# ENVIRONMENTAL MANAGEMENT PLAN (EMP) PROPOSED AQUACULTURE FISH FARM PROJECT AT MACHITA COMMUNAL AREA, ZAMBEZI REGION



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Proponent:

Boophalow Investment cc P.O Box 25440 Windhoek Namibia

May 2025

Title	Application for Environmental Clearance Certificate for the Newly
	proposed Aquaculture Fish Farm Project at Machita Communal
	Area, Zambezi Region
Environmental Practitioner	Nyepez Consultancy cc
Reviewer	Erongo Consulting cc
Client	Boophalow Investments Cc
Status	Environmental Management Plan (EMP)
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### 1. INTRODUCTION

Boophalow Investment cc is the proponent and developer that acquired a portion of communal land from Machita Subkhuta through Mafwe traditional authority (through the traditional administration of the Chief) and through the Namibia Communal Land Reform Act of 2007. Through this the Communal Land Reform Act, the proponent possesses a legal land right Customary Certificates, approved in the year 2020 by the Zambezi Communal Land Board.

The proponent has accessed funds from financial support entity, whereby part of the legal requirement to needed to approve the Capital Funds the Clearance Environmental Certificates, hence this application. The proponent wishes to meet all legal requirements that will ensure the full registration and development of the proposed project and piece of land where green houses and fish ponds will be developed. The proponent was allocated 23.1 hectares for both crop farming and fish farming. The initial area for the fish farming project is only 10.2 Hectares. This 10.2 hectares is land already cleared as it was previously used for crop farming by the proponent. The site is partly developed and further construction development are being caried-out on the site. The project site is not vacant as its partly cleared for crop farming, partly cleared for ongoing fish farm establishment and construction or the fish farm.

The project site area is situated within Machita Communal area, located in the Katima Rural Constituency and situated about 2 kilometres from the Machita Administration area comprising of Schools, Business, clinics other Government offices) tarred road. The site is situated about +-40 kilometres East of Zambezi Region's Capital City (CBD) Katima Mulilo. The project site is partly developed, free of vegetations and not vacant. The land is zoned communal land suitable for both commercial business use, and customary land use.

The developer also the owner Boophalow Investment cc of the proposed Fish Farm Project appointed Nyepez Consultancy cc to conduct the Environmental Assessments and develop an Environmental and social Management Plan (EMP) and accompanying report for the proposed fish farm project. An Environmental Scoping Study was undertaken to identify key biophysical and social concerns related to the project. During November 2024, the consultant conducted site visit and communicated with a range of stakeholders to determine these issues or concerns and this report contains such findings

#### **1.1 MAIN OBJECTIVE**

- To apply for the acquisition of the Environmental Clearance Certificate (ECC) for the proposed Aquaculture fish farming in Machita Communal area of Zambezi region.
- To provide a brief background of the proposed project and its proponents
- Explain the need for this project;
- To explain the process that was followed during the Environmental Scoping Study;
- Provide for the Compliant and updated Environmental Management Plan for the project and explain all matters in relation to the Bio-physical environment of the project area;

### **1.2 DESCRIPTION OF THE PROPOSED PROJECT**

Boophalow Investments cc intends to develop an aquaculture tilapia farm with the capacity to produce 2,000 tonnes of annual harvest by 2026. Boophalow Investment fish farming project is located  $\pm$  40 km Eastern side of the Regional Capital City of Katima Mulilo. The project area located in Machita communal area. The site falls within traditional and customary land. From a distance the area is also located some 5 km from the main Machita Combined School. When fully implemented and operational the project will have a hatchery with 50 nursery and 20 breeding ponds to produce 6 million.

### **1.3 AIMS OF THIS STUDY**

- Comply with Namibia's Environmental Assessment Policy, Environmental Management Act (2007) and its February 2012 EIA Regulations;
- Compile a management plan in line with the 2012 EIA Regulations of the Environmental Management Act (2007) and terms of reference.

### **1.4 LOCALITY**

The proposed development of a farm is located  $\pm$  40 km Southern part of the town of Katima Mulilo, located at Machita, communal area. The site falls within the communal land. From a distance the area is also located some 5km Site area for Boophalow's farming project at Machita communal area. The project site coordinates are Lat -17.78050, Lon 24.33244.



Figure 1: Project site locality area



Figure 2: Direction guide to the project area



Figure 3: Project area site area



Figure 4: Project area surrounding developments

Boophalow Investment fish farming project therefore intends to set up a tilapia fish or Bream (Oreochromis Niloticus) project at Machita with a capacity to produce 70,000 thousand annual harvests by 2026 at the site with a net profit of about N\$2,376,000 (million). In addition, Boophalow Investment fish farm project intends to achieve the following:

- a) Provide employment to the community of Machita District and the entire region.
- b) Increase income and standard of living in the community by employing the local community.
- c) Show that unemployed and uneducated youths are not a problem to the Community and region but assets to the region.
- d) Mobilize youths, the local people to work together for common benefits

# 1.4.1 The project Implementation phases

The project components will be implemented in three (3) phases that include:

# Preparation phase

All the planning related to the project, including budgeting, establishing sales points, mobilising equipment, will be carried out during this stage. Additionally, Boophalow Investments cc will obtain permits or approvals from relevant government institutions and agencies which include MEFT, DoF and Mafwe Traditional Authority.

