



GOOD PRACTICE GUIDELINES FOR THE PACIFIC OYSTER INDUSTRY

2025 Edition

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Background

This document provides guidance to Pacific oyster producers for strengthening on-farm biosecurity measures and on potential measures to assist in minimising stock losses associated with disease. The objective of the guidelines is to assist farmers in avoiding disease introduction and to minimise the impact of disease outbreaks should they arise.

This is a working document which reflects the current status of knowledge regarding best practice with regard to disease and mortality in *C. gigas*. It represents an assimilation of information gathered and discussed during periodic meetings held with Irish *C. gigas* producers since 2016.

The development of the manual was preceded by almost a decade of disease and mortality problems across the Pacific oyster industry in Europe. In 2008, significant mortality events were observed in seed and juvenile Pacific oysters in France. Further mortality episodes were observed shortly thereafter in oysters in Ireland. The ensuing investigation revealed the presence of a new genotype of Ostreid herpes virus-1 termed Ostreid herpes virus-1 μ Variant (OsHV-1 μ Var). The new genotype proved to be more virulent than the reference strain and over the next few years was associated with very significant mortality episodes across the EU and beyond. In recent years, the impact of the disease has been reduced through several management measures including changes to husbandry practices and the use of more disease tolerant stock, which is now routinely produced by the main oyster hatcheries in France.

In the wake of the OsHV-1 μ Var mortalities a second disease issue emerged. The aetiological agent *Vibrio aestuarianus* (*V. aestuarianus*) is a bacterium belonging to the *Vibrio* genus. The disease affects all age classes, but older oysters are typically more severely affected. This disease has therefore had an even greater impact on the Pacific oyster industry. In 2015, significant mortalities were observed in Ireland in association with the disease which triggered the establishment of a working group comprised of representatives from the Pacific oyster industry, the Marine Institute, Bord Iascaigh Mara and IFA Aquaculture. The broad aims of the group were to establish better communications in relation to shellfish health and to identify strategies to solve or ameliorate health related issues. The primary focus of this group thus far has been on *Vibrio aestuarianus*. One of the initial outputs from this group was the first version of this guidance document, published in 2017. The guidance document is reviewed and updated periodically to ensure the recommendations remain relevant.

In 2021, a manual for bivalve disease management, [VIVALDI Manual for disease management and biosecurity - Vivaldi \(vivaldi-project.eu\)](https://vivaldi-project.eu), was published as one of the outputs from the Horizon 2020 funded Vivaldi project. This was co-constructed by scientists, decision-makers, hatcheries and growers from the participating countries. Several of its recommendations were integrated into this document in 2023. In 2024, a survey of the current working group members was carried out to determine whether the manual aligns with industry practices and to evaluate the effectiveness of industry measures in addressing ongoing challenges with *V. aestuarianus*. The survey established that the recommendations provided herein remain relevant to the industry particularly against the background of ongoing problems with *V. aestuarianus*. The survey also emphasized significant variability in the applicability and effectiveness of individual measures across different sites. It is essential to determine which measures are relevant and how they should be implemented at the site level. The 2025 edition of this manual now incorporates this information as well as other information from the survey.

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Technical recommendations

1. Biosecurity & Your Biosecurity Plan

Biosecurity is a strategic and integrated approach that encompasses the policy and regulatory frameworks for analysing and managing relevant risks to humans, animal and plant life and health and associated risks to the environment (Food & Agriculture Organisation).

In the context of aquaculture, biosecurity is a combination of management practices and protocols designed to prevent the transmission of diseases, pests and disease-causing agents. In general, this involves restricting and controlling the movement of anything capable of carrying disease or disease-causing agents, including people, animals, equipment and water.

Under the terms of the Fish Health Approval which the Marine Institute has granted for each site, a biosecurity plan must be in place for all aquaculture sites. This plan recognises the risks to that site and outlines how those risks can be mitigated. It is essential that the biosecurity plan is followed and updated regularly to reflect any changes in the management practices on-site. All staff should be aware of the contents of the biosecurity plan. All records relevant to the biosecurity plan (i.e. cleaning, disinfection, visitors etc.) must be kept in either the Shellfish Record Book, or other suitable paper or electronic format.

