

# **FINAL BASIC ASSESSMENT REPORT FOR SIBERIAN STURGEON FARMING**

**Prepared by**



**Prepared for**

**UMKHULU WENA CO-OPERATIVE**

**Reference Number: DC24/0023/2015**

## Notice

This basic assessment report has been prepared by Nzingwe Consultancy on behalf of the Umkhulu Wena Cooperative in connection with the construction of the Siberian Sturgeon Fish Farming, within Jammerdaal Farm. The information in this report has been compiled by Nzingwe with care and diligence normally required for projects of this nature and magnitude. The information in this report has been carefully supplied by the Umkhulu Wena Co-operative and Nzingwe Consultancy, gathered from a variety of sources including investigations and assessments done during site visits, the proposed study area was analysed to outline all the necessary and important factors of the environment that need to be protected when the project is implemented. Information from Interested and Affected Parties (I&APS) has also been included as they also play a huge role in discovering the strengths and weaknesses of the environment. Neither Nzingwe Consultancy nor any of their respective directors, officers, agents, employees or advisors make any representation or warranty express or implied, or shall have any responsibility or liability whatsoever in respect of the achievement of projected results.

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# 1 Executive Summary

The Umkhulu Wena Co-operative has proposed the construction of Siberian Sturgeon Fish Farm within Umvoti Local Municipality. The land for the proposed fish farming has been identified within Kranskop. The approximate location of the proposed fish farm is located within 29° 04' 23.88" (s) 30° 56' 21.35" (e).

The final Basic Assessment Report is being produced as part of the process of achieving the Environmental Impact Assessment process. Basic Assessment reports are a key tool in effective environmental management. An important component of ensuring a healthy environment is to understand the impacts human activities have on the environment and the health and well-being of those who live in it and depend on the environment. This final Basic Assessment report can be seen as a system of analysing and reporting on the impact of the construction of the fish farm in Kranskop to enable decision makers to whether the proposed development can be authorized to be implemented and if so, identify the conditions under which it should be carried out.

The information contained in this report is a combination of primary data collection (onsite exercise) and secondary desktop research. The information contained in this report has been cited from different sources, analysed and synthesized into the basic assessment report. Where possible, sources have been cited, failure to do so in some instances is not intentional.

In terms of the current status of engineering services supply, there is a baseline for the services essential for an efficient fish farm that will allow efficient functioning. This construction must be in line with the requirements of all legislation, outlining the activities that this development will trigger and ensuring that if the proposed fish farm is given authorization that the mitigation process is adhere to.

The status of land ownership has been established that the land is privately owned, however the land owner is in support of the proposed development and has therefore provided a letter detailing his approval to the proposed development.

## 2 ACRONYMS & ABBREVIATIONS

**BSc** : Bachelor of Science

**CITES** : Convention of International Trade in Endangered Species

**EAP** : Environmental Assessment Practitioner

**EIA** : Environmental Impact Assessment

**FBAR** : Final Basic Assessment Report

**Hon** : Honours

**IEM** : Integrated Environmental Management

**I&APs** : Interested and Affected Parties

**NEMA** : National Environmental Management Act

# 1. Introduction

## 1.1 Details of Applicant

|                            |   |
|----------------------------|---|
| Name of Consultant/Company | Umkhulu Wena Co-operative                 |
| Contact Person (s)         | Lidia Dube                                |
| Physical Address           | R74 Silverstream Farm<br>Kranskop<br>3268 |
| Telephone                  | 083 595 6553 / 032 481 5711               |
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## 1.2 Details of Environmental Assessment Practitioner (s)

|                            |  |
|----------------------------|--|
| Name of Consultant/Company | Nzingwe Consultancy  |
| Contact Person (s)         | Silindile Nqoko  |
| Physical Address           | 06 Staffordshire Place<br>117 Marine Drive<br>Shelly Beach<br>4265 |
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The EAP was appointed in accordance to the requirements of the National Environmental Management Act (Act No. 107 of 1998). Ms Silindile Nqoko heads the project team and acts as the project manager for all phases of the project. Silindile holds a BSc. Environmental Sciences (Hon.). She is an Environmental Scientist with 8 years of experience. Silindile specialises in Integrated Environmental Management (IEM), Environmental Impact Assessments (EIAs), Rural Development, Land use issues and Socio-Economic surveys. Silindile has been a project scientist for various EIA's in KwaZulu Natal, Eastern Cape and Mpumalanga provinces in South Africa. Silindile is currently a Project Manager and Senior Environmental Scientist at Nzingwe Consultancy.

## 1.3 Names and Expertise of representatives of the EAP

| Name of representatives of the EAP | Education Qualification | Professional Affiliations | Experience at Environmental Assessment |
|------------------------------------|-------------------------|---------------------------|--|
| Ms. Silindile Nqoko                | <i>MSc. (Env.),</i>     | <i>(Cand. Nat. Sci.)</i>  | 8                                      |

|                   |                                  |        |   |
|-------------------|----------------------------------|--------|---|
|                   |                                  | IAIASA |   |
| Ms. Anelisa Mhatu | <i>BSc Ecology and Geography</i> | N/A    | 3 |

## 1.4 Project Title

Siberian Sturgeon Farming

## 1.5 Background to the project

The Umkhulu Wena Co-operatives is proposing to construct a Siberian Sturgeon Farming in the area of Kranskop within the Umvoti Local Municipality. The proposed fish farming will include an abattoir, theatre, cool rooms (42m x 75m), nursery, hatchery, fish pools, a filter system (24m x 24m), pump system (24m x 24m) as well as a food store room (40m x 40m). The fish pools will vary in size (D1 32m x 40m {30 pools of 3m x 10m} D2 30m x 60 m {20 pools of 5m x 15m} D3 & D4 40m x 200m {10 pools of 20mx 40}).