# Construction phase

This phase will include erection of physical buildings/infrastructure such accommodation, offices, workshop, fish processing plant, hatchery, toilets, breeding ponds, nursery ponds, settling ponds and improving on existing road network that is already in the area.

#### *Project Activities*

A phased approach will be taken on the on (1) one site, to ensure that all activities are implemented according to plans and with best practice. The project activities will include the following:

- Installing of two (2) Standard Industrial Water Boreholes with overhead tanks and pipes laid for transporting water system
- Constructed x 4 naturally modified Outdoor fish pond (12 x 15 and 1,8m deep deck for breeding)
- Construction of the farm house, equipment storage, cool room area to be integrated in one building for storing of farming inputs, hatchery equipment and farm implements activities

Installation of water pump and solar panels

### 2. LEGAL AND REGULATORY REQUIREMENTS

The Namibian Environmental Management Act (Act No. 7 of 2007) promotes the sustainable management of the environment and the use of natural resources by establishing principles for decision making on matters affecting the environment. With regard to managing ambient air quality in a sustainable way and limiting impacts, health-based ambient standards, emission standards, and ambient monitoring are considered the most appropriate approaches.

### 2.1 Emission standards and guidelines

Emission standards may be set for industrial processes so that the resultant ambient air quality concentrations will not exceed the air quality standards. Namibia does not have emission standards for industrial processes. The International Finance Corporation (IFC) provides emission guidelines for SO2, NOx and particulate matter for small combustion facilities (IFC, 2007). The World Bank provides emission and effluent guidelines for a variety of industrial processes that are normally accepted by the World Bank (World Bank, 1998).

### 2.2 Monitoring

Emissions and ambient air quality monitoring provide the necessary information to assess the effectiveness of emissions management. There are no specifications regarding monitoring of either in the Namibian environmental legislation. The IFC provides guidelines for monitoring programs (IFC, 2007) which include parameters to be monitored, the type of monitoring and frequency, the location of sampling equipment and the sampling methods.

### 3. IMPACT ASSESSMENT

The purpose of this section is to assess and identify the most prominent environmental impacts and provides possible mitigation measures that area expected from both the operational and the decommissioning for the activities of the Boophalow Investment fish farm project. The following component or section below summarizes categories of impacts identified, following the site visits that were undertaken at the site area and from other comments received from relevant stakeholders. The major impacts include the following:

- Land use change
- Impact on water quality as a result of wastewater and effluent discharges improper farm management

- Impacts on habitats through vegetation clearing
- Eutrophication
- Sedimentation

These identified impacts will be assessed and evaluated in different phases of the development. By subjecting each of the potential impacts to the criteria stipulated above, it is possible to establish the significance of each impact prior to implementing mitigation measures and then after mitigation measures have been implemented. Detailed descriptions of management actions in terms of mitigation measures are contained in the accompany-ing EMP. The process of accessing the significance of each of the possible impacts is contained in the above tables. It must be noted that the impacts described in these tables considers the nature of the potential impact before (pre) and after (post) mitigation as set out in the ESMP.

Although the significance rating of the most of the impacts can be reduced considerably to a "low significance" by implementation proper mitigation measures the proponent should however understand that a "low significance" impact still exerts pressure on the environment and therefore the proponent should intend to go above and beyond the prescribed mitigation and management measures provided in this report by aiming to improve the remaining environment. There are specific policies and guidelines that address environmental issues related to the development. The policies and guidelines were referred to in the legal section.

Nature	Reviews the type of effect that the proposed activity will have on the rel-
	evant component of the environment and include "what will be affected
	and how"
Extent	Indicates whether the impact will be site specific: local (limit to within 15
	km of the area): regional (limited to -100 km radius); national (limited to
	the coastline of Namibia); or international (extending beyond Namibia's
	boarders)
Duration	Reviews the lifetime of the impact, as being short (days, <1 month), me-
	dium (months, <1 year), long (years, <10 years), or permanent (genera-
	tions, or >10 years).
Intensity	Establishes whether the magnitude of the impact is destructive or innoc-
	uous and whether or not it exceeds set standards, and is described as
	none (no impact); low (where natural/social environmental functions and
	processes are negligibly affected); medium (where the environment con-
	tinues to function but in a noticeably modified manner); or high (where
	environmental functions and processes are altered such that they tem-
	porarily or permanently cease and/or exceed legal standard/require-
	ments).

