



Environmental
Management
Programme
(EMPr)

Mussel Farm

7-27-2020

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1. Background Information

1.1. Introduction

██████████ operates a 30 hectare mussel farm inside the Saldanha Bay commercial harbour, within Small Bay ██████████ has been operational since 2012, it's lease awarded by Transnet National Ports Authority back in 2007. The Mediterranean Mussel (*Mytilus galloprovincialis*) is grown on mussel ropes suspended from rafts. Recently ██████████ was included into the Saldanha Bay Aquaculture Development Zone (ADZ) and the location of the site can be seen on Figure 1. GPS coordinates are:

A 33:00:22,5 S ; 17:58:03,6 E

B 33:00:22,7 S ; 17:58:26,8 E

C 33:00:38,9 S ; 17:58:26,6 E

D 33:00:38,8 S ; 17:58:03,5 E



Figure 1: Location of ██████████ farming area

M. galloprovincialis was first detected on the west coast of South Africa in the late 1970's. Indigenous to the Mediterranean and Black seas, this species has colonised and formed naturalised populations at nine localities outside of its native range, including South Africa, where it is now abundantly distributed along the entire west coast. *M. galloprovincialis* is widely cultured and is one of the major contributors to the mussel aquaculture industry.

██████████ produces 700 – 1000 tons of graded mussels per annum. The farm marine infrastructure consists of 48 meters long flexible HDPE rafts from which 800 mussel ropes of 6 meters each are

suspended into the water column. A total of 26 rafts are located on the farm. Concrete mooring blocks are used to secure the rafts from each end. The mooring system for each raft consists of a 5,0 ton concrete block with 8 meter of 28-millimetre spring chain. The riser rope (40-millimetre polyester 8 strand) is 22 meters and connects to a bridle of 11 meters (also 40-millimetre polyester 8 strand). The bridle is attached to the pontoons of each raft with an 8-ton lifting sling. Each raft has laminated SA Pine beams of 5.1 meters spaced 1.2 meter across the two HDPE pontoons. On top of these beams are 8 HDPE 90-millimetre lengths, called runners from which the mussel ropes are suspended. The production rope is tied to the runner using a 12-millimetre poly-steel rope.

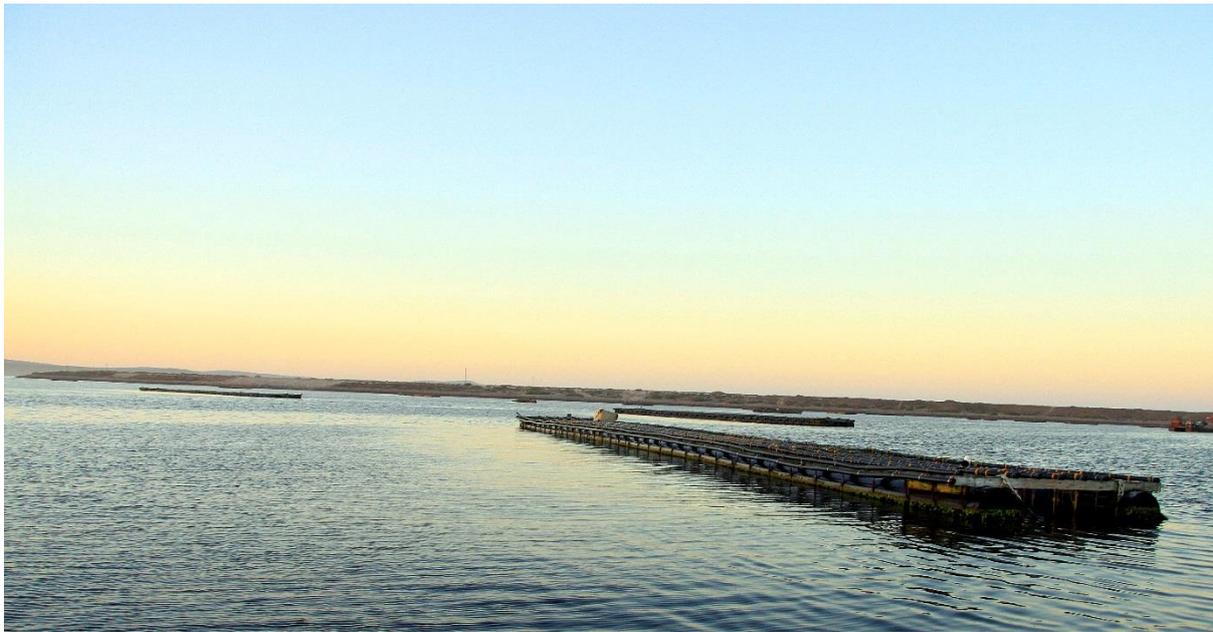


Figure 2. Mussel raft on the farm

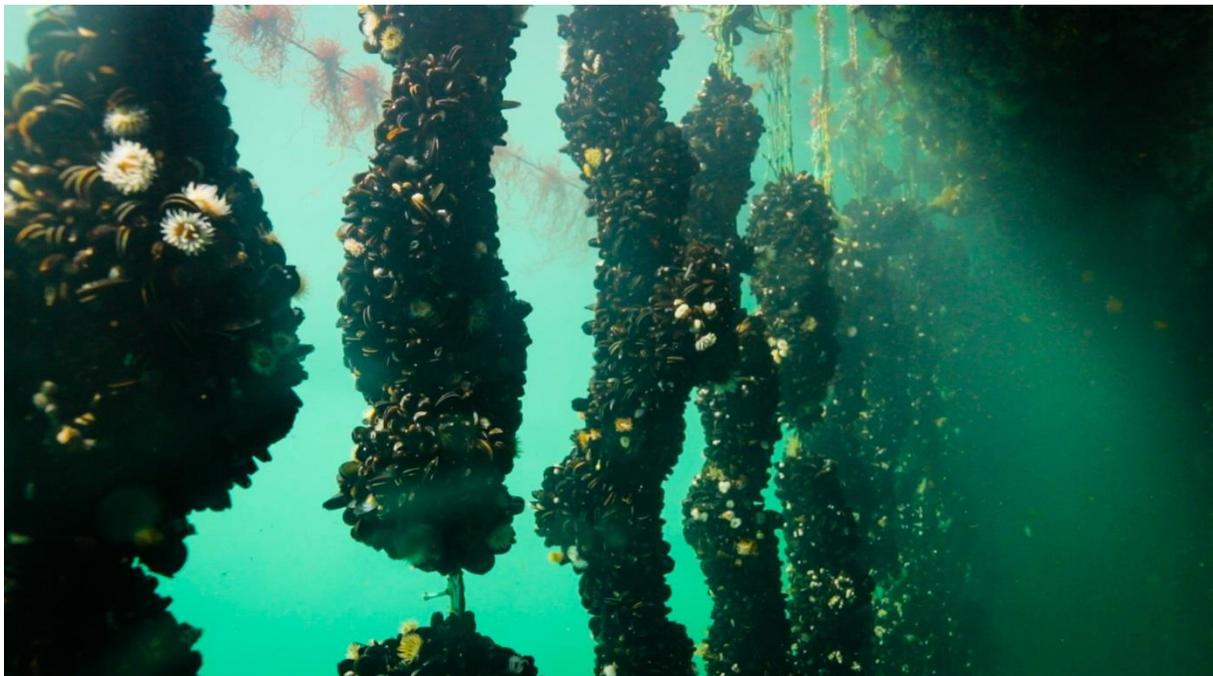


Figure 3. Mussel droppers suspended from the raft

The land base at Plot 14, Pepper Bay includes basic office, storage, ablution facilities and a work yard. The work boat is moored nearby.