The proposed project for the Siberian Sturgeon Farming will be located in the KwaSizabantu Mission for the Domino Servite School. As the fish farming will specialise in sturgeon it will require an import license from Convention on International Trade in Endangered Species (CITES). The import license will be conditional on an environmental authorization, once an import license is obtained from CITES, the proposed proponent will order a consignment of the first batch of fish eggs from Armenia/Russia which will be imported to South Africa.

In light of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and its Environmental Impact Assessment Regulations (4 December 2014) and Listing Notices 1-3 (GNR 983 – GNR 985 of 4 December 2014), the proposed activity triggers a Basic Assessment process as it triggers activities that are listed within Listing Notice 1 (GNR 983).

Nzingwe Consultancy has been appointed as the Environmental Assessment Practitioner (EAP) according to Regulation 12 of the EIA Regulations (4 December 2014) and will therefore be responsible for carrying out the Basic Assessment with its associated processes.

This report serves as the final Basic Assessment Report (fBAR) required in the Environmental Impact Assessment process. It has been compiled following circulation of the draft BAR to



Interested and Affected Parties (I&APs) for the 30 day commenting period as set out in the Environmental Impact Assessment Regulations (2014). Comments from I&APs and stakeholders have therefore been incorporated into the document for consideration by the competent authority when making the decision to grant or refuse environmental authorization of the propose development.

Nzingwe Consultancy has facilitated the Basic Assessment process and undertaken tasks in terms of an approved Project Implementation Plan (PIP) as follows:

- Conducted site visits for the preliminary physical observation of the site;
- Map generation
- Collected site information, including; inter alia
  - Identification of authorities to be involved in the process i.e. municipality and key personnel, government departments and any other authorising bodies;
  - Applicable development environmental statutory requirements and guidelines for the study area;
  - Location and size of the site (including an assessment of the existing size vs space norms);
  - access and accessibility;
  - Biophysical and social profile of the proposed site and surrounds;
  - Current land use of the site and surrounding areas and the potential impacts thereof;
  - Site zoning and surrounding zonings;
  - Preliminary environmental Assessment;
  - Desktop information on the existing infrastructure and associated services;
  - Ownership details and land negotiations (if required);
- Analysed the information and compiled the site assessment report ( with recommendations on the specialist input required and any other requirements, based on the findings);

## 2. Description of the proposed Activity

The proposed fish farm will be constructed within Kranskop area, a town not far from Greytown. The fish farm will be part of the activities taking place within the KwaSizabantu Mission. The proposed fish farm will cover a total area of 3.5ha including all structures that will form part of the proposed fish farm. Water for the proposed fish farm will be obtained through a borehole that will be developed as part of the proposed fish farm.

The following are the project components;

The proposed fish farming construction will include the removal of vegetation, excavation of topsoil, and installation of pump station to pump up water which will be used within the fish farming facility. The fish farming facility will have microbiological filter systems which will be used to clean the water and ensure that there is no waste entering the fish tanks and prevent diseases among the fish.

### 2.1 Operational Phase Processes

Water for the fish farm will be obtained through a borehole. The fish farm will be operated through the Reticulated Aquaculture System (RAS). Water will be continuously recycled and monitored to maintain optimal conditions. Water quality will be maintained through the filter system which will remove waste and reticulate clean water into the system. The control of temperature for the fish tanks/pools will be important to ensure that temperatures are kept at temperature preferred by the sturgeon and that oxygen levels are kept at levels needed for the fish to survive and stay healthy. Temperatures will be controlled with combination of submerged heaters, heat pumps, chillers and heat exchangers. The exact manner in which these will be used will be determined upon finalization of design details.

### 2.2 Water circulation

The hatchery will be supplied with freshwater from the borehole with volume up to 100m<sup>3</sup> per hour. The water will then flow to D1 and then gravitate to D2, D3, D4 and P1 (pump system). The pump system will pump water up to the filter system. The hatchery will only be filled with fresh water from the borehole. The total volume of water to be used will be 60 000ℓ and 100 000ℓ at full production.

## 2.3 Breeding Cycle

### *Broodstock*

The first batch of eggs will be purchased from a reputable supplier and thereafter the farm will then produce their own eggs. This cycle will be explained below:

The Siberian sturgeon is a gonochoristic species. Rearing conditions in farms are generally more favourable than the natural conditions where they originate, and puberty occurs considerably earlier, at about 6 years old for the males and 7 years old for the females in generally temperate conditions.

The management of the broodstock is complicated by the fact that the females do not ovulate every year (with only a very few exceptions) and they are not all synchronous. Therefore, for a given cohort, the number of mature females obtained annually can vary between 35–63 percent of the stock. By controlling the temperature of the water, it is possible to obtain eggs over an extended period, namely December–May.

Vernalisation and hormone stimulation are carried out to obtain good quality sexual products. Various types of hormone can be used, including extracts of sturgeon or carp pituitary, or Gonadotrophin Releasing Hormone analogues (GnRH<sub>a</sub>). The main problem is being able to determine the right moment to administer the hormone injection, in other words, to choose the animals in the most suitable physiological state.

Eggs are harvested either by repeated abdominal massaging at 2-hourly intervals or (better still) by carrying out a small laparotomy. Several stitches are inserted to close the opening. During the operation, the animal receives a stream of water through the mouth. Harvests vary from between 8–14 percent of the female live weight. The eggs are often ovoid in shape, brown and/or dark green in colour, with their longest measurement being 3.0–3.8 mm. There are between 35 and 45 eggs/g and they have several micropyles. Males frequently produce several tens of ml of sperm, which is collected using a small flexible tube introduced carefully into the genital orifice. Fertilisation occurs using techniques perfected several decades ago.