Table 1: criteria used to describe impacts Description

Probability	Considers the likelihood of the impact occurring and is described as im-
	probable (low likelihood), probable (distinct possibility), highly probable
	(most likely) or definite (impact will occur regardless of prevention
	measures).
Degree of confidence in pre- dictions	Is based on the availability of specialist's knowledge and other information

The application of the above criteria to determine the significance of potential impact uses a balanced combination of duration, extent, and intensity/magnitude, modified by probability, cumulative effects, and confidence. Significance is described as follows.

Significance Rating	Criteria
Low	Where the impact will have a negligible influence on the environment
	and no modifications or mitigations are necessary for the given pro-
	ject description. This
Medium	Where the impact could have an influence on the environment, which
	will require modification of the project design and/or alternative miti-
	gation. This would be allocated to impacts of moderate severity/mag-
	nitude, locally to regionally, and in the short term
High	Where the impact could have a significant influence on the environ-
	ment and in the event of a negative impact the activities causing it,
	should not be permitted (i.e., there could be a no-go implication for
	the project, regardless of any possible mitigation). This would be al-
	located to impacts of high magnitude, locally for longer than a month,
	and/or of high magnitude regionally and beyond.

The FAO guidelines for fields projects (FAO, 2012) will be used during the assessment.

### Table 2: Environmental categories for FAO field project

Environmental Cate	- Environmental and Social Impacts	Environmental Analysis or Assess-
gory		ment Required
Category A	Significant, or irreversible adverse im-	Mandatory environmental impact as-
	pacts	sessment
Category B	Less significant adverse impacts that	Environmental analysis to identify
	may be easily prevented or mitigated	more precisely potential negative im-
		pacts

**NB:** Based on the above FAO's categories of field project analysis, the proposed development of Boophalow Investment fish farm project at Machita falls under category B, where there is less significant adverse impacts that may be easily prevented or mitigated. Environmental analysis is required to analysis to identify more precisely potential negative impacts. The following box below specify the type of projects under Category B, which according to FAO (2012) do not require a full EIA but will require further deepening of environmental or social considerations, depending on the expected magnitude of risks. In many cases, the analysis would aim at gathering additional information in sufficient detail so as to be able to discuss concretely how risks could be addressed and minimized (and possibly eliminated) in the project design.

According to Pastakia (1998) the Rapid Environmental Assessment method can be used to assess projects related to the Poultry development project and Pastakia's method will be used during the assessment. The ranking formulas area calculated as follows;

A=A1 x A2 B=B1 +B2+B3 Environmental Classification (ES) =A x B

 Table 3: Environmental Classification of Impacts according the Rapid Impact Assessment Method of Pastakia

 1998

Environmental Classification (ES)	Class	Description of Class
	Value	
108 to 72	5	Major positive change/impact
71 to 36	4	Significant positive change/impact
35 to 19	3	Moderate positive change/impact
10 to 18	2	Positive change/impact
1 to 9	1	Slight positive change/impact
0	0	No change/status quo/not applicable
-1 to -9	-1	Slight negative change/impact
-10 to -18	-2	Negative change/impact
-19 to -35	-3	Moderate negative change/impact
-36 to -71	-4	Significant negative change/impact
-72 to -108	-5	Major negative change/impact

### Table 4: Assessment Criteria

Criteria	Score	
Importance of condition (A1) –Assessed against the spatial bou	Indaries of human interest it will	
affect		
important to national/international interests	4	
important to regional/national interests	3	
important to areas immediately outside the local condition	2	
important only to the local condition	1	
No importance.	0	
Magnitude of changes /effects (A2) -measure of scale in terms	of benefits of an impact or condi-	
tion		
Major positive benefits	3	
Significant improvement in the status quo	2	
Improvement in status quo	1	
No change in status quo	0	
Negative change in the status quo	-1	
Significant negative disbelief or change	-2	
Major disbelief or change	-3	
Permanence (B1) –defines whether the condition is permanent or temporary		
No change/not applicable	1	
Reversible	2	
Permanent	3	
Cumulative (B3) –reflects whether the effects will be a single direct impact or will include cumu-		
lative impacts over time, or synergistic effect with other condition	ions. It is a means of judging the	
sustainability of the condition-not to be confused with the permanence criterion		
Light or No cumulative Charater /Not applicable	1	
Modern Cumulative character	2	
Strong Cumulative character	3	

 Table 5: Criterion for Impact Evaluation (Directorate of Environmental Affairs, 2008)

