive Alien Species Strategy**; "*Objective 1 of the NI Invasive Species Strategy is to minimise the risk of invasive alien species entering and*

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becoming established in Northern Ireland and reduce the risks associated which may cause the further spread of invasive alien species already established within Northern Ireland". The Strategy states under Priority Action 1.4 that Codes of Practice should be developed with key sectors and invasive alien species should be integrated into industry standards. This guidance is considered a code of practice for the aquaculture industry. The Strategy also states under Priority Action 1.6 that mechanisms to control the import and possession of high-risk invasive alien species at all points of entry must be considered.

5. **The Marine and Coastal Access Act 2009** (MCAA) and the **Marine Act (Northern Ireland) 2013** (The Marine Act) require the Department of Agriculture, Environment and Rural Affairs (DAERA), as the Marine Plan Authority (MPA), to prepare marine plans, for the better management of the Northern Ireland marine area. It informs and guides the regulation, management, use and protection of the Northern Ireland marine area. It will support and complement other existing legislation, policies, plans and strategies. As part of the marine plan, proposers are required to implement biosecurity measures and effective risk management in compliance with scientific advice to prevent the risk of introduction and/or spread of invasive alien species. These measures depend on the risk, scale, nature, and location of the proposal.

6. The **draft Marine Plan for Northern Ireland** requires public authorities to consider the potential risk from the introduction and/or spread of invasive alien species in the marine area as a result of proposal. Furthermore, a public authority will require the proposer to demonstrate how the risk has been considered; and appropriate measures to address the risk.

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