



NEW ZEALAND  
**Sustainable  
AQUACULTURE**

# GREENSHELL™ MUSSEL BIOSECURITY STANDARDS

September 2023





# NEW ZEALAND GREENSHELL™ MUSSEL INDUSTRY BIOSECURITY STANDARDS

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## Foreword

Biosecurity is a critical part of the New Zealand Greenshell™ mussel industry. Managing biosecurity risks to the industry and the environment ensures marine farmers are respecting and doing their part to protect and restore the coastal environment. In 2019 the industry agreed to form Operational Zones that are designed to provide large scale protection of industry operations by introducing biosecurity controls on national pathways that are within its control.

To coordinate biosecurity risk management and increase information sharing at a finer scale, smaller localised Management Areas can be formed within Operational Zones. These could be areas of higher risk (e.g. have unwanted pests and diseases under management through regulation) or are of critical significance to industry (e.g., important spat catching sites).

By agreeing to these national standards, industry is actively managing biosecurity risks associated with their business and are clearly defining the requirements for movements of people, stock, equipment, and vessels moving.

These standards are regularly revised to ensure the New Zealand Greenshell™ mussel industry continues to be a leader in marine biosecurity.



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## Objectives

Through the implementation of national biosecurity standards, the New Zealand Greenshell™ Mussel (NZGSM) industry seeks to:

- Manage national-scale industry risk pathways transparently and consistently, so that all stakeholders can be assured that appropriate measures are being carried out by everyone in industry;
- Provide assurance to the public and regulators that site-specific and agreed national standards (including surveillance and reporting) are in place and are actively being maintained to safeguard the industry and the environment in which the industry operates;
- Implement zone and area-based biosecurity risk management;
- Benchmark good practice and guide industry in the development of their Biosecurity Management Plans (BMPs) that will reduce biosecurity risks to the industry and the environment in which the industry operates; and
- Through biosecurity leadership and as members of the Government Industry Agreement (GIA) on biosecurity, align efforts to improve the overall marine biosecurity status of New Zealand.



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## Document Layout

The document is divided into two parts:

- **Part 1** provides a background to industry biosecurity risk management planning; summarising general biosecurity measures to safeguard the environment and industry against biosecurity risks.
- **Part 2** provides detailed biosecurity standards that will be implemented through company Biosecurity Management Plans (BMPs) to address biosecurity risks to the industry and the environment in which it operates through national-scale zone-based pathway management (Operational Zones), Management Areas and Facility-level controls.





## Process and Document Life

- Objectives for the A+ Greenshell Mussel Biosecurity Standards were agreed to by the mussel farming members of Aquaculture New Zealand and reviewed by external biosecurity experts in 2019.
- The objectives of this document were then translated into specific biosecurity standards and approved by the AQNZ Mussel Biosecurity Working Group in 2021. To ensure they remain relevant the Standards have been reviewed and updated by the working group in 2023.
- The agreed Standards are implemented through the development of company Biosecurity Management Plans. This includes a requirement for these plans to be operative and regularly reviewed.
- Any update to these Standards is expected to be implemented within 12-months of publication, through the revision of company specific Biosecurity Management Plans.
- Mussel farmers self-report against their Biosecurity Management Plans and compliance with the Standards as part of their membership of the A+ Sustainable Management Framework and may be assessed against the standards by an external assessor appointed by Aquaculture New Zealand (AQNZ).
- These Standards will be reviewed every three years by the Mussel Biosecurity Working Group and updated as required but may be amended at any time with the agreement of the Working Group.
- AQNZ maintain the Standards as they exist within the A+ programme.

By taking the lead in marine biosecurity, the industry hopes to influence regulatory direction and put emphasis on the need for appropriate management of high-risk pathways that are outside the direct control of industry (e.g., shellfish disease surveillance in ports, harbours and marinas, inter-regional recreational and commercial vessel movements, and domestic ballast water exchange).





## Glossary

Below are definitions for key terms used throughout these biosecurity standards.

Biosecurity Coordinator (Company)	Designated by a company in their Biosecurity Management Plan as the contact point for biosecurity issues, queries, or in-house management. This individual is responsible for liaising with the operational zone biosecurity coordinator as per these standards. A company does not have to have an in-house Biosecurity Coordinator and can instead designate the Operational Zone Biosecurity Coordinator in their BMP.
Biosecurity Coordinator (Operational Zone)	Designated person within an Operational Zone as the central industry contact point for wider biosecurity communications. They should be informed by companies of any potential biosecurity events
Biosecurity Management Plan (BMP)	Each company is required to have their own BMP which meets the requirements set out by these standards. BMP Templates and resources can be found at: <a href="http://www.aplusaquaculture.nz/biosecurity">http://www.aplusaquaculture.nz/biosecurity</a>
Biosecurity Standards	This document defines the industry agreed minimum biosecurity requirements and expectations for the purpose of minimising and mitigating biosecurity risk to and from the aquaculture industry in New Zealand. All company Biosecurity Management Plans should meet the requirements of these standards.
Controlled Area Notice (CAN)	Under the Biosecurity Act 1993 government agencies and regional councils can declare additional biosecurity controls and restrictions for specific areas in response to heightened risk or biosecurity incursions. All individuals operating within a CAN are legally required to comply with the measures detailed in the notice.
Decontamination	Decontamination is the cleaning, treating, and drying of equipment to a degree that ensures the inactivation of pest and pathogens. Decontamination methods may vary depending on equipment and the Decontamination Standards listed in this document should be followed.
Disease	A disorder / sickness in animals and plants
Facility	Includes on-water and land-based sites and structures, such as: Processing plants, yards, farm sites, hatcheries, etc.
Fomite	A thing or individual that could spread disease between locations. Could include personnel, equipment, animals, stock, etc
Fouling	Unwanted plants and animals that grow on vessels and equipment, particularly vessel hulls and farm structures.
Government Industry Agreement (GIA)	The Government Industry Agreement for Biosecurity Readiness and Response. GIA operates as a partnership between primary industry and government to manage pests and diseases that could badly damage New Zealand's primary industries, economy, and environment. <a href="https://www.gia.org.nz/">https://www.gia.org.nz/</a>
Incursion	The arrival or establishment of a pest or disease species in an area where it previously had not been found.
Management Area	Management areas are localised areas within an Operational Zone with specific management requirements or measures. These can include any regional CAN, or industry agreed sites of heightened risk. Management areas are changeable based on current information and circumstance and consequently are not listed in these standards. It is expected that companies will detail all management areas relevant to their practices within their BMP and keep these up to date.



Moribund	Dead or dying stock
MPI Surveillance and Incursion Investigation Group	These are the individuals responding to the MPI biosecurity hotline and are responsible for making response decisions to any reported potential biosecurity event. They will assess the information provided by the farmer and decide if any sampling / testing or operational response is required. All response actions in a Biosecurity event will be dictated by this team. Not all calls to the hotline will result in any required action.
Notifiable pest / disease	Pests and diseases that must be reported to MPI, if spotted in New Zealand. <a href="https://www.legislation.govt.nz/regulation/public/2016/0073/latest/whole.html#DLM6792208">https://www.legislation.govt.nz/regulation/public/2016/0073/latest/whole.html#DLM6792208</a>
Operational Zone (OZ)	These are the large regional biosecurity control areas defined by these Biosecurity Standards. These areas are based on factors such as interconnectedness, regional management bodies, areas of operation, and environmental variations. Farming operations may in many cases span across multiple OZ's and will therefore require additional biosecurity control measures as dictated by these Standards.
Pathogen	An organism causing disease in a host species.
Pest / Invasive species	An organism that could cause harm to natural environments and industry operations. <a href="https://www.mpi.govt.nz/biosecurity/how-to-find-report-and-prevent-pests-and-diseases/search-for-a-pest-or-disease/">https://www.mpi.govt.nz/biosecurity/how-to-find-report-and-prevent-pests-and-diseases/search-for-a-pest-or-disease/</a>
Potential Biosecurity Issue	This is when unusual or ramping mortality is observed, or a suspected unwanted organism that is new to the Operational Zone is observed. Potential Biosecurity Issues must be reported to a Biosecurity Coordinator, or directly to the MPI Pest and Disease Hotline.
Potential Biosecurity Event	This is when MPI or Regional Council have determined that a biosecurity incursion of some kind may be occurring, and they have recommended actions that could affect wider industry. The Operational Zone Biosecurity Coordinator must be involved if a Potential Biosecurity Event is enacted.
PPE - Personal Protective Equipment	The safety clothing and gear required in situations where risks are present and can be mitigated (e.g., handling of chemicals, operation of machinery, water safety, handling of disease or sickness, etc.)
Risk Pathways	Describes methods by which pests or disease could be spread from place to place. Pathways can be both national and international and can vary in type depending on the traits of the risk organism. Pathways can include things such as commercial vessels, recreational vessels, farm visitors and other personnel, stock movements, vehicles, water, wild animals, equipment, etc.
Unexplained Mortality	Any farm mortality that occurs outside of agreed normal limits or without apparent reason. Explained mortalities could include die-off in response to weather events, etc. Unexplained mortality cannot be associated with any sufficient explanation. If unsure whether something is explained or unexplained, call the MPI hotline and they will provide guidance.
Unwanted Organism	Pests and diseases that could harm New Zealand if they arrived. <a href="https://pierpestregister.mpi.govt.nz/">https://pierpestregister.mpi.govt.nz/</a>
Waste Products	Waste products can be organic or inorganic materials generated by farming. These can include used equipment, dead (non-diseased) stock, shells, water used in processing or cleaning, ropes and floats, etc. Their history of use may pose a biosecurity risk and could require management.