Risk Event	Description of the risk that may lead to an impact
Probability	Refers to the probability that a specific impact will happen following a risk event
	Improbable (low likelihood)
	Probable (distinct possibility)
	Highly probable (most likely)
	Definite (impact will occur regardless of prevention measures)
Confidence level	The degree of confidence in the predictions based on the availability of information and specialist knowledge
	Low (based on the availability of specialist knowledge and other information)
	Medium (based on the availability of specialist knowledge and other information)
	High (based on the availability of specialist knowledge and other information)
Significance (no mit- igation)	<b>None</b> (A concern or potential impact that, upon evaluation is found to have no significant impact to all)
	<b>Low</b> (any magnitude, impact will be localised and temporary. Accordingly the impact is not expected to require amendment to the project design)
	<b>Medium</b> (Impacts of moderate magnitude locally to regionally in the short term, ac- cordingly the impact is expected to require modification of the project design or alter- native mitigation)
	<b>High</b> (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable)
Mitigation	Description of possible mitigation measures
Significance (with	<b>None</b> (A concern or potential impact that, upon evaluation is found to have no significant impact to all)
initigation)	<b>Low</b> (any magnitude, impact will be localised and temporary. Accordingly the impact is not expected to require amendment to the project design)
	<b>Medium</b> (Impacts of moderate magnitude locally to regionally in the short term, ac- cordingly the impact is expected to require modification of the project design or alter- native mitigation)
	<b>High</b> (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable)
The following to	

The following tables evaluate the identified impacts, both positive and negative of the farming project activities on the environment. This includes the social, economic and natural environment affected by the activities on the proposed site.

# 3.1 Construction Phase Impacts Prior to Mitigation

# 3.1.1 Negative Impacts of Low Significance for the construction phase prior to mitigation

NEGATIVE IMPACTS	DESCRIPTION OF IMPACT
(LOW)	
Hydrology: Storm water and	The development will result in a low marginal increase in storm water run-
drainage	off, especially where vegetation will be cleared for the construction of fish
	ponds, roads and associated infrastructure. This will require some manage-
	ment to prevent soil erosion.
Land transformation:	Exposed land might be susceptible to wind and water erosion.
Erosion	
Land transformation: Dust lev-	The proposed development may not result in increased dust levels during the
els	construction phase.
Land transformation:	Increased noise levels due to earthmoving and construction equipment.
Noise levels	
Land transformation:	Land clearing and soil preparation could create a temporary visual impact.
Visual impact	
Floral biodiversity	Vegetation will be impacted where earthmoving activities (vegetation clearing
	and bulldozing / disturbance of the topsoil) are necessary during the construc-
	tion period. The development will however not result in a complete removal
	of this vegetation within the development site. The local loss of this vegetation
	type due to the proposed development on the Subject Land will have a small
	overall effect and will not endanger the future of this vegetation type.
Increased traffic volume	The transportation of construction equipment and materials to the site will
	increase traffic levels in the area.
Waste Sewage/effluent/	Little or no sewage will be generated during land clearing and construction.
nydrocarbons	Spillage and/or leakage of hydrocarbons by construction vehicles and machin-
	ery may cause chemical contamination of soil and groundwater.
Waste – Building rubble	There will not be a significant amount of building rubble generated during the
and littering	construction phase. Construction workers might litter during this phase.
Heritage	The proposed development will not have an impact of great significance on
	archaeological or paleontological remains that might be encountered during
	implementation of the project.

# 3.1.2 Positive Impacts identified for the construction phase prior to mitigation

POSITIVE IMPACTS	DESCRIPTION OF IMPACT
Socio-Economic –	Approximately 30 new employment opportunities will be created dur-
upliftment of quality of life	ing the construction & operation phase. Approximately 75% of the
	expected value of these employment opportunities will be accrued to
	previously disadvantaged individuals.

# 3.2 Operational Phase Impacts Prior to Mitigation

# 3.2.1 Negative Impacts of Low Significance for the operational phase prior to mitigation

NEGATIVE IMPACTS	DESCRIPTION OF IMPACT
(LOW)	
Land transformation – Dust	The proposed development may not result in increased dust levels
levels	during the operational phase.
Land transformation – Noise	The farm is situated in a rural area and the farmers in the area
levels	should be accustomed to the sound of working machinery. The
	operation of fish farm itself will not generate any significant levels
	of noise during the operational phase. Some noise could arise
	in relation to the expected increase in traffic to and from the site,
	especially at the end of a production cycle
Heritage	The proposed development is not expected to have any significant
	impact on archaeological or paleontological remains during the op-
	erational phase.

# 3.2.3 Negative Impacts of Medium-Low Significance for the operational phase prior to mitigation

NEGATIVE IMPACTS	DESCRIPTION OF IMPACT
(MEDIUM-LOW)	
Hydrology – Storm water and drainage	The roofs of the office building will increase storm water runoff.
	Soft surface will absorb water now into the ground.
Hydrology – Water supply	Water use for fish ponds and irrigation purposes.