### *Hatchery*

The fertilised eggs must undergo an anti-adhesive treatment to prevent them clumping together during incubation. Treatment in an aqueous clay suspension is very often carried out, and sometimes milk is used. After rinsing, the eggs are placed in incubators, usually Zoug jars or McDonald jars. Embryonic development takes place in about 6 days at between 13–14 °C. Normal larvae can then be easily selected, because of their positive phototropism.

### *Nursery*

The order and duration of the different phases of larval behaviour are clearly defined at 17–18 °C. Under these conditions, the larvae should be given their first food between the 9th and 11th days after hatching, in other words after the phase of endogenous alimentation has completely finished. Excellent results are obtained (growth and survival rates) by giving them composite food straight away.

### *Grow-out production*

There is little information on the grow-out production of sturgeon in the scientific literature and most information is proprietary. The following information is based on some general practices for the market production of meat, caviar and broodstock. Tanks use either aerated, flow through well water or recirculating system technology. Raceways are also used to a lesser extent. Juveniles don't survive well in pond culture, partly because of high water temperatures and ammonia levels at the soil/water interface of pond bottoms, especially where soils have high organic content. Deeper ponds in temperate climates may contain cooler water during summer. Ideal water temperatures for grow-out for many sturgeon species are 20 to 26°C. Fish are raised for 3 to 4 years for meat, 8 to 10 years for meat and caviar. Sex of fish cannot be determined by tissue biopsy until at least 3.5 years of age.

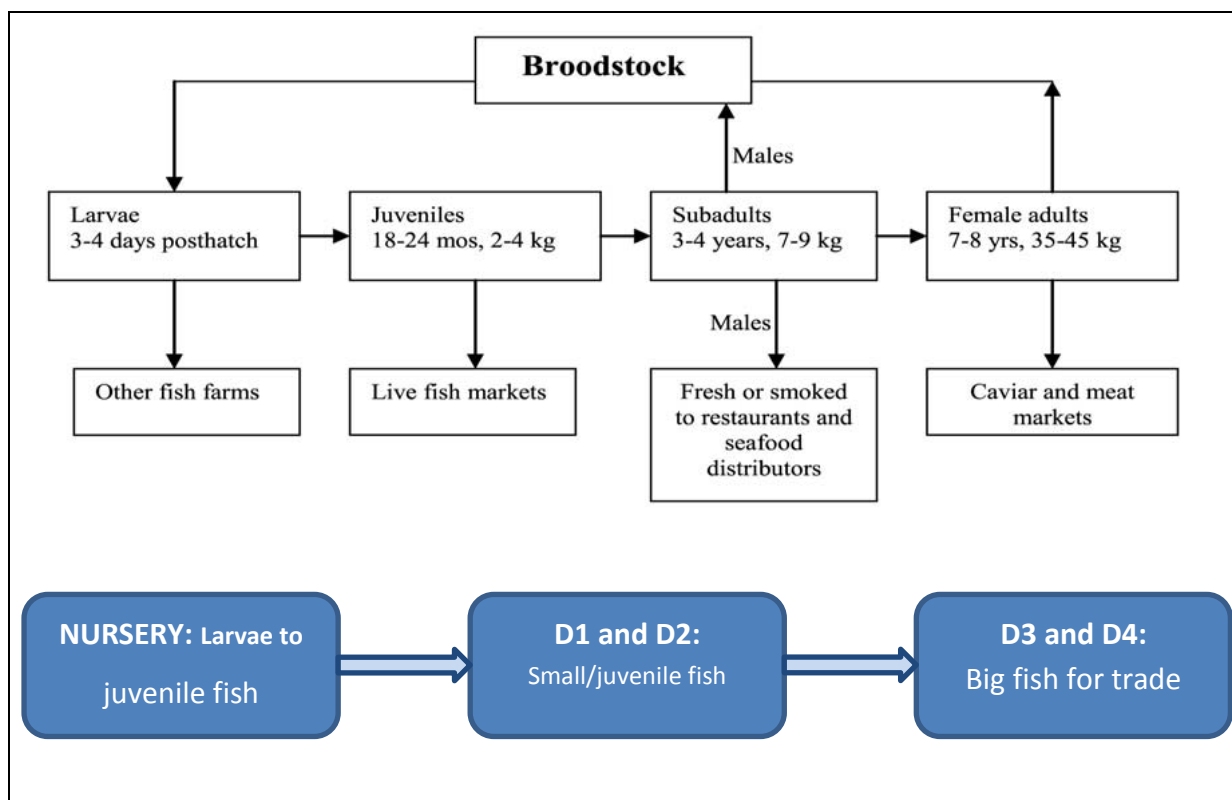
Sturgeon have one of the fastest growth rates of all freshwater fish—up to 11 grams per day for juvenile sturgeon under ideal water temperatures. Averages of 1.0 to 2.2 kg/year are common with some species. In some studies fish grew to 2.8kg within 18 months post hatch. To produce a marketable size fish (1 to 3 kg for the meat market) under optimal environmental conditions, stocking density can exceed 60 to 70 kg/m<sup>3</sup> with oxygen

concentration maintained at 5 mg/L. Survival rate is expected to be 50 to 80 percent from fry stage to marketable size.