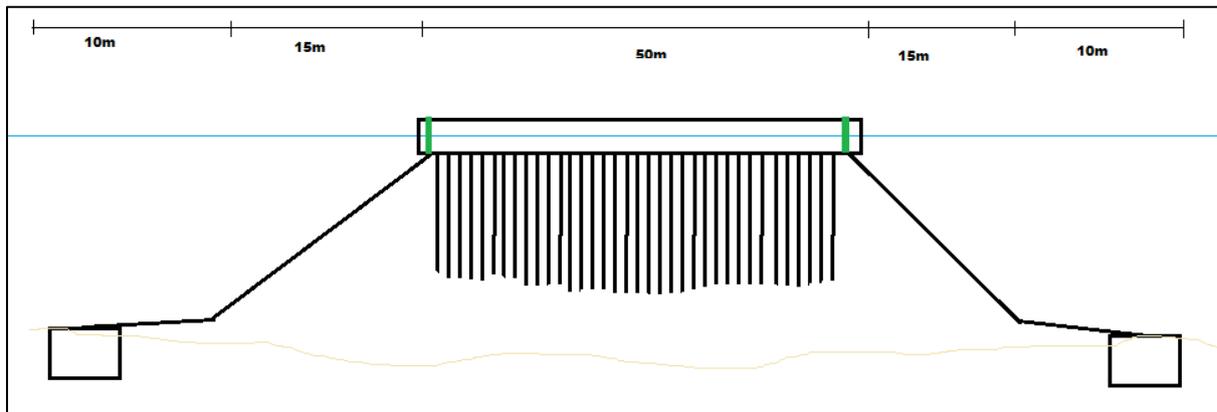


Figure 4. Mooring arrangement of mussel raft

Natural mussel spat-fall settles onto the mussel ropes and start growing on there for about 4-6 months before being stripped and thinned. These are then re-seeded onto production ropes and grown for a further 6 to 8 months. New spat-fall recruits onto the same mussel ropes. The smaller mussels as part of the harvest are separated, graded into various sizes and re-seeded on mussel ropes for further grow-out until market size is reached. Re-seeded mussels are harvested every 6-8 months.

The harvested mussels are placed in containers and transported to land for further processing at selected processing plants (cooking and freezing into half-shell/full-shell or mussel meat).

The mussels (and other marine life) that drop off mussel ropes during harvesting are dispersed by currents and settle on the sea bed.

The rafts, which are exposed to about 500mm above water, is the only part of the system that can be seen and have visual impact.

1.2. Risk Assessment

If appropriately managed the environmental impacts of the mussel industry are relatively minor. Farming activities take place in a sensitive environment (the marine coastal area) and extreme care is therefore required to ensure any impacts are avoided or minimised and to ensure regulatory and public concerns are addressed and acknowledged.

██████ has assessed and identified 'key' environmental issues in their operations. These are issues that have potential to create the most significant environmental impacts, are issues of particular concern to regulatory authorities or are perceived as key issues by other users of the coastal marine area, including the public.

The environmental risk assessment was harmonised to the risk assessment undertaken for the ADZ, with no additional risks identified. The results are summarised below. The scales used for determining severity and probability are contained in Table 1 and Table 2. The following were the key environmental risks identified for the operation and have been assessed in Table 3:

1. Marine mammals' entanglement with mooring lines and mussel ropes and mortality as a result
2. Build-up of compounds on seabed from mussel defecation and or mortality
3. Hazard to shipping as a consequence of raft breaking loose and drifting into shipping channel
4. Loss of biodiversity as a consequence of introduction of new alien invasive species
5. Localised marine benthic and pelagic mortality as a consequence of large-scale mortality of mussels
6. Mortality of indigenous marine species as a consequence of introduction of diseases at mussel farm
7. Deterioration of visual landscape with mussel farm rafts
8. Disruption of shipping and or recreational craft with mussel farm boats and infrastructure
9. Disposal of synthetic materials (rope ties and mussel ropes)
10. Generation of organic waste through mussel harvesting
11. Public nuisance through generation of odours from mussel harvesting
12. Storage, transfer, use and disposal of fuels and chemicals on boats
13. Discharges of water
14. Poisoning of customers as a consequence of accumulation of heavy metals or toxins in the flesh of the mussels
15. Potential mussel farm impacts on the aquatic environment include sediment and organic material accumulating on the sea floor, impacts of mussel food supply on the local and wider ecosystem, and impacts of any non-natural items (e.g. anchors, ropes) deposited in the marine environment or on the sea floor
16. Colonisation of other areas with spat from the mussel farm

Table 1: Probability Criteria

Probability		Score	
Happens weekly	Almost Certain	10	Unacceptable probability
Happens once in a month		9	
Happens once in three months	Likely	8	
Happens once in six months		7	
Could happen once in a year	Possible	6	
Could happen once in two years		5	
Could happen once in five years	Unlikely	4	Acceptable probability
Could happen once in ten years		3	
Could happen once in twenty years	Rare	2	
Could happen once in fifty years		1	

Table 2: Severity of impact

Consequence on the Natural Environment	Score	
Very significant impact on highly valued species, habitat or eco system - irreversible change to ecosystem performance or the extinction of a species or rare habitat	10	Unacceptable severity
Significant impact on highly valued species, habitat, or ecosystem -high mortality for an affected species or significant changes in the function of an ecosystem to the extent that changes would not be amendable to mitigation	9	
Very serious environmental impairment of ecosystem function	8	
Long-term environmental impairment of a localised habitat / ecosystem function, effects are manifested over a measurable distance, usually limited to one or two interlinked / adjacent habitats or ecosystems	7	
Serious medium-term environmental effects	6	
Medium term environmental effects limited to a distance covering a portion of a localised (project footprint and immediate surrounds) habitat or ecosystem such as a single water body or coastal bay	5	
Moderate effects affecting ecosystem function, effects are limited to the boundaries of the project or within a distance that can be influenced directly by remediation without affecting other users of a common resource	4	
Short-term effects but not affecting ecosystem function	3	Acceptable severity
Minor effects on biological or physical environment, operation based	2	
Limited damage to minimal area of low significance	1	

Table 3: Results of risk assessment

For this assessment the maximum permissible risk value (severity multiplied by probability) was assumed to be 12 (severity 3 and probability 4).