## PART 1:

# Background To Biosecurity Risk Management

Good biosecurity measures help protect the coastal marine environment and can be low cost compared to productivity and product quality losses if a pathogen (an organism that causes disease) or a new marine pest were to establish. Preventative biosecurity actions that reduce the risk of damaging pests and pathogens from arriving usually provide the best return on investment.

Good biosecurity practices can support productivity, product quality, trade and profitability. Improved biosecurity practices can:

- result in better animal health and improved stock performance
- reduce the spread of pathogens and pests within/between operational areas
- allow for early disease detection
- support marketability and market access
- be integrated with broader risk management planning such as workplace health and safety, food safety, and environmental management.

These Standards provide a biosecurity risk analysis, which is the first step in developing Biosecurity Management Plans. It identifies potential pathways of entry, emergence, or spread of pathogens and pests, sets down surveillance and reporting expectations, assesses the level of risk each pathway presents, and helps to determine appropriate pathway risk management and controls.



Figure 1: Biosecurity Risk Management Process



## General Biosecurity Practices to Reduce Risk

This section details general biosecurity practices that should be implemented to reduce biosecurity risk to the NZGSM industry from pathogens and pests. Seven steps to protecting your aquaculture business from biosecurity risks:

1. Maintain stock health and welfare
2. Be aware of the pathways of risk organisms onto, within, and off farms
3. Obtain pest and disease-free stock
4. Keep things clean
5. Check your farm and stock regularly
6. Report anything unusual to the MPI Pests and Disease Hotline, and relevant regional council
7. Have a Biosecurity Management Plan (BMP), implement it, and revisit it regularly, and revise it when things change.

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## MPI PEST & DISEASE HOTLINE 0800 80 99 66

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### Maintenance and Monitoring of Stock Health

Farmers should inspect their stock at regular intervals and note general stock health. Records of growth rates, dead shells, gaping mussels, and obvious stock loss should be kept as they can provide early warning of an issue and are invaluable if disease events occur.

The Biosecurity Management Plan should provide detail on the escalation and reporting, where large numbers of mussels are gaping, or where there is more than normal mortality. Farmers working with officials may be required to send samples for testing to investigate the issue with the aim of determining cause. This may be environmental, but if caused by a pathogen, early detection is very important.

When carrying out normal farm management operations, farm staff should keep an eye-out for new marine pests and anything that might indicate the presence of a pathogen. Such detection should be reported quickly to the **MPI Pests & Disease Hotline (0800 80 99 66)** and to the relevant regional council.

### Pathways for Pathogens and Pests

Pathogens and pests can enter and exit farms via many 'pathways'. Managing pathways can reduce the risk of pathogens and pests entering farms, spreading within a farm area and extending to other farms. Pathways that bring pathogens in close contact with farm stock are most likely to result in an infectious disease. These pathways need to be identified and where possible addressed as a priority. The main pathways for diseases and pests in mussel farming include: commercial and recreational vessel movements, stock movements, natural processes like ocean currents, farm and harvest equipment, people, biological waste, and wildlife.

It is important to note that as the oceans warm, the distribution of marine pests and diseases is predicted to change, along with an increased likelihood of naturally occurring harmful algal blooms.

## Stock Movement and Containment

Movement of stock (including spat, broodstock, onto and off a farm or facility) can present a significant biosecurity risk, particularly if they are of unknown health status. All farmers should ensure that stock movement records are kept for each farm or facility. This includes:

- Movement of stock onto the farm (date, volume, place of origin, lines populated)
- Stock movements within a farm (by reseedling or line movement)
- Movement of stock off a farm (date, volume, lines depopulated, destination including harvesting)
- Details of any stock losses and possible reasons why (mortality, predation, stripped to waste, biofouling, harmful algae bloom (HAB) history)

## Equipment, Vehicles and Vessel Hygiene

Equipment that has been in contact with aquatic plants and animals can present a risk of pest and disease transmission. Equipment can include anything brought into a farming area such as harvest, grading, diving, and processing equipment. The level of risk will depend on the history of use; for example, equipment used at other farms or processors will have a higher biosecurity risk compared to using new equipment.

Vehicles such as cars, trucks and tractors can also bring pathogens into a farming area such as a marine yard. As with equipment, the level of risk will depend on the history of use and care taken to achieve biosecurity controls.

Vessels (e.g., aquaculture, commercial and recreational) present a risk of introducing pathogens and pests that have 'hitchhiked' and are attached to external and internal parts of the vessel, particularly when they have been at other farms, in other marine waters or have been in close contact with marine pests (e.g., harvest barges or have been in ports known to contain notified marine pests). Biofouling tends to be most significant on slow moving vessels (< 10 knots) or those that have been stationary for extended lengths of time or are inadequately maintained (i.e., expired or no antifouling coatings). Risks could also arise from vessels that move among regions for specific tasks (e.g., contract service vessels that install mussel farm anchors).

Practices that reduce biosecurity risk from these pathways include:

- Regular cleaning and antifouling to minimise biofouling accumulation on vessel hulls, ensuring the external hull has minimal fouling, especially in niche areas.
- Washing biofouling debris and sediment from decks and equipment before departure.
- Refraining from washing stock that are destined for other areas while within port boundaries.
- Decontamination of equipment, vehicles, and vessel decks before moving between Operational Zones (Decontamination = Clean + Disinfect + Dry)
- In the case of trailered boats - washing down boats, trailers and equipment, preferably with fresh water, and draining all water from bilges and the anchor well, before moving between Management Areas and Operational Zones.

## People

Without appropriate precautions, people can present a significant risk of pest and disease introduction, particularly where they visit other farms or environments containing pathogens and pests of concern. People can include site staff, contractors, visitors, and



unauthorised entrants. They can introduce pathogens and pests via contaminated skin, clothing and footwear. Where possible staff and visitor access should be managed to reduce the associated risk. Many of these apply to land-based facilities and these risks can be addressed by:

- Having appropriate perimeter protection to prevent unauthorised entry.
- Having biosecurity signage.
- Having appropriate staff receiving training in the identification of unwanted marine pests, the normal and abnormal appearance of mussels, who to report to if something unusual is observed, and how to take samples for marine pest identification and disease diagnosis.
- Having visitors (including Contractors and Non-operational Staff) enter via a designated entry point. Keeping records of all visitors
- Explaining biosecurity protocols to all visitors
- Restricting access to sensitive areas (e.g., broodstock units)
- Managing staff movement between farming areas
- Where appropriate using footbaths and hand wash stations when entering and leaving land-based facilities
- Where appropriate, using PPE and having decontamination procedures in place.

## Water and Waste

A farm's water supply is an important asset that has a major influence on animal health. In open systems, such as marine farms located in the coastal marine area, there can be little to no control of water as a route of pest and disease transmission; however, on a large scale the nature of oceanic water currents and the separation of farming areas can be considered to provide some level of biosecurity risk management. For land-based facilities, biosecurity risks will depend on the nature of the water source, presence of host animals in that water source and the proximity of other farms that may discharge into the water source.

Water and waste products present a biosecurity risk to industry. This risk can be addressed by:

- Assessing and managing the biosecurity risk of a facilities water source.
- Assessing the potential biosecurity risk of waste products (e.g. dead animals, water and effluent) to the farm and the environment.
- Containment, handling, treatment, and disposal of waste products to minimise identified disease transmission risks.

## Biological Material

The introduction of raw, live, dead, and fresh biological material (e.g., live or dead mussels) to a farming area from elsewhere can present significant biosecurity risks. The level of risk will depend on the pests and pathogens of concern, the origin of the raw biological material and the level of processing; for example, freezing may kill some parasites but may not kill viruses. These risks can be addressed by:

- Assessing the biosecurity risk posed by biological material and implementing appropriate controls to address identified risks.
- Storing biological material in designated areas (e.g., clean, dry, secure from wildlife) to avoid contamination.

## Wildlife

Wild aquatic plants and animals entering a farm or facility via a water supply, and wild animals such as marine mammals, birds, scavenging vermin (rats, stoats), and domestic animals (particularly at land-based storage facilities) present a risk of introducing pathogens or pests. Appropriate infrastructure and procedures are required to manage the disease risks associated with wildlife; these include:

- Control or exclusion of predators, wildlife, vermin, or other organisms (e.g., rainbow skinks, aquatic life) from land-based facilities
- Regular inspection and monitoring of farms for early detection

## Zones and Management Areas

An important measure to reduce potential spread of pathogens and pests is the division of the coastal marine area and industry into Operational Zones and the establishment of Management Areas within zones, with associated management measures for movement between each.