*Water quality*

Sturgeon have been cultured in well and surface waters of varied water quality. Some specific water quality requirements have been identified for a few sturgeon species, largely based on the experience of hatchery and grow out facility managers. Generalizations can be made about the quality parameters in Table 1. Other parameters, including hydrogen sulfide, iron, heavy metals and chemical residues, are not clearly understood. Managers should have water tested and follow the guidelines that are known for other sturgeon species. As with most species, young sturgeon are more susceptible to minor deviations from ideal water quality than adults.

| <b>Table 1. Recommended water quality concentrations for sturgeon culture.</b> |  |
|--|--|
| <b>Parameter</b>   | <b>Recommended concentrations</b>                                    |
| Alkalinity   | 50-400 mg/L as CaCO <sub>3</sub>                                     |
| Ammonia (unionized)  | < 0.01 mg/L as N   |
| Dissolved oxygen   | > 5.0 mg/L   |
| Gas saturation   | < 105 %  |
| Hardness   | 50-400 mg/L as CaCO <sub>3</sub>                                     |
| pH   | 6.5-8.5  |
| Nitrite  | < 0.1 mg/L as N  |
| Salinity   | 0-0.5 ppt for fry; 0-3 ppt for juveniles; and 3 ppt for adults       |
| Temperature  | varies with species; 10-20°C for spawning, and 20-26 °C for grow-out |



The above diagram shows the general fish cycle within the fish farming facility. The eggs from the fish will be used to rear young to feed back into the system as well as for the production of caviar.

### 3 Feasibility and reasonable alternatives

#### 3.1 Needs and Desirability

The proposed development of a fish farm will be located within the Kwasizabantu Mission where a number of other activities are taking place including the aQuellé water factory, 6ha of advanced greenhouses where sweet peppers are grown hydroponically and avocado farming. The products produced from Kwasizabantu Mission are packaged for Woolworths, Checkers, Spar and other local markets with some produce even exported. It also produces dairy products which are marketed through their Bonlé brand.

The proposed development will initially include testing for growing Siberian sturgeon where eggs are imported and reared into hatchlings up to the 3 months stage which is critical for stabling whether the fish can be successfully farmed in South Africa. Differences between the northern and southern hemisphere may affect success of the proposed development. Should this be successful, South Africa will be put on the map on an International scale as there are currently few countries producing Siberian sturgeon for meat and caviar.

Following the decline of fish populations in the “wild” due to excessive/fishing, fish farming aquaculture has become a rising practice. This is to try and meet the growing demand for fish meat which is an important source of protein and seen as a “healthier” alternative to other meat. Fish farming is therefore being explored in South Africa as it is seen as alternative that could help reduce pressure on “wild” stock fish. Fish farming is presented as an opportunity to supply population with a sustainable nutritious source of protein.

Fish has a major importance in the economy and provides significant employment. The fisheries and aquaculture sector in Africa employs about 12.3 million people manufacturing fish supply in a sustainable manner and of much interest to society. It holds a great opportunity to drive development and attend to food securities.

Fish farming is only emerging in South Africa and therefore projects such as the proposed development hold important lessons as to whether or not it can truly be successful in this country and establishing conditions under which it is most successful. The proposed development therefore has the potential to make a significant contribution to the development of fish farming within South Africa.

Should the proposed development be successful, the fish farm will supply local markets with fish and caviar. Temporary employment opportunities will also be created for the locals during the construction phase. During the operational phase, permanent employment will be created as there will be need for people to run and monitor the fish farm. Those who stay in locality of the fish farm will have access to fish at a more affordable price.

### **3.2 Feasibility**

The proposed project is a practical and achievable development. Financial provision has been made by the proponent for the proposed project. This will cover costs for the material and expertise needed for the proposed project to materialise. There will be environmental “costs” associated with the project however, with the planned mitigation measures, these impacts can be reduced to acceptable levels. The appointment process for appointing engineers, contractor and other experts will ensure that the needed skills and experience are obtained for the proposed project to be achieved in alignment to the applicable regulations and norms and standards.

Operating aquaculture in South Africa can be challenging as there is a lot that the country is learning on how to successfully run aquaculture farms. However, this industry is growing with a number of successful aquaculture facilities. It is therefore possible for the proposed development to succeed both in construction and operation and the proponent has prepared to ensure that the proposed development is successful through communication with other aquaculture operators both locally and internationally doing research on requirements for construction and operation of the fish farm.

### **3.3 Alternatives**

#### **3.3.1 Activity to be undertaken**

The proposal is to construct a Siberian Sturgeon Farming facility. This would include the construction of an abattoir, theatre, cool rooms, nursery, hatchery, fish pools, filter system, pump system and food store room. There is no alternative in terms of alternative activity as this project is aimed at creating a safe fish farming facility which needs to be at close proximity to the road for easier and quicker means of transporting the produced goods.

#### **3.3.2 Location**

The proposed development will be constructed within Kranskop within the Umvoti Local Municipality. The coordinates for the proposed site are; 29° 04' 23.88" south 30° 56' 21.35" east refer to the locality map attached as Appendix 1. This area was identified in consultation with the community leaders as per the survey study done. The area falls within land owned by the KwaSizabantu Mission a mission which cares for people who have been addicted to drugs and they assist them by employing them to work within the different facilities they have within the mission. The proposed development is proposed for servicing the community and therefore the choice of the location was also made as a result of an indication from the economy of the community.

#### **3.3.3 Technology**

The location of the proposed fish farm is at an area which is generally flat and is not rocky. This is an advantage in the sense that establishment of the fish farm foundation will not require extensive excavation. Technology to be used will be selected as per the required tasks to be undertaken. Use of technology will also be influenced by the characteristics of the area where rock presence triggers more extensive use of technology.