	Risk	Severity	Probability	Risk Value	Commentary
1	Marine mammals' entanglement with mooring lines and dropper ropes and mortality as a result	3	1	3	There has been no record of any such incidents in Saldanha. The mooring lines are taut which reduces the possibility of entanglement. Integrity of the infrastructure is managed using procedure 3.1.
2	Build-up of compounds on seabed from mussel defecation and or mortality	3	2	6	The currents and tidal range in the vicinity of the mussel farm are strong. Any accumulation of wastes or dead mussels will be rapidly dispersed.
3	Hazard to shipping as a consequence of raft breaking loose and drifting into channel	3	3	9	The rafts are attached at two points with anchors. While it is possible that one anchor point can break, both breaking is unlikely. Integrity of the infrastructure is managed using procedure 3.1.
4	Loss of biodiversity as a consequence of introduction of new alien invasive species	3	1	3	The Mediterranean Mussel (<i>Mytilus galloprovincialis</i>) is listed under Category 2 of the AIS Regulations, requiring a permit for production in terms of NEMBA. However, these species are exempt from requiring a permit in Saldanha Bay. No spat or other new species will be brought into the area. The droppers will be used to attract locally occurring wild mussel spat for grow-out. If any other alien species are found during harvesting, they will be discarded to waste. Actions to be taken to prevent spread of exotic species are detailed in procedure 3.2.
5	Localised marine benthic and pelagic mortality as a consequence of large-scale mortality of mussels	1	1	1	In the event of large-scale mortality of the mussels in the farm, local eutrophication could occur, which could adversely affect surrounding mussel colonies. The only action that can be taken is to remove all rafts and the dead mussels and dispose to waste in accordance with procedure 3.2.
6	Mortality of indigenous marine species as a consequence of introduction of diseases at mussel farm	4	1	4	It is possible that since the mussels are in large numbers, an outbreak of disease could occur which could spread to the wider bay. Such an outbreak has not been recorded anywhere in the world. If such an event were to occur, procedure 3.5 would be used to manage the situation.

	Risk	Severity	Probability	Risk Value	Commentary
7	Deterioration of visual landscape with mussel farm rafts	3	1	3	The rafts only protrude 500mm above the waterline and are of neutral colours. This is the only part of the farm infrastructure that is visible. There has been raft infrastructure on the farm for the past 8 years. Minimal visual intrusion is therefore anticipated.
8	Disruption of shipping or recreational craft with mussel farm boats and infrastructure	4	1	4	The mussel farm is clearly marked in the international shipping charts and is well out of the shipping lanes, any disruption is therefore minimal or non-existent. Navigational lights to be installed by the Port Captain if required
9	Disposal of synthetic materials (rope ties and mussel ropes)	2	6	12	Closed containers are on the production vessel for the disposal of synthetic materials while operating to prevent these ending up in the environment. It is however possible for a mussel rope to drop into the environment below. This risk will be mitigated through procedure 3.1 and disposal of synthetic materials according to procedure 3.2.
10	Generation of waste through mussel harvesting	2	1	2	The mussel ropes are pulled up onto a work platform. Marketable mussels are removed from the ropes and packed in plastic bins for processing plants. The only waste would be broken shells, non-commercial mussel species and debris. Disposal of this waste will be according to procedure 3.2.
11	Public nuisance through generation of odours from mussel harvesting	3	1	3	Not applicable
12	Storage, transfer, use and disposal of fuels and chemicals on boats	4	2	8	The mussel farming and harvesting process makes use of diesel engines and hydraulic motors. As a result, there is the potential of hydrocarbon compounds entering the environment. All boats are operated under the merchant shipping act with relation to pollution and these regulations regarding fuel tanks and oil bilges are policed by SAMSA.
13	Discharges of water	3	1	3	Not applicable
14	Poisoning of customers as a consequence of accumulation of heavy metals or toxins in the flesh of the mussels	5	1	5	The position of the mussels in a working harbour exposes the mussel meat to the risk of contamination with heavy metals and or other contaminants. Mussels are

	Risk	Severity	Probability	Risk Value	Commentary
					strictly monitored for food security under the South African Molluscan Monitoring and Control Program. A further two area-specific programs: one for biotoxins and one for microbial control is in place as well.
15	Potential mussel farm impacts on the aquatic environment include sediment and organic material accumulating on the sea floor, impacts of mussel food supply on the local and wider ecosystem, and impacts of any non-natural items (e.g. anchors, ropes) deposited in the marine environment or on the sea floor	3	4	12	Mussel infrastructure and farming does have a localised impact on the environment. A change in the fauna directly under the rafts occurs as well as an alteration in the chemical composition of the environment directly under rafts. The impact is however localised and does not have an impact within the farm between rafts and no impact outside of farm area. The impact will be monitored as outlined in Annexure 3 and 4. This negative impact is managed through procedure 3.1 and 3.2.
16	Colonisation of other areas with spat from the Mussel Farm	1	1	1	There is no "risk" since any such colonisation would be with locally occurring species and not newly introduced invasive aliens. There is no negative consequence to this event.

As can be seen in the diagram below none of the risks identified exceeded this threshold. All are thus considered acceptable.

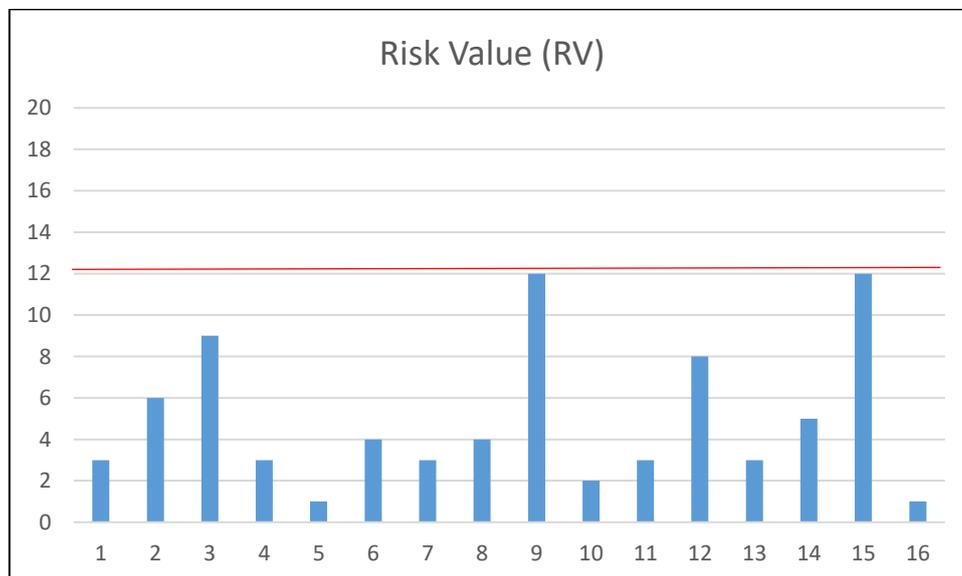


Figure 5. Diagram showing risk values for risks identified

A more detailed examination of the risks provided in the diagram above reveals that the majority of the risks fall into sector A in which the severity and probability of the events taking place are sufficiently low, that as long as normal operations are maintained, no significant negative environmental impact is anticipated.