The Marine Institute has prepared sample plans which you may use as a guide in preparing a shellfish health biosecurity plan for your own establishment. The biosecurity plan should consider biosecurity measures in place to prevent the spread of disease, disinfection and cleaning requirements, transportation guidance to reduce risk of disease spread and controls in place for visitors to the site.

The sample plan for the production of shellfish can be downloaded directly from the [Fish Health Unit website](#) or by contacting Notification@marine.ie to request a template plan. The fish health Veterinary Inspector will assist with completion of the biosecurity plan template during the approval process. Any changes or updates to the plan can be notified to the Fish Health Unit at the Marine Institute.

Recommendations

- Ensure a biosecurity plan is in place which takes account of the disease risks to that site and outlines how those risks can be mitigated.
- Ensure all staff are aware of the plan and that it is followed and updated regularly to reflect any changes in the management practices on site

2. Good farming practices

The use of good farming practices in conjunction with a good biosecurity plan can assist in limiting the spread of pathogens and improve survival on aquaculture sites by mitigating their impact. Good farming practice requires the establishment and use of optimal culture techniques and husbandry practices for each site or location. Defining optimal conditions usually requires trials to compare the outcome of different strategies. Accurate documentation of this process is essential.

As new challenges arise, adaptation of husbandry practices may be required. For example, following the emergence of the μ variant of ostreid herpes virus-1 μ variant (OsHV-1 μ Var) in 2008, many oyster growers adapted the way in which they grew seed. Changes included altering the timing of seed inputs and adjustment of the rearing height for seed.

In establishing the optimal conditions for growing oysters in any given bay or site there are a number of factors that should be considered. These are detailed below.

2.1 Stock

Good farming or husbandry practices begin with the selection of the right stock and ensuring the health of all stocks introduced to the site.

2.1.1 Introduction of Stock

The introduction of new stock onto aquaculture sites represents the most significant risk of disease introduction. The source of stock, the size at introduction and the number of introductions to the site are all important factors to be considered.

Stocks from different sources will have different characteristics and some may perform better / worse under different growing conditions. Similarly, the best size of seed to select will be influenced by the prevailing conditions on site. For example, small seed is unlikely to do well in very exposed sites or parts of a site. Establish what stocks are most suitable for your site through small scale trials.

According to fish health legislation, oysters cannot be relocated from areas experiencing ongoing mortality. If there is uncertainty regarding compliance with this requirement in the site or country of origin, the stock purchaser should conduct their own inquiries before accepting new stock. For added assurance, purchasers may request testing at the source and consult with the Marine Institute for further guidance.

Strategies such as bulk purchasing of stock, which enable operators to minimize the number of individual introductions to their sites while also providing greater control over the timing of introductions and the ability to request disease testing, should be explored at the bay level or on a broader scale. Where it is in place, consider using the framework of CLAMS, Co-ordinated Local Aquaculture Management System for managing inputs.

The movement of half-grown and adult oysters, both within Ireland and into the country from elsewhere, has increased in recent years in Ireland. The suitability of such movements should be

evaluated based on the potential increased disease risk associated with this practice. If the risks are deemed significant, these movements should be restricted. Guidance on this matter may be sought from the Marine Institute.

When introducing stock, animals should be acclimatised to new conditions by minimizing handling stress and avoiding abrupt temperature changes. This can be achieved by using chilled temperatures during transport and avoiding stock imports during warm periods. Additionally, the time spent out of the water should be kept to a minimum. New stock should be monitored for mortality carefully in the weeks following deployment.

2.1.2 Monitoring of Introduced Stock

Early detection of mortality, rapid reporting and testing is critical if action is to be taken to prevent disease spread. Vigilance should be exercised for all new stock introductions. If there are signs of mortality in the batch do not redeploy the stock on site. Contact the Marine Institute either by phone or through the Fish Health Unit text alert system to request disease testing. A sample will be requested for testing where it is required.

2.1.3. Breeding Programmes & Disease Tolerance

Breeding programmes to select for desirable traits such as growth and disease tolerance have been employed by hatcheries for many years. Following the emergence of OsHV-1 μ Var in 2008, programmes focused on improving resistance or tolerance to this pathogen. There is significant evidence available to demonstrate that these lines show an increased tolerance to the virus. Current programmes in a number of hatcheries are focused on producing genetic lines that are tolerant to *V. aestuarianus* although thus far this has not been successful.