As part of these industry standards, Operational Zones have been established (see Part 2 [B]). These zones take advantage of natural environmental (e.g., ocean currents) and geographic operational clusters, and introduce risk management measures on as many of the remaining pathways as possible to prevent the spread of pathogens and pests before and after detection. The goal of these measures is to reduce the chances of the widespread distribution of pathogens and pests by industry, and their subsequent emergence across the wider environment and industry.

Within each Operational Zone, Management Areas may be established based on operational links and hydrographic connection (epidemiologically connected populations). Management Areas can be established by agreement in industry critical areas (e.g., spat producing areas that supply multiple Operational Zones), or areas that represent a potentially elevated risk of being a node of risk entry (e.g., Ports that have unwanted organisms that have yet to establish in nearby farming areas). For example, in the Top of the South Operational Zone the Wainui spat farm is an industry agreed Management Area, and specific rules are in place to reduce the risk of entry of risk organisms to the site to the greatest extent possible. MPI and regional councils have powers under the Biosecurity Act that enable the formation of Controlled Areas which detail pest- and pathogen-specific controls for zones (or areas) under management (through Controlled Area Notices). Regional councils can also detail additional pest-specific controls and rules under Regional and Small-Scale Pest Management Plans. Controlled Areas and the rules within Regional or Small-Scale Pest Management plans can also guide the development of Management Areas within Operational Zones.

Management Areas and any associated controls need to be regularly reviewed within company specific Biosecurity Management Plans as Controlled Areas and rules within Pest Management Plans, and the pest and disease status of Management Areas evolve. AQNZ provides a summary of current Management Areas in the A+ Biosecurity Management Plan Templates<sup>1</sup>, which are reviewed as required.

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1 Templates available at: [http://www.aplusaquaculture.nz/biosecurity#biosecurity\\_templates](http://www.aplusaquaculture.nz/biosecurity#biosecurity_templates)



## Contingency Planning

Additional biosecurity measures may be required to ensure the sustainability of the industry in the event of emergency incidents that directly or indirectly affect biosecurity (e.g., floods, earthquakes, disease outbreaks). Contingency plans are to be developed within Operational Zones to minimise the impact of any such incidents. For example, if the pathogen and pest landscape within New Zealand changes it may be necessary to quickly harvest and dispose of large amounts of stock in landfill. Ideally contingency plans for such eventualities should be developed in advance of potential biosecurity incidents.

## Notifiable Organisms Relevant to NZ's Mussel Industry

All New Zealanders are expected to report unusual organisms to MPI. Unusual organisms are those that appear to be something not normally seen in New Zealand (<https://www.mpi.govt.nz/biosecurity/how-to-find-report-and-prevent-pests-and-diseases/report-a-pest-or-disease/>).

Notifiable organisms are those compulsorily reportable to the Ministry for Primary Industries through the MPI Pests & Disease Hotline. They represent internationally significant pathogens and pests with potential for serious production or trade related impacts (<https://www.mpi.govt.nz/biosecurity/pests-and-diseases-not-in-new-zealand/priority-list-of-potentially-invasive-pests-and-diseases/>).

All mussel farmers in New Zealand should ensure that staff are educated regarding the appearance of, effects of, and reporting mechanisms for, legislated notifiable pests and signs of diseases. Staff should be introduced to and have access to the NZ Marine Pest ID Guide (MPI 2022) and know what to do if signs of disease or mortality are observed.

In addition, some mussel pathogens may be listed in the unwanted organisms register (searchable at <https://pierpestregister.mpi.govt.nz/>). All parties should be aware of the need to check organism identifications against the unwanted organism register and report presence of unwanted organisms when detected.

If there is any doubt as to the status of an organism, mussel farmers can check with MPI Biosecurity New Zealand through the MPI Pests & Disease Hotline directly.

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## MPI PEST & DISEASE HOTLINE 0800 80 99 66

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## Disease Surveillance

Mussel farmers are not expected to identify specific pathogens, but all farmers, processors, and staff should be aware of the signs of disease and how to report them to MPI through the MPI Pests & Disease Hotline.

Pathogens pose a hazard to native ecosystems and the NZGSM industry. Pathogens that warrant targeted surveillance in wild mussel populations (e.g., GSM and *Mytilus galloprovincialis*) at potential points of entry (e.g., harbours, marinas, and areas used for large vessel shelter), and passive surveillance by industry in farmed populations have been reviewed separately<sup>2</sup>. The relative risks posed by these pathogens will be re-assessed every three years, or if a new disease is detected in Australia.

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<sup>2</sup> AQNZ 2022 - NZ Mussel Industry - Pathogen Risk Profile Report – 2nd Edition 18p – available on request from AQNZ









## PART 2: Detailed Biosecurity Standards

### Biosecurity Zoning

Greenshell™ mussels (*Perna canaliculus*) are grown in many coastal areas of New Zealand using longline systems. Currently one mussel spat hatchery operates in Nelson, others are anticipated.

The industry recognises the importance of managing movements between farming regions as much as is practical, particularly when faced with novel biosecurity challenges.

Industry zone-based management will, therefore, be actioned at a national scale to reduce biosecurity risk, and to enable a coordinated response to a potential biosecurity event.

Industry Operational Zones have been formed (Figure 2). These Operational Zones are separated geographically and consider the hydrodynamics of the water bodies they encompass, and the essential aspects of mussel farming operations.

Companies operating within an Operational Zone will appoint at least one Operational Zone Biosecurity Coordinator. The Operational Zone Biosecurity Coordinator may act as the industry level coordinator of responses in potential biosecurity events.

#### Biosecurity Coordinator - Role Description

Biosecurity Coordinators act as the intermediaries between on-water staff, MPI, and regional council biosecurity staff where required, and can support the coordination of each company's biosecurity responses to potential biosecurity events.

Some companies may wish to appoint a Company Biosecurity Coordinator for managing potential biosecurity events and biosecurity responses at a company level. It is expected that Company Biosecurity Coordinators will work alongside Operational Zone Biosecurity Coordinators if MPI action a potential biosecurity event.

Operational Zone Biosecurity Coordinators can serve as a contact point for all farmers and operators in an Operational Zone, across all farmed species. They can serve as a first port of call for questions or concerns and are responsible for informing the wider industry when MPI recommend actions that trigger a potential biosecurity event. They will help with communicating requests from MPI or Regional Councils to the wider industry.

#### Key responsibilities include:

- Liaising directly with the MPI marine incursions investigators for the purpose of reporting on behalf of farmers and, where requested, coordinating sampling and testing.
- Informing farmers and other affected parties of a potential biosecurity event for the purpose of ensuring all operators effectively collaborate on minimising impacts to industry and the environment.
- Participate in the AQNZ Biosecurity Standards Working Group
- Actively participate inter-regional Marine Biosecurity Partnerships (e.g., Top of the South Marine Biosecurity Partnership)



Where appropriate, Management Areas may be formed within Operational Zones. Management Areas can be formed based on the following criteria:

1. Regional and national statutory biosecurity requirements (e.g., Regional Pest Management Plans, Small-Scale Management Plans, Controlled Area Notices which may include policies, controls and rules related to the management and control of marine biosecurity risks associated with aquaculture pathways).
2. Agreement within or between companies (e.g., a Management Area Agreement), where multiple growers farm in a shared waterbody and / or share facilities or agree to protect important spat catching sites (e.g., Wainui, Aotea Harbour, Te Oneroa-a-Tōhe, Bay of Plenty).
3. High risk pest area (e.g. port, harbour or marina) that has a lower biosecurity status than nearby farms (e.g. Lyttleton Port, Port of Auckland, and Coromandel Harbour all have unmanaged populations of *Sabellia*).

Land-based hatcheries, nurseries and mussel research facilities are included in their adjacent Operational Zones due to the link with the water body (unless discharged water is sufficiently treated to remove risk of pest and disease transfer, in which case they will be considered separately).

## Operational Zones

The following Operational Zones have been established to provide a national framework for aquaculture biosecurity (see Figure 2):

1. The Top of the North (Northland, Auckland, Waikato, and Bay of Plenty (to East Cape boundary) - includes west coast of North Island to southern Waikato boundary)
2. East Coast (East Cape regional boundary to NE Manawatu – Whanganui regional boundary)
3. The Top of the South (Northern of Taranaki regional boundary and includes the West Coast of the South Island to NW Southland boundary. NE Manawatu – Wanganui regional boundary to SE Marlborough boundary at Clarence)
4. Canterbury (SE Marlborough boundary at Clarence to NE Otago regional boundary)
5. Chatham Islands
6. West coast (Regional Council Boundaries)
7. Lower South (NE Otago Regional boundary to NW Southland boundary includes Stewart Island - Big Glory Bay)

There are specific biosecurity requirements for moving between Operational Zones, which vary depending on the item being moved and cover animals, equipment, people, and personal protective equipment (PPE). These requirements are specified in the following sections.

NB: The industry also recognises that there are other growers of shellfish and marine farmers more generally in New Zealand, whose operations may be at risk or may pose a risk to the NZGSM Industry. The mussel farming industry encourages other organisations growing and processing seafood to adopt similar standards and operate under Biosecurity Management Plans.

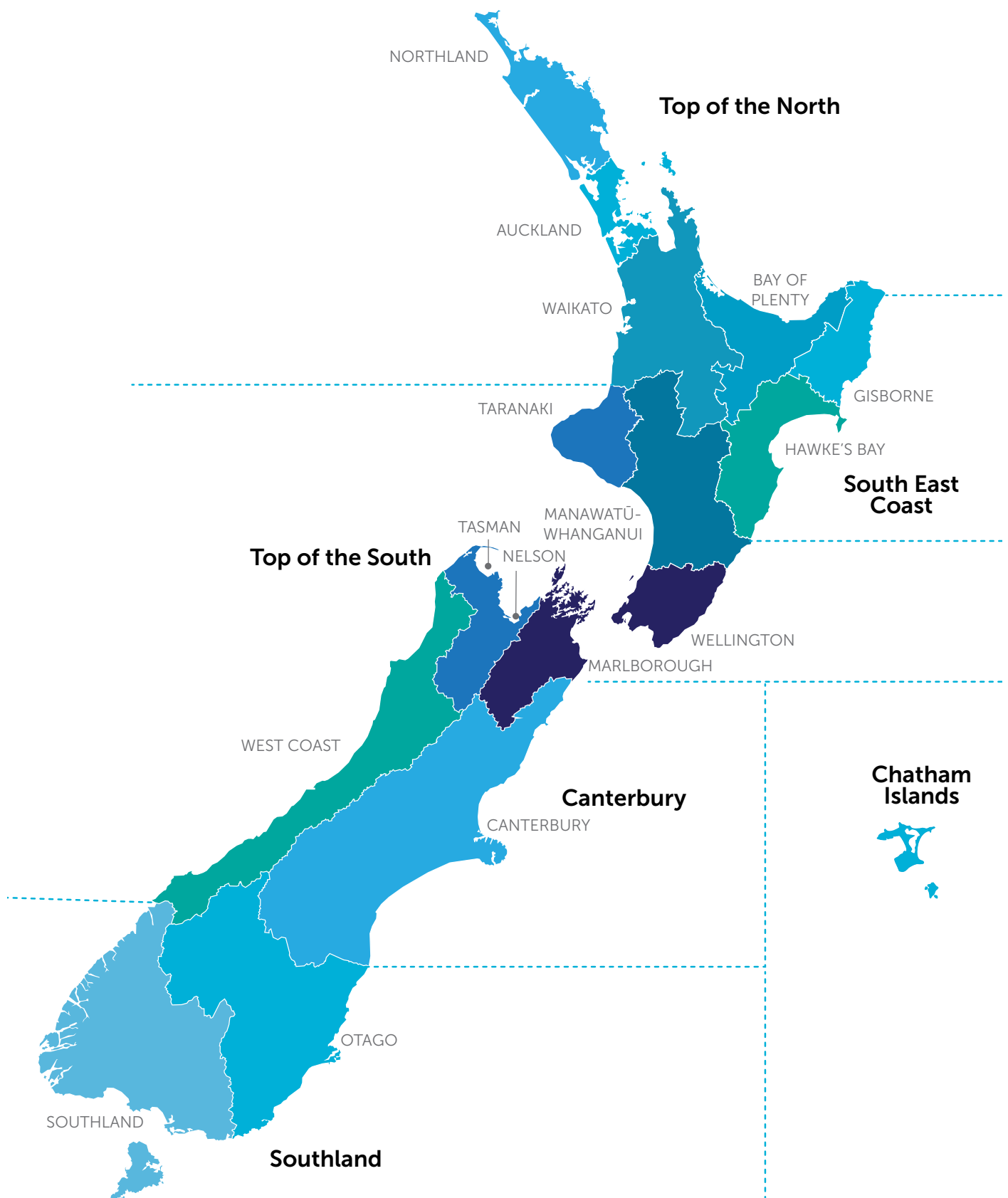


Figure 2: NZGSM Industry Operational Zones for National-Scale Biosecurity Pathway Management

## Biosecurity Management Plans

Biosecurity Management Plans must be developed by each company to give effect to the following:

- A. National Standards
- B. Operational Zone Standards
- C. Management Areas
- D. Facility Standards
- E. Spat and Seed Movement Standards
- F. Harvest Standard
- G. Broodstock Standards
- H. Waste, Wastewater and Water Management Standards
- I. Wildlife Management Standards

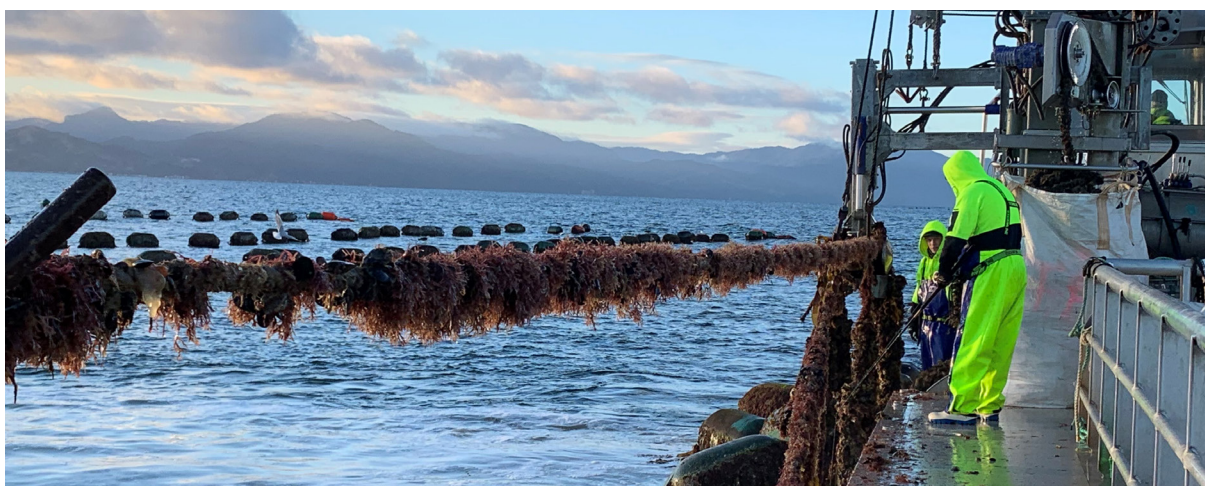
A+ Biosecurity Management Plan templates have been developed and can be downloaded and adapted to suit each operation: <http://www.aplusaquaculture.nz/biosecurity>

### National Standards

The following standards apply to all mussel farming operations in New Zealand.

#### Requirements

- All parties must comply with all government regulations relating to aquaculture biosecurity and marine activities (e.g. Biosecurity Act 1993, Resource Management Act 1991 including the National Environment Standards for Marine Aquaculture, the Freshwater Fish Farming Regulations 1983 and the Fisheries Act 1996) and any 'Directions' or movement controls put in place under regulations.
- All parties will participate in any shellfish health or shellfish biosecurity programmes as required by MPI and/or relevant territorial authorities, understanding that such measures are regulatory requirements. They may be consent conditions, urgent response or readiness measures, or initiatives developed in partnership with the industry through the Government Industry Agreement (GIA) on biosecurity.
- Company specific Biosecurity Management Plans must be developed to ensure compliance with these industry biosecurity standards and must be readily available to relevant staff within each company and available to anyone upon request.





## Operational Zone Standards

These specify controls for all movements **between** Operational Zones.

### Requirements

- Movement of mussel spat and seed is permitted between Operational Zones if the movement complies with the "Spat and Seed Movement Standards" (e.g., healthy hatchery, or Te Oneroa-a-Tōhe (90-mile beach) spat can be transferred to all Operational Zones);
- Movement of harvested shellfish from an Operational Zone to processing facilities may occur at any time if Processing Standards have been met (See "Harvest and Processing Standards");
- Broodstock may only be moved between Operational Zones provided "Broodstock and Breeding Standards" are met;
- Lines and farm equipment used in Operational Zones should not be moved to other Operational Zones without being cleaned. New lines and equipment should be used in preference to reuse. If movements of used lines and farm equipment between Operational Zones is deemed necessary or reuse is chosen, decontamination procedures must be followed (see "Decontamination Standards"). These lines and farm equipment must be clearly labelled and documented to indicate that decontamination has been completed;
- Vehicles and associated equipment that move between Operational Zones must be thoroughly cleaned before movement to remove all biological material);
- For farming vessels (including contractor vessels) which are to be moved between Operational Zones:
  - » The vessel hull must have an in-water inspection to ensure the hull fouling is visibly free of notifiable or unwanted species, or those species otherwise designated by the MPI as marine pests in the 'New Zealand Marine Pest ID Guide' before moving between Operational Zones (Refer to Decontamination Standards).
  - » Records of the inspection must be kept. Refer to "Decontamination Standards" for a more detailed description of vessel pathway management requirements.
  - » Vessels must be cleaned with detergent and then disinfected on the deck surface and down to the water line. Refer to "Decontamination Standards" for suitable decontamination methods.
  - » Bilge water must be disposed of before leaving one Operational Zone and entering another.
  - » Ballast water must be exchanged at least twice between Operational Zones.
  - » Details of decontamination actions taken for contractor and third-party vessels must be recorded.
- Non-absorbent and non-permeable equipment must be decontaminated before moving between Operational Zones (see "Decontamination Standards").
- Decontaminated equipment must be labelled to indicate that decontamination has been completed.
- Where, for exceptional reasons, movements between Operational Zones are necessary that do not meet the above standards, a risk assessment must be done. Where this occurs, the circumstances and risk management controls taken should be made available to the Biosecurity Working Group for consideration at the next review of these standards.

### Recommendations

- Mooring lines, floats and other farm infrastructure contaminated with shellfish debris or organic material should be replaced or pressure washed and soaked in disinfectant. Refer to "Decontamination Standards" for suitable decontamination methods.

## Management Area Standards

These specify controls for all movements **between** Management Areas (where they have been formed).

### Requirements

- Management of biosecurity risks arising from movements between Management Areas are generally managed by compliance with government regulations, (e.g., MPI permits under a Controlled Area Notice, or regional council planning rules) or Facility Standards (next section), but additional area-specific pathway risks controls may be agreed (i.e., through a Management Area Agreement).

### Recommendations

- A Management Area Agreement should be considered, where farming companies share stock, facilities, or vessels (i.e., that are epidemiologically linked)
- A national emergency response plan (to be developed through the GIA) should detail potential Management Areas that could be used in the event of a national response.

## Spat and Seed Movement Standards

These standards specify the conditions under which spat or seed are permitted to move into an Operational Zone, and onto a farm or land-based facility within it.

### Requirements

- For wild spat and secondary seed (<40mm) biosecurity controls include:
  - » Seed must not be transferred from an Operational Zone known to contain a notifiable pathogen or pest that is not present in another Management Area or Operational Zone unless a permit is obtained from MPI.
  - » Spat or seed movement must not occur from areas where toxic algae cells are present at cell concentrations above which flesh testing is required, or if a potential biosecurity event is reported in the Operational Zone.
  - » All seed must be removed from lines, de-clumped, saltwater washed, and transferred to bags on site before movement between Operational Zones.
- Spat production facilities (e.g., Hatcheries & Nurseries) must have a programme monitoring the health of spat at the facility. Biosecurity controls must include:
  - » Regular observations and recording.
  - » Surveillance of the overall health status of the stock.
  - » A pathway for investigation, under direction of an appropriately trained aquatic health professional, in cases of unusual clinical signs, elevated mortality, or poor performance.
  - » A Biosecurity Coordinator must be notified if a potential biosecurity issue is identified.

### Recommendations

- Ideally, the background disease status of each Operational Zone would be known, and ongoing disease surveillance of wild and farmed mussel populations would guide the risk-profile of each movement.

**Tools to enable this in a cost effective and practical way are in development and should be implemented as soon as they have undergone appropriate validation and sign off.**

- Spat or seed movement should not occur if shellfish are visibly unhealthy or dying at time of transfer.
- To reduce disease susceptibility, stress on spat or seed during transfer should be minimised (e.g., where possible spat and seed should be kept moist and cool).

## Harvest Standards

The following measures must be put in place at harvest and at land-based facilities (e.g., processing facilities) to control the potential introduction and spread of disease agents in harvested shellfish and equipment:

### Requirements

- Visual inspection must be undertaken prior to harvest and in processing facilities to assess shellfish for signs of unwanted pests and diseases.

**The presence of unwanted organisms or signs of disease that are new to an Operational Zone must be reported to a Biosecurity Coordinator, who will notify the MPI Pest & Disease Hotline.**

- Visual inspection records must be kept and should include observations of any lesions and general reporting of abnormal condition.
- Harvest bags must not be overfilled (to avoid spillage of biological material) and must be labelled with the farm identification number and line numbers from where the mussels were sourced.
- Harvest bags must be cleaned and sanitised to reduce the risk of transferring pests and diseases.

**Controls to reduce risks associated with used harvest bags can include: hot washing with detergent, freezing, or disinfection with an approved disinfectant as per the "Decontamination Standards" prior to leaving a processing facility.**

- Harvest bags arriving from different Management Areas or Operational Zones must be colour-coded or otherwise marked for identification and segregated in separate washdown and disinfection areas.

## Hatchery Broodstock Management

This section details control measures for broodstock moving into hatchery facilities, noting that the hatchery is likely to have a comprehensive biosecurity protocol as part of its RMA consent.

### Requirements

- Broodstock movement between Operational Zones is only permitted if the following control measures are in place:
  - » Broodstock must be visually inspected prior to movement.
  - » Unhealthy broodstock must not be moved.
  - » If evidence of disease is noted, this must be investigated using diagnostic sampling and no further transfer activities carried out until the cause of disease is determined and resolved; in which case a testing-out regime may be implemented.
  - » All personnel undertaking and equipment associated with the broodstock transfer activities must be trained and adhere to the relevant standard operating procedures for biosecurity.
- Hatchery facilities must have a section in their Biosecurity Management Plan which addresses the risks associated with horizontal transmission of pathogens from broodstock to other stock. This must include:
  - » Visual inspection of broodstock
  - » Pest control processes for bringing stock into a land based broodstock holding facility
  - » Monitoring programme of broodstock health while in the holding facility
  - » Record keeping processes of health, mortalities and investigations
  - » Associated standard operating procedures and approaches to manage risk while the broodstock is on site and during spawning

### Recommendations

- Broodstock should be segregated as far as possible from other populations (e.g. held separately from the rest of the stock in the facility) and actively monitored for ill health for four weeks post to transfer.

# Facility Level Biosecurity Management

## Facility Standards

Facility Standards apply to all mussel farming operations including grow out farming areas, spat catching farms, hatcheries, broodstock holding facilities, and processing facilities.

To develop appropriate biosecurity controls it is essential to understand the type of biosecurity risks that may be encountered and the routes (pathways) by which they may enter or leave the facility. A generic risk analysis has been completed as part of developing these Standards. However, it is critical that any additional risk pathways are identified for each farming/facility operation and addressed in the company specific Biosecurity Management Plan (BMP).

This process must be done at the time of developing the BMP and should be reviewed if the biosecurity status of a facility or the operations risk profile changes (e.g., a new species is being farmed or processed alongside mussels).

Additional risk analysis, if required, should be done by a suitably competent person, and both an organism specific approach (i.e., a risk analysis that looks at the aquaculture species that is being farmed) and a process-based approach for each risk pathway.

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**Companies may have individual operational policies and procedures or may customise controls by each operation, providing minimum biosecurity standards are met.**

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Every mussel farming operation must develop and maintain a BMP that outlines how it will meet specified minimum facility level management in the following areas:

- Training and induction of staff, contractors, and visitors in biosecurity and shellfish health
- Stock Traceability and Recording
- Monitoring shellfish health
- Investigation and response to biosecurity challenges
- Communicating biosecurity issues
- Contingency & Response plans
- Risk specific biosecurity measures





The facility level biosecurity requirements and recommendations are detailed below.

## Staff Training

This section details the training and induction requirements for all staff in biosecurity and shellfish health, including contractors.

### Requirements

- At least one person must be assigned the role of Biosecurity Coordinator. This may be either the company or Operational Zone Biosecurity Coordinator.
  - » The Biosecurity Coordinator must know how to escalate in response to a potential biosecurity event (see figure 3).
- All staff must be inducted in basic biosecurity requirements of the company or facility / operation and know who to report to if they notice unexpected mortality, diseased stock, or an unusual pest.

### Recommendations

- Appropriate staff within each company should also be identified and have technical responsibility and accountability for biosecurity and shellfish health.
- These individuals should be known to all staff and receive specialised training over and above that required for other staff. For example:
  - » the use of sampling kits that allow samples to be gathered and sent for testing.
  - » the theory of biosecurity, risk pathways and mitigation measures possible and the specific procedures (e.g. SOPs) to ensure maintenance of biosecurity standards;
  - » the importance of maintaining stock records for traceability purposes in the event of a biosecurity event.
  - » Normal healthy stock – their appearance and behaviour.
  - » Unhealthy stock – signs of abnormal health and abnormal behaviours.
  - » The appearance of unwanted marine pests, how to sample unknown pest organisms, who to contact and where to send samples.
  - » The importance of regular inspection and surveillance for marine pests and shellfish diseases to the industry, environment and for market access.
  - » Environmental parameters to measure and record (DO, water temperature, phytoplankton), and why they are important if a shellfish health issue is suspected.
  - » How biosecurity is regulated in New Zealand and their role in the Government Industry Agreement on Biosecurity that the NZGSM industry has signed.

## Stock Traceability and Recording

This section details the stock record requirements for traceability of stock to ensure that stock can be identified throughout the entire life cycle and production process.

### Requirements

- All facilities must keep, as a minimum, records of:
  - » stock entry to farms
  - » stock movement on site between lines / tanks
  - » stock departure from site, including destination.

## Monitoring

This section details the monitoring of shellfish health and unwanted organisms in all farming facilities.

### Requirements

- Representative lines or holding tanks must be visually inspected prior to movement and harvest, weather permitting, for signs of disease, moribund shellfish and mortalities;
  - » Records of visual inspection and results must be kept;
- Companies within each Operational Zone must develop and maintain a record of normal and expected mortality levels and background shellfish health status (through visual inspection of stock);
  - » At all farms, an estimate of the proportion of mortality on the lines must be recorded along with the location of the farm and the number of lines affected.
  - » Any moribund (sick or dying) shellfish must be assessed visually for signs of disease (e.g., lesions).

**If mortality is unexpected, farm staff must notify their designated Biosecurity person.**

- Farm structures must be checked during routine management and maintenance activities for the presence of unwanted aquatic pests;
  - » New pest identifications must be reported to MPI (via the MPI Pest & Disease Hotline) and the relevant regional council.

### Recommendations

- Disease surveillance and testing should be undertaken, where appropriate and the level of risk requires it, prior to stock movements.

**The requirements for, and the specifics of any active surveillance should be determined in association with a qualified aquatic health professional and / or MPI Animal Health Lab.**

- For the purposes of assessing shellfish health the following information may be required. This could include but is not limited to:
  - » Records of previous farm management actions (e.g., spat- catching, seeding, grading, inter- seeding etc.)
  - » Water temperature and salinity data
  - » Results of regular phytoplankton sampling (NB: Generally, this is covered by regional Shellfish Quality Programme type sampling, but additional targeted sampling may be required)
- Where practical, known unwanted aquatic pests should be disposed of securely on land.



## Investigation and Response

This section details the investigation and response to biosecurity challenges and potential incursions within a facility.

### Requirements

- In the event of mortality above normal or expected levels, as quickly as possible the affected farm stock must be reviewed by personnel with responsibility for biosecurity and shellfish health to determine if there is a clear reason for the elevated mortality.
  - » This may include referral to the Company Biosecurity Coordinator or the Operational Zone Biosecurity Coordinator and diagnostic sampling under instruction from MPI Animal Health Lab.
- A **potential biosecurity issue** is considered to have occurred where mortality rates show a consistently increasing trend between monitoring times and the cause is not immediately apparent, or large mass mortality or a new clinical presentation (e.g., lesions) is noted (see flow diagram on following page - Figure 3).
  - » The affected farmer(s) or a Biosecurity Coordinator must notify a Marine Biosecurity Incursion Investigator through the MPI hotline immediately and follow their instructions.
  - » If MPI recommend actions that have potential to affect wider industry, then the issue becomes a **potential biosecurity event**.
  - » For a **potential biosecurity event**, communication to industry must be carried out as specified in the 'Communication' section below.

**All parties must remain cognisant of their obligations under the Biosecurity Act 1993 to report any symptoms of unknown cause or species which may be new to New Zealand; presence or suspicion of notifiable organisms; unwanted organisms or potentially new to New Zealand organisms. Such notifications should be made to the MPI Hotline.**

### Recommendations

- Voluntary movement restrictions during a **potential biosecurity event**:
  - » In consultation with MPI officials, and where appropriate Regional Council representatives, from its initiation to its resolution, stock or equipment movements should cease from the affected Operational Zones to other Operational Zones.
  - » Within and between an Operational Zones, stock should not be moved from the affected facility except when harvest for processing.
  - » Transfer to a processing facility should only occur where the risk of doing so has been assessed and appropriate control measures are in place.
  - » Equipment should only be moved after suitable decontamination measures have been taken (See "Decontamination Standards").
  - » Once the cause is known, and if appropriate risk mitigation measures known to be effective can be put in place, then stock and equipment movements may be able to recommence before the event is fully resolved.

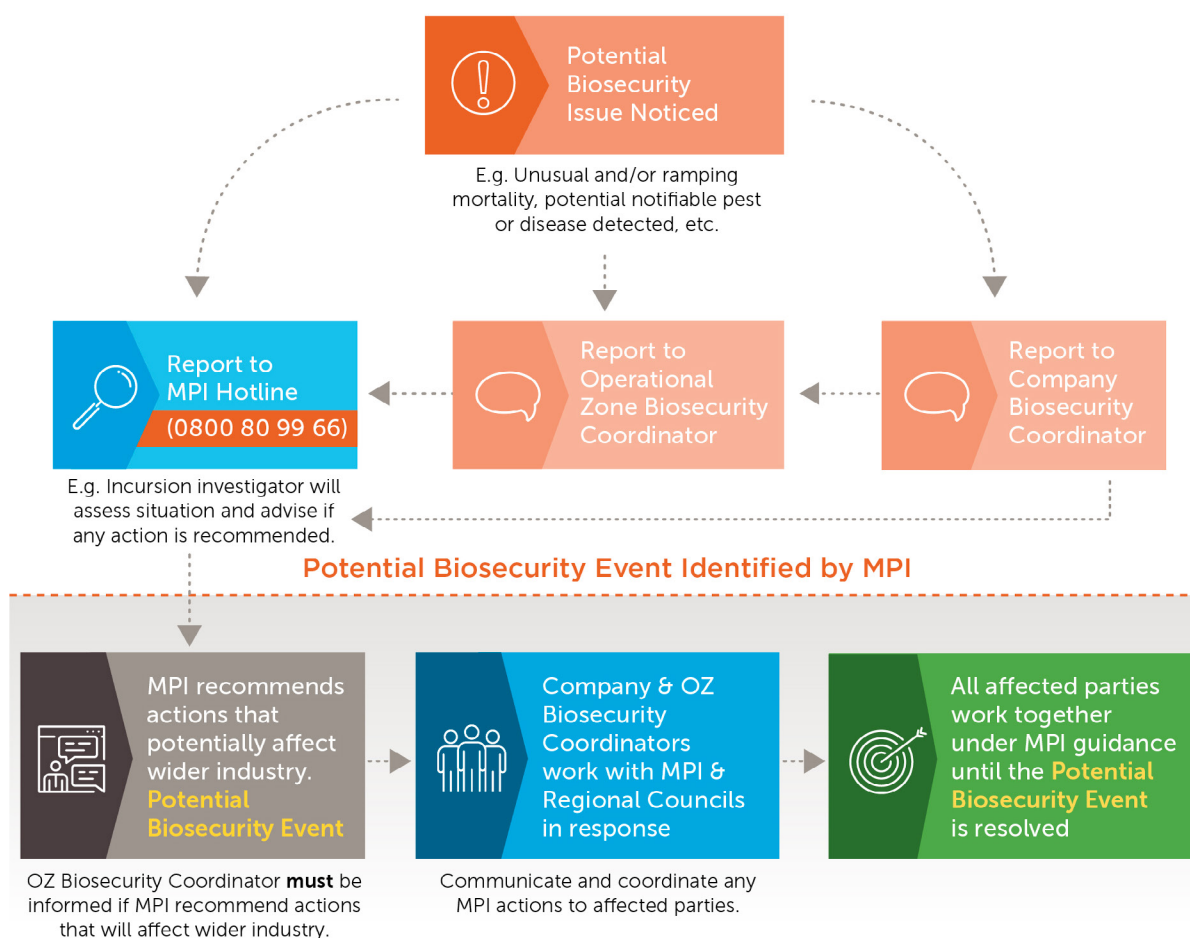


Figure 3: Flow diagram showing reporting structure when a potential biosecurity issue is noticed.

## Communication

This section details the communication requirements and protocol for biosecurity events.

### Requirements

- Early communication is carried out when a **potential biosecurity event** is encountered:
  - » Within an Operational Zone – Biosecurity Coordinators and AQNZ must be notified of a potential biosecurity event and or any MPI instructions within 48 hours or sooner if practicable; the Biosecurity Coordinators and / or AQNZ will then notify all relevant parties of any MPI directives.

**This notification may include a series of actions to be carried out within a set period.**

### Recommendations

- Broad level industry communications will be carried out through annual A+ reporting. AQNZ will hold such information confidentially and will collate and circulate a summary to growers to facilitate identification of emerging issues as appropriate.

**National Response Plan:**  
**Industry will collaborate with Government under the GIA to develop a National Emergency Response Plan for high-risk pathogens and specific unwanted organisms.**



## Contingency Plans

This section details the protocol for unexpected events and emergency incidents that can directly or indirectly impact farm biosecurity.

### Requirements

- Each company must include a contingency plan in their BMP that provides details that guide response to emergency incidents that might impact farm biosecurity.
- Relevant staff must be aware of the contingency plan for emergency incidents.

Incidents or events which may require biosecurity considerations include:

- Natural Disasters (e.g., storms, flooding, fire, earthquake, tsunami, etc)
- Chemical / oil spills
- Water supply issues
- Water quality issues
- Mass mortalities
- Emergency cleaning and disinfection
- Disposal of stock inadvertently harvested during a harmful algal bloom event



## Risk Specific Pathway Management

The following risks have been identified through an industry risk assessment<sup>3</sup> as needing specific management measures:

### Vessel, Vehicle, and Equipment Management

The movement of vehicles, vessels and their associated equipment between facilities requires risk assessment and, where appropriate, disinfection treatments as a precautionary measure to prevent the spread of pests and pathogens.

Details of approved decontamination treatments are presented in "Decontamination standards" for reference.

#### Requirements

##### Vessels:

- Vessel hulls must be maintained at a level of fouling that reduces the risk of transferring unwanted pests.

**If Management Areas have been formed, cleaning and removal of all biological material from the deck and farming equipment must occur before moving between Management Areas.**

**Vessels must also comply with Management Area requirements detailed in Regional Pest Management Plans and Controlled Area notices.**

##### Vehicles:

- The vehicle decks must be hosed clean of biological material (preferably with fresh water, but where this is not available seawater) and, where a risk assessment suggests it is necessary, decontaminated (see "Decontamination Standards") before moving between facilities.
- A log of cleaning and disinfection activities must be kept.

##### Equipment, Lines, and Floats:

- Lines and floats brought to onshore maintenance and treatment yards must be segregated from new or previously disinfected lines, floats, sticks, bags, baskets, and other production equipment, and must be identifiable (i.e. labelled / tagged/dated).
- Any equipment used in operations (e.g., washing, grading, harvesting equipment) must be cleaned to remove all biological material, and ideally dried, prior to transfer to another facility or Management Area.

#### Recommendations

##### Vessels:

- The decks and equipment of work vessels should be hosed clean of biological material at the end of each workday.

##### Equipment, Lines, and Floats:

- Where possible, minimise equipment transfers between facilities.

<sup>3</sup> AQNZ 2022 - NZ Mussel Industry - Pathogen Risk Profile Report – 2nd Edition 18p – available on request from AQNZ

## People Management

This section details how risk posed by people movements on and between facilities can be mitigated.

### Requirements

Biosecurity control measures to minimise the risk of staff and visitors transferring pests and pathogens onto, within, and off the facility, and the biosecurity risks associated with unwanted persons accessing, or interacting with the facility, include:

- Perimeter or boundary protection must be in place to prevent unauthorised entry, as appropriate to site constraints.
- Biosecurity signage must be used as appropriate to site constraints.
- Risk appropriate entry/exit decontamination procedures must be in place for all people and associated equipment entering a facility (e.g., foot baths or handwashing stations).
- Areas of decontamination and storage of PPE must be designated, away from production areas.

**These controls mainly apply to land-based facilities where mussels are processed, marine farming yards and hatcheries**

### Land-based Staff

- Upon arrival at a facility, staff must disclose if they have attended another aquaculture facility or been in another seafood facility or on a fishing vessel in the previous 72 hours and undertake any additional disinfection procedures requested by the facility manager.
- Upon entering a facility, all staff must undertake appropriate disinfection procedures (e.g., disinfectant foot baths) and wear only approved PPE.
- Onshore personnel (those staff that are based onshore but visit multiple facilities) must receive safety and biosecurity inductions and specialised training.
- Prior to leaving a facility, all staff must undertake appropriate disinfection procedures.
- Personal clothing soiled with organic material (e.g., biofouling) must not be transferred to another facility unless it is disinfected or laundered.
- All personnel entering or leaving washdown areas must use a disinfectant footbath.

### Vessel Staff

- Vessel staff must disclose if they have been aboard another marine farming vessel or if they have visited any seafood, fishing vessel or land-based aquaculture facilities in the previous 72 hours, and undertake any additional disinfection procedures advised by the skipper (e.g. change into vessel specific PPE).
- Upon boarding the vessel, all staff must wear only approved PPE, and if deemed necessary undertake appropriate disinfection procedures.

### Visitors (including contractors)

- Visitors must be asked if they have visited any other aquaculture sites or fishing vessels in the previous 72 hours. If they have, appropriate biosecurity control measures must be used. These may include denial of entry, decontamination of equipment, and/ or changing of clothing and footwear to facility-specific PPE.
- Visitors must sign-in to a logbook when entering any facility for traceability.
- Visitors must receive safety and biosecurity inductions, and where appropriate wash hands and arms with detergent, and should use only PPE approved by the company being visited.
- All visitors (excluding contractors) must be supervised by company representatives, and access to sensitive areas should be avoided.
- Contractors must be supervised by company personnel.
- Prior to departure visitors must follow an appropriate decontamination process, which could include a foot bath, and washing of hands and arms with detergent.



### Dive Service Teams

- Dive gear may be transferred between facilities of equivalent health status or from higher to lower health status, but it must be cleaned, soaked in freshwater, and ideally disinfected before being moved.
- Additional risk mitigation measures must be implemented for dive gear movements with elevated risk (e.g., contract dive teams moving between Operational Zones, or coming from a facility with a lower health status). These movements must comply with the 'Decontamination Standards'.
- In the case of a potential biosecurity event, dive gear must not be moved between facilities until the issue is resolved.

### Recommendations

#### Visitors (including contractors)

- Appropriate signage should direct visitors to the correct reception point.

## Mortality Management

This section details how mortalities should be managed and disposed of.

### Requirements

#### Under Normal Operational Circumstances

Under no circumstances should dead or moribund (sick or dying) stock be used for any other purpose (e.g., bait) unless it has been heat-treated or similar to mitigate the risk of transferring disease.

Biosecurity risk control procedures when handling moribund or dead stock include:

- Using leakproof liners during transport;
- Heat washing or decontaminating bins or baskets after use and safely disposing of liners to an approved landfill;
- Washing trucks used to move bins or baskets;
- Wearing and decontaminating PPE used to handle dead stock.

#### Under Exceptional Circumstances

- Refer 'Contingency plan' section.





## Waste, Wastewater, and Water Management

This section details how mortalities should be managed and disposed of.

### Requirements

These standards apply mainly to land-based facilities but should be applied to marine facilities where a risk assessment suggests it is necessary. A waste management section must be included in your Biosecurity Management Plan to minimise the biosecurity risks associated with organic and inorganic waste. A 'waste management plan' should be developed where large amounts of waste or high-risk wastes are being managed.

- Organic waste must not be directed to bait or burley manufacture unless treated in a manner that will inactivate any potential pathogens.

Control measures for wastewater management from land-based facilities include:

- All bin or bag tipping, bin/ bag washing, and truck washing must be undertaken in a bunded area where water is collected in a wastewater system.
- Bunded areas must be washed down using a high-pressure hose after all bins/ bags have been off-loaded from trucks.
- Bunded areas and the corresponding wastewater system must have enough storage capacity to ensure there is no overflow during storm events.
- A contingency plan must exist for instances of wastewater treatment failure.

Control measures for water management at land-based facilities include:

- Incoming and outgoing water (including discharge water) and its flow throughout the facility must be assessed for biosecurity risk to the facility, other facilities and the environment by a suitably qualified person. This risk assessment must be documented and reviewed each time procedures or operations change.
- Settlement tanks and ponds must be maintained to prevent proliferation of pests and pathogens or harbouring of escaped stock.

### Recommendations

Risks from inorganic waste, wastewater and water should be assessed and managed according to the risk profile.

Controls to manage risks associated with inorganic waste include:

- All collected waste should be stored in covered, leakproof and animal/bird proof containers.
- Solid organic waste from processing facilities should be diverted to an approved storage, landfill, rendering, composting or biodigestion site, and should not be placed into the aquatic environment (freshwater, or coastal marine environments) unless treated to inactivate pathogens.
- Facility staff should be trained in waste collection and disposal procedures, as appropriate to each employee's job description.
- Detailed records of waste disposal activities should be kept.

Controls to manage wastewater risks include:

- All other wastewater should be directed to the wastewater system, or directed to a municipal wastewater treatment plant under a 'trade waste agreement', or managed under resource consent conditions in accordance with council regulations.
- Bunded areas should be washed down using a detergent after all bins/ bags have been off-loaded from trucks.

Controls to manage risks associated with water include:

- Incoming and outgoing water infrastructure should undergo regular surveillance and maintenance.

## Wildlife Management

This section details how wildlife should be managed as potential fomites.

### Requirements

Wildlife (e.g., birds, cats and vermin) can transfer pests and diseases into and out facilities and need to be managed through additional barriers using the following controls:

- Rodent bait stations must be used around the transfer point from trucks to the processing facility and within the processing facilities to prevent the spread of infectious agents;
- Preventive measures must be implemented to keep birds and other wildlife away from shellfish and wastewater during unloading operations;





## Decontamination Standards

This section specifies minimum "Decontamination Standards" required. Proper and effective decontamination is a combination of cleaning, disinfection, and drying that is documented. These "Decontamination Standards" apply to high-risk PPE, farm equipment (including lines, floats, and bags), and harvest equipment (e.g. to be transferred between Operational Zones) – see Special Decontamination Requirements.

Ensure appropriate PPE (e.g. Gloves and eye protection) is used when handling and applying disinfectants.

**Caution:** there are risks associated with mixing detergents with some disinfectants. Please check prior to using in combination.

PRODUCT NAME (ACTIVE INGREDIENT)	USE	DOSAGE	APPLICATION METHOD
Virkon® Aquatic (potassium peroxymonosulphate and sodium chloride)	Disinfection of pre-cleaned surfaces (e.g. culture tanks, walls, floors, tables)	1:100 (freshwater only)	Wipe or spray at 300mL/m <sup>2</sup>
	Disinfection of equipment (e.g. hand-held meters, refractometer, secchi disk, algae nets, aeration systems, weigh scales)	1:100 (freshwater only)	Wipe or spray at 300mL/m <sup>2</sup> ; or immerse in solution for 10 min; rinse clean with fresh water and air dry
	Foot baths and vehicle tyre baths	1:100 (freshwater only)	Fill baths with solution and replenish every 4 days or when moderately fouled
	General disinfection of farm equipment (e.g. floats, culture rope)	1:200 (freshwater only)	Spray 300mL/m <sup>2</sup> ; or immerse in solution for 10 min; then air dry (for a minimum of 28 days if transferring between Operational Zones)
Quaternary ammonium compounds - can be used where freshwater is not available but lacks efficacy for some pathogens	Disinfection of equipment	2 ppm (fresh or saltwater)	Immerse in solution for 15 min rinse clean with fresh or saltwater and air dry
	Foot baths and vehicle tyre baths	10 ppm (fresh or saltwater)	Fill baths with solution and replenish every 4 days or when moderately fouled

NB: If neither Virkon® Aquatic nor quaternary ammonium compounds are available, or facilities wish to use other compounds (e.g. Peraclean, Sodium hypochlorite), then the tables in Annex 1 should be followed.

## Special Decontamination Requirements

1. Special decontamination requirements for transfer of used farming equipment between Operational Zones:
  - a. Any foreign matter, animals, animal matter or other soil must be cleaned from bags or bins using clean fresh water where possible. All water should be drained from equipment;
  - b. Lines must be water-blasted clean with fresh water and should be treated with an appropriate disinfectant (suitable chemical disinfectants include those detailed in the table above and alternatively those in Annex 1);
  - c. Lines must be dried for 28 days (preferably exposed to sunlight);
  - d. Where applicable, to specifically to reduce the risk of transferring terrestrial animals, (e.g. rainbow skink), after cleaning, disinfection, and drying, bags or bins containing mussel lines will ideally be wrapped and frozen to (-18 degrees) for at least 10 days before transfer;
  - e. If bags or bins are to be re-used, the internal and external surfaces must be disinfected using wet heat (on suitable surfaces) or chemical disinfectants.
2. Special decontamination requirements for transfer of used Processing Equipment between Operational Zones:
  - a. Any foreign matter, animals, animal matter or other soil must be cleaned from used equipment using clean fresh water if possible.
  - b. All contaminated water must be drained from used equipment.
  - c. Used equipment must be water blasted clean with fresh water and disinfected using wet heat (on suitable surfaces) or treated with a suitable chemical disinfectant (see table above). Suitable chemical disinfectants include those detailed in the table above and alternatively those in Annex 1.
  - d. Equipment must then be air dried for 48 hours (preferably exposed to sunlight) before transfer between Operational Zones.
3. Special pathway management measures for aquaculture vessels moving between Operational Zones:
  - a. Vessels must have an anti-fouling system applied, maintained, and re-applied in accordance with the manufacturer's instructions. Guidance on effective antifouling can be found in the Australia and New Zealand 'Anti-fouling and In-water Cleaning Guidelines' <sup>4</sup>;
  - b. Vessels visiting the farm must have a clean hull. A hull is a 'clean' hull when minimal biofouling is present;
  - c. Vessels that have operated within territorial waters outside the Operational Zone since last antifouling: biofouling must be no more than slime layer.
  - d. The allowable biofouling must be visibly free of notifiable or unwanted species, or those species otherwise designated by the MPI as marine pests in the 'New Zealand Marine Pest ID Guide' (<https://www.mpi.govt.nz/document-vault/10478>) or subsequent versions of that document.
  - e. The vessel operators must maintain records of measures undertaken and information on which they have relied when determining compliance with measures above. Where requested, the records are to be provided prior to arrival at the farm site<sup>5</sup>.

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4 [www.agriculture.gov.au/biosecurity-trade/aircraft-vessels-military/vessels/marine-pest-biosecurity/biofouling/anti-fouling-and-inwater-cleaning-guidelines](http://www.agriculture.gov.au/biosecurity-trade/aircraft-vessels-military/vessels/marine-pest-biosecurity/biofouling/anti-fouling-and-inwater-cleaning-guidelines)

5 The maintenance of a Biofouling Record Book as outlined by the International Maritime Organisation, would be an appropriate format for record keeping relating to vessel biofouling management (i.e. antifouling certificates, hull inspection reports, etc).



HULL AREA (SEE NOTE)	ALLOWABLE BIOFOULING
<b>Main Hull</b>	<p>Algal growth occurring as:</p> <ul style="list-style-type: none"> <li>• no more than 4 mm in length; and</li> <li>• continuous strips and/or patches of no more than 50 mm in width.</li> </ul> <p>Incidental (maximum of 1%) coverage of one organism type of either tubeworms, bryozoans or barnacles, occurring as:</p> <ul style="list-style-type: none"> <li>• isolated individuals or small clusters; and</li> <li>• a single species, or what appears to be the same species.</li> </ul>
<b>Wind and water line</b>	<p>Algal growth occurring as:</p> <ul style="list-style-type: none"> <li>• no more than 4 mm in length; and</li> <li>• continuous strips and/or patches of no more than 50 mm in width.</li> </ul> <p>Incidental (maximum of 1%) coverage of one organism type of either tubeworms, bryozoans or barnacles, occurring as:</p> <ul style="list-style-type: none"> <li>• isolated individuals or small clusters; and</li> <li>• a single species, or what appears to be the same species.</li> </ul>
<b>Niche areas</b>	<p>Algal growth occurring as:</p> <ul style="list-style-type: none"> <li>• no more than 4 mm in length; and</li> <li>• continuous strips and/or patches of no more than 50 mm in width.</li> </ul> <p>Scattered (maximum of 5%) coverage of one organism type of either tubeworms, bryozoans or barnacles, occurring as:</p> <ul style="list-style-type: none"> <li>• widely spaced individuals and/or infrequent, patchy clusters that have no algal overgrowth; and</li> <li>• a single species, or what appears to be the same species; and</li> </ul> <p>Incidental (maximum of 1%) coverage of a second organism type of either tubeworms, bryozoans or barnacles, occurring as:</p> <ul style="list-style-type: none"> <li>• isolated individuals or small clusters that have no algal overgrowth; and</li> <li>• a single species, or what appears to be the same species.</li> </ul>

## Notes

1. Main hull: The immersed surfaces of a vessel excluding niche areas and wind/water line.
2. Wind and water line: The area of the hull that is subject to alternating immersion due to a vessel's movement or loading conditions (also known in shipping as the boot-top).
3. Niche areas: Areas on a vessel hull that are more susceptible to biofouling due to different hydrodynamic forces, susceptibility to coating system wear or damage, or being inadequately, or not, painted, e.g. sea chests, bow thrusters, propeller shafts, inlet gratings, rudders, keels, trim tabs, dry-dock support strips.

## Annex 1: Disinfectant doses

Disinfectant application and recommended doses (adapted from DAFF 2022<sup>6</sup>). Suitable for disinfection of surfaces and equipment.

Types of broad spectrum chemical disinfectants	Examples of disinfectants	Parameters for use Note: These are minimum rates only
<b>Oxidizing Agents</b>	<b>Virkon</b> Active ingredients: Pentapotassium bis (peroxymonosulphate) 40-55% Sodium C10-13-alkylbenzenesulfonate 10-12% Malic acid 7-10% Sulphamidic acid 4-6%	<ul style="list-style-type: none"> <li>• Virkon – 10g to 1 litre of water</li> <li>• Contact time - 10 minutes.</li> </ul>
<b>Quaternary ammonium compounds</b>	<b>Powerquat</b> Active ingredient: Benzalkonium chloride 10 - <30%	<ul style="list-style-type: none"> <li>• Powerquat – 125ml to 19,875ml (litres) of water</li> <li>• Contact time - 5 minutes.</li> </ul>
<b>Alkalis</b>	<b>Sodium hydroxide</b> Active ingredient: Caustic soda NaOH (2% solution)	<ul style="list-style-type: none"> <li>• Sodium hydroxide - 20g (2%) to 1 litre of water</li> <li>• Contact time - 10 minutes.</li> </ul>
<b>Acids</b>	<b>Suma Crystal A8</b> Active ingredient: Citric acid 3-10% Alkyl alcohol alkoxyate 3-10%	<ul style="list-style-type: none"> <li>• Suma Crystal - 2.86 % w/v (28.6-29g) to 1 litre of water</li> <li>• Contact time - 30 minutes.</li> </ul>
<b>Halogen</b>	<b>Sodium hypochlorite</b> Active ingredient: Chlorine	<ul style="list-style-type: none"> <li>• Sodium hypochlorite – 1% available chlorine – 200ml to 800ml of potable water</li> <li>• Contact time – 10 minutes</li> <li>• Sodium hypochlorite – -1% available chlorine – 200ml to 800ml of non-potable water (pH of 6-8)</li> <li>• <b>Note:</b> Care should be taken when diluting these solutions to ensure a final working concentration of 1% is achieved. These calculations are based on using a 5% sodium hypochlorite product. If using 4% sodium hypochlorite product, adjust accordingly.</li> </ul>

### Notes

- The above are disinfectants for use when decontaminating equipment, spillage areas or situations.
- Equipment and surfaces should be cleaned and free from organic material and grease prior to any form of disinfection or decontamination.
- The parameters are minimum concentration rates and contact times.
- Chemicals must be applied in accordance with the label directions.

6 <https://www.agriculture.gov.au/biosecurity-trade/import/arrival/arrangements/requirements/disinfectants>









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