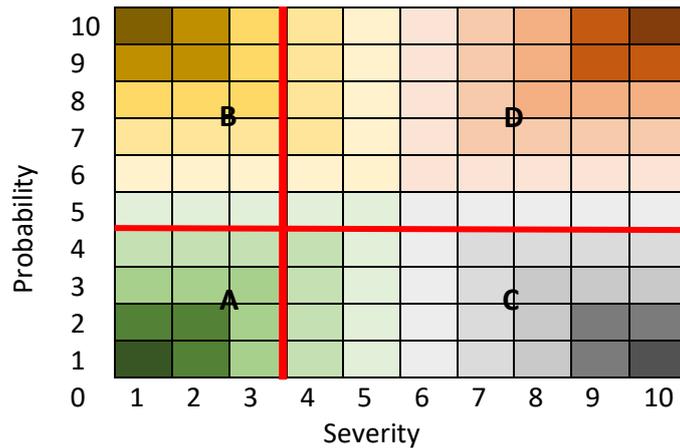


Figure 6. Risk matrix

Sector A:

Risks within this area are considered acceptable risks without modification under the condition that current controls persist and are maintained.

Risks identified that fall in this section: 1, 2, 3, 4, 5, 6, 7, 10, 11, 13, 15, 16

Sector B:

Risks within this area are acceptable but can be mitigated further through management actions.

Risk 9

Sector C:

Risks within this area are acceptable but can be mitigated further through management actions.

Risks 8, 12, 14

Sector D:

Risks within this area are considered unacceptable risks and need modification.

None

Based on the risk criteria, both probability and severity should be 4 or below to be an acceptable risk. Only two risks fell outside of the acceptable sector: risk 9 and 14.

Risk 9 has to do with the risk of synthetic materials entering the environment. Although the severity in the event of this occurring is low, the probability of this occurring pushes the risk above the threshold. Risk 14 is the risk of consumer poisoning as a result of biotoxin accumulation or other toxic substance accumulation. Because mussels are filter feeders, they accumulate toxins and given the severity of this risk, it is pushed above the threshold. It is important to note that the probability of this occurring is very low, as a result of all the monitoring programmes being undertaken by independent authorities.

The environmental risk assessment shows that the farming operation has an overall low ecological risk profile.

This Environmental Management Programme (EMPr) sets out the management procedures that seek to avoid or minimize the potential negative impacts anticipated by the risk assessment or to maintain or improve the quality of the surrounding natural and man-made environment during the course of the operational and decommissioning phases of the farming process.

This EMPr will need to be reviewed, revised on a regular basis at a frequency not exceeding 12 months, as operations continue and a greater understanding of the impacts is achieved, or as legislation changes.

1.3. The Affected Environment and Anticipated Environmental Impacts

Site selection

A number of factors were considered to find a suitable location and position for the farm site. The selected site was chosen as it is sufficiently sheltered to provide optimal husbandry conditions resulting in optimal growth of the mussels, yet provides sufficient water displacement and depth under the mussel ropes to aid in the dispersal of the faeces accumulating on the sea floor. Furthermore, the rafts are moored in the designated aquaculture development zone (ADZ) where no boat traffic is allowed without the permission of port authorities to ensure safety from and to marine traffic. Despite the fact that the rafts are in a no-shipping zone, safety controls which are presented in 3.4 to minimize the risk of possible marine traffic accidents.

Terrestrial Environment

Existing leased site (Plot 14, Pepper Bay, Saldanha) is used as land base

No significant land-based impacts are anticipated as a result of operations.

Marine Environment

No accumulation of faeces under the rafts is anticipated since the strong currents will rapidly disperse the organic compounds. Some mussels and other biofouling organisms are anticipated to accumulate under the rafts and alterations of the immediate environment below the rafts is anticipated. This will however be monitored as deemed necessary by the AMC. No feeding of mussels is undertaken so there will be no additional and artificial nutrients added to the system. No anti-biofouling agents are required or used.

Fauna

There is a low probability that marine mammals could become entangled in the moorings or mussel ropes (although this has never been reported since mussel farming started) and has not been reported internationally. The Guidelines and Standards to mitigate marine mammal entanglement for the Saldanha Bay Aquaculture Development Zone risk assessment shows that the placement of the farm is in an area that does not receive whale visits. The mooring lines are heavy and taught lines and only single droppers are used for seed collection, so risk of entanglement is low.

Archaeology

Potential for impact is low across the ADZ. Concrete mooring blocks placed on the sea floor will not affect buried shipwreck material. In addition, 5-ton concrete blocks are relatively small and have a small footprint on the seabed. Impact may result if moorings are placed on exposed shipwreck material.

1.4. Objectives of EMPr

This EMPr aims to achieve the following objectives:

- to set out the mitigation measures and environmental specifications which are required to be implemented in order to ensure that potential negative impacts on the environment are minimised and positive impacts maximised;
- to provide a structure within which the environmental management requirements will be implemented, audited and reported on;
- to state standards and guidelines that are required to be achieved in terms of environmental legislation and authorization conditions;
- to provide a clear indication of the environmental management requirements of each of the role players involved;

1.5. Abbreviations

ADZ	Aquaculture Development Zone (Saldanha Bay)
AMC	Aquaculture Management Committee
DEA&DP	Department of Environmental Affairs and Development Planning (Provincial)
DEFF	Department of Environment, Forestry and Fisheries
DEO	Designated Environmental Officer
EA	Environmental Authorisation
ECO	Environmental Control Officer
EMPr	Environmental Management Programme
Licensed Landfill Site	Dumpsite for waste that has been licensed in terms of the National Environmental Management: Waste Act 59 of 2008, or has been permitted under previous legislation, i.e. National Water Act 36 of 1998.
Environment	The aggregate of surrounding objects, conditions and influences that influence the life and habits of man or any other organism or collection of organisms.
Site	The boundary and extent of operations and infrastructure.
Site Operations Manager	The manager employed to the farm to oversee day to day operations on the project site.