Recommendations

- Source stock from an area of equal or higher health status than the bay in which you operate. This relates to both listed and non-listed diseases.
- Request information on the mortality and disease situation in the area where you are sourcing stocks.
- Do not move stock from sites where unresolved mortality is occurring to other growing sites as laid down under EU Regulation 2016/429/EC.
- Do not move half-grown or adult oysters for relaying, where the disease risk posed by such movements outweighs the potential benefit.
- If mortality is evident in incoming stocks DO NOT relay them. Contact the Marine Institute immediately to request disease testing. This can be done through the text alert system (087 1847285) / by phone (091 387200) / by email (notification@marine.ie).
- Following introduction monitor new stocks for signs of mortality.
- Keep up to date records of stock movements and mortality as per your Fish Health Authorisation.

2.2 Culture System & Support

The majority of *C. gigas* reared in Ireland are grown in bags on trestles although in recent years there has been increasing interest in the use of baskets, floating bags and other systems which reduce the requirement for direct handling of stock. The type of system used (e.g. bottom culture, intertidal culture, suspended culture) and modifications to existing systems can affect the immersion time of oysters and the frequency and intensity of handling, which in turn will affect growth rates and the quality of the oyster produced.

The type of culture permitted for use on a given site is specified in the aquaculture licence for that site. Most licences in operation at the moment are restricted to the use of standard bags and trestles. To use alternative culture systems, an appropriate license must be obtained. There are three mechanisms to achieve this:

i) Apply for a Trial Licence – Trial Licences for shellfish aquaculture sites may be granted for a period of up to 3 years.

ii) Apply through the Aquaculture and Foreshore Management Division of DAFM for permission from the Minister under Section 67B of the Fisheries Amendment Act to use novel or experimental equipment within a portion of an existing licensed area for a specified period of time

iii) Apply to amend your existing licence –an application for an amendment to an Aquaculture Licence is made to the Department of Agriculture Food and the Marine. Amendments can only be made after a period of three years has elapsed from the date the licence was granted or renewed.

If your licence is due for renewal, consider whether there are additional culture systems you may want to use and add these to the licence application at renewal.

Detailed information on licence amendments and Trial Licences is available from the Department of Agriculture Food and the Marine. IFA Aquaculture also provide information and guidance on the process in “IFA Aquaculture – Best Practice Guidance & Information for Aquaculture licensing, Legislative responsibilities & Environmental objectives”

The use of alternative culture systems is not yet widespread in Ireland, however, controlled trials have been conducted at several sites with various systems and a small number of sites have transitioned a significant portion of their production over to alternative systems. To date the trials have largely shown positive results. Most of the systems have a significantly reduced labour requirement and indications are that the quality of oysters produced can be significantly higher. There are also indications from some bays that survival of oysters is higher in certain culture systems. The performance of any culture system will vary depending on the suitability of the site for that particular system and therefore small-scale trials are strongly recommended, subject to the appropriate permissions being granted.

A review of alternative husbandry systems currently on the market is available through the BIM website at: <https://bim.ie/aquaculture/industry-projects/husbandry-innovation-for-the-shellfish-sector/>

2.3 Density Considerations

2.3.1 In-bag Stocking Densities (standard bags & trestles)

This section focuses on stocking density for bags and trestles as they remain the most widespread system in use. Similar principles can be applied to the use of baskets or other culture systems. In-bag / basket stocking densities are important and should as a general principle be kept as low as possible. This helps to promote more uniform growth, reduces the need for handling, and ultimately minimizes stress on the oysters. The use of low densities has been exploited in conjunction with timing of deployment in a number of sites to specifically avoid the need to split oysters in high-risk periods.