#### 3.3.4 No-go

Where the proposed fish farm is not authorized, an opportunity to contribute positively to food security will be lost. Employment opportunities for the local community members will be lost as they will no longer be employed for temporary and or permanent work on the project. An opportunity to learn more about fish farming in South Africa will not materialise. The economic opportunities local and national that the proposed development could have had will not occur.

## 4 Description of property on which activity is to be undertaken

The land earmarked for the construction of the fish farm is in close proximity to the rural residential area, with scattered homesteads. The area has large amount of open areas some which have vegetation. There is a gravel road that leads up to the site for the proposed fish farm which will be used to access the construction site. Vegetation around the site mainly consists of grass. The property is within Jammerdaal Farm with the 21 Digit Code being NOFT00000000194100006

### 4.1 Description of Affected Environment

#### 4.1.1 Vegetation

The vegetation type in the area is known as KwaZulu-Natal Sandstone Sourveld which features short, species-rich grassland with scattered low shrubs and geoxyrice suffrutices. Proteaceae trees and shrubs can be locally common. The dominating landscape features are flat (or rolling) plateau tops and steep slopes commonly forming table mountains.

The above description is as per the vegetation unit in which the area falls as per Mucina and Rutherford (2006). However, the ideal vegetation for the area as per the description does not exist on the site as the area has been affected by anthropogenic activities with clearance of the originally existing vegetation for farming and other activities.

No trees of conservation importance are located within the area to be disturbed. The areas mainly has grass and some alien invasive plant species such as Bugweed (*Solanum mauritianum*) and Ageratum (*Ageratum conyzoides*). There are also some reeds and sedges on the site.



#### **4.1.2 Geology and Soil**

The proposed site area falls under the Ordovician Natal Group sandstones which carry shallow, nutrient-poor, skeletal, sandy soils freely drained and including Glenrosa and Mispah forms (Mucina & Rutherford, 2006).

#### **4.1.3 Climate**

The proposed site is located under the KwaZulu Natal Coastal Belt Bioregion Unit (CB3), this region is a summer rainfall and humidity region with the procession of frontal systems along the east coast. The Bioregion Unit has a mean annual temperature of 30°C (Mucina & Rutherford, 2006).

#### **4.1.4 Watercourse-River**

Kranskop is located at the edge of the Valley of the Tugela River. The site for the proposed development is located to the south east and is therefore within the valley with a number of streams located around it. There is a stream located to the northern part of the site where the foot of some of the hills meet. From the desktop assessment done, this stream does not appear to be joined to the Tugela River. It is connected to a few other streams within its

locality. The boundary of the proposed development will not be within a 500m radius of the stream.

## 4.2 Identification of all legislation and Guidelines

In order to protect the environment and ensure that this development is undertaken in an environmentally responsible manner, there are various significant pieces of environmental legislation that focuses on this assessment. The proposed development must conform *inter alia* to:

- I. The Constitution of South Africa Act, 1996 (Act No. 108 of 1996)
- II. National Environmental Management Act (107 of 1998) and its EIA Regulations
- III. KwaZulu-Natal Planning and Development Act (Act No.9 of 1997)
- IV. KwaZulu-Natal Heritage Act (Act No. 4 of 2008)
- V. National Environmental Management: Biodiversity Act (Act 10 of 2004)
- VI. National Heritage Resources Act (Act No. 25 of 1999)
- VII. National Development Plan (2010)
- VIII. National Water Act (1998)

Note that other legislative requirements may pertain to the proposed development, but identification and interpretation of these is beyond the brief of this study. As such, the list provided below is not intended to be definitive or exhaustive, and serves to highlight key environmental legislation and obligations only.

### 4.2.1 The Constitution of South Africa Act, 1996 (Act No.108 of 1996)

The Constitution is the supreme law of South Africa, against which all other laws are measured; any laws in conflict with it are therefore invalid. It protects certain fundamental rights which are, however, not absolute, and may be limited 'in terms of law of general application to the extent that the limitation is reasonable and justifiable in an open and democratic society based on human dignity, equality and freedom' (Section 36).

### The Environmental Clause

One such fundamental right in Section 24 provides the basic framework for all environmental policy and legislation, and it states:

"Everyone has the right –

- a) to an environment that is not harmful to their health or well-being; and

- b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –
- i. Prevent pollution and ecological degradation;
  - ii. Promote conservation; and
  - iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

It is however important to note that though an activity may be allowed in terms of an Act of Parliament or a permit issued under a statute, **it may still be declared unlawful if it is harmful to human health or well-being.**

### **Access to Information**

Section 32 provides that everyone has the right of access to any information held by the State or another juristic person and that is required for the exercise or protection of any rights.

### **Just Administrative Action**

Section 33 of the Constitution entrenches the right to lawful, reasonable and procedurally fair administrative action, as well as written reasons for administrative actions that have adversely affected a person’s right.

### **Enforcement of Rights**

In terms of Section 38, if any rights in the Bill of Rights have been infringed or threatened, a court may be approached for assistance by a person acting individually; on behalf of another who is incapacitated; on behalf of a group or class of persons; in the public’s interest, or as an association in the interests of its members.

#### **4.2.2 National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended**

The National Environmental Management Act (NEMA) provides the legislative framework for Integrated Environmental Management (IEM) in South Africa. Section 24 provides that all activities that may significantly affect the environment and require authorisation by law must be assessed prior to approval. NEMA also provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for

coordinating environmental functions exercised by organs of the State and to provide for matters connected therewith. Section 2 of NEMA establishes a set of principles that apply to the activities of all organs of state that may significantly affect the environment.