2. Implementation of Environmental Management Programme

This EMPr is a requirement of the National Ports Authority lease agreement and describes mitigation measures in detail, identifying specific people or organisations to undertake specific tasks, in order to ensure that negative impacts on the environment are minimised and positive impacts optimized during farming operations. This EMPr includes all relevant documentation contained or referred to within it, along with any amendments or appendices to this document.

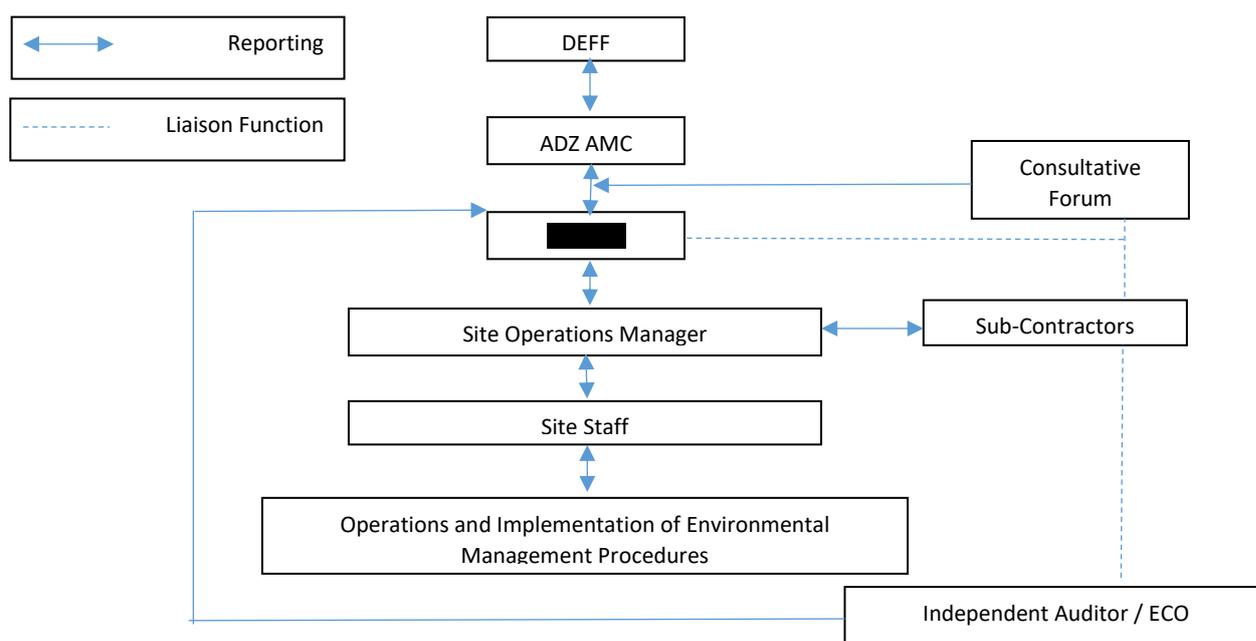
2.1. Key Legislation

Act, Ordinance, By-law	Section	Description	Relevance
National Environmental Management Act (No 107 of 1998)	S 28(1)	Duty of Care responsibilities	Responsible for the duty of care of natural assets.
Environmental Impact Assessment Regulations and listed Activities (2014, as amended).	Listing Notice 1, Appendix 4	Activities requiring authorisation. Contents of EMPrs	Aquaculture activities requiring an Environmental Authorisation. An EMPr is also required.

Act, Ordinance, By-law	Section	Description	Relevance
National Environmental Management: Biodiversity Act (No 10 of 2004)	S 65, 69	Restricted activities involving alien species and Duty of care relating to alien species	The AIS Regulations in terms of NEMBA lists four categories of invasive species and the control/management of each. The Mediterranean Mussel (<i>Mytilus galloprovincialis</i>) is listed under Category 2 of the AIS Regulations, requiring a permit for production in terms of NEMBA. However, this species is exempt from requiring a permit in Saldanha Bay.
National Environmental Management: Integrated Coastal Management Act (No 24 of 2008)	S 58, 69	Promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes, including pollution control, regulating discharge of effluent to sea	There is a requirement to prevent pollution of or undue damage to the coastal zone in or adjacent to which this operation is situated.
National Environmental Management: Waste Act (No 59 of 2008)	Chapter 4 Pt 3 and 5	Regulates waste management in order to protect health and the environment.	Management of waste on site.
Occupational Health and Safety Act (No 85 of 1993)	All	Primarily aimed at ensuring the health and safety of persons at work, and visitors. Specifies the basic systems that need to be in place and measures that need to be taken.	Site staff and visitors need to be protected from health and safety risks.
Hazardous Chemical Substances regulations (25 August 1995)	9A(1)	Storage and handling of hazardous chemical substances.	Need to ensure the safety of people working with hazardous chemicals (specifically fuels), as well as safe storage, use and disposal of containers.
Animal Health Act No. 7 of 2002	S 16 & 17	Control measures for the prevention of diseases and parasites and for schemes to promote animal health.	Implementing measures to prevent diseases
Marine Living Resources Act No 18 of 1998	Reg R111 of 1998, S72 & 73)	To provide for the conservation of the marine ecosystem, the long-term sustainable utilisation of marine living resources and the orderly access to exploitation, utilisation and protection of certain marine living resources. Provides for	A Marine Aquaculture Right and permit is required in terms of this legislation in order to undertake the project and comply with food safety requirements.

Act, Ordinance, By-law	Section	Description	Relevance
		the control of food safety in terms of cultured marine fish.	
National Ports Act No. 12 of 2005		The manner in which the project will be operated (including its location) will be directed by the NPA.	Specifically related to marine hazards and use of the port
National Regulator for Compulsory Specifications Act, 2008 (Act No. 5 of 2008)	VC 9107_2018	Compulsory specification for aquacultured live and raw bivalve molluscs	Lays down food safety control measures for aquacultured live and raw bivalve molluscs
Foodstuffs, Disinfectants and Cosmetics Act, 1972 (Act No. 54 of 1972)	Regulations	Food safety controls for product intended for human consumption	Lays down food safety control measures for aquacultured live and raw bivalve molluscs

2.2. Responsibilities and Organisational Structure



2.2.1. DEFF : Branch Fisheries

Responsible for:

- Allocating a marine aquaculture right for the project as well as issuing other relevant permits;
- Establishing and managing an Aquaculture Management Committee (AMC) to receive bi-monthly reports;
- ensuring that permit holders have suitably experienced and qualified DEO and/or ensure that monitoring and management controls of licence holders is implemented and maintain a good compliance standard;

- Establishing and managing a Consultative Forum with industry operators, TNPA, IAPs;
- Receiving independent environmental monitoring information.
- Monitoring and control of food safety requirements prior to harvest.