Land transformation – Soil	Soil chemical properties and vegetation yield can however be neg-			
chemistry and fertility	stingly effected if large emounts of menure is emplied over lang			
	alively affected in large amounts of manure is applied over long			
	periods of time.			
Land transformation – Visual	The proposed project is consistent with the existing agricultural			
Impacts	land use of the property and surrounding areas. All buildings and			
	associated infrastructure will be sited as unobtrusively as possible.			
	A natural buffer zone will be maintained between the fish farm site			
	and neighbouring village. Indigenous trees and shrubs wi			
	planted and maintained to reduce visibility from adjoining road			
	and properties.			
Increased traffic volume	The transportation of fish to and from the site will increase traffic			
	levels in the area.			
Land transformation – Loss of	The construction of roads and fence lines through the project			
ecological processes (Ecologi-	site area will impact on Ecological Support Areas (ESAs) and the			
cal Support Areas)	level of ecological connectivity (corridors) that they offer.			
	No disposal or irrigation of grey water will occur within a few me-			
	ters from any watercourse. Ablution facilities for farm workers will			
	be placed in the building.			
Land transformation – Odour	The fish farm and ponds will be located well away from any human			
nuisance levels	settlements and the building will be cleaned and disinfected after			
	every production cycle. Subject to good management of fish			
	farming systems and waste disposal, odour should not present a			
	significant impact.			
Faunal biodiversity	Potential faunal habitat will be lost, transformed and fragmented			
	due to the clearance of land and the construction of infrastructure.			
Floral biodiversity	Approximately 2 ha natural veld will be cleared for the construction			
	of fish ponds and associated infrastructure.			
Waste-Sewage/effluent/	There are two potential sources of effluent – sewage from ablution			
hydrocarbons	facilities and grey water from fish ponds down procedures. Rela-			
	tively small amounts of waste water are generated during the			
	cleaning office building which occurs at the end of each production			
	cycle.			
Veldfire	Machinery and human activity will increase hellfire risk levels. es-			
	pecially during the dry seasons			
i la				

### **3.3.4 Positive Impacts for the operational phase prior to mitigation**

POSITIVE IMPACTS	DESCRIPTION OF IMPACT
Socio-Economic: Economic uplift-	Approximately 15 permanent employment opportunities will be cre-
ment	ated during the operational phase. Approximately 60% of the ex-
	pected value of the employment opportunities will be accrued to
	previously disadvantaged individuals.
	The proposed fish farm will make the farms economically more vi-
	able. The farm will be the main source of fresh fish meat since there
	are only 2 small scale fish farms in the Zambezi region
Socio-Economic: Food	The local production and subsequent processing of fish at the
security	Boophalow Investment fish farm in Machita communal area will
	boost the Environmental Management Programme Expansion of the
	fish farm on Farms and economy of Machita and surrounds, while
	aiding in securing the local availability and access to an additional
	food source.
Socio-Economic: Healthier food	The demand for fish products is however escalating due to an in-
option produced in a more hu-	creased demand for healthy living and an increased awareness re-
mane and sustainable manner	garding food welfare.
	Fish meat is a healthier food option compared to meat that is pro-
	duced in the conventional intensive industry. The proposed farm
	will thus supply an alternative food source to the population that is
	produced in a more humane and sustainable manner. The Applicant
	proposes to base the proposed development on a permaculture
	system which is based on core values and ecological design princi-
	ples that seek to develop sustainable agricultural systems.
	The proposed development has the potential to set a positive prec-
	edent for sustainable agriculture in Zambezi region & Namibia as a
	whole.

As depicted in the tables above, impacts related to the operational phase are expected to mostly be of medium significance but can mostly be mitigated to have a low significance. The extent of the impacts is mostly of low likelihood. An Environmental Management Plan (EMP) will ensure that the impacts of the operational phase are minimised and include measures to reduce the identified impacts during the operation of the fish farm project

activities while ensuring that the local environment is rehabilitated and employees working on the guesthouse are suitably protected to avoid accidents and injuries.

### 3.4 Mitigation Measure

Potential negative impacts can arise from poor farm design, construction activities, improper wastewater and effluent discharges and unqualified farm management.

**NB:** Management will take into consideration careful farm design; good site selection and Construction of breeding ponds will minimize habitat impacts by avoiding delicate habitats and where disturbance is inevitable retaining as much vegetation as possible and replanting where necessary. Construction of settlement basins for water intake and sedimentation pond for discharge of waste water will enable control of pollution of water quality.