These include the following:

- Development must be sustainable;
- Pollution must be avoided or minimised and remedied;
- Waste must be avoided or minimised, reused or recycled;
- Negative impacts must be minimised; and
- Responsibility for the environmental health and safety consequences of a policy, project, product or service exists throughout its life cycle.

These principles are taken into consideration when a government department exercises its powers, for example during the granting of permits and the enforcement of existing legislation or conditions of approval.

Section 28(1) of NEMA states that “every person who causes, has caused may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring”. If such pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways of minimising these risks;
- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants;
- Eliminating the source of pollution; and
- Remedying the impacts of the pollution.

The authorities may direct an industry to rectify or remedy a potential or actual pollution problem. If such a directive is not complied with, the authorities may undertake the work and recover the costs from the responsible industry.

### 4.2.3 National Development Plan (2010)

President Jacob Zuma appointed the National Planning Commission (NPC) in May 2010 to draft a vision and National Development Plan (NDP) for consideration by Cabinet and the country. The NPC is an advisory body consisting of 26 experts drawn largely from outside government.

As a long-term strategic plan, it serves four broad objectives:

- Providing overarching goals for what we want to achieve by 2030;
- Building consensus on the key obstacles to us achieving these goals and what needs to be done to overcome those obstacles;
- Providing a shared long-term strategic framework within which more detailed planning can take place in order to advance the long-term goals set out in the NDP; and
- Creating a basis for making choices about how best to use limited resources.

The Plan aims to ensure that all South Africans attain a decent standard of living through the elimination of poverty and reduction of inequality. It therefore defines a desired destination and identifies the role that different sectors of society need to play in reaching that goal.

The intention of the National Development Plan (NDP) is to make the most of South African citizens - their goodwill, skills and resources. It aims to step away from Business as usual and to spark a cycle of more sustainable, low emission development that will expand opportunities, build capabilities and raise living standards.

National government aims to create five million jobs by 2020 (which is approximately three million more than the anticipated growth rate which has been extrapolated from the years 2002 to 2009). Related to this is the New Growth Path, which is targeting opportunities for 300 000 households in agricultural smallholder schemes and 145 000 jobs in agro-processing by 2020, while there is potential to upgrade conditions for 660 000 farm workers. In terms of the green the economy, there is the national goal to create 300 000 additional direct 'green jobs' by 2020.



#### 4.2.4 National Water Act 1998

The water resources in South Africa are limited making them critically important for the sustainable economic and social development of the country. As the custodian of water resources, the Department of Water Affairs (DWA) is responsible for the protection of the health of aquatic ecosystems, thus ensuring the ability of these systems to support utilisation for these systems to support utilisation for the benefits of current and future generations. The Siberian Sturgeon Farming is anticipated to trigger a water use licence, the activities are it triggers are listed below.

### Description of Environmental Issues and Potential Impacts

The construction of the Siberian Sturgeon Farm will have a negative impact on the environment during construction, however it is anticipated that the environment will recover from the stresses caused during the construction phase. The implementers of the project have the mandate to demonstrate that the proposed fish farm will have the least negative impaction and interference with natural surroundings i.e. river and other flora and fauna in immediate vicinity of the development footprint.

The table below outlines the listed activities and description of the project activities that trigger;

**Indicate the number and date of the relevant notice:      Activity No (s) (in terms of the relevant or notice) :      Describe each listed activity as per the project description (and not as per wording of the relevant Government Notice)<sup>1</sup>:**

| NATIONAL ENVIRONMENTAL MANAGEMENT ACT REGULATIONS |                     | PROJECT DESCRIPTION  |
|---|---------------------|--|
| GNR 983: Listing Notice 1 (December 2014)         | Activity no: 3(iii) | The proposed fish farm is anticipated slaughter Siberian fish that will be more than 20 000 kg per annum |
| GNR 983: Listing Notice 1 (December 2014)         | Activity no: 6 (i)  | The production output is anticipated to exceed 20 000 kg per annum.                                      |

<sup>1</sup> Please note that this description should not be a repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description, i.e. describe the components of the desired development

The risk associated with biodiversity such as soil erosion, loss of natural habitats will be evaluated and mitigation measures will be taken. These will be classified as direct, indirect or cumulative impacts depending on the nature, extent and forecasted stage of occurrence of impacts.

## 5 Environmental Impact Assessment and Public Participation

As the appointed EAP for the proposed project, Nzingwe Consultancy conducted a site visit on the **01<sup>st</sup> of July 2015**. This was to access the receiving environment in order to accurately predict impacts which may be associated with the proposed project.

Notification of the proposed project and application for environmental authorization will be published in the Greytown Gazette on the **14<sup>th</sup> of October 2015** inviting Interested and Affected Parties (I&APs) to register. A community meeting will be conducted on the **08<sup>th</sup> of October 2015**. Proof of adverts and notice boards placed on site will be forwarded to all the respective I&APs.

| NAME OF DEPARTMENT                              | CONTACT PERSON    | ADDRESS   |
|---|-------------------|---|
| Ezemvelo KZN Wildlife                           | Mr A Blackmore    | EKZN Wildlife Head Integrated Environmental Planning P.O Box 13053 Cascade 3202 |
| Department of Water Affairs                     | Mr R Pillay       | P.O Box 1018<br>Durban<br>4000  |
| Department of Agriculture, Forestry & Fisheries | Mr Wiseman Rozani | Private Bag X9029<br>Pietermaritzburg<br>3200                                   |

The Department of Agriculture, Forestry & Fisheries commented on the draft BAR which was circulated to them on the 06<sup>th</sup> of October 2015. The department has no objections towards the proposed development given that there are no natural forests and/or protected tree species in terms of the NFA that will negatively be impacted upon.