██████████

██████████ is responsible for the overall operational management/implementation including:

- Ensuring that all required approvals/permits are in;
- Appointment of Site Operations Manager and other staff and ensuring that they are made aware of the EMPr requirements;
- Liaison with DEFF: Branch Fisheries and other authorities regarding operations and incidents (this may be delegated but he/she remains responsible).

2.2.3. Site Operations Manager

The Site Operations Manager is the manager employed (maybe the same person as the farm manager) to oversee day to day husbandry operations as well as the implementation of the EMPr, in particular:

- The implementation of the management procedures set out in the EMPr;
- Ensuring that detailed environmental records are generated and kept as required by the EMPr;
- Regular internal review of the environmental procedures in the EMPr and their continued relevance and applicability and suggest revisions where appropriate;
- Staff environmental awareness training according to an environmental awareness plan (refer to EMPr **Annexure 1** for environmental awareness plan);
- Facilitating independent environmental auditing through provision of information requested.

Note that the Site Operations Manager, while retaining overall responsibility for EMP compliance on the projects site, may delegate EMP compliance monitoring, record keeping and reporting duties to a Designated Environmental Officer, see below.

2.2.4. Designated Environmental Officer (if applicable)

A person with aptitude and knowledge of environmental management, delegated to undertake EMP compliance monitoring, record keeping and reporting duties on behalf of the Site Operations Manager.

2.2.5. Environmental Control Officer

In accordance with the Environmental Authorisation ADZ EMPr, an Environmental Control Officer (ECO) must be appointed. The ECO is an independent external environmental consultant who must audit and ensure project compliance with stipulations in the Environmental Authorisation and EMPr during the construction phase (installation of new farms), which includes:

- Visiting the project site minimum monthly during periods of active construction;
- Keeping record of all activities observed during site inspections, problems identified, transgressions noted and a schedule of tasks undertaken by the ECO;
- summarise compliance monitoring findings into a monthly report and present at bi-monthly AMC meetings;
- Submit monitoring reports to the DEFF: branch Environment: Compliance Monitoring on a monthly basis.

2.3. Social Responsibilities

██████ adheres to typical social responsibility awareness of a small company. Goods and services are procured from local, provincial or South African suppliers as far as possible.

2.4. Financing and Environmental Control

The implementation of the environmental control requirements outlined in this document shall be financed by ██████

2.5. Review and Amendment of EMPr

The management procedures contained in the EMPr may need to be amended from time to time, to ensure that the environmental management requirements of the document remain relevant to the site conditions and in light of experienced gained during operations.

All proposed amendments shall be tabled by ██████ to the DEFF: branch Fisheries and the AMC for approval prior to changes being made to the EMPr.

2.6. Monitoring, Auditing and Reporting

The Site Operations Manager in collaboration with ██████ will carry the responsibility of internally monitoring the implementation of the EMPr on site by all relevant parties on an on-going basis and address any non-conformity. The ADZ EMPr currently stipulates audits quarterly and then to be amended after 1 year by the AMC. It notes that operators should submit monthly farm monitoring report to the ADZ ECO.

The farm production supervisor will be responsible for weekly and monthly inspections as specified in the monitoring plan (attached as appendices to this EMPr) and these will be reported to the Site Operations Manager. The farm production supervisor may delegate some of the actual physical inspections and checks but will be the responsible person to ensure these are completed. The Site Operations Manager will ensure that these inspections are completed in accordance to this EMPr as well as ensure that any additional recommendations from the AMC be included and adhered to by farm production supervisor and staff.

The Farm Manager will submit monthly reports to the ADZ ECO. In the event of incidents or non-compliance to the EMPr the Site Operations Manager will report to the Farm Manager whom will need to rectify the non-compliance or report the incident or problem to the ADZ ECO.

The Farm Manager will further implement an internal audit at the AMC recommended frequency.

3. Environmental Management Procedures

3.1. Infrastructure and Equipment Management

Background and Anticipated Environmental Risks:

- Damage to heritage ship wrecks may take place if moorings are placed outside approved mooring area
- Rafts can break loose during severe weather and become a hazard to shipping
- Mussel ropes can wash onto and become litter on the beaches and might be a hazard to marine animals

Objectives:

- Ensure that farm infrastructure is maintained in a safe and serviceable condition to avoid failure, especially before and after bad weather
- Maritime safety protocols are implemented
- Minimise visual impacts of infrastructure
- Protect heritage resources

Performance Indicators:

- Detailed mooring distribution plan on file, submitted and approved by relevant authorities (DEFF, ADZ ECO and TNPA, SAHRA)
- Actual mooring on site is in accordance with the plan
- Infrastructure inspection logs completed at required frequencies
- Infrastructure and work boat visibly serviceable and as evidenced by inspection logs
- No loose infrastructure from operation at sea or on sea shore
- Land based facilities are clean and tidy
- Incident reports related to infrastructure failure on file
- All rafts accounted for
- Rafts remain in anchor grid
- No undue negative visual impact

Procedures:

1. Mooring

- Diver inspection of mooring bi-annually to ensure that it has not moved and is not placed on exposed shipwrecks
- Detailed mooring distribution plan to be submitted to DEFF, ADZ ECO and TNPA as well as SAHRA if any alterations to mooring layout is planned
- Contact an archaeologist if shipwreck material is identified at mooring sites
- Obtain a permit from SAHRA prior to continuing with activities that have disturbed a wreck site or part thereof, including objects or artefacts

2. Rafts

- Rafts are in grid layout and correct orientation
- Minimum space of 30 meters between rafts
- Mooring lines are secured and taut and rigid at all times

3. Monitoring and Maintenance

- The following infrastructure shall be inspected by the farm production supervisor or site operations manager or a third party specialist appointed by farm manager weekly and before and after bad weather intervals:
 - Mooring system (raft attachment points, bridles, mooring lines and chains)
 - Work boat
 - Office and storage site

- Maintenance and replacement of worn components identified during the inspections contemplated above shall be undertaken as soon as detected
- The work boat shall in particular be inspected to check for oil or fuel leaks and undue generation of smoke or noise and repaired immediately as required
- Serious infrastructure failure shall be investigated per the Incident Management Procedure 3.5 and action taken in order to avoid repeat incidences

4. Visual Impact

- Use grey or black based hues for all project components visible above the water surface as far as possible
- Ensure project components are of a similar style, scale and have a consistent spacing between them as far as possible to promote visual cohesiveness
- Utilise the minimum number of safety or warning buoys as far as possible. Only demarcate the corner points of each precinct and the minimum interval distance along the precinct boundary to meet NPA safety requirements

5. Housekeeping

- Demarcate all equipment (raft components) with the identifiable logo or name to enable tracing of lost equipment or debris
- Retrieve loose rafts, equipment to prevent littering
- The office or storage area shall be maintained in a clean and tidy condition, free of litter or other sources of pollution and toilets are kept hygienic and in working order

Monitoring and Reporting:

Infrastructure inspection reports (including marine and land-based infrastructure) shall be completed by the designated competent person as stipulated above on a weekly basis and kept on the site file (attached as Appendix 2).