The optimal density varies both between sites and within individual sites. A wide range of densities is employed across different locations, reflecting the diverse growing conditions found along the Irish coast. Factors such as tidal range, immersion time and level of exposure to prevailing winds and current can all influence growth rate. For the majority of operational sites, optimal densities have been adapted over time in response to various changes and challenges. Following the emergence of *V. aestuarianus* in Ireland over the past decade, many operators have reduced stocking densities of half-grown and adult oysters to promote more homogeneous growth while reducing the need for shaking and splitting of oysters during high-risk periods of the year. Other changes include changing the timing of seed inputs which was embraced in the aftermath of early OsHV-1 μ Var mortalities. There is generally a requirement to use higher stocking densities for seed deployments in the later part of the year to ensure there is enough weight in the bag to stop it being blown off the trestle in high winds.

In 2024, a survey of working group members indicated that, in general, stocking densities have been reduced across all sites over the last decade in response to the increased fragility in oysters which is linked with the presence of *V. aestuarianus*. The operating densities and the mesh size of bags used varied from site to site. Table 1 below shows the range of stocking densities in operation.

Mesh Size	Size class at deployment	Stocking level at deployment
4mm*	seed	500 to 2800 [‡]
6mm	seed	500-3000 [‡]
9mm	2g to 15g	100-500
	30g+	80-150
14mm**	30g+	80-200

* The 4mm bags are not used in many sites with issues reported ranging from the mesh clogging easily to higher losses in seed in these bags.

** The 14mm bags are not used in many sites because the oysters are more susceptible to bird predation

‡ Higher numbers typically used for overwintering new seed to ensure there is enough weight in the bag to prevent the bags from lifting too much in high winds which could cause damage to the oysters or result in the bags being blown off the trestles. The seed is then typically split to between 500 to 1000 in the spring.

The density ranges provided above are very broad. In general, the lower end of the range in each mesh size is used with smaller oysters and the higher with larger oysters. For example, in the 9mm and 14mm bags oysters at 30g will generally be deployed at a density of 150-200 and 60g oysters will be at 80-120. However, in certain sites even the 30g oysters might be deployed at a density of 120 or 125. This highlights the need to evaluate stocking densities at a site level.

Recommendations

- Maintain appropriate in-bag stocking densities for the growing conditions on site, whilst aiming to keep them as low as possible at all times
- Establish optimal densities at a site level

2.3.2 Site Level Stocking Density

Whilst reducing in-bag density is likely to have a more significant effect on the health of stocks, reducing stocking density across the site will also reduce infection pressure simply by decreasing the number of animals present on the site at any one time. Increasing the spacing between trestles can reduce silt build-up and improve the flow of water through a site, both of which are conducive to a healthier environment for the oysters.

In sites where losses associated with the presence of the pathogen *V. aestuarianus* occur annually, annual production should be managed to allow for a reduction in the quantity of the most susceptible stocks on-site prior to the onset of the high-risk periods of the year. In general, adult oysters tend to be the most susceptible stock to the disease.

Recommendations

- Where possible, decrease the number of oysters on site
- Maximise the distance between trestles within the constraints of the site
- Plan production to allow for reduced numbers of susceptible stock on site in the high risk period.

2.4 Biofouling

Biofouling on bags can reduce water flow and food delivery, potentially affecting oyster growth rates, quality, and increasing stress to the stock. Other than during periods when temperatures are very high, build-up of weed on bags should be avoided. However, during high summertime temperatures, the retention of some weed on the bags can assist in protecting the oysters by helping to reduce in-bag temperatures.

Recommendations

- As a general rule, biofouling on bags should be kept to a minimum. The exception to this rule occurs during high summertime temperatures, when the retention of some weed on the bags helps to assist with keeping in-bag temperatures as low as possible, thereby decreasing stress on the animals.

2.5 Grading / Handling

Vigorous turning and grading of oysters can lead to shell damage and increased stress in oysters. Practices that limit the impact of handling will minimise damage and help to reduce the impact of disease outbreaks on stocks and increase survival.

In areas where *V. aestuarianus* is associated with recurrent mortality it is therefore recommended to avoid handling, especially grading, in the high-risk period of the year (typically July & August) or when temperatures are high. Handling should also be avoided if mortality is evident in the bags. Where it is necessary to grade in the summer months, measures should be taken to limit the impact of grading. This could be achieved using either water graders or water bins at high impact points for traditional graders. Switching to hand grading for small batches is also an alternative. In sites where harvest stage mortality is particularly problematic, hardening of oysters is only carried out prior to grading and once stock is graded it is either put into cold water tanks or shipped as soon as possible after grading. Putting graded stock out on the shore often leads to higher mortality in these sites.