Table 1: Assessment and Ranking Impacts

| Rating        | Definition of Rating                                  | Score |
|---------------|---|-------|
| <b>Extent</b> | <i>The area over which the impact is experienced.</i> |       |



|  |  |   |
|--|--|---|
| Local  | Impact confined to project area or part of the project area.   | 1 |
| Regional   | Impact on region   | 2 |
| National/international   | Impact national and or beyond.   | 3 |
| <b>Intensity</b> – <i>The magnitude of the impact in relation to sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources.</i> |  |   |
| Low  | Impact is site-specific with negligible alteration of the wider natural and or social functions and processes.     |   |
| Medium   | Impact is site-specific and wider natural and or social functions and processes continue albeit in a modified way. |   |
| High   | Impact is site-specific and wider natural and or social functions and processes are severely altered.              |   |
| <b>Duration</b> – <i>The period over which the impact will be experienced and its reversibility.</i>   |  |   |
| Short-term   | Impact experienced for up to 2 years   | 1 |
| Medium-term  | Impact experienced for a period between 2 and 15years  | 2 |
| Long-term  | Impact experienced for a period longer than 15years.   | 3 |

Scoring from the 3 categories will be totalled together to determine the overall rating of the impacts

|                             |          |     |        |      |           |
|-----------------------------|----------|-----|--------|------|-----------|
| <b>Combined score</b>       | 3 - 4    | 5   | 6      | 7    | 8-9       |
| <b>Combined consequence</b> | Very low | Low | Medium | High | Very high |
|                             |          |     |        |      |           |

Table 2: Probability of the impact is determined using following criteria

| <b>Probability</b> – <i>the likelihood of the impact occurring</i> |   |
|--|---|
| Improbable   | < 40% chance of the impact occurring      |
| Possible   | 40% - 70% chance of the impact occurring  |
| Probable   | >70% - 90% chance of the impact occurring |
| Definite   | >90% chance of the impact occurring       |

Significance of the impacts is determined using the combination of the consequence rating and probability.

Table 3: Significance of the impacts

| Significance Rating | Possible Impacts Combination |   |             |
|---------------------|------------------------------|---|-------------|
|                     | Consequence                  | & | Probability |
| Insignificant       | Very low                     | & | Possible    |
|                     | Very low                     | & | Improbable  |
| Very low            | Very low                     | & | Definite    |
|                     | Very low                     | & | Probable    |
|                     | Low                          | & | Possible    |
|                     | Low                          | & | Improbable  |
| Low                 | Low                          | & | Definite    |
|                     | Low                          | & | Probable    |
|                     | Medium                       | & | Possible    |
|                     | Medium                       | & | Improbable  |
| Medium              | Medium                       | & | Definite    |
|                     | Medium                       | & | Probable    |
|                     | High                         | & | Possible    |
|                     | High                         | & | Improbable  |
| High                | High                         | & | Definite    |
|                     | High                         | & | Probable    |
|                     | Very high                    | & | Possible    |
|                     | Very high                    | & | Improbable  |
| Very high           | Very High                    | & | Definite    |
|                     | Very High                    | & | Probable    |

## 5.1 Anticipated Impacts

### 5.1.1 Removal of Vegetation

Site establishment will include removal of vegetation on and around the site. The vegetation removal will mainly consist of grass as this is the dominant vegetation type on the site. This

will be a negative impact which will occur on a local scale. No indigenous vegetation is anticipated to be removed however this will further be confirmed prior to commencement of construction activities.

The vegetation must be retained as far as is possible. An Environmental Control Officer (ECO) must be appointed to monitor construction activities. Such ECO must be given the opportunity to walk around the site and determine whether any indigenous vegetation falls within the boundaries of the area to be disturbed. If indigenous vegetation is found, it should be marked and transplanted or replaced as per the applicable ration for the species.

#### **5.1.2 Soil Erosion**

Soil within the area will be exposed as a result of the removal of vegetation. The soil will further be loosened as a result of the earth works that will be part of the proposed project. Top soil from the disturbed areas will be removed and stockpiled. These factors will contribute to the occurrence of soil erosion on and around the working area.

Runoff management must be in such that no excessive erosion occurs during construction and operational phases. Vegetation must be used to ensure soil cohesion and reduce erosion susceptibility of the soil.

#### **5.1.3 River Sedimentation**

River sedimentation could be a possible impact of the proposed development considering the removal of vegetation and soil erosion with watercourse in proximity of the site. However, this impact is not anticipated to occur as there is vegetation between the river/stream and project site which will trap sediments in runoff water before it reaches the stream.

#### **5.1.4 Pollution**

Pollution is one of the main factors that characterise a site where construction is taking place. Inappropriate disposal of waste and littering during both construction and operational phases could cause land and or water pollution. Water contamination could result from disposal of waste removed from the fish farm water circulation system.

It is therefore important that the waste from the filter system that will clean water in the fish farm be properly disposed. It is recommended that such waste be used for manure for soil fertilization as there are a number of crops grown within the farm.

### 5.1.5 Noise and Dust

Noise and dust will mainly be experienced during the construction phase and not the operational phase due to activities associated with the construction phase such as removal of vegetation and movement of machinery and cars around the site.

### 5.1.6 Ecological Impact

In the long-term, the fish farm will contribute to fish stock obtained through aquaculture in South Africa and therefore a part of developments and activities taking place that have the potential to release pressure from the wild fish species in the ocean. Fish numbers in the wild can therefore replenish which might prevent some of the threatened species from going extinct. This will be a positive impact.