The project will strictly adhere to good environmental practices. The project will ensure to do the following:

- Preserve aquatic ecosystems and protect the quantity and quality of fisheries resources, including genetic resources.
- Avoid dumping of fish processing wastes in water bodies.
- Protect artisanal fisheries and commercial fishing vessels and their gears from conflict with cage culture facilities.
- Protect small-scale farmers and local communities

### Summary of expected operational phase impacts prior to mitigation

BE=Biological/Ecological EO=Economical/Operational PC=Physical/ Chemical SC= Sociological/Cultural

Impact Category	Impact Type	Class Value
BE	Waste pollution	-1
BE	Ecosystem and Biodiversity impact	-1
EO	Fire	-2
PC	Groundwater, surface water and soil contamination	-1
SC	Skills, Technology and development	2
SC	Employment	2
SC	Cumulative	-2

### 4. IMPLEMENTATION OF THE ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Table below outlines the management of the environmental elements during the planning and operational phases. Section 2 provides a brief summary of the management of the Boophalow Investment fish farm development project. Contents of these tables could be incorporated into a HSEQ management system. The proponent who is also the investor or owner of the business (Boophalow Investments cc) would be responsible to assign the responsibilities and ensure that the tasks are executed.

### 4.1 Construction Phase Management Plan

The overall goal for the construction phase is to undertake the activities associated with the expansion of the free-range chicken farm in a way that:

- Ensures that activities are properly managed in respect of environmental aspects and impacts. Protects the natural environment from degradation and harm.
- Ensures the development achieves its positive socio-economic impact.
- Complies with legislation.

# 4.2 Operational Phase Management Plan

The key to successful fish farming is good land management. This applies to the nature of the land itself, the degree of shelter it offers, how it is fenced to defer predators and how pasture is managed and maintained. The overall goal for the operational phase is to undertake the activities associated with the fish farming a way that:

- Ensures that activities are properly managed in respect of environmental aspects and impacts.
   Protects the natural environment from degradation and harm.
- Ensures that the development is properly managed in terms of the required biosecurity measures.
- Ensures the development achieves its positive socio-economic impact.
- Complies with legislation, permits and authorizations.

# 4.3 Decommissioning and Closure Phase

At closure, all farm equipment will be removed. All the ponds will be buried and the standing structures demolished. The impacts associated with the closure and post closure of the project are summarized below. The following connotations have been used in characterization of impact.

a) Small positive impacts (SPI)

- b) Small negative impact(SNI)
- c) Moderate positive impact(MPI)
- d) Moderate negative impact(MNI)
- e) Large positive impact(LPI)
- f) Large negative impact (LNI)

S/N	Environmental	nvironmental Environmental Impact omponent	Nature and SignificanceManagement Action	Timing		Responsible	
	Component				Start	End	Person
	L	Project	Component: Co	onstruction Phase			
1	Land and soil Quality	Contamination of surface runoff from spills of oil and fuel from Farm equip- ment and breakdowns	MNI	All contaminated soils will be removed from site area and stored in old oil drums for removal. Oil contamination will be removed using various floccu- lants on the market or through biore- mediation methods onsite.	2025	2026	Project Manager
2	Surface water	Contamination of surface runoff from spills of oil and fuel from Farm equip- ment and breakdowns.	MNI	All contaminated soils will be removed	2025	2026	Project Manager
3		Contamination of surface runoff from spills of oil and fuel from Farm equip- ment and breakdowns	SNI	Oil collection trays will be used when carrying maintenance and repair works	2025	2026	Project Manager
4	Flora and Fauna	Loss of habitat may occur as a result of clearing ac- tivities	LNI	Clearance of vegetation around the site will be restricted to only planed areas. No unnecessary Vegetation clearance shall be conducted.	2025	2026	Project Manager
5	Air Quality	Localized air contamina- tion may occur from con- struction activities.	SNI	A water bowser will be used to spray the access routes to prevent dust de- velopment	2025	2026	Project Manager
6	Noise/Vibration	Construction activities will generate localized disturb- ances	SNI	The surrounding vegetation and the remoteness of the site will screen the noise. It is therefore Important to	2025	2026	Project Manager

					-		
				prevent unnecessary clearance of the			
				vegetation.			
7	Safety	General safety of employ-	SPI	Employees will be offered training in	2025	2026	HR Manager
		ees in the project areas.		safety to prevent occupation health			
				hazards.			
8			SPI	Warning signs in English and local	2025	2026	Project Manager
				languages will be erected around the			
				project site			
			Project C	Component: Operational Phase			
9	Safety	General safety of employ-	SNI	Warning signs in English and local	2026	Closure	Project Manager
•	- Currenty	ees on the project site		languages will be erected around the			
				site to warn the employees and the			
				locals of hazards			
10		Degradation of the soils	LNI	Clearance of vegetation around the	2026	Closure	Project Manager
		may occur through ero-		project site will be restricted to			
		sion on exposed surfaces		planned areas.			
11			LNI	Clearance of vegetation around the	2026	Closure	Project Manager
	Land and Soil	Frosion of cleared areas		project site			
	Quality			will be restricted to planned areas			
				and good soil management practices			
				such as planting of vegetation on the			
				pond dykes shall be employed that			
				will prevent the loss of topsoil			
12	Aesthetics	Generation of waste from	MNI	All employees shall be provided with	2026	Closure	Project Manager
		the project		appropriate personal protective			
		site		equipment			
13		Release of nitrogen and	LNI	Good feeding practices will be im-	2026	Closure	Project Manager
		phosphorous to surface		portant to maintain water quality and			
		water		to maintain a good			
				amount of naturally occurring fish			
	Surface Water			food available in the water			
14		Proliferation of algae	MNI	All the ponds will be aerated with	2026	Closure	Supervisor
				floating paddle wheel aerators.			