Responsibilities:

The Site Operations Manager (or a person delegated by him) is responsible for infrastructure inspections and completion of inspection forms and is responsible for implementing this procedure on the project site.

Related Documents:

- Weekly infrastructure inspection checklists (Appendix 2)
- Completed Incident report (if applicable)
- Incident Management Procedure 3.5
- Mooring inspection maintenance plan or maintenance directed

3.2. Waste and Pollution Management

Background and Anticipated Environmental Risks:

- Waste generated during harvesting includes:
 - Seaweeds
 - Damaged mussels
 - Diseased mussels
 - Mussels of other species not suitable for processing
 - Other sessile organisms
- During harvesting of ropes at sea on the farm: seaweeds, some mussels, other sessile organisms as well as mussel faeces and pseudo-faeces are lost to the ocean environment. Further to this, during the reseeded of mussel seed onto new mussel ropes, some mussel shells, foreign species, sessile organisms and seaweeds inevitably end up in the marine environment. No organic material that has been landed on shore is to be returned to the marine environment. No damaged or diseased mussels are to be returned to the marine environment and a high occurrence of diseased mussels should be reported to DEFF immediately
- Fuel and oils will be used in the operation of the work boat and on the farming site and spills of these substances are a potential source of marine pollution
- Other waste may include:
 - Defunct or damaged infrastructure or equipment
 - Staff food waste or packaging
 - Materials packaging waste

Objectives:

- Avoid pollution of the marine environment through the sound waste management

Performance Indicators:

- Proper solid waste storage (secure bins) and separation (general, organic, hazardous, recyclable waste) at the site office or storage area
- Organic waste does not remain on site for longer than 24 hours
- Disposal receipts indicating disposal of waste to a licensed waste site or service provider are available on file in cases where waste is not collected directly from site by the municipality
- No evidence of fuel or oil spills or pollution related to the work boat or equipment operating on site
- No evidence of any waste other than organic items discussed above discarded at sea

Procedures:

- Bins shall be provided for the temporary storage of solid waste at the site office or storage area
- Prevent littering by staff at work sites by providing bins or waste bags in sufficient locations
- Provide separate bins for hazardous or polluting or organic materials and mark these clearly
- Any exotic mussel species and diseased mussels are to be deposited in the designated organic waste bins
- No organic waste, including mussel waste, may be stored on site for more than 24 hours – all other waste can be stored at the yard in weather and leak proof containers in an area that they cannot be knocked over or damaged by other traffic until removed by the municipality
- The presence of significant amounts of diseased or exotic mussels shall be recorded as an incident in the Incident Management Procedure 3.5 and reported to DEFF.
- Do not discard any waste other than organic categories mentioned overboard

- Ensure no debris and waste material used at the operations enters the marine environment (particularly plastics), to minimise the risk of attraction, harming and entanglement by seabirds, marine mammals and large predators
- In the event of equipment, litter and debris entering the sea, remove these as soon as possible
- Solid waste generated (excludes all categories covered 3.2 above) on vessels at sea shall be taken back to shore to be disposed of properly
- Minimise waste through re-using and recycling materials
- Waste shall be removed by the municipality or alternatively disposed of at a licensed waste disposal site or recycling depot and disposal receipts retained on file
- Refuelling of the work boat shall not result in spillage and the pollution of the marine environment. Drip trays, spill containment and mop-up products as appropriate shall be employed

Monitoring and Reporting:

- Presence of diseased or exotic mussel species shall be recorded as an incident (per Incident Management Procedure 3.5)
- Pollution incidents shall be recorded and reported on as per the Incident Management Procedure 3.5.

Responsibilities:

The Site Operations Manager is responsible for implementing this, including monitoring and reporting requirements.

Related Documents:

- Refuelling SOP (Appendix 4)
- Waste Management Plan (Appendix 5)
- Incident Management Procedure 3.5

3.3. Marine Animal Management

Background and Anticipated Environmental Risks:

- Risk of entanglement with mooring lines and dropper ropes by larger marine animals (sharks, turtles, dolphins, whales, seals and birds)
- Changes in behavioural patterns of marine animals due to the presence of the operation, including attraction of predators, or due to depletion or alteration of food sources, especially phytoplankton, for other organisms

Objectives:

- Minimise injury or death of marine animals through entanglement
- Minimise opportunities for predators to be attracted to the area

Performance Indicators:

- Project records show no cases of entanglement by large marine animals

Procedures:

- Compliance to Entanglement Guidelines developed for the Saldanha ADZ
- Any lost droppers or ropes that could pose a hazard shall be traced and retrieved before they pose a hazard to marine life
- Monitor the rafts for entanglements on a daily basis and free any animals caught or summon assistance from local marine conservation authorities as required. Contact the DEFF as per email communication on entanglements stipulated in the Entanglement Guidelines issued for the ADZ if large marine mammals become entangled. Record any incidents
- Farm personnel shall monitor the presence (and absence) of marine mammal species in the vicinity or general region of the farm site, as well as observations of any time spent under or around the farm structures. Farm personnel shall keep a log of all cetaceans, seabirds and predators not usually observed and recorded in the vicinity of rafts, including behavioural observations. This will be reported to the ECO monthly in the Farm Monitoring Report.

Monitoring and Reporting:

- Monitor droppers for entanglements on an on-going basis (daily) and record all incidents per the Incident Management Specification 3.5
- Marine animal observations and monitoring data should be periodically compiled and sent to relevant experts for analysis

Responsibilities:

The Site Operations Manager is responsible for implementing this procedure, including monitoring and reporting requirements.

Related Documents:

- The Incident Management Specification 3.5
- Incident records related to this procedure

3.4. Marine Traffic Management

Background and Anticipated Environmental Risks:

- Although marine traffic is very active in the port of Saldanha Bay, the site is located in an area that is not used by marine traffic without the permission of the NPA, therefore the risk is limited
- Recreational users (sailing, kite surfing, paddling, fishing etc.) may encounter rafts, although most of the rafts would be situated outside the areas used by recreational users

Objectives:

- Ensure minimum risk to and from marine traffic in the port because of the farm infrastructure

Performance Indicators:

- No marine traffic incidents or accidents reported (refer to incident reports)

Procedures:

- Ensure that the farm is accurately marked on navigational charts
- Where required and applicable the farm area shall be fitted with radar reflectors, marker buoys and signal lighting to the satisfaction of the NPA to ensure safety. Confirmation from the NPA as to whether these are required
- All rafts and floats if used are marked with "IM" and a number, this will enable tracing of rafts if lost.
- Any lost infrastructure that could pose a hazard to marine traffic must be traced and retrieved before they cause damage. There are several service providers (Saldanha Bay Diving and Blasting, Waypoint Marine Services, Jutten Marine Solutions) on standby to move rafts back to farm if required. If the weather is too severe to move rafts back safely it will end up on any of the beaches towards the North of the farm (Bluewater Bay) and the raft or debris will then be towed back to the farm from there.
- The project shall adhere to any further requirements set out by the NPA and the South African Maritime Safety Authority (SAMSA)

Monitoring and Reporting:

- Implement monitoring of infrastructure per the Infrastructure Management Specification 3.1
- All marine traffic incidents or accidents shall be recorded as per the requirements of the Incident Management Specification 3.5. This shall include reporting to the NPA

Responsibilities:

The Site Operations Manager is responsible for implementing this procedure.