## 5.2 Environmental Impact Statement

**Table 4: Impact Summary**

| Ecological Impacts  | Nature   | Extent | Duration  | Significance before Mitigation | Proposed mitigation   | Significance after mitigation |
|---------------------|----------|--------|-----------|--------------------------------|---|-------------------------------|
| Vegetation Removal  | Negative | Local  | Permanent | Medium                         | Retaining of vegetation, Re-vegetation                            | Medium                        |
| Soil Erosion        | Negative | Local  | Temporary | Low                            | Removal topsoil before construction and replace post construction | Low                           |
| River Sedimentation | Negative | Local  | Temporary | Low                            | Retain vegetation around the site                                 | Low                           |
| Pollution           | Negative | Local  | Temporary | Low                            | Remove all waste created during construction                      | Low                           |
| Water Contamination | Negative | Local  | Temporary | Low                            | No washing of vehicles or use of detergents on or near            | Low                           |

|                |          |       |           |     |                                       |     |
|----------------|----------|-------|-----------|-----|---------------------------------------|-----|
|                |          |       |           |     | stream                                |     |
| Noise and Dust | Negative | Local | Temporary | Low | Keep vehicle and machinery speeds low | Low |

The practice of aquaculture has a number of environmental concerns. One of the concerns is that farmed species can escape into the wild and out-compete indigenous wild species where the farmed species is an exotic species. That will not be the case with this development as the fish farm will be a land and not ocean/lake based aquaculture.

Space needed for the development is of medium size. What is mainly of concern where the project requires land space are the impacts on vegetation and organisms found within the area. The proposed development may affect bird species through the removal of trees. However, removal of indigenous trees is not anticipated. The necessary steps will be taken to ensure that removal of vegetation has minimal impacts where area to be used will be kept within the already disturbed area as much as possible and bird nests to not be disturbed.

Environmental concerns with regards to aquaculture are mainly around marine aquaculture. Land aquaculture is currently starting to rise as it has been currently viewed as posing less environmental threats than marine aquaculture.

Socio-economic impacts will be positive as there will be employment opportunities. Such impacts will be even more significant on a local and national scale where the fish farm operates successfully for a long term period with production of good quality healthy fish meat and caviar for human consumption which will increase trade to markets and therefore employment opportunities.

From successful international and local aquaculture practices, it has been noted that for a fish farm to be successful with minimal environmental impacts, the system must be closely monitored and well managed. It will therefore be important for the proponent to bring on the necessary expertise for the running of the fish farm to ensure it has minimal negative impacts.

## 6 Conclusion

### 6.1 Recommendations of the EAP

Below are recommendations of the EAP for the proposed development.

### **6.1.1 PLANNING AND DESIGN PHASE**

Success of the proposed fish farm is highly dependent on proper planning and design to avoid fatal flaws to the system.

- The proponent must ensure that the system is set up in such that any faults are detected early. A plan must also be put in place as to how any problems detected can be quickly resolved to avoid fish fatalities.
- Contractor to be appointed for the construction phase must have experience with construction of pools and related structures for fish farm/aquaculture facilities.
- During planning phase, thorough research must be done with regards to funds needed for the construction, start-up and full operation of the fish farm.

### **6.1.2 CONSTRUCTION PHASE**

- The proponent must ensure that the import permit is obtained prior to importing of the fish. Construction of the fish farm may be commenced prior to obtaining the permit provided that a positive environmental authorization decision is given and all other permits and licenses which may be required are obtained.
- All those who may be affected by the proposed development must be notified of the commencement of the construction and operation phase. Time frames may be as per notification of the Department of Economic Development, Tourism and Environmental Affairs.
- The existing roads to the site must be used for access of the site with no creation of new access routes or unnecessary disturbance of surrounding environment and vegetation.

### **6.1.3 OPERATIONAL PHASE**

- Waste from the fish farm must always be properly disposed of. Should there be a need for any permit or license (e.g. water use license), the proponent must take responsibility to ensure that such license or permit is obtained for disposal of waste.
- Waste must be handled and disposed of in a manner that is not harmful to the environment.
- Should there be a change in source of the water; proper processes should be followed including obtaining a Water Use License if it is to be obtained from a watercourse.

In line with the requirements of the NEMA EIA Regulations, this final Basic Assessment Report has provided a brief description of the project and its associated activities. The EAP has strived to ensure that all the necessary information to inform the decision making with regards to the environmental authorization is provided within the document.

Although there is a lot to learn as a nation with regards to successful fish farming, a lot of movement has been made in this industry and as such the EAP believes that it would be possible for the proposed fish farm to run successfully and sustainably. Guidance from a number of government departments such as the Department of Forestry and Fisheries as well as from the private sector from other fish farm runners can be used to ensure that fatal flaws are avoided in the development and operation of the proposed fish farm.

Appendix 1: Locality Map

# LOCALITY MAP



Appendix 2: EAP CV

# **EAP CV**

Appendix 3: Facility Illustrations

# **FACILITY ILLUSTRATION**

Appendix 4: Photographic Plates

# PHOTOGRAPHIC PLATES

Appendix 5: Public Participation Process

# **PUBLIC PARTICIPATION PROCESS**

**Community Meeting Minutes**

**Community Meeting Register**

**Proof of Adverts**

**Proof of Noticeboards**

**Acknowledgement of receipt from I&APs**

**Proof of follow up for comments**

Appendix 6: Environmental Management Programme

# **ENVIRONMENTAL MANAGEMENT PROGRAMME**