15		Disposal of green water	MNI	Green water will be discharged into a settling pond before being released	2026	Closure	Project Manager
16	Fish diversity/ escape	The escape of non-native culture species could lead to interbreeding thereby altering the local gene pool of local fish popula- tions - Non-native species could also lead to competition with native species - Diseases can also be transmitted from es- capees to wild fish -Com- petition can also alter or modify the pre-existing natural and fragile aquatic habitats and destroying some segments of aquatic environment	LNI	<ul> <li>Install screens on all inlet and outlet points in the fish farm to minimize the escape of fry, juveniles and brood stock</li> <li>Filter screens in fish farm shall be designed to retain the smallest life stage present</li> <li>Filter devices should be capable of screening all water</li> <li>Cages will be made of sturdy, non- corrosive material</li> <li>Make through inspection of nets before they are deployed so as to avoid possible escapes from the cages</li> <li>Follow protocols when transferring, changing nets or harvesting fish from the cages</li> <li>Divers or underwater cameras will periodically inspect</li> </ul>	2026	Closure	Project Manager
17	Fish diseases	Spread of diseases to wild populations and evolution of drug-resistant fish pathogens	MNI	Practice good husbandry     Limit use of chemicals     Quarantine introductions	2026	Closure	Project Manager
18	Fish mortalities	Bacterial action and autol- ysis of dead fish results in the excretion of ammonia in pond waters. Live fish preying on dead fish can result in the	MNI	<ul> <li>Conduct a daily routine of collecting mortalities on the farm</li> <li>All mortalities should be burnt at the incinerator</li> </ul>	2026	Closure	Project Manager

		spread of diseases if the corpse died of a disease.					
		Mortalities attract fish predators e.g. birds, in the farm and birds, crocodiles at the cages					
19	Predator/Pre-In- teractions	Fish losses to predation	MNI	<ul> <li>Putting nets over ponds to deter birds</li> <li>Putting predator nets around Cages</li> </ul>	2026	Closure	Project Manager
20	Air Quality	Dust blown off exposed surfaces on the farm may affect local air quality.	SNI	All the access roads and cleared ar- eas will be sprayed with water to sup- press the dust	2026	Closure	Project Manager
		· · ·	Project Com	ponent: Post Closure Phase			
21			MNI	The area will be re-profiled to estab- lish the natural drainage pattern.	Closure	3 years after closure	Project Manager
22	Aesthetics	Improper decommission- ing and closure practices	MNI	Salvage all reusable and recyclable materials and scrap of good value will be salvaged and sold off while office buildings may be let intact and used for other purposes.	Closure	3 years after closure	Project Manager
23		cally intrusive	MNI	Carry out site levelling and re-profiling shall be done to re-establish the natu- ral drainage pattern across the site, af- ter which, the site shall be re-vege- tated with indigenous grasses and trees	Closure	3 years after closure	Project Manager
24			MNI	Dispose of all materials and equip- ment that cannot be reused recycled or sold shall be disposed of at an ap- proved non-hazardous disposal site.	Closure	Within 1 year after closure	Project Manager

25	Aesthetics	Ensure that the final land- form is hydrologically compatible with surround- ing areas	MNI	Re-profile all ponds and drainage channels with additional soil amend- ment material such as rock from elsewhere, previously stripped topsoil and organic matter and re-vegetated	Closure	3 years after closure	Project Manager
26			MNI	Carry out re-shaping and grading of the site to make slopes stable and less prominent	Closure	3 years after closure	Project Manager
27	Surface water	Discharge of green water from the pond may con- taminate surface water- courses	LNI	Green water will be not be allowed to dry in the pond but will be used in re- vegetation activities	Closure	3 years after closure	Project Manager
28	Air Quality	Localized deteriorations in the air quality from dust generated from open ar- eas.	MNI	Water will be used to suppress the dust and encourage natural coloniza- tion.	Closure	3 years after closure	Project Manager
29	Public Health and Safety	Un buried ponds will cause a physical and health hazard to the com- munity	MNI	The ponds will be buried so that they will not be a breeding ground for mosquitoes	Closure	3 years after closure	Project Manager
30	Surface Water	Contamination of surface water from storm water contaminated by ponds material	MNI	Surface runoff around the ponds fa- cility will be collected in perimeter drains and settled in a settlement pond.	Closure	3 years after closure	Project Manager
31	Air Quality	Local contamination from wind erosion on exposed surfaces of the project area	MNI	The surrounding vegetation will be maintained to act as a wind shield	Closure	3 years after closure	Project Manager

The EMP will have specific targets for each year that will be evaluated by the annual Environmental audit. The audit can make recommendations which will necessitate Changes in the EMP. The EMP will be reviewed on an ongoing basis as new environmental challenges arise or targets/objectives are achieved. The Operations Manager will ensure that this review occurs in a timely manner.