Recommendations

- Minimise handling and avoid grading of oysters in periods of high temperatures particularly between May and September
- Avoid handling of stocks undergoing mortality
- Manage stock to ensure grading is not required in the summer period. i.e. deploy low densities at appropriate times to ensure splitting is only required in the cooler months
- Consider hand grading where and when feasible, particularly in the summer months
- Use water graders instead of traditional graders or use water bins for the oysters to fall into at high impact points in traditional graders
- Return stock to the water as soon as possible after grading
- Consider hardening oysters prior to grading
- Following grading immerse oysters in cold water tanks prior to shipping.

2.6 Rearing Height

In intertidal areas, adapting the rearing height of trestles, or increasing the exposure time of oysters by placing them higher on the shore may reduce infection pressure through lowering exposure to pathogens present in the water. This also reduces growth rates which may also be beneficial where oysters are growing too quickly and becoming stressed. It is important to note, however, that producers may be restricted by their licence specifications and may need to either request permission to carry out a trial with a new trestle height (particularly if they want to go higher) or seek a review of their licence terms and conditions.

Recommendations

- Consider adapting trestle height or increasing exposure time of oysters to reduce infection pressure and stress.

2.7 Temperature Management for Cultivation, Handling and Harvesting

Adjust farming practices such as position on the shore or height of trestles, stock manipulation (turning & grading) and harvesting time to take account of critical periods, when temperatures are favourable for the pathogen expression.

Differences between harvesting, transport and immersion temperatures should be managed to minimise stress on the oysters especially for movements of oysters during periods of warm weather when *V. aestuarianus* is active. This might be achieved through the use of cold-water tanks, and chilling of grading sheds as well as the use of refrigerated transport.

In general, the period between May and September has been identified as a higher risk period, although this period may vary slightly from bay to bay. Excessive or unnecessary handling should be avoided during this period. Where possible, handling and especially vigorous shaking, should be avoided altogether in the highest risk months which are typically July and August.

2.7.1 Cultivation Calendar

The development of a site-specific immersion calendar can aid in mitigating against the impact of diseases. It requires knowledge of local pathogen occurrence and seasonality so that stock deployments or movements during periods of infection or mortality can be avoided. These periods depend on host (species and physiological conditions), environment (temperature, hydrodynamics, food), production system and pathogens (type, occurrence).

For example, an immersion calendar for *Crassostrea gigas* exposed to Ostreid herpes virus-1 (OsHV-1) would involve deploying the largest possible animals, ensuring the process occurs when temperature is well below 16°C (during the autumn or the winter) and adopting the lowest possible densities based on the production system in use.

Recommendations

- Adjust farming practices to take account of critical periods, when temperatures favour pathogen expression
- Manage temperatures to minimise stress on oysters through the use of chillers and cold-water tanks following harvesting
- Consider the use of a site-specific immersion calendar to aid in mitigating against the impact of diseases
- Ship oysters refrigerated
- Deploy stocks at densities that reduce handling requirements in the summer months
- Consider adjusting / optimising the hardening and grading regimes, where harvest stage mortality is a problem

3. Cleaning & Disinfection

Pathogens can survive in organic material attached to equipment, people and vehicles. The use of appropriate cleaning and disinfection protocols are critical to limiting the spread of aquatic pathogens.

3.1 Bags & Trestles

Before reuse, bags and trestles should be thoroughly cleaned to remove all organic matter. Large scale disinfection of bags and trestles after cleaning is the best way to prevent pathogen spread. However, this may not be practical unless the cleaning and disinfection process can be carried out away from the shore and / or safe disposal of the cleaning and disinfection wash water is possible. Information is available on <https://www.fishhealth.ie/fhu/health-surveillance/disinfection> regarding disinfectants and their use in aquaculture.