Related Documents:

- Incident Management Specification 3.5

3.5. Incident Management

Background and Anticipated Environmental Risks:

Incident reporting are to be in line with the Saldanha Bay ADZ EMPr as well as with reference to ADZ level emergency responses developed by the managing authority and is required in the event of loose or drifting infrastructure, accidents or collisions with other water users, entanglement of marine animals, loss of stock, disease outbreaks, spill of pollutants and finally waste in the marine

environment. Harmful algal blooms are dealt with as part of the SALMSM&CP and will not be covered in this EMPr. There is a need to investigate and document significant incidents that occur during operations (disease outbreak, mass mortalities, marine traffic or marine animal injury incidents, storm damage to infrastructure, public complaints etc.) in order to assess if current management measures are adequate to address the expected risks of the operations, to guide action through documenting a clear, practical response to situations and allocating responsibilities and investigating the cause of the incident and finally making management adjustments were possible to prevent the reoccurrence of the incident.

Objectives:

- Investigate incidents as a tool towards the development of a management response to prevent future incidences of a similar nature
- An effective communication system to register and respond to complaints

Performance Indicators:

- Detailed incident reports on the project site file

Procedures:

- A significant environmental incident is an inadvertent occurrence (including sabotage) in which the performance criteria specified in this EMPr (or in the environmental authorisation) have been contravened or any environmental facet has been endangered or degraded through the event. A significant incident occurring on the farm will be reported to the Site Operations Manager immediately and may include:
 - Loose or drifting equipment
 - Accidents (collisions) with other water users
 - Entanglement of marine animals
 - Spill of pollutants
 - Waste in the marine environment
 - Public complaints
- Upon receiving a report of an incident, the Site Operations Manager shall take any action required to contain or isolate the adverse effects
- Once the incident area has been stabilised, the Site Operations Manager shall complete the incident investigation form (refer to template form at the end of this procedure). This shall include a full investigation into the causes of the incident and how a recurrence can be avoided
- Once the form has been completed it shall be submitted to the farm manager for review within one week of the incident who shall table any reports following significant incidents (refer to definition below) to branch Fisheries and the ADZ ECO
- The branch Fisheries and the ADZ ECO shall review the incident reporting forms of all significant incidents and provide technical input where appropriate
- Request and support assistance with environmental incidents from the AMC if the incident cannot be dealt with at farm level
- Where there have been public complaints, provide feedback to the complainant as soon as practically possible of the outcome of the incident investigation and remedial measures employed or planned. Maintain all correspondence on file with the incident report

Definition of a significant environmental incident

A reportable significant environmental incident is any inadvertent occurrence (including sabotage):

1. In which the performance criteria specified in the EMPr or this monitoring plan have been inadvertently contravened, or
2. Any environmental facet (air, water, soil) has been polluted or degraded through a spill or similar event or
3. Any part of the project infrastructure is lost or has become a danger or potential danger to marine traffic or animals

This will include but is not limited to:

- Spills of any noxious liquid or noxious solid into the sea (a spill of any volume will be communicated to the ADZ ECO and remediation steps followed with their guidance)
- Invasion by exotic marine species
- Large-scale disease of the mussels on the farm
- Loss of rafts into open water of the bay

Note: The above definitions do not include danger to human wellbeing. Such incidents will be managed with a parallel Occupational Health and Safety Act system.

Note: This definition is different from the definition of a significant incident defined in terms of section 30(1)(a) of NEMA as an unexpected sudden occurrence, including a major emission, fire or explosion leading to **serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed**. The incidents dealt with by this procedure are localised and do not require the intervention of the provincial or national environmental authority. If the incident is deemed significant in terms of this legislation the procedure is overruled and the procedure legislated by the Department shall be assumed.

Monitoring and Reporting:

Per the responsibilities section below

Responsibilities:

- The Site Operations Manager is responsible for completing the incident reports contemplated in this procedure
- The Farm Manager shall review incident reports and shall table any significant reports to the AMC, branch Fisheries and other relevant authorities (NPA)

Related Documents:

- Incident Report Form

Incident Report Form
Note: In the event of a significant incident which is defined in terms of section 30(1)(a) of NEMA as an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed, the incident shall be reported to the National Department of Water and the Environment and an appropriate incident form completed and submitted to the regional office or as instructed by the competent official.

If residual damage remains- what is the reason and what is planned with respect to the environmental damage. The ECO must counter sign this form in this event before it can be closed. (see below)

Upon investigation, what was found to be the cause of the incident? (Detail)

Is this a repeat of a similar incident?

What is the reason that planned changes did not prevent a recurrence of the incident?

What is to be changed to ensure that the incident will not be repeated? (Detail)

Section Two: To be completed by the ECO	
Does the incident comprise a contravention of legislation?	
What action has been taken?	
Have all the required and appropriate actions been taken to the satisfaction of the ECO?	
Have all parties signed the incident form?	

Date

Farm manager

Date

ECO

4. Decommissioning Requirements

Should the operation be decommissioned for any reason a decommissioning report shall be compiled and submitted to the AMC and or the branch Fisheries. As part of the lease agreement with TNPA the operator is responsible for removal of all farm infrastructure. The 3 to 6 month deposit held by TNPA calculated from the 6th year of lease rental rates is sufficient to decommission and remove all infrastructure (Appendix 12).

As a minimum the report must address:

- removal of the infrastructure on the sea-based site - moorings, rafts, floats
- disposal of any remaining waste on the land-based site (packaging material, plastic bins, ropes etc.)
- removal or disposal or storage or re-use for another purpose of any infrastructure and equipment from the site
- addressing of any other identified residual environmental risks as a result of the operations

The report must be jointly agreed by the independent monitoring body and the Project Manager and must be accepted by the branch Fisheries, the ADZ ECO and the AMC for the project to be considered closed.

Appendix 1 – Environmental Awareness and Training Plan

Appendix 2 – Investigation Form

Appendix 3 – Weekly Inspection Sheet

Appendix 4 – Monthly EMP Reporting Sheet

Appendix 5 – Refuelling SOP

Appendix 6 – Waste Management Plan