### **5. DECOMISSIONING PHASE**

Developmental projects are usually temporary in nature and after a certain period of operation, the cages, ponds and associated infrastructures will be decommissioned and the sites closed. It will be important that activities during this phase are carried out in an environmentally sound manner, leaving as little impact as possible on the environment. To this end, a decommissioning and closure will be developed.

The main objectives of the plan will be to:

- Promote alternative economic activities in the area that are sustainable in the future;
- Ensure the safety of surrounding communities through public consultation and the erection of warning signs.
- Return the land to conditions capable of supporting the former land use, or where this is not practical, or feasible, an alternative sustainable land use; and
- Prevent potential significant adverse effects on adjacent environs.

Where possible, Boophalow Investments cc will ensure that progressive rehabilitation is undertaken so that the rate of rehabilitation is similar to the rate of borrow pit operations.

Issue	Closure Objectives
Physical stability	All remaining anthropogenic structures are physically stable
Chemical stability	The biological environment is restored to a natural, balanced ecosystem
	typical of the area, or is left in such a state so as to encourage and
	enable the natural rehabilitation and/or reintroduction
	of a biologically diverse, stable environment
	Closure aims at preventing physical or chemical pollutants from entering
	and subsequently degrading the downstream environment - including
	surface and ground waters

### Fundamental criteria for closure

Geographical and climatic in-	Closure is appropriate to the demands and specifications of the location
fluences	of the site in terms of climatic (e.g. rainfall, storm events, seasonal ex-
	tremes) and geographic factors (e.g. proximity to human habitations,
	topography, accessibility of the mine)
Local sensitivities and oppor-	Closure optimizes the opportunities for restoring the land and the up-
tunities	grade of the land use is considered whenever appropriate and/or eco-
	nomically feasible
Land use	Rehabilitation is such that the ultimate land use is optimized and is com-
	patible with the surrounding area and the requirements of the commu-
	nity
Funds for closure	Adequate and appropriate readily available funds need to be available to
	ensure the implementation of the closure plan
Socio-economic considera-	Consideration will be taken of opportunities to communities whose live-
tions	lihoods may depend on the employment and economic fallout from pro-
	ject activities. adequate measures made to ensure that the socio-eco-
	nomic implications of closure are maximized

### 6. CONCLUSIONS AND RECOMMENDATIONS

The project, when implemented, will bring huge positives for the district of Machita communal areas, Zambezi region and the entire Namibia. Both the primary, secondary and tertiary beneficiaries will be wide spread across Namibia but with the largest number and therefore more positive impacts in Katima Mulilo town and surrounding environs. The EIA process has allowed both the developer and other stakeholders to interact, openly identify positive and potential negative impacts both from a social-human environment and biophysical environment.

Based on these interactions and also on other national and international practices, it is concluded that on the basis of the environmental and socio- economic assessment undertaken and based on a very wider consultation and the professional expertise employed, the positive impacts of Boophalow Investment fish farm project far outweigh the negative impacts. Boophalow fish farm project (lead by proponent) has followed the due process of the law on environment. The socioeconomic impacts of the project are largely positive, while negative impacts are minimal. These impacts will be adequately avoided through best management practices and compliance. No family will be displaced by the project. In addition, a project impact management and monitoring framework has been proposed and therefore merits support. The stakeholders more especially the communities of Machita & Masokotwani are highly positively expectant of Boophalow project in Zambezi region and want the project to start as soon as possible. NYEPEZ Consultant therefore recommends that the project be allowed to be implemented due to its outlined benefits.

Development related impacts must be prevented or mitigated by implementing strict monitoring and control. All permits and approval must be obtained from the relevant ministries or authorities for the operation of the fish Farm, such as business fitness certificates & certificates of operation from Ministry of trade. It is imperative that the mitigation measures as set out in the ESMP be implemented during the planning (layout design) construction and operational phases to prevent unnecessary damage to the natural environment.

The ESMP should be added to all contractors' agreements and be signed by such contractors. The recommendations made in this report places the developer under a legal obligation to ensure that all mitigation measures are implemented and followed through during construction and operation of the fish farm.

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NYEPEZ CONSULTANCY CC Environmental and Management Consultant

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