Where disinfection of bags and trestles is not possible, the use of warm-water power washing can effectively remove organic material from bags, and this should be completed where feasible. Desiccation is considered a suitable alternative to provided complete drying of the equipment is achieved for a period of time which is sufficient to kill any pathogens which might be present. The desiccation period should be a minimum of 30 days but ideally 3-6 months. Where possible, bags should be stored in direct sunlight as this method provides three potential disinfection actions, i.e. UV irradiation, heating and desiccation. (WOAH, Aquatic Code 2022).

Recommendations

- Clean bags and trestles thoroughly to remove all organic material
- Where possible / practicable disinfect all bags and trestles after cleaning
- Power wash with warm water to remove organic material from bags
- Desiccate bags for a minimum of 30 days before reuse

3.2 People, Equipment, Vehicles and Vessels

The risk posed by the movement of staff, equipment, vehicles or vessels between sites is well recognised. Where producers have sites in more than one bay, separate equipment should be kept for each site where practical. If this is not possible, disinfection is required before moving between sites.

Record keeping in relation to cleaning, disinfection and aquaculture related visitors to your site is mandatory and must be recorded. Where a visitor to your site poses a disease risk, appropriate disinfection measures should be put in place before the individual accesses the site or the stock, e.g. disinfection of their boots and protective equipment or provision of suitable PPE at the site.

3.3 Water Treatment for Land-based Facilities

Shellfish land-based facilities such as hatcheries and shellfish depuration facilities located in close proximity to production sites pose a risk for the spread of pathogens. Water treatment is a powerful tool for preventing the spread of pathogens both into and out of a facility and should be put in place routinely.

Water treatments can be installed both in flow-through or closed systems, such as recirculation aquaculture systems (RAS). The technical choice depends on the type of facility and the characteristics of the site including:

- water source and quality,
- location in relation to shellfish production sites

Several water treatments are regularly used for water disinfection/pathogen inactivation including ultraviolet light (UV), chlorine and ozone. The treatment systems chosen should guarantee that the inflow and outflow water is safe for the stocks. To ensure the efficient functioning of treatment systems standard operating procedures need to be implemented, together with regular staff training, efficient monitoring programmes, and data recording/traceability, in order to guarantee the correct maintenance of installations.

Recommendations

- Where site specific personnel and equipment are not available, disinfect all PPE, equipment, vehicles or vessels moving between aquaculture sites in different bays
- Keep records of all cleaning and disinfection carried out
- Keep a record of all visitors to the site
- For land-based facilities effective water treatment measures to prevent the spread of pathogens is essential
- Information is available at <https://www.fishhealth.ie/fhu/health-surveillance/disinfection> regarding disinfectants and their use in aquaculture.

4. Staff Awareness & Vigilance

Staff awareness and vigilance in monitoring stocks is critical to the early detection of disease problems. The earlier a problem is detected the more effectively it can be dealt with ensuring limited impact on stocks. Training should be provided to all staff in relation to the biosecurity plan for the site (including identification of disease and pest risks). Stock should be monitored for signs of mortality following introductions of new stock to the site and in high-risk periods for the predominant Pacific oyster diseases present in Ireland. Maintain good records to assist in identification of issues.

Recommendations

- Ensure all staff are aware of the potential pathways of disease introduction and the need for vigilance with regard to mortality
- Check stock regularly and thoroughly
- Monitor stocks carefully during higher risk periods (i.e. when temperatures are high, when there are disease outbreaks elsewhere, etc.)
- Keep records of all relevant husbandry, production and environmental factors such as handling, stocking density, pests, high or low growth, water quality parameters (temp, salinity where data available, high rain, blooms, etc.)

5. Mortality

5.1 Records & Reporting Requirements

Details of all increased mortalities must be recorded. Where mortalities at a given point in the production cycle are significantly above what would be expected under prevailing conditions, they should be notified to the Marine Institute.

For *C. gigas* related mortalities, trigger reporting levels have been introduced which are as follows:

- Seed – report at 30% or above
- Half-grown – report at 10% or above
- Adults – report at 10% or above

These mortalities can be reported by sending a text message to the FHU text alert number **087 184 7285** or by contacting notification@marine.ie.

The following information should be included:

- Details of mortality levels
- Age class of affected stock(s)
- Your name
- Company/Site name

Following submission of the mortality report the laboratory will contact you directly.

5.2 Guidelines on Submitting Shellfish Samples to the Fish Health Unit.

5.2.1 Please ensure all collected shellfish are alive or moribund (sluggish/sickly/gaping but responsive to stimuli). Please do **not** submit dead shellfish to the laboratory.

5.2.2 Sample should contain **at least 30** shellfish unless otherwise requested by lab staff.

5.2.3 Suitable containers for samples are: Polystyrene box; Jiffy bag; or other insulated and **LEAKPROOF** container.

5.2.4 Details to be included with the sample:

- Name of company/operator
- Bay
- Origin and current size of shellfish in batch
- Mortality levels in the batch
- Contact details of sender

5.2.5 Samples should be sent to:

*Sample Reception,
Fish Health Unit,
Marine Institute
Rinville, Oranmore
Co. Galway
H91 R673*

5.2.6 Method of Transport:

- The preferred method of transport is by overnight delivery using An Post. If this is not possible an overnight courier delivery service can be used, however the laboratory should be informed as to which courier you have used.
- Samples should **arrive** at the lab from **Tuesday – Thursday** via an overnight delivery service. Alternatively, samples can be personally dropped into the lab on Monday.
- Please do not send samples over the weekend to arrive on Monday.

5.2.7 Finally, please telephone 091 -387200 or email notification@marine.ie to let the laboratory know a sample is on its way. If you have any questions, please contact us using the above details.

5.3 Estimating Mortality

5.3.1. Select a minimum of 3 bags from each of the affected stocks. The bags should be chosen randomly but should cover different locations on the site where the batch has been deployed. Where batches are distributed over multiple locations within the site and appear to show different levels of mortality, three bags should be checked from each area.

5.3.2 Pour the contents of each bag onto a table, trailer bed or similar flat surface

5.3.3 Inspect a sample of about 100g from each bag (or at least 100 oysters) depending on the size of the oysters

5.3.4 Record the number of live and dead oysters in each sample. Take care to ensure the oysters chosen are representative of the bag as a whole. Particular care will be required with the smaller oysters, where the shell may settle out of the bags or be broken up and dispersed.

5.3.5 Calculate the percentage mortality per bag using the formula:

$$\frac{\text{No of Dead animals}}{\text{Total No of Live + No of dead animals}} \times 100$$

5.4 Disposal of Dead Animals

In the event of mass mortalities on a Pacific oyster site, it may be advisable to remove the dead animals to eliminate them as a potential source of infection. Once removed from the water, the dead oysters must be treated as an animal by-product in line with European Regulation (EC) No 1069/2009 and Commission Regulation (EU) No 142/2011 which lay down the health rules as regards animal by-products and derived products not intended for human consumption. The regulation determines the circumstances under which animal by-products are to be disposed of, in order to prevent the spreading of risks for public and animal health. Both DAFM & the SFPA are the

agencies responsible for the implementation of the Animal By-Product regulations. The SFPA have produced a Food Safety Information Notice for Seafood Operators outlining their obligations under the Animal By Products Regulations: [FFSU-FS-IN-ABP-06-25 Seafood Operators and their obligations under Animal By Products Regulations V2](#)

Shells from shellfish with soft tissue and flesh already removed are exempt from the ABP regulations. These shells can be regarded as waste and can be disposed of to landfill. There are alternative options available for the disposal of shells such as spreading on land. Such practices require approval from the local Authority.

For further information on the disposal of dead animals, consult the Food Safety Information Notice or contact the SFPA at: SFPAFood&FisheriesSupport@sfpa.ie

Appendix I: Fish Health Unit Contact Information

Postal Address:

Fish Health Unit
Marine Institute
Rinville
Oranmore
Co. Galway
H91 R673

Telephone Numbers:

Switchboard: 091 387200

Mortality Text alert: 087 184 7285

Email address:

notification@marine.ie

Appendix II: References

World Organisation of Animal Health (WOAH), Aquatic Code 2022

VIVALDI Manual for disease management and biosecurity, 2022

FAO Biosecurity Toolkit, 2007

IFA Aquaculture – Best Practice Guidance & Information for Aquaculture licensing, Legislative responsibilities & Environmental objectives